

STUDIES IN EVOLUTIONARY POLITICAL ECONOMY

**Theory of unbundled and
non-territorial governance**

Trent J. MacDonald

RMIT University

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Theory of unbundled and non-territorial governance

A thesis submitted in fulfilment of the requirements for the degree of

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Trent J. MacDonald

BEcon/BBusMan, BEcon(Hons)

School of Economics, Finance and Marketing

College of Business

RMIT University

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Declaration

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; and, any editorial work, paid or unpaid, carried out by a third party is acknowledged.

Trent J. MacDonald

June 2015

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STUDIES IN EVOLUTIONARY POLITICAL ECONOMY

Theory of unbundled and non-territorial governance

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Extended abstract

This thesis is largely theoretical in nature, broadly falling into the field of political economy. The aim is to contribute to the literature by providing a theoretical analysis of two hitherto underappreciated principles of political organisation: *unbundling* the functions of government and devolving responsibilities to *non-territorial* jurisdictions. The motivation is the inherent limitations in bundled, territorially monopolistic governance. Political economists are well aware of how majoritarian democratic decision-making necessitates various conflicts and compromises. Territorial decentralisation also bears efficiency limitations because its sorting mechanism requires citizens sacrifice economic and social preferences to satisfy political preferences. And political bundling generates trade-offs and impedes preference satisfaction if the bundles offered by governments and rival political parties do not conform to citizen preferences over the fully suite of policy areas.

Accordingly, this thesis explores the theory of unbundled and non-territorial governance as means to overcoming these problems. I use economic theory from multiple schools (i.e., new institutional, public choice, Austrian) to argue that greater efficiency and citizen welfare follows from non-territorial unbundling, and to also clarify the conditions under which it might or might not ever eventuate. I trace the history of these ideas in political-economic thought, and uncover past and contemporary cases of non-territorial unbundling. The finding here is that the ‘pure’ version of the theory has yet to fully arise in practice, but emerging examples of cryptographic ‘virtual states’ come close to realising non-territorial unbundled forms of political organisation.

Next I outline a ‘political-jurisdictional Coase theorem’ (PJCT) to describe how political systems and jurisdictions change. This model suggests that it is the relative imposition of transaction cost over different modes of jurisdictional change as well as wealth effects that enable or prevent non-territorial unbundling. In addition to this I outline a ‘political-jurisdictional possibilities frontier’ (PJPF) that describes the space of *possible* allocations of property rights and political authority, given the prevalence of market, political, and jurisdictional transaction costs; and a ‘political-jurisdictional

transformation frontier' (PJTF) that shows the compact trajectory of *actual* allocations that obtain, given the prevalence of ideas, interests, and wealth effects. Together these furnish a fuller model of the political-jurisdictional Coase theorem and illustrate its insight as to the conditions of possible emergence or implementation of non-territorial unbundling.

I then present a model of partial internal exit that captures the competitive dynamic between incumbent and potential governments in a non-territorial unbundled system. This model particularly applies to the case of 'cryptosecession' that appears the most likely avenue for non-territorial unbundling to ever eventuate. It demonstrates how fiscal exploitation is reduced and eventually eliminated as the capability of citizens to move to non-territorial and unbundled jurisdictions increases. When interpreted as a model of cryptosecession, it shows how the balance of citizen opacity and government legibility determines the balance of fiscal exploitation versus equivalence.

Finally, I take an Austro-evolutionary perspective on the theory of non-territorial unbundling. I define 'the knowledge problem of the nation-state' as the task of designing a political-jurisdictional order given that the requisite knowledge is distributed among individuals in a polity. Attempts at redrawing borders or executing population transfers have proven appalling failures in rational constructivist planning. Conversely, spontaneously ordered political jurisdictions is the general solution to the knowledge problem of the nation-state, which I label a 'constellaxy.' I argue that the pure theory of non-territorial unbundling resembles to a constellaxy, and submit that in the absence of a constitutional mechanism, a solution can be found in technologies of cryptosecession. While this is necessarily speculative in nature, such discussions are of value if we are to advance the quality of governance and meet with the challenges of an increasingly complex future.

Keywords Non-territorial, unbundling, jurisdictions, nation-state, secession, Coase theorem, knowledge problem, spontaneous order

Introduction

Background

Sovereignty is an inherently territorial principle; it legitimates and reifies a particular territorially grounded way of organising political, social, and economic life. The modern foundation of political authority is territorially exclusive, continuous and contiguous. As The German sociologist Max Weber put it, the nation-state is a “compulsory political organization with continuous operations ... insofar as its administrative staff successfully upholds the claim to the monopoly of the legitimate use of physical force in the enforcement of its order” (Weber [1922] 1978: 54). The modern nation-state has also come to be an all-purpose form of political organisation; over time the scope of responsibilities subsumed by governments has readily expanded into the comprehensive political bundles we observe today.

In this thesis, I wish to explore an alternative concept of governance I call ‘non-territorial unbundling.’ This concept runs contrary to the nation-state, as we know it, which is a bundled territorial form of political organisation. I use economic theory from multiple schools (i.e., new institutional, public choice, Austrian) to investigate the characteristics of a possible non-territorial unbundled system of governance and argue for its desirability, if not its inevitability.

The modern process of ‘territorial bundling’ dates to the Peace of Westphalia, which marked the end of what could be considered a non-territorial unbundled medieval period and ushered in the beginning of the hegemony of the territorial nation-state. Modern territorial states came to replace the wide variety of territorial and non-territorial forms of political organisation and overlapping assemblages of authority. This was made possible by the emergence of the *idea* of exclusive authority in Western thought, as expressed by the likes of Jean Bodin and Thomas Hobbes, and culminating in the concept and practice of

Westphalian sovereignty. But in addition to ideology, technological changes also contributed to the creation of nation-states as we have known them since the seventeenth century; namely the development of certain military, cartography, and state legibility technologies. The purpose of this thesis is to consider the prospect of a contrariwise future process of 'non-territorial unbundling.' The argumentation is largely theoretical, but there is also a measure of speculation on the impact of technological change on the future of nation-states; namely cryptography and citizen opacity technologies.

There is a growing body of economic and political theory that suggests that political organisation need not be exclusively territorial, and can be overlapping and even non-territorial over certain functions of governance. Indeed, some scholars are critical of the notion that political authority should reside in unitary, territorially monopolistic states (Ostrom 1971; Bull 1977; Elkins 1995; Ludlow 2001). Accordingly, sovereignty is increasingly viewed not as inherently territorial, and as divisible or issue-specific rather than absolute (Agnew 2009). Sizable attention has also been given to the 'end of the nation-state' hypothesis, which largely focuses on the role of technological development, global capitalism, and cosmopolitan culture in bringing about demise. Critics point to the effects of the Internet and globalisation in expanding authority beyond states and in reducing the primacy of territorial political organisation. Examples of these processes include denationalisation of currencies, dual and multiple citizenship, increased international migration, free trade of capital and goods, formation of virtual digital communities and non-territorial identities, and the prevalence of transnational corporations engaged in business in multiple countries.

There is a growing feeling among economists, political scientists and even national governments that the nation-state is not necessarily the best scale on which to address certain issues. Some functions of governance require supranational organisation, others are perhaps best administered at a smaller scale, such as at the city or regional level. A large number of public and private organisations intervene, mediate, and engage in the provision of public goods across state boundaries, with attending implications for the transition towards issue-specific, non-territorial government. States themselves have become more willing to share authority given the way environmental, economic, and social problems

extend over traditional borders. Situations of ‘shared sovereignty’ between nominally sovereign entities are becoming more common—such as between governments in dual-system special zones like China and Hong Kong, partnership arrangements in special economic zones and private cities, constituent members of supranational governments like the European Union, international institutions like the International Monetary Fund, and more. It no longer seems outlandish to ask whether the modern state system “may be giving place to a secular reincarnation of the system of overlapping or segmented authority” of the pre-Westphalian era (Bull 1977: 254).

Thesis outline

Chapter 1 Economic theory of non-territorial unbundling

Chapter 1 ‘Economic theory of non-territorial unbundling’ introduces the case for non-territorial unbundling by taking a discursive approach through public choice and evolutionary economic theory. The argument begins with an appreciation of the many paradoxes and problems of majoritarian voting and how a more efficient system of governance is one in which citizens relate their political preferences in detailed and filigreed ways. That is to say simultaneous provision of collective goods and services cultivates greater citizen welfare than monopolistic provision, because of the conflicts and compromises that majoritarian democratic decision-making necessitates. Accordingly, this chapter explores the theory of non-territorial and unbundled governance as means to improve political choice. I find that decoupling political jurisdiction from geographical location (so that citizens can switch political jurisdictions without switching location) and unbundling government (so that collective goods and services can be provided separately by independent public enterprises) will result in greater diversity of governmental forms, a wider range of choice for groups and individuals, and ultimately, better governance.

The traditional solution to the problems of majoritarian democracy is territorial decentralisation and political sorting: allowing citizens to sort themselves into the government that best represents their political preferences. But territorial decentralisation,

too, suffers from inherent efficiency limitations. It relies on perfect mobility between jurisdictions, yet sorting over territorial jurisdictions is inherently costly and never perfect. The mobility and sorting mechanism requires that citizens sacrifice economic and social preferences (e.g. employment, civil society networks) for the satisfaction of political preferences. Therefore, to the extent that public, private, and social preferences over geographical space are non-identical, there exist structural efficiency limits. And the more that political preferences diverge from other spatial preferences, the more preferable is non-territorial governance to political territoriality.

Next, this chapter argues that bundled governance generates trade-offs and impedes preference satisfaction over the full suite of government policy areas. This is because preferences over distinct functions of governance are often mutually exclusive, at odds with each other, or simply not offered coextensively by governments or rival political parties. Unbundling governance is the proposed solution. I argue that even if there are relatively few unbundable functions, and even if there are relatively few public enterprises from which to choose, there could be considerable welfare gains from improved political preference satisfaction. Only when unbundled choices converge on what would be the fully bundled, majoritarian-democratic result are welfare gains trivial.

Moreover, I contend that not all bundling should be ruled out; rather, the point is to create an 'unbundleable' system of governance and allow political entrepreneurs to discover ways to *rebundle* functions. Experimentation with bundling, unbundling, and rebundling of the various services states offer elicits the discovery of optimal bundling options for the diversity of citizen preferences. Various normative political theories (i.e., anarchism, libertarianism, social democracy, etc.) amount to conjectures of political bundling. Yet optimal political bundles can only be discovered through practice, empirical trial and error, rather than prescribed theoretically. The chapter concludes that non-territorial unbundling is a platform for such a discovery process to play out.

Chapter 2 History of an idea: Non-territorial-unbundling

Chapter 2 parses non-territorial unbundling by way of a literature review and an overview of historical and contemporary cases. I trace the history of these ideas in political-economic thought, and uncover past and contemporary cases that clarify the conditions for their possible implementation or emergence.

The chapter begins with a chronicle of the political philosophy of panarchism, which closely resembles to non-territorial unbundling. The classical foundations of panarchism were laid more than a century and a half ago by Belgian political economists Gustave de Molinari and Paul Émile de Puydt, before undergoing a long dormant period, and only recently experiencing something of a contemporary revival. States in panarchy are distinguished from traditional Westphalian states in two fundamental respects: (1) they eschew territorial sovereignty; and (2) they offer explicit social contracts. Moreover, I argue that panarchism is empirical, evolutionary, and historical, whereas the classical contractarian justification for traditional Westphalian nation-states is rational, timeless, and ahistorical.

While the political philosophy of panarchism laid dormant for much of the twentieth century, similar concepts appeared. I give a brief account of related ideas. Moritz Schlick, the founder of the Vienna Circle and the philosophical school of logical positivism, advocated for non-territorial states in his *Natur under Kultur* in 1952. In his 1974 book *Anarchy, State, and Utopia*, Robert Nozick developed a ‘framework for utopia’ that likens to the non-territorial states concept. This was a philosophical reinvention of the theory of clubs, in which conditions of free competition enable the best ‘utopian’ political communities to emerge spontaneously. Czech dissident Vaclav Benda made a philosophical call for a non-territorial shadow state in a short seminal tract called ‘Parallel Polis’ (later published in English in 1988). The overthrow of communism in the Velvet Revolution meant that his vision was never fulfilled, but a group of Czech political activists and bitcoin entrepreneurs have today revived the concept under the guise of the ‘Cryptoanarchy Institute.’

More recently, Roderick T. Long (1993) outlined a form of political organisation at an intermediate or hybrid position between the territorially sovereign state and a pure system of non-territorial governance, which he called ‘virtual cantons.’ Yet another related concept is ‘functional overlapping competing jurisdictions’ (FOCJ) advocated by Swiss economists Bruno Frey and Reiner Eichenberger (1999). This too is a hybrid form of non-territorial political organisation, and its functionally defined political units also resemble to political unbundling. Liesbet Hooghe and Gary Marks (2001) provide a fruitful empirical counterpart to the theoretical exposition of Frey and Eichenberger in their analyses of multi-level governance arrangements. They find that both bundled/territorial (type I) and unbundled/non-territorial (type II) governance can be efficient under various conditions.

Non-territorial unbundling may appear radical to people who have only known and lived in nation-states. However, there are a number of historical precedents to the concept. The second half of this chapter reviews some of these. Non-territorial systems of governance date back as far as ancient Greece, Sparta, and Rome. The Icelandic Free Commonwealth of the middle ages was composed of both territorial and non-territorial courts and assemblies known as ‘Things.’ Subjects could easily switch membership simply by making a witnessed public pronouncement and paying membership fees to their new Thing, ‘voting with their tributes.’ The Ottomans applied a non-territorial ‘millet’ system to govern their multi-cultural and multi-religious empire. A millet was an autonomous self-governing community organised under its own laws and headed by its own leader, who was responsible to the central Ottoman government for responsibilities and duties such as the payment of taxes, maintenance of internal security, and various public goods. Karl Renner and Otto Bauer proposed a non-territorial federation to accommodate the considerable ethno-national diversity of early twentieth century Austria-Hungary. Despite at various times being in positions of power within the government they were unable to bring about their reform, amid a tide of nationalism that saw the collapse of Austro-Hungarian Monarchy and disintegration of the Empire.

More recently, Belgium and Switzerland have applied composite territorial and non-territorial federal systems. Belgian dual federalism is constructed such that citizens living in the Brussels-Capital region have the choice of two community governments

(e.g. Flemish and French). These govern in parallel over functions of government related to education, culture, language, health, welfare, and more. In Switzerland, a multitude of governmental units exist, at the commune, canton and federal levels. There are some 5,000 ‘special commune’ public jurisdictions that levy their own taxes to fund the provision of various functions of governance. Many are overlapping and functionally defined so can be considered governments without territory.

Finally, I discuss how technological developments, especially in areas such as cryptography and telecommunications, are shifting the balance away from purely territorial governance to more decentralised, non-territorial political forms. The most demonstrable connection between technology and non-territorial governance is found in the theory and practice of cryptoanarchy: citizens connected in digital networks non-territorially seceding without erection of borders or movement of people. The emergence of bitcoin and blockchain based enterprises (e.g. *UnSystem*, *Ethereum*, *Bitnation*) may fulfill the panarchist ideal of non-territorial unbundled states or they may merely serve as laboratories for experimentation in creative social, political, and legal arrangements.

The upshot from this chapter is that the ‘pure’ theory of non-territorial unbundling has yet to fully arise. Historical and contemporary cases like the Ottoman Empire and Belgian dual federalism are only partial exemplars, and have met with mixed successes. Evidently the case of cryptographic exit and virtual states is closest to realising non-territorial unbundled forms of political organisation; however, since this is a development still unfolding, decisive conclusions cannot yet be made.

Chapter 3 The political-jurisdictional Coase theorem

Chapter 3 ‘The political-jurisdictional Coase theorem’ proposes an extension of the Coase theorem to explain how political systems and jurisdictions change. This conceptualises politics as commons and describes how changes to access rules and boundary rules serve to reallocate property rights within and across political commons. The framework corresponds

to various political-jurisdictional transitions—including non-territorial unbundling—and is used to explore the problem of nation/state incongruities. The point of the political-jurisdictional Coase theorem model is to clarify the conditions under which non-territorial unbundling might emerge, or conversely, to explain why it has yet to eventuate.

Fiscal processes typically transform private property into common property, with the state becoming the forum where rules for governing the commons are decided. In a political commons the fiscal capacity of the whole economy is the analogous exploitable resource. I outline how polities are constituted as fiscal commons, and describe how this often portends to exploitation and inefficiency. Next I present an analysis of political-jurisdictional systems as complex institutional structures of access rules and boundary rules, which either sustain or deplete social value. Citizens differentially contribute to and draw from political commons according to these rules, and as a result, changing access to and boundaries of political commons modifies the allocation of property rights in a polity. I argue that by generating viable exit options and membership externalities in multiple, overlapping majorities, non-territorial unbundling tempers the tragedy of the fiscal commons.

Jurisdictions and policies serve to mediate the allocation of property rights in a polity. A seeming *de facto* allocation of legal entitlements can be modified by state action and transformed into a *de jure* allocation, as the result of Coasean political exchange. I present a model in which *de facto* property rights and jurisdictions are the most basic connections forming the institutional structure of a polity-economy. Thus transitions in the structure of *de jure* property rights relations are a function of transitions in *de facto* property rights relations and transitions in jurisdictional relations, as well as political reallocations. Moreover, a Coasean reading of this model suggests that the optimally efficient allocation of property rights that maximises social welfare can be achieved by making reallocations in markets, jurisdictions, or politics. The political-jurisdictional Coase theorem (PJCT) accordingly states that

Regardless of the initial allocation of legal entitlements (i.e., property rights, policies, jurisdictions) if transaction costs are not prohibitively high and trade in externalities is possible then bargaining will lead to an efficient allocation of property rights and political authority.

Whether this reallocative process is efficient will depend on familiar Coasean assumptions pertaining to the distributive effects of the initial allocation (i.e., wealth and income effects) and relative impositions of political, jurisdictional, and market transaction costs.

We can reinterpret many episodes from history—how things worked, but also failures and grievances—in light of the political-jurisdictional Coase theorem. The central claim made here is simply that the problem of the nation-state is the combined expression of non-optimal allocations of political, jurisdictional, and property rights, prohibitive transaction costs, and/or perverse wealth effects. If ideal Coase-theoretic conditions were met then a political-jurisdictional system would indeed move toward the optimal allocation of property rights and political authority—of nations, states, and nation-states—in imperfect real-world conditions there is no such guarantee.

The implications for the prospect of non-territorial unbundling are then discussed. First, if the initial allocation of political authority among jurisdictions is inefficient, then prohibitively high transaction costs will impede a more efficient allocation from obtaining. That is, even *if* non-territorial unbundling is optimal, it will not eventuate. Similarly, wealth effects could prevent an optimal allocation of political authority if citizens lack the requisite wealth to make political exchanges and effect jurisdictional change. This may explain why non-territorial and unbundled states are rare in history; or it may simply be the case that it is a comparatively inefficient institutional form. The political-jurisdictional Coase theorem accommodates both possibilities.

Chapter 4 Political-jurisdictional possibilities and transitions

Chapter 4 ‘Political-jurisdictional possibilities and transitions’ presents a framework describing the tradeoff between inefficient markets, politics, and jurisdictions, and applies it to the problem of jurisdictional design. The purpose is to analyse the institutional structures that exist in the political-jurisdictional Coase theorem in greater detail. As such I introduce the political-jurisdictional possibilities frontier (PJPF) to illustrate the space of property-authority allocations (as political-jurisdictional rules) and a political-jurisdictional transformation frontier (PJTF) to illustrate movements about property-authority allocations. To conclude I use the possibilities space and the transformation frontier to demonstrate various political-jurisdictional transitions in some stylised examples.

Different allocations of property rights and political authority associate to different institutional systems, which array along the political-jurisdictional possibility frontier. The PJPF maps tradeoffs between the social losses from market, political, and jurisdictional transaction costs, which form the three axes of an institutional possibilities space. Minimising transaction costs in each of these dimensions brings about optimally allocated property rights and political authority, given the location of the PJPF. The location of the PJPF varies across societies and over time. Improvements in market-supporting institutions and repeal of market-controlling policies serve to shift the PJPF inwards along the market transaction cost dimension. For political transaction costs, an inward shift associates to a general *reduction* in the costs of political decision-making as well as a general *equalisation* of political transaction costs (since disparities create potential for rent seeking). Constitutionally permitting jurisdictional change and removing barriers to citizen mobility shift the PJPF inwards along the jurisdictional transaction cost dimension.

Yet irrespective of transaction costs, whether or not a society moves toward the efficient point on the PJPF also depends on the initial allocation of property rights, policies, and jurisdictions. If a property holder cannot be adequately compensated for the transfer (i.e., if the other party is constrained by wealth) then no political, jurisdictional, or market exchanges will take place. The PJTF defines the set of maximal outcomes—allocations of property rights and political authority—achievable by a polity-economy,

given the interests of the incumbent holders of private property rights and political property rights in franchise. The location and shape of the transformation frontier is codetermined by the subjective valuations of incumbent and prospective entitlement holders: *beliefs and ideas* about the value of entitlements, the efficacy of policies, or the effect of a jurisdictional change.

The PJPF model shows the full space of allocations of property rights and political authority that are *possible* for a polity-economy, given the prevalence of market, political, and jurisdictional transaction costs. The PJTF model, on the other hand, shows the compact trajectory of allocations that the polity-economy *actually* charts as it undergoes political-jurisdictional transformation. The PJTF is a means to describe how a polity-economy moves within the possibilities space, given the PJPF it finds itself on (so incorporating transaction costs) but, moreover, given the interests of incumbents and the ability of prospectives to compensate with side payments (so incorporating wealth effects). The PJPF and the PJTF combine to chart the trajectory a polity-economy takes through the space of possible property and authority allocations, and together they furnish a fuller model of the political-jurisdictional Coase theorem.

Chapter 5 Theory of non-territorial internal exit

Chapter 4 ‘Theory of non-territorial internal exit’ presents a model of partial internal exit that captures the dynamic of fiscal competition between incumbent and potential governments in a non-territorial unbundled system. The purpose of the model is to demonstrate how non-territorial unbundling reduces and eventually eliminates fiscal exploitation as the capability of citizens to move to non-territorial and unbundled jurisdictions increases. To begin, I argue that non-territorial unbundling in general, and cryptosecession in particular, is a form of partial internal exit. I then show that the outcome of a ‘cryptosecession game’ is that politically connected insiders choose not to exploit ineffective outsiders. Instead they choose a set of policies and jurisdictions that is optimally efficient in the political-jurisdictional Coasean sense. The chapter concludes by

discussing the implications of the model for non-territorial unbundling and blockchain based cryptosecession.

The chapter begins with a discussion of the relationship between fiscal exploitation and allocative efficiency in public good provision. Here I argue that if a political-jurisdictional order is not yet allocatively efficient—and some subset of citizens is being fiscally exploited—then the process of non-territorial unbundling should see taxes converge on average costs of provision, fiscal surpluses disappear, and transfers cease. Within the non-territorial unbundled system, jurisdictional changes attending to fiscal equivalence are not limited to complete realignments of citizens and jurisdictions, but also extend to changes in the distribution of political-economic activity that citizens conduct in their multiple political units. That is to say, this is a process of *partial* exit, not ‘all-or-nothing’ exit. In modelling this a coefficient β is introduced to represent the share of activity a potential seceder can shift between jurisdictions. This is a general measure of the capability of citizens to move between non-territorial unbundled jurisdictions, and is also interpreted as representing the state of cryptosecessionist technology.

The partial internal exit model takes the form of a cryptosecession game played between politically connected insiders (or fiscal surplus ‘sharers’) and ineffective outsiders (‘non-sharers’). This is a multi-stage game: in the first stage sharers set the tax rate; in the second stage non-sharers decide to secede or not; and in the third stage both sharers and non-sharers simultaneously decide to cryptosecede or not. The game is solved by simple comparison of payoffs for each player and backward induction. I find that the outcome of the cryptosecession game is that there is no cryptosecession. That is to say, while secession and cryptosecession do not occur, their presence as options for citizens serves to limit fiscally exploitative behaviour, and ensures an optimally efficient outcome. It is precisely the capability to secede—whether fully or partially, territorially or non-territorially—that induces a fiscal competition, and which restricts fiscal exploitation.

Moreover, the model shows that if crypto technology is developed to a certain critical threshold, then fiscal exploitation is fully eliminated and the resulting political-jurisdictional order is optimally efficient. That is to say, partial internal exit (i.e., non-

territorial unbundling) overcomes the disadvantages of territorially moving from a larger polity-economy. It becomes a more potent force for correcting inefficient allocations of policies, peoples, and polities than basic internal exit (i.e., territorial mobility).

I conclude that the capability of citizens to reconfigure their political memberships in an unbundled system or to switch between non-territorial jurisdictions incentivises incumbent institutions to dispense of inefficient or exploitative policies. Secondly, if non-territorial unbundling does indeed promote an optimally efficient alignment of citizens and policies (as argued elsewhere in this thesis) then the patterns of political-jurisdictional re-equilibration should reflect this. These are testable implications of the model: that the growth of cryptography-mediated internal exit will exert pressures for fiscal reform, and subsequent patterns of change will resemble to the non-territorial unbundled form.

Chapter 6 Spontaneous order in the formation of non-territorial political jurisdictions

Chapter 6 ‘Spontaneous order in the formation of non-territorial political jurisdictions’ extends existing theories of spontaneous order in politics to a new theory of spontaneous order in jurisdictions. Under certain conditions the various kinds of jurisdictional changes—citizen mobility and migration, but also external and internal re-bordering, and secession and integration—constitute spontaneous orders. Jurisdictional spontaneous orders emerge and evolve in an orderly yet unplanned way due to shared rules of procedure, simplified feedback mechanisms, freedom of entry and exit, and equality of status among participants. Moreover, they are complex discovery procedures that coordinate the distributed knowledge of participants. Personal secession and non-territorial governance are parsed through the framework as potential mechanisms of jurisdictional change, and some implications of technological change are discussed.

The problem of the nation-state is how to design a jurisdictional order and assign political authority so as to discover a harmonious allocation of people to nations, states,

and nation-states. But the limits of human reason and planning apply to the carving out of international (and sub-national) borders, not only the political actions that occur within them. I argue that just like the knowledge problem critique of attempts to replicate market allocations with central planning, rational constructivist planning of jurisdictional orders succumbs to what I call ‘the knowledge problem of the nation-state.’ The information required for rational jurisdictional planning is distributed among individuals throughout the polity and thus unavoidably exists outside knowledge of a central authority.

The knowledge problem of the nation-state is most often confronted (‘solved’) with rational constructivist planning, and what is a weak correcting force of controlled migration. In a certain morose sense, attempts to redraw borders or move peoples have illustrated the appalling failures of planning: political division, large-scale population displacement, and ethnic cleansing. In contrast, spontaneously ordered political jurisdictions are the general solution to the knowledge problem of the nation-state. Much like how the spontaneous order of a free market system is designated a ‘catallaxy’ I define a ‘constellaxy’ as the spontaneous order of a free jurisdictional system. Nation-states are not yet perfect constellaxies and as such there is an imperative to discover alternative models of governance that are capable of adapting to the increasingly complex, intermingled, and multidimensional compound of publics that prevail today.

Next I argue that non-territorial polycentric democracy cultivates spontaneously ordered political jurisdictions. Non-territorial polycentric democracy is defined as a political system constituted by multiple *overlapping* jurisdictions. Rather than foreclosing on a broad class of non-territorial solutions I suggest that citizens seek out each other to form political jurisdictions irrespective of location. The jurisdictional order in non-territorial polycentric democracy is then an emergent property of the process of group discovery and formation; and is thus a spontaneous order that is potentially curative of the knowledge problem of the nation-state.

The prospect of non-territorial polycentric democracy depends on patterns of political, social, and economic geography within a polity. As mentioned throughout this thesis, there is an inherent dilemma generated in the tension between political geography

(i.e., jurisdictional order) and social and economic geography (i.e., the patterns of economic activity and dispersal of co-existing groups). Moreover, trends in technology, globalisation, urban development, and inter- and intra-national migration continue to generate more complex and intermixed political-social-economic geographies. The result of multiple groups overlapping within the same location is an apparent conflict between the traditionally conceived nation-state and other orders. I argue that non-territorial polycentric democracy subverts this conflict: spontaneously ordered political jurisdictions are capable of adapting to other orders, however they might be geographically distributed.

Such an institutional system is capable of generating new jurisdictional rules from within by either: (1) constitutionally permitting non-territorial jurisdictional change and enabling political entrepreneurship (a *de jure* mechanism); or (2) in the absence of this, through cryptoanarchist technologies that enable non-territorial secession and governance (a *de facto* mechanism). It is important that one of these avenues remains open, as inhibiting or prohibiting these mechanisms causes distortions that constrain or prevent political-jurisdictional constellaxy. The assumption that political jurisdictions must be territorial limits the potential of democracy; in contrast non-territorial polycentric democracy cultivates both political sorting *and* intermixed and concentrated civil society and economy. For these reasons, it is crucial that we understand institutional mechanisms supporting non-territorial polycentric democracy.

Chapter 1

Economic theory of non-territorial unbundling

Imagine buying cars the way we buy governments. Ten thousand people would get together and agree to vote, each for the car he preferred. Whichever car won, each of the ten thousand would have to buy it. It would not pay any of us to make any serious effort to find out which car was best; whatever I decide, my car is being picked for me by other members of the group. Under such institutions, the quality of cars would quickly decline.

David D. Friedman, *The Machinery of Freedom*

The political choice problem: A better way?

Much has been said about the vices and virtues of democracy. Democracy, said Benjamin Franklin, is two wolves and a sheep voting on what to have for dinner.^[1] Lord Acton warned that democracy is susceptible to a ‘tyranny of the majority.’^[2] Winston Churchill told us that democracy is actually the worst form of government... except for every other form that has been tried. Not without irony, he also said that the best argument against democracy is a five-minute conversation with the average voter.^[3] H.L. Mencken described democracy as the theory that people know what they want, and deserve to get it good and hard.^[4]

These quotes speak to the majoritarian dimension of democracy and the reality that even in the best-of-functioning systems 49% of the people can remain unhappy. To be sure, in most modern democracies even a less-than-majority popular vote can carry an election, due to the peculiarities of electoral systems.^[5] Democracy, in other words, is a system to ensure that *some* people get what they want; it is not a system to allow *everyone* to do so.

From a purely economic perspective, the purpose of government is to administer collective goods that would otherwise fail to be provided and to help overcome coordination problems on population-wide, mutually preferred economic outcomes. Governance amounts to a sort of collective goods provision problem; majoritarian democracy is a social technology we use to all choose the *same* set of collective goods and institutions that *harms the least* number of people.

But is this the best we can do? Isn't this definition of successful governance a little shallow? We are still struck with the reality that swaths of the population remain unhappy with a set of collective goods and government that they did not choose and are effectively forced to consume, with little to no recourse for satisfaction. A truly efficient system of governance, on the other hand, is one in which citizens are able to relate their preferences over policies in a more detailed and filigreed way.^[6] The challenge then is to find a system we can use to all choose *different* sets of public goods and institutions that *please the most* number of people, in contradistinction to governance as we know it.

The traditional approach to this challenge is to territorially decentralise and provide differentiated bundles of collective goods and services at the regional or local government levels.^[7] This has proved more or less successful throughout history and across the world, but the territorial sorting mechanism on which it is based is subject to inherent efficiency limitations. In short, if people sort themselves over territorial jurisdictions according to their political preferences, they must sacrifice economic and social spatial preferences, thereby limiting efficiencies in these other realms. The same applies in reverse, and in most cases we simply decide where to live based on economic and social considerations, at the expense of efficiency in political choice.^[8]

Moreover, the benefits of decentralisation have nothing to do with the inherent *territoriality* of regional or local governments, but rather they follow from mechanisms underlying decentralised, parallel governance, and equally apply to a *non-territorial* system of governance. The solution to the limits of *territorial* decentralisation, then, is rather obvious: *non-territorial* decentralisation.

The governance problem is about political choice; and there are two related features of political choice that contribute to this challenge. The first might be termed the *majoritarian problem*; that is to say, “*no matter what you would choose, you get what everybody else chooses.*” This is cause for much disagreement *between* people, as politicians and advocates (as well as the general population, though often unwittingly) manoeuvre to impose their conceptions of “what government ought to do” on society at large.^[9] Political choice has degenerated into an electioneering numbers game, and more often we are simply lumped with a choice between bundles of government policies that the median voter might have chosen.^[10]

This point is not lost on the wider public, and as a result the majoritarian institutional feature is not particularly amenable to informed political choice on the part of the citizen, and nor does it elucidate much information about citizens’ political preferences on the part of government.

The second feature of political choice as we know it might be termed the *bundling problem*; that is to say, “*when you choose, you have to choose everything all at once.*” This, too, is cause for much disagreement—but *within* people—who, even supposing they aren’t prey to the majoritarian problem, are unable to reconcile the internal incompatibilities of preformed government bundles offered by rival political parties. To put another way, bundled governance generates innate political preference incongruities (i.e., trade-offs) and impedes preference satisfaction over the *full suite* of government policy areas.

Again, the wider community understands this frustration—particularly younger generations, who find neither Conservative nor Liberal nor Social Democrat policy-bundle offerings altogether appealing—a likely explanation for the concurrent, though seemingly

contradictory, political disaffection at the party-platform level and often viral enthusiasm for advocacy campaigns at the single-issue level. And again, the bundling institutional feature stifles political choice and suppresses information about citizens' political preferences.

We can overcome the majoritarian problem and the bundling problem, as well as the inherent spatial trade-offs in territorial decentralisation, by carrying the decentralisation ethos to its logical ends: *unbundle* as many functions of government as possible (whether territorial or not), decentralise *non-territorially* where feasible, and promote *parallel* governance. The reality is we don't need to all agree on the same set of collective goods and institutions. By 'unbundling governance' we can each individually choose the public goods and services that we want and rebundle them as we like.

What might such an approach look like? Proposals of this kind are essentially variations on the 'voting with feet' political sorting mechanism and theories of competitive governance.^[11] In the first instance these are familiar ideas such as competitive federalism, fiscal decentralisation, devolution, autonomous regions, and other *territorial* expressions of the 'voting with feet' principle like special economic zones, charter cities, and seasteading.^[12] But equally so, the standard applies to methods of *non-territorial* decentralisation such as market decentralisation (i.e., privatisation and private governance),^[13] multi-level governance,^[14] polycentric governance and functional, overlapping and competing jurisdictions,^[15] parallel governance and autonomous spaces,^[16] non-territorial consociation (typically for geographically dispersed minorities),^[17] non-territorial and national-cultural autonomy,^[18] millet and extraterritorial jurisdictions,^[19] the political philosophy of panarchism,^[20] or even Robert Nozick's 'utopia of utopias',^[21] among other non-territorial possibilities.^[22] I propose that all of these theories and mechanisms, whether territorial or non-territorial, can be subsumed under the auspices of the concept, 'unbundled governance.'

The traditional solution: territorial decentralisation

Traditional solutions to these problems are variations on the theme of competitive governance; that is, political decentralisation and competitive federalism. The idea is that a simple territorial division into regional or even local jurisdictions (i.e., bundles of government) allows people to sort themselves into the government that best represents their political preferences; this is the ‘voting with feet’ mechanism.

By doing so the majoritarian problem is somewhat lessened: citizens have stronger voice in a federal majoritarian system than in a unitary majoritarian system (the smaller is the political unit, the greater is individual political influence, and the more valuable is the citizen’s vote); and even if they still fall prey to the tyranny of the majority, they have recourse to exit. This also reduces the bundling problem: decentralisation is a form of unbundling, as a portion of government policy areas are removed from the central government and reassigned to subsidiary political units (i.e., rebundled, but in smaller bundles); so in principle citizens are afforded greater choice, and, from the perspective of the citizen, there may be less political preference incongruity within the smaller bundles on offer at each level.

Notice, however, that these are only partial solutions to the majoritarian and bundling problems; they are weakened but not eliminated. The potential for tyranny of the majority still exists for the citizen of a relatively decentralised jurisdiction; and the citizen is still made to choose between preformed government bundles, albeit smaller ones. Taking the competitive governance argument to its logical ends, the majoritarian and bundling problems will only be eliminated in a system of governance with either a sufficiently large number of jurisdictions with sufficiently diverse policy-bundle offerings, or in a fully-unbundled system in which the citizen is free to ‘curate their own state.’

We will come back to this point, but for now note that better political choice and more competition can be achieved two ways: (1) raising the benefits of switching governments by devolving control over more policy areas to lower-level political units, thereby generating conditions for greater variety in the government bundles on offer; or

(2) lowering the costs of switching by making jurisdictions smaller and easier to move between.

By doing the above, the benefits of changing government are more likely to outweigh the costs of actually having to move between jurisdictions, and people will be able to enjoy the benefits of variety in government without having to sacrifice other economic or social preferences. People may be unwilling to move from Melbourne to Brisbane in search of their preferred political bundle, but many are willing to move across neighbourhoods like from Melbourne to Parkdale; they can still live near to their friends and community, they can still visit their favourite restaurants and travel easily to and from work, and so on.

These institutional features generate a political choice setting that begins to resemble a competitive market; so we should expect greater incentives for citizens to inform themselves of political options and more information to be revealed about citizens' political preferences. Indeed, the underlying 'voting with feet' concept was originally envisioned as a quasi-market mechanism:

Just as the consumer may be visualised as walking to a private market place to buy his goods, the prices of which are set, we place him in the position of walking to a community where the prices (taxes) of community services are set. Both trips take the consumer to market. There is no way in which the consumer can avoid revealing his preferences in a spatial economy. Spatial mobility provides the local public-goods counterpart to the private market's shopping trip.^[23]

Moreover, by 'voting with feet' not only will citizens sort themselves optimally into the jurisdictions offering their preferred bundles of taxes and public services, but they also incentivise the political units to compete for their membership, assuring that the public goods demanded will be provided at the lowest cost. This capacity to limit the government oversupply and over-taxation that is characteristic of monolithic, central government—to 'tame Leviathan'—is one of the foremost virtues of the decentralised institutional form. Further, the lobbying advantages that special interests hold over the general public—the balance of concentrated benefits and dispersed costs, as Mancur Olson explained—are eroded as political unit size decreases. The impacts of government failure are also tempered

since policy mistakes have smaller consequences and policy successes can be replicated. In this sense, political decentralisation can be considered a kind of ‘meta-solution’ to the problems of concentrated power and government failure in monocentric political systems.

Most importantly, competition serves as a discovery process.^[24] Since the risks associated with innovation are less for sub-national governments, they will, other things being equal, have a greater propensity to innovate.^[25] The political system as a whole is characterised by *parallel* experimentation (i.e., multiple policies are tested simultaneously by competing sub-national governments) rather than *serial* experimentation (i.e., multiple policies can only be tested singly by a central government). From an evolutionary perspective, political-jurisdictional competition can be compared to the process of natural selection; parallel experimentation and migration of discoveries between constituent political ‘laboratories’ is key.^[26] Decentralisation therefore provides a framework for experimentation and learning about policy alternatives and their consequences; and the system as a whole incorporates—and *discovers*—far greater amounts of information than a more centralised, monolithic public service complex.^[27] All-in-all, market-like competitive constraints provide structural limitations on government power while promoting the avails of competition and innovation in governance.

The structural efficiency limits of territorial political sorting

But the decisive point alluded to in the passage by Charles Tiebout above is not that of benefits, but costs: the adjustment process has inherent efficiency limits due to mobility costs. When we talk about ‘voting with feet’ we invariably refer to a *spatial* phenomenon; notions of competitive federalism, political decentralisation, and even vogue ‘big ideas’ like special economic zones, charter cities, and seasteading, are all *territorial* expressions of the sorting principle. The major limitation of the ‘voting with feet’ proposition, at least in its idealised form, is that it relies on perfect mobility between jurisdictions (i.e., costless moving), yet sorting over territorial jurisdictions is inherently costly and never perfect.

Do you know anyone who has changed cities to better fulfil their political preferences? What if you are unwilling to move even from Melbourne to Parkdale? The effectiveness of competition among political jurisdictions is inversely proportional to the costs of changing jurisdiction; simply converging on ever-smaller territorial units might reduce switching costs, but this can never be complete. This is because people also make locational decisions based on private and social activities—career, friends and family, restaurants, recreation, the great outdoors, and so on. There might not be much overlap between the people you want to live with and the people who would choose the same form of government as you; in effect, we put up with government we don't like in order to live near the people and places we do.

A complex of many small local governments—even if for the sake of argument we concede costless moving—promotes mobility away from economically and socially optimal locations. Sorting thus generates incentives for people to move away from where they would have located if public goods and services were provided *non-territorially*. Territorial political sorting therefore causes deadweight loss and reduces what is termed 'agglomerative' efficiency. On the other hand, economic and social agglomerative efficiency dictates that citizens sort for reasons other than their political preferences, which causes a reduction in the efficiency of political sorting.^[28] Again, this efficiency limit exists relative to an alternative system of *non-territorial* political jurisdictions.

To the extent that public, private, and social preferences over geographical space are non-identical, there exist structural efficiency limits of territorial political sorting. And the more that political preferences diverge from other spatial preferences, the more preferable non-territorial governance becomes to political territoriality.

The non-territorial solution

So unless preferences for neighbours and policies coincide, citizens face a trade-off in a world of *territorial* governance. Of course, trade-offs are an inescapable reality in economic life; but since we are interested in solving the political choice problem, we should ask: is there another way? Fortunately, there is another solution: *non-territorial decentralisation*. Just as a nation can be divided into many small geographically distinct territories for purposes of local and regional government and national representation, so too can it be divided into analogous non-territorial political units.^[29]

The idea of non-territorial governance might sound strange at first, but if we think of governance as just another industry, it makes sense.^[30] For instance, we choose our mobile phone provider, our health insurance provider, our superannuation provider, and so on, all irrespective of location. If switching costs are all that stand in the way of an efficient, political preference satisfying allocation of collective goods and services—costs that directly follow from an explicitly territorial mode of political organisation—then it seems forthright to suggest a decoupling of political jurisdiction and geographical location so that people could switch political jurisdictions without switching location.

In a world of *non-territorial* governance people would be able to change their political affiliations, in effect memberships or subscriptions to club-like governance providers, as easily as one changes health insurance providers; without ever having to change location. Non-territorial governments would be defined by their memberships of citizen-consumers (more or less of whom may happen to reside in a given territory) and not necessarily the territory itself. In such a system, governance doesn't follow the territory, but rather the person.

People with different values, beliefs, and political preferences could 'migrate in place' to different non-territorial states. We would likely see a proliferation of heterogeneous political bundles: different states may offer varying levels of services in areas such as health, education, and unemployment insurance, for different prices. The particulars of the states that might emerge are difficult to comprehend ahead of time; conceivably, they

could span the entire ideological spectrum, although we should expect them to broadly reflect already-existing political preferences, and would therefore offer relatively familiar policy bundles to those that we are faced with today. The difference, however, is that jurisdictions will be extended non-territorially; so that you and your next-door neighbour might be citizens of quite different governments:

Suppose that at the beginning of the year, you sign up for your preferred national government. You enroll yourself for one year. Next year you may make a different choice. To keep matters simple, suppose that you have three choices: Republican (Red), Democrat (Blue), and Libertarian (Coral). But in the back of your minds, understand that there can be more choices. There can be Green, Red Lite, Blue Lite, Yellow, and so on. If you choose Red, you agree to abide by Red's national government. If you choose Blue or Coral, you agree to abide by their national governments, respectively. You may choose Red and your neighbor may choose Coral. Each of you decides to abide by your own selected national governments. The Reds, Blues, and Corals live all over the place in crazy-quilt patterns.^[31]

The underlying logic of the ‘voting with feet’ mechanism is directly applicable to a decentralised system of non-territorial states; it is perfectly general and applies to territorial local government jurisdictions, non-territorial jurisdictions, and private goods alike (indeed, it mimics consumer choice theory). In fact, non-territorial governance more accurately resembles the political quasi-market, in which political firms (i.e., territorial public enterprises) compete over citizen-consumers, that was originally envisioned of the sorting mechanism. Indeed, James M. Buchanan noted “Tiebout’s analysis may best be interpreted as an early and pioneering attempt to describe the adjustment process in an essentially *nonspatial* world of voluntary clubs.”^[32]

Decentralisation is principally a non-territorial phenomenon, albeit one that has been applied up until now primarily in a territorial context. The key insight is that welfare is maximised when collective goods and services are provided by political units to subsets of the population with homogenous political preferences. This means decentralisation of some sort; for some time ever smaller territorial units have been the means to achieving this, but we should pursue non-territorial decentralisation too.

In such a world of *non-territorial federalism*, all the competitive and innovative benefits of quasi-market competition are heightened: collective goods and services would be provided more efficiently and the amount of state interference that people would tolerate without switching would be lower (Leviathan would be not only tamed, but domesticated); states would compete on innovation and service as well as price (or more accurately, rather than being shielded from competition by regional monopoly and mobility thresholds), and would need to tailor their suite of services to meet citizens' political preferences; special interest lobbying would be greatly restricted if not altogether futile given the ease of exit from captured jurisdictions; and importantly, non-territorial governance promotes a superior distribution of people over geographic space, and citizens are free to locate according to their own interests—political preferences need no longer conflict with economic and social preferences.

The unbundled solution

Next we should consider the bundling problem. Non-territoriality doesn't deal with this; it is a way of overcoming the limitations of territorial sorting while generating more diversity in government policy bundles. But what if, even in a non-territorially decentralised system, the bundle of collective goods and services that best satisfies your political preferences is not offered? Political preferences over distinct functions of governance are often mutually exclusive, at odds with each other, or simply not offered coextensively by governments or rival political parties. That is, the nature of the modern nation-state as a *general-purpose* form of political organisation generates innate political preference trade-offs *within* the individual, not only *between* individuals, and impedes preference satisfaction over the full suite of governance functions. Put another way: many people begrudge how pay TV companies bundle their packages of services—why don't we have that same resentment over government bundling?^[33]

Consider the possibility of *unbundled governance*, where independent single-purpose governments or public enterprises that are functionally specialised provide collective goods and services separately. This is ‘government a la carte’: there will be greater diversity of governmental forms and a wider range of choice for groups and individuals. More to the point, citizens will be able to personally curate the suite of collective goods and services that is amenable to their unique political preferences; they are free to opt-in to the ones that suit their values, in effect rebundling the functions that have been deemed ‘unbundleable.’

Even if there are relatively few unbundleable governance functions, and even if there are relatively few public enterprises from which to choose, the welfare gains from improved political preference satisfaction under such a system could be substantial. Indeed, only when citizens’ choices converge on what would be the fully bundled, majoritarian-democratic result will welfare gains be trivial (i.e., when there is near-unanimity; an outcome of vanishingly small probability).^[34] When citizens are able to assemble their own political bundles based on their unique preferences, the stifling effect of ‘one-size-fits-all’ political monopolism and the internal contradictions in preformed political bundles are diminished; frustration is replaced by customisation.

Just as a monolithic, general-purpose corporation is not the solution to all private enterprise problems, a monolithic, general-purpose government is not the solution to all public enterprise problems. Rather, competing public enterprises should be free to provide these same services, so that citizens can choose among a range of options and select the providers most responsive to their political preferences. Think of this as ‘government by subscription’ or the freedom to ‘curate your own state.’ This is not to say that existing governments should be abolished, nor that all services that governments have traditionally provided should be opened up to other providers; simply that the monopolistic and general-purpose features of government should be questioned if we desire a system that satisfies citizens’ political preferences. Citizens who wish to remain subject to a relatively hierarchical, consolidated public enterprise would be free to do so; but equally so, citizens wishing to opt in to other arrangements would be free to do so as well.

The key point in relation to the bundling problem and decentralisation is that the subsets of the population for which political preferences are homogeneous differ on a function-by-function basis. So not only is it unlikely that the people you prefer to live nearby will have similar political preferences over the whole suite of public goods and services, but for each distinct function of governance there will be a different community of interest that shares that particular political preference with you.

Furthermore, the diversity of scale economies, spillovers, and externalities for different collective goods and services means that each citizen should be a member of numerous multi-scaled, overlapping jurisdictions. For some collective goods, the optimal jurisdiction size is the entire country, for others it is narrower. But if the optimal jurisdiction size depends on the specific collective good or service, then everyone should belong to a multiple overlapping jurisdictions: one for each function of government.^[35]

Collective goods and services that happen to have coterminous jurisdictional boundaries or membership bases could be bundled, but if this insight were to be applied strictly, it seems more likely that some amount of *unbundling* would in fact be called for. Bruno Frey suggests that each individual would belong to a different group each for cultural affairs, transportation, schooling, social security, health care, telecommunications, and so on; labelling the result ‘functional federalism.’

Moreover, recall the principle virtues of decentralisation are adaptiveness to citizen preferences (due to ‘localness’ or ‘closeness’) and greater efficiency in provision (from knowledge of costs and benefits of production). There is reason to believe that a decentralised regime of jurisdictions defined predominantly by function rather than geography will be at least as responsive to citizen preferences (as jurisdictions become smaller), and indeed, more attuned to the specifics of production (as jurisdictions become functionally specialised)—thus ensuring even greater efficiency and welfare.

Of course, greater satisfaction of political preferences does not come for free, and there are potentially increased coordination costs, spillovers, information costs, and decision burden associated with a conceptually fully unbundled system of governance. The point for

now, however, is to highlight this very trade-off—that alternative political systems can indeed result in greater citizen satisfaction, albeit at some cost—while calling into question the presumption of monopolistic, bundled governance.

Unbundle, only to rebundle again?

We should unbundle the functions of government and provide them distinctly according to their diversity. Each type of government activity has slightly different externalities or economies of scale from the others and therefore requires a different size (i.e., in terms of a territorial jurisdiction or non-territorial membership base). This is expressed in Mancur Olson’s notion of ‘fiscal equivalence’: for every collective good, there is a unique boundary for which a separate government is needed, so that “there can be a match between those who receive the benefits of a collective good and those who pay for it.”^[36] Thus we should observe a complex of overlapping jurisdictions with unique boundaries relating to the provision of specific collective goods. In the case of non-territorial jurisdictions, the boundaries for fiscal equivalence would be defined not as territorial borders but personal associations. As Olson suggested, “There is a case for every type of institution from the international organization to the smallest local government”; a case for “both centralized and decentralized units of government in the same context.”^[37]

One might add, there is similarly a case for a great many more institutional forms in the same context. We can have centralisation *and* decentralisation, we can have bundling *and* unbundling, we can have territorial provision *and* non-territorial provision—but we need a framework in which the assignment of powers can be *discovered*, and continually *rediscovered*, not assumed *a priori*. This is a framework for an unbundled state, but it might be more accurately described as an ‘unbundleable’ state. Where possible, we should allow political entrepreneurs to unbundle the functions of government by creating parallel entities for the provision of a particular collective good or service. This would require free—in the sense of being unrestricted, not costless—entry of new public enterprises and emergence of new jurisdictions.

Territorial and non-territorial decentralisation are the mechanisms by which this might happen. The political entrepreneur may wish to create a territorial public enterprise if economic logic dictates that production, provision or consumption of the collective good or service need be local. Conversely, there may be scope for the creation of non-territorial government units. Both acts require in the first instance the unbundling of governance and the creation of a new, parallel public enterprise, whether territorial or non-territorial.

While unbundling is key to this, the point is not to rule out all bundling of functions of government—as mentioned, unbundled jurisdictions that happen to have coterminous boundaries or membership bases could be rebundled. Rather the point is to create an unbundlable system of governance and allow this decentralised system to discover ways to rebundle functions; the role of the political entrepreneur is to discover scales *and* scopes of public service production and provision.

Public enterprises may decide to jointly provide a suite of goods or services should they discover coterminous economies of scale or scope; or even without such economies, purely as a marketing exercise (although presumably this would be based on some underlying economy). Similarly, where separate public enterprises are able to derive an advantage through the formation of a new joint enterprise for an encompassing larger community there would be recourse to form yet another larger self-governing public enterprise. This might involve smaller public enterprises, working within the same domain but serving different communities, coordinating to serve a larger joint membership; or it might involve functionally distinct entities cooperating to provide a suite of services to a common membership.

The theory of unbundling government is therefore best explicated in terms of discovery frontiers: promotion of parallel experimentation to generate knowledge of the proper extent of territoriality and bundledness in the prevailing complex of jurisdictions and public enterprises. The public service industry would be characterised by both single-function public enterprises and multi-organisational arrangements in response to diverse economies of scale and the demands of varying communities of interest. Some of the single-function enterprises would service non-territorially defined membership bases, while others would be

restricted by geography; similarly so for bundled arrangements, with the possible addition of hybrid bundles that comprise both territorial and non-territorial provisions of governance. Concurrent, non-centralised authority will exist simultaneously in a larger industrial complex of overlapping jurisdictions of public enterprises.

Dealing with economies of scale and spillover externalities

One important form of cooperation between public enterprises we would expect to emerge is purchasing agreements. These are already used by lower-level jurisdictions in territorially decentralised systems of governance; for example, often larger local governments produce their own police services while smaller governments purchase their services by hiring from the larger government or national government. This is a way of dealing with diverse economies of scale in such a way as to capture diminishing supply costs (i.e., when the efficient scale of production is relatively large) while maintaining inter-jurisdictional competition (i.e., having more than a single public enterprise perform the function). In a similar fashion, national governments sometimes perform administrative functions as a means of alleviating insufficient economies of scale of smaller sub-national governments (i.e., tax collection).

We need not assume that a particular government unit must provide its own facilities or produce a particular collective good or service. This dissociates the efficient scale of production from the efficient scale of provision or consumption. That is, if a public enterprise can purchase from a specialised producer, then the economies of scale cease to have relevance to the decision of to the size of the governmental unit, and we can have multiple overlapping, competing enterprises servicing a given territorial space. And public enterprises would still be free to create higher-level consortiums that adopt a common policy or provision of some particular good, given that the constituent enterprises represent the preferences of their members in doing so.

Notwithstanding, the very act of decentralisation may cause inter-jurisdictional spillovers of both benefits and costs: if you have a very large number of public enterprises and overlapping jurisdictions presumably there will be externalities generated by individual units on each other. Therefore, the public enterprise chosen to deal with any given activity should be large enough to internalise any externalities that the activity generates (or some arbitrary proportion of the externalities, since border spillovers are pervasive).^[38] Again, according to this criterion each function of government or collective good calls for a different size public enterprise due to the diversity of externalities. And again, this would seem to be reason for *ever-larger* jurisdictions, as a means of internalising an *ever-larger* proportion of externalities.

If we want to maintain the benefits of inter-jurisdictional competition and parallel governance then the decentralised public enterprises will need to coordinate to internalise spillovers, but coordination is costly. Externalities can be internalised through voluntary policy coordination among interacting public enterprises; or a new level of organisation can be created to deal with externalities. For instance, this might require the creation of a public service enterprise with the specific task of internalising the externalities generated by the individual enterprises on each other, through tax and subsidy transfers.

These new government units would perform a role similar to that of a central government (i.e., stabilisation and distributive objectives), although there would likely be a multitude of such new enterprises, specialised according to the coordinative function they perform. However, if the externalities of a particular collective good or service are sufficiently widespread (and coordination costs are intolerably high), a higher-level enterprise may have to assume complete responsibility for its provision. Thus, there seems to exist an inherent trade-off between the advantages of decentralised parallel governance (coupled with coordinated internalisation of externalities) and the disadvantages of centralised governance (with less need for costly coordination activities).

Again, the first point is to highlight this very trade-off: in the final comparative analysis decentralised parallel governance may in fact trump presumptive centralisation. And in the second instance, we should consider the role of political entrepreneurship and parallel

experimentation in the discovery of dynamically efficient jurisdictional systems.^[39] It may very well be the case that a complex of overlapping public enterprises is statically inefficient, in terms of generating inter-jurisdictional spillovers. Yet the very same complex design might cultivate a superior policy-learning environment, precisely because the presence of externalities creates opportunity for political entrepreneurial behaviour.^[40] In this sense, a statically inefficient complex of jurisdictions and public enterprises is in fact dynamically efficient and therefore preferable to spillover minimising centralisation. David Ellerman makes the argument thusly: “parallel experimentation is a fundamental dynamic efficiency scheme to enhance and accelerate variation, innovation, and learning in contexts of genuine uncertainty or known ignorance.”^[41] Put another way, a centralised system of governance devoid of parallel experiments is likely to be dynamically inefficient and generate a comparatively larger externality problem.

Dealing with decision burden and complexity

Central to this proposal is the argument that a truly efficient system of governance is one in which citizens are able to relate their preferences over policies in a more detailed and filigreed way. In addition to this image of statically efficient political preference satisfaction, is the prospect of dynamic efficiency: non-territorial unbundling cultivates entrepreneurial discovery of the extent of territoriality and bundledness necessary for preference satisfaction, and promotes continual experimentation and rediscovery. We should, however, expect there to be some complexity or cognitive constraints to all this, well inside the extreme of having each and every aspect of government unbundled and provided by autonomous public enterprises.

We have already seen how scale economies and the need to internalise externalities can sometimes temper the arguments for unbundling; but the most straightforward rationale for bundling (or, granted, rebundling) is that the innumerable combinations of government bundles imposes onerous information costs on the citizen-chooser—not to mention on public enterprises that are expected to provide as wide a range of choice of combinations

as possible. The educational level and informational costs required to take advantage of the opportunities inherent in such a system would largely be burdensome, and the likelihood of a citizen actually sorting over the space of possible bundles to find their optimum—should a perfectly complete governance marketplace be imagined—is vanishingly small.

Yet if the complexity of a fully unbundled system is incomprehensible to the *mere* citizen-chooser and hence unnavigable, then the correlate argument must be that the complex combinatorics of an unbundlable system is incomprehensible to the *mere* jurisdictional designer and hence unplannable. For the question of the bundledness and territoriality of jurisdictional design this is an important counterpoise. Just as public choice theorists demand behavioural symmetry between self-interested economic agents and public officials,^[42] and robust political economy calls for comparative institutional analyses under symmetrical deviations from ideal assumptions about motivation and information (e.g. “limited benevolence” and “limited rationality”),^[43] so too must we approach comparative analyses of relatively more-or-less bundled and territorial modes of political organisation (and complexity and cognitive difficulties therein) with symmetry between citizen-chooser and would-be jurisdictional designer.

The task of the jurisdictional designer is analogous to that of the central planner charged with determining the welfare maximising allocation of resources in an economy. While beginning in the 1920s it was Ludwig von Mises and Friedrich Hayek^[44] who were the primary opponents of market socialist economic planning, already a decade earlier Vilfredo Pareto had provided a ‘computational complexity’ critique of his own.^[45] According to Pareto, calculation of equilibrium conditions is “an absurd hypothesis” with no “practical possibility of solving the problem.”^[46] This is because with only a small number of individuals and goods the system of equilibrium conditions would far exceed the capacity of algebraic analysis. Therefore, he insisted: “the only means of solving them would be to observe the actual solution which the market gives”.^[47]

Similar critiques can be mounted against the hypothesis that a welfare maximising jurisdictional design (i.e., an allocation of people to jurisdictions) can be planned for by

solving the system of inter-jurisdictional externality optimality conditions. Just as an economy cannot be seen as a set of equations, neither can the jurisdictional design of a polity be reduced to rational construction: it is impossible to calculate an optimal solution of jurisdictional allocations. The system of equations would require too much information, information that is inherently dispersed throughout the polity. While admittedly we have seen how citizen mobility and differential taxes can act as a price-like mechanism in a territorially decentralised system of jurisdictions, which might suggest an information signalling role, we have also seen how there are inherent limitations to this process in comparison to non-territorial governance. A crucial condition for economic calculation is the existence of genuine entrepreneurship and market rivalry; and this condition is lacking when the bundledness and territoriality of the polity has been predetermined by a jurisdictional planner.

And even supposing informational assumptions most favourable to such a calculation (to echo Pareto, “an absurd hypothesis”) there would be little practical possibility of solving the problem due to the computational complexity of the task. This requires the planner to map the individual preferences of citizens over location and the numerous policy areas into a collective plan for how a geographic space will be partitioned into jurisdictions (i.e., territoriality) and how policy authority will be allocated among political units (i.e., bundledness). Consider that a given jurisdictional design can be classified as a configuration along three dimensions: (1) the extent of territorial decentralisation;^[48] (2) the extent of non-territorial decentralisation;^[49] and (3) the extent of bundling.^[50] The alternatives facing the planner have a combinatorial structure: each is characterised by a tuple of variables ranging over a finite domain, and as a result there are exponentially many possible allocations of authority among political units. The space of possible jurisdictional designs explodes in size as the number of potential territorial and non-territorial units, and number of unbundleable functions of governance, increases.^[51]

Vincent Ostrom presaged: “the great multitudes of operational choices that become available when people can relate to one another through diverse institutional arrangements.”^[52] The standard approach jurisdictional planning does not take the computational limitations induced by the combinatorial nature of the problem into

account. Moreover, a plan that is ignorant to the multitudinous space of possibilities is likely to the detriment of citizen-choosers. If we were to proceed from a true appreciation of the overwhelming size and complexity of the jurisdictional design space, we would have profoundly less optimism in our ability to rationally construct an optimal architecture of governance. As James M. Buchanan and Viktor Vanberg argued, we need “conditions for learning and adaptation at all levels at which we engage in problem solving, including the level at which we choose the constitutional framework for all other efforts.”^[53] This is an invocation for a framework that is capable of generating experimentation and institutional diversity from within; that is, for non-territorial unbundling and political entrepreneurship.^[54]

Moreover, we should recognise that information problems of this ilk are pervasive in all other marketplaces too, not only in the *completely unbundled* governance system envisaged here. The larger private economy does not comprise every possible combination of every good; firms offer products that are conjectured (or have been discovered) to be popular bundles of attributes, niche providers offer unique bundles, and specialist firms focus on single-attribute offerings. The genius of the competitive, decentralised market order is that it provokes persistent conjecture and refutation of market hypotheses; through parallel experimentation, consumer sovereignty (i.e., mobility), and the ability to freely bundle product attributes as necessary (i.e., contestability, entry and exit).

We should expect a similar process to unfold in an unbundlable system of governance—perhaps counter-intuitively, we should *expect bundling* as the analogous response to information problems and the cognitive burden placed on citizens.^[55] A range of popular governance bundles might be offered (by individual public enterprises and consortiums) with popular single-element items available in the *market for governance* as well. There might also be the option of self-managing collective goods and services—consider them subscriptions—although it is unlikely that a large number of people would decide to undertake this, due to the inherent complexity of the task. While it is difficult to speculate on the prevailing structure following unbundling, the upshot is that simultaneous offerings and parallel governance promotes learning about which policy bundles are preferable to consumers and the appropriate way to produce and provide such services.

Finally, another way consumers cope with decision burden in situations that are cognitively complex is to seek heuristics or appoint an agent with relevant expertise. In the current democratic system citizens vote for political parties on the dual basis of the bundle of policies they proffer *and* to appoint politicians as agents. In fact, there is an argument to be made that due to the ‘rational ignorance’ of voters, the appointment of politicians as agents is the primary function of an election. When, however, the functions of government are unbundled and citizens are able to individually curate a portion of their bundle of collective goods and institutions, elections may cease to be the dominant method by which the political-institutional environment adapts and changes. There is thus a motive for citizens to appoint an agent by *contract*, whether formal or tacit, and a new class of public enterprise dedicated to advising citizen-choosers might emerge. To be sure, political consultants, advocacy groups and think tanks already exist but they would potentially play a much more instrumental role in an unbundled political system, as complexity-reducing agents. The role of the political party would change markedly as well; at once rebundlers or consortiums of public enterprises and also highly visible, public enterprise advocates.

Conclusion: Non-territorial unbundling as discovery

Much as the unbundled state defies prestatement, such a system could be described thusly: a quasi-market public service industry of self-governing public enterprises, potentially multi-organisational and multifunctional, but with overlap and fragmentation, centralisation and decentralisation, subject to diverse economies of scale and with dissociation of production, provision and consumption. Gordon Tullock described such a system as “a vast collection of governmental units, each of these governmental units being to some respect of a different geographical coverage than the others and each one dealing with a separate activity.”^[56] In Vincent Ostrom’s terminology this is a “highly federalised” system,^[57] although not necessarily territorially, as non-territorial collective good provision is likely to be preferable where possible. I have proposed that the spectrum of ideas discussed in this chapter be subsumed under the concept of ‘non-territorial unbundling.’

What remains is the question of just which functions of governance are unbundlable, and which are necessarily linked to territory. And what's more, what governance functions can or should be performed by different levels of government? For the most part, it should be left to political entrepreneurs to experiment with provision of certain hitherto-conceived government goods and services. The central government might assist in the processes of discovering which function are unbundlable; opening up niches for entrepreneurs to experiment in, monitoring results, and deciding if and when to scale up or terminate unbundled provision of the governance function. Of course, ultimately there will also be a political dimension to this, and it will be dependent on prevailing governments' (ideological) views on what functions of government are deemed acceptable for unbundling and what must remain centralised or within the bounds of the state.

It should also be stressed that non-territorial unbundling is not simply a ploy to rid ourselves altogether of the state, but rather an attempt to rid ourselves of a particular state: monopolistic, general-purpose, and territorially sovereign. Moreover, unbundling is more than just a process of 'de-centering' the state; it involves a wide-ranging shift from government to governance, following from a recognition that a given collective good may be supplied, or a publicly necessary service performed, by a variety of bodies. These public enterprises may indeed resemble government departments; or fiscal clubs, communes, or companies; and ownership may reside in the state, a commons, or indeed private enterprise. To echo Errico Malatesta: "Probably all possible forms of ownership, use of the means of production and all forms of distribution will be experimented with simultaneously, in the same or other locations, and they will be merged together and adapted in various ways until practical experience identifies the best form or forms."^[58] But importantly, ownership and governance models that reflect community standards will proliferate in a social order where individuals choose for themselves the kinds of associations, communities and institutions they wish to be connected to.

In some respects, the non-territorial unbundling of the state is already underway: technological developments, especially in areas such as electronics and telecommunication, are shifting the balance away from purely territorial governance to more decentralised, non-territorial political forms. Such trends undermine the general-purpose, territorial

nation-state by opening up new governance structures and possibilities. Technological and economic advances have reduced the optimum scale of production in a wide range of industries, which is undermining, albeit gradually, the logic of large-scale centralised organisation. For instance, this has fed the rise of commons-based peer production in private enterprise and we might expect an attendant rise of commons-based peer production in public enterprise. Similarly, network technology has had a revolutionary effect on the transaction costs of traditional economic activity and organisation, facilitating the emergence of more effective decentralised collective action practices. It provides a platform for new, non-territorial mechanisms of collective action for potentially widely dispersed communities, and the capability of virtual communities to provide multiple, non-territorial niches is ever-increasing. The upshot is that parallel developments are driving this trend in many traditionally conceived functions of government, which is underwriting the rationale for small-scale, non-territorially decentralised, and functionally specialised modes of governance. The cumulative effect is that a rapidly increasing share of the functions previously carried out by the state can now be effectively carried out by commons-based peer production, social-entrepreneurial crowdfunding, or special-purpose public enterprises.

We could be on the verge of a non-territorial, unbundled future. But even so, it is important to recognise that even for societies at the forefront of social, political, and technological development, non-territorial unbundling represents an admittedly radical proposal, and could only proceed in an incremental, piecemeal, and experimental way. While there may be difficulties with the strongest version of this proposition, I have argued that the benefits of non-territorial unbundling are substantial. It is a system we can use to choose *different* sets of public goods and institutions that *please the most* number of people, rather than the *same* set of public goods and institutions that supposedly *harm the least* number of people.

Unbundling allows citizen-consumers to choose each element of government separately, rather than having to choose from a number of predefined, complete bundles without any substitution, and for a full term as a bloc. This overcomes the diminishing political preference satisfaction that is a consequence of ever-greater bundling of policy bundles in

general-purpose governments (with commensurate implications for welfare). Non-territoriality provides the ability to subvert the trade-off between agglomerative efficiencies and political choice efficiencies that prevails when citizens sort themselves over a geographic space populated by *territorial* jurisdictions. It also spurs beneficial inter-jurisdictional competition without having to rely on citizen mobility, which places limits on government oversupply and over-taxation, ‘taming Leviathan.’ Parallel governance promotes parallel experimentation and learning about citizen preferences and policy alternatives, eliciting a quasi-Hayekian discovery process. Just as territorially decentralised policy experimentation is conceptualised as ‘laboratory federalism’ we can also describe the theory of the discovery process of non-territorial unbundling as ‘laboratory panarchism.’

Non-territorial unbundling recognises the heterogeneity of political preferences over collective goods and institutions and the diversity of the population. Rather than a *meddlesome constraint* to political consensus, as in majoritarian democracy, unbundled governance is a pluralistic approach that embraces such diversity, with the view that the satisfaction of heterogeneous preferences as a *necessary* to any considered system of governance. Such an approach heeds Acton’s warning of democracy as a ‘tyranny of the majority’; provides a mechanism for responding to Churchill’s claim that no other better form of governance than majoritarian democracy has *yet* been tried; and takes seriously Mencken’s idea that people know what they want, and deserve to get it good and hard.

Moreover, this approach need not even assume people know the outcomes they desire, or that the proper assemblage of political authority and mode of governance is even *a priori* knowable. Rather, it provides a framework for experimentation and learning about policy alternatives and their consequences. While decentralisation is key, we need not presuppose decentralised governance and institutional forms will always be the outcome. This is a framework in which the assignment of powers can be *discovered*, and continually *rediscovered*, not assumed *a priori*. This is a framework for the unbundled state.

Notes

- [1] Widely attributed to Franklin, although not found in any of his known writings.
- [2] “The pervading evil of democracy is the tyranny of the majority, or rather of that party, not always the majority, that succeeds, by force or fraud, in carrying elections” (Acton 1877: 98).
- [3] A speech in the House of Commons on 11 November 1947: “Many forms of Government have been tried and will be tried in this world of sin and woe. No one pretends that democracy is perfect or all-wise. Indeed, it has been said that democracy is the worst form of government except all those other forms that have been tried from time to time.” The second comment is also widely attributed to Churchill, but with no verified record or citation.
- [4] Mencken (1916: 19).
- [5] There are many paradoxes and problems of majoritarian voting: Condorcet (1785); Hotelling (1929); Black (1948); Arrow (1950); Tullock (1959); Buchanan and Tullock (1962); Gibbard (1973); Satterthwaite (1975). Boettke & Leeson (2002), Caplan (2011), and DeCanio (2014) provide more recent contributions.
- [6] Concentrated market power (e.g., monopoly or oligopoly) inhibits allocative efficiency is, which is precisely the monocentric, majoritarian-democratic model. In this sense, a ‘market for governance’ can be described as ‘allocatively efficient.’
- [7] Much of this literature is centred about discussion of the merits of polycentric governance (Tiebout 1956; Ostrom, Tiebout & Warren 1961; McGinnis 1999ab; Kurrild-Klitgaard 2010; E. Ostrom 2010; Andersson 2012), club theory (Buchanan 1965; Sandler & Tschirhart 1980, 1997; Casella & Frey 1992; Leeson 2011, Sandler 2013), federalism (Hayek 1939; Tullock 1969; Ostrom 1973, 1976), and secession (Buchanan & Faith 1987; Lowenberg & Yu 1992; Kurrild-Klitgaard 2002).
- [8] This line of argument is best elucidated by Schleicher (2010) who calls attention to the conflict between ‘sorting’ and ‘agglomerative’ efficiencies, but only goes so far as to suggest that territorially-bound government must balance this trade-off. Non-territorial governing units are bound by no such trade-off, as will be discussed later.
- [9] See, for instance, Buchanan (1975) and Buchanan, Tollison & Tullock (1980) on the distinction between ‘protective,’ ‘productive,’ and ‘redistributive’ politics; Kruger (1974) on the rent-seeking society; and Olson (1965, 1982) on collective action and the pernicious effect of distributional coalitions. When a particular set of political preferences are privileged at the expense of others, the redistributive consequences are akin to those outlined above.
- [10] E.g. Hotelling (1929) and Black (1948). See also Romer & Rosenthal (1979) and Milanovic (2000) for empirical analyses.

- [11] E.g. Tiebout 1956; Ostrom, Tiebout & Warren 1961; Buchanan 1965; Tullock 1969; Ostrom 1973, 1976; Buchanan & Faith 1987.
- [12] See Bräutigam & Xiaoyang (2011), Wang (2013), and Moberg (2015) on special economic zones; Romer (2010ab) on charter cities; Beito, Gordon & Tabarrok, (2002) and Rajagopalan & Tabarrok (2014) on private cities; and Friedman & Taylor (2012) on seasteading.
- [13] Megginson & Netter (2001) provide a survey of empirical studies on privatisation, while seminal contributions to the theory of private governance include Friedman (1973), Benson (1990), Dixit (2007), Stringham (2007, 2015), and Beito, Gordon & Tabarrok, (2002).
- [14] Hooghe & Marks (2001, 2003) are exemplars of multi-level governance theory.
- [15] Casella & Frey (1992), Frey & Eichenberger (1999), and Frey (2001) represent the theory of functional, overlapping and competing jurisdictions.
- [16] Landauer (1978), Benda et. al (1988), Bey (1991), Newman (2010, 2011), and Lagos, Coopman & Tomhave (2014) explore the possibility of creating institutions to parallel incumbent states.
- [17] Lijphart (1985, 2004) and O'Leary, Lustick, & Callaghy (2001) discuss consociation and power sharing on territorial and non-territorial bases.
- [18] The theory and practice of non-territorial autonomy and national-cultural autonomy is evaluated by Coakley (1994), Nimni (1999, 2004, 2007, 2015), De Villiers (2012), and Nimni, Osipov & Smith (2013).
- [19] The Ottoman millet system is investigated by Braude & Lewis (1982), Kuran (2004), and Barkey (2005, 2008), while Friedrichs (1997), Slaughter (1997), Rapley (2006), Kayaoglu (2010), and MacKenzie (2014) study extraterritoriality past and future.
- [20] Seminal contributions to the political philosophy of panarchism include Puydt (1860) and Nettleau (1909), while Zube (1986), Long (1993), Borders (2009), and Tucker (2010) have recently addressed the subject.
- [21] Nozick's (1974) reinvents the theory of clubs in a non-territorial context, with Bader & Meadowcroft (2011) recently compiling a companion text.
- [22] Further works on non-territorial self-governance include Schlick (1952), Elkins (1992, 1995, 1997), Schleichert (2003), Kukathas (2003, 2008), and Weinersmith (2014).
- [23] Tiebout (1956: 422).
- [24] Hayek (1948) and Kirzner (1997).
- [25] For application of the competition as discovery ethos to institutional competition see Vihanto (1992), Vanberg & Kerber (1994), Kerber (2006), Stringham & Zywicki (2011).

- [26] On the importance of parallel experimentation see Thomke, Von Hippel & Franke (1998), Ellerman (2004, 2014), and Saam & Kerber (2013).
- [27] While it seems forthright to suggest territorially decentralised, polycentric systems (known as ‘laboratory federalism’) outperform monocentric systems from the ‘evolution of knowledge’ and dynamic efficiency perspectives, this does beg the question: Isn’t parallel experimentation more accurately reflected in a system of non-territorially decentralised policy laboratories. Thus we can neologise non-territorial unbundling as ‘laboratory panarchism’ and perform ‘comparative social epistemics’ (cf. comparative institutional analysis) as to whether territorial or non-territorial policy laboratories cultivate superior conditions for parallel experimentation and institutional knowledge discovery.
- [28] See Schleicher (2010) for a fuller elaboration of the trade-off between agglomerative efficiency and sorting efficiency.
- [29] Here I can scarcely improve on Roderick Long’s (1993) description of virtual cantons. This is also reminiscent of the model of national-cultural autonomy proposed by Austrian Social Democrats Karl Renner and Otto Bauer at the beginning of the twentieth century to accommodate considerable ethno-national diversity in the Austro-Hungarian Empire (see Nimni 1999, 2004); and the millet system of governance in the multicultural and multi-religious Ottoman Empire (see Barkey 2005, 2008).
- [30] Patri Friedman makes this very point in a post on Let A Thousand Nations Bloom blog and in his work on competitive governance and seasteading, e.g. Friedman & Taylor (2012).
- [31] Rozeff (2010: 1).
- [32] Buchanan & Goetz (1972: 27).
- [33] The analogy to television comes from a post by Arnold Kling on EconLog for the Library of Economics and Liberty: “Many people resent the way that cable TV companies bundle their packages of services. I have that same resentment over government bundling.” The phrase ‘unbundling government’ originates from either Kling’s blogging or the aforementioned Let A Thousand Nations Bloom blog (both circa 2009-10).
- [34] See Buchanan & Tullock (1962) for discussion of the legitimacy and costs of the conceptual unanimity rule (and alternative rules) in political decision-making. The economic theory of non-territorial unbundling could be incorporated into analyses of this kind.
- [35] See Hooghe & Marks (2001, 2003), Frey & Eichenberger (1999), and Frey (2001) for a fuller elaboration of these arguments.
- [36] Olson (1969: 483).
- [37] Ibid.

- [38] See Tullock (1969) for an analytical approach to internalising inter-jurisdictional spillovers.
- [39] There is a deeper point to be made here about comparing a ‘rationally constructed’ jurisdictional design that is presumed ‘optimal’ (minimising inter-jurisdictional spillovers) and one that emerges from the process of political entrepreneurship and citizen choice. Such an order can only emerge from individual interaction and any comparison is epistemologically and ontologically suspect. This is the jurisdictional analogue to the argument in Buchanan (1982) about the logical impossibility of replicating an emergent market order.
- [40] See Potts (2009) for an evolutionary perspective on the problem of too much static efficiency.
- [41] Ellerman (2014: 259).
- [42] Buchanan and Tullock (1962), Buchanan (2003).
- [43] Boettke & Leeson (2004), Leeson & Subrick (2006), Pennington (2011).
- [44] The socialist calculation debate was carried out between Austrian economists Ludwig von Mises and Friedrich Hayek and neoclassical and Marxist economists Oskar Lange, Abba Lerner, and Fred Taylor. The position of Mises and Hayek was to highlight the economic calculation problem: economic planning was no substitute for market allocation of resources due to the absence of the price mechanism. That is, “rational economic activity is impossible in a socialist commonwealth” (Mises 1990: 33) because the information provided by market prices is lacking in a system of bureaucratic or technocratic allocation. See Mises (1920, 1990), and Hayek (1935).
- [45] Pareto (1906: 171): “Let us make the hypothesis most favorable to such a calculation; assume that we have overcome all the difficulties in the way of acquiring knowledge of the data of the problem, and that we know the ophelimities of all the goods of each individual, all the particulars pertaining to the production of the goods, etc. This is already an absurd hypothesis, and yet it still does not provide us with the practical possibility of solving the problem. We have seen that in the case of 100 individuals and 700 goods there would be 70,699 conditions (in reality a great number of particular details, which we have disregarded so far, would increase this number further); then we would have to solve a system of 70,699 equations. As a practical matter, that is beyond the power of algebraic analysis, and it would be still further beyond it if we considered the fabulous number of equations which a population of forty million individuals, and several thousand goods would entail. ... In other words, if all these equations were actually known, the only means of solving them would be to observe the actual solution which the market gives.”

- [46] Ibid. Note that this is different to the argument made by Hayek (1945) that price signals are essential for coordinating tacit and dispersed information. Pareto assumes away the knowledge problem—while acknowledging the absurdity of such a move—and instead extends his argument to the computation complexity of the mathematical optimisation problem with such myriad objectives and constraints. While computational power has increased dramatically, for the complex economies and heterogeneous polities of today such calculations still remain outside the realm of possibility (Nove 1983; Beinhocker 2007).
- [47] Ibid. Buchanan (1982 and endnote 41) came to a similar conclusion about the logical impossibility of comparison between bureaucratic-technocratic allocation that is presumed ‘optimal’ and the market order. Pareto’s is about the practical impossibility of replicating an optimising market allocation.
- [48] Defined as the number of territorial political units the geographic space is partitioned into.
- [49] The number of non-territorial political units layered within the geographic space.
- [50] The extent to which the above allocations of political authority to political units correlate across the various functions of governance.
- [51] For one function of governance (hence no unbundling) and up to two territorial political units or up to two non-territorial political units and any combination thereof, there are only seven possible designs. Extending this setting to two functions of governance (and hence now permitting unbundling) sees the number of possible designs expand to 147. For one function of governance and up to three territorial political units or up to three non-territorial political units, there are 86 possible designs. Now, extending this to two functions and permitting unbundling yields over a thousand possible jurisdictional designs. In the same way that Pareto noted the computational complexity of calculations under even the most favourable of conditions, one should pause to reflect on the complex combinatorics of the jurisdictional design space with similarly favourable dimensions. Perhaps 20 functions of government, up to 20 territorial political units, and up to 20 non-territorial units (which seems *prima facie* to be a very restrained simplification of reality), would yield innumerable combinations of possible jurisdictional designs. This exponentially increases the subsequent optimisation problem—allocating “a population of forty million individuals” among territorial and non-territorial political units for the multitudes of possible jurisdictional designs would certainly “exceed the capacity of algebraic analysis.”
- [52] Ostrom (1988: 184).
- [53] Buchanan & Vanberg (2002: 128-129).

- [54] See also Potts (1999; 2000), Caceres (2014), Felin et al (2014), and Koppl et al (2014) on the complexity of economic space and the roles of entrepreneurship and competitive governance in rendering the complexity intelligible.
- [55] See Potts (2012) on novelty-bundling markets as a solution to the problem of complexity and decision burden in choice domains that are information-intensive, uncertain, and difficult for consumers.
- [56] Tullock (1969: 25).
- [57] Ostrom (1973: 205): "I prefer to characterize a "highly federalized" political system as one which as a rich structure of overlapping jurisdictions with substantial autonomy among jurisdictions."
- [58] Malatesta (1995 [1929]: 114).

Chapter 2

History of an idea:

Non-territorial unbundling

For a long time I have been fascinated by the thought how wonderful it would be if at last, in public opinion on the succession of political and social institutions, the fateful term ‘one after another’ would be replaced through the very simple and self-evident ‘simultaneously.’

Max Nettlau, *Panarchy: A Forgotten Idea of 1860*

History of thought on non-territorial unbundling

The political philosophy of panarchism

The non-territorial governance concept resembles closely to the political philosophy of panarchism—a specific form of governance (i.e., ‘-archy’) that encompasses all others (i.e., ‘pan-’). The central idea is that individuals should have maximum freedom to join and leave the jurisdiction of any government they choose, without having to change their current location. The classical foundations of panarchism were laid more than a century and a half ago, but underwent a long dormant period, until something of a contemporary revival of panarchist political theory and philosophy in the late twentieth century and today (Tucker & de Bellis 2015).

Panarchy (pan-archy: many chiefs; multi-government) is a system of competing, co-existing governments which conduct their operations within the same geographical territories without making any claims to those territories, and whose only powers derive from the consent of those they govern, i.e., those who voluntarily agree to submit to a particular government. These voluntary governments are constituted and operate on the basis of contractual personal law rather than the coercive territorial law of the Nation-State (Taylor 1989).

This first traces of non-territorial, panarchistic governance lead back to 1849, with Gustave de Molinari's book *Les Soirées de la Rue Saint-Lazare (The Evenings of the Rue Saint-Lazare)*. This work follows of a series of conversations between three individuals of differing worldviews—a conservative, a socialist, and an economist—with the role of the economist played by Molinari himself. This character openly proclaimed his demands for the introduction of “free governments whose services I can accept or refuse according to my free will” (1849: 305). Molinari, a Belgian political economist and classical liberal theorist, is renowned as the first proponent of anarcho-capitalism (e.g. by Rothbard, Hoppe) and the originator of the theory of market anarchism (e.g. by Long) for the essay ‘The production of security’ (1849b). In it he describes how a market in justice and protection services could gainfully supplant the state; and this is rightly recognised as an anarchistic concept of governance. However a multiplicity of governance units within the same territory is implied in the work, and the implementation of his idea would consist in allowing competition amongst non-territorial governments, so Molinari should also be recognised as a ‘proto-panarchist’ (Tucker 2015).

Moreover, Molinari's ideas came to influence the later inventor of panarchism. The concept was first proposed in 1860 by the Belgian botanist, litterateur, and political economist, Paul Émile de Puydt, in his seminal article ‘Panarchie’ from the *Revue Trimestrielle, Bruxelles*. In what is the first full statement of the idea of non-territorial states, proponent of laissez-faire economics de Puydt applied Molinari's idea of economic competition to social and political relationships. He wrote that “governmental competition” would allow “as many regularly competing governments as have ever been conceived and will ever be invented” to exist simultaneously and detailed how such a system would be implemented (1860: 229). According to de Puydt, many governments freely chosen by

individuals would co-exist side by side in the same territory, and supply more efficiently those services currently provided by monopolistic territorial states.

But de Puydt's argument was not limited to economic and public sector efficiency, and was written at the time as a proposal to resolve the political schisms of Belgium. Flemish nationalism 'imagined its community' (Anderson 1982) predominantly along cultural-linguistic lines and from the 1850s had begun to demand a parallel public life separate from the Francophone cultural and political elite (Hooghe 1993). Eventually Belgium would settle on a quasi-panarchistic form of dual federalism (as discussed later), although this happened quite apart from de Puydt's proposal.

In his own time, nothing came of de Puydt's ideas—no theoretical debate, no practical experiment—his work was largely ignored until the historian of anarchism Max Nettlau rediscovered it half a century later. In 1909 Nettlau wrote an article for Gustav Landauer's *Der Sozialist*—titled 'Panarchy: A forgotten idea of 1860'—that relayed de Puydt's theory of coexisting competing governments with a certain enthusiasm for the idea. Then once more the idea of non-territorial states lay dormant for some time.

Through the second half of the twentieth century John Zube became the most well known advocate for panarchism and developed an archive of related materials. For Zube, "Panarchism is nothing but the freedom to disassociate and to associate—consistently applied in the last spheres where it is so far not realized, namely in political, economic and social relations" (1986). And moreover, the people in any group need not be territorially united; non-territorial associations will serve them as well as they serve churches and sects:

The realization of as many different and autonomous communities as are wanted by volunteers for themselves, all non-territorially coexisting, side by side and intermingled, as their members are, in the same territory or even world-wide and yet separated from each other by personal laws, administrations and jurisdiction, as different churches are or ought to be (Zube 1986).

Zube was also sure to distinguish panarchism from anarchism, as a political normative *meta-theory*, not a prescription for politics at an operative level. Under panarchism people can associate and dissociate with states voluntarily, whereas under anarchism any form of state would be prohibited. Panarchy is many states; anarchy is none. The two are only compatible when panarchism is conceived as a meta-theory. Anybody from the most statist communist to the most individualist anarchist could have the government they wish under panarchism: anarchism for anarchists, communism for communists, capitalism for capitalists, and so on.

There has been something of a revival of panarchist political theory and philosophy in the later twentieth century and today. Some contributors are stated panarchists while others propose hybrid normative theories in which non-territorial jurisdictions combine with more traditional territorially based politics. A forthcoming volume edited by Aviezer Tucker and Gian Piero de Bellis collects the classical foundations and new works (Tucker & de Bellis 2015). Modern contributors relate panarchist theory to contemporary political, social, and economic theory, in the context of recent technological innovations and historical changes. This thesis' blend of public choice and Austrian economics, applied in the context of cryptographic technologies, is a prime example.

Aviezer Tucker provides the leading modern exposition and definition of panarchism: “a normative political meta-theory that advocates non-territorial states and explicit social contracts between citizens and states, formalized as constitutions” (2015: 1). States in panarchy are distinguished from traditional Westphalian states in two fundamental respects: (1) they eschew territorial sovereignty; and (2) they offer explicit social contracts. Tucker reiterates the central tenet of panarchism—the separation of geographical location from citizenship so that people can be citizens of states irrespective of where they happen to live. Instead a market mediates citizenship relations, so as to radically reduce political-jurisdictional transaction costs and “facilitate and accelerate rational geographical relocation and political realignment” (2015: 1). He envisions a process of creative destruction in political offerings, whereby efficient, innovative states proliferate at the expense of inefficient or non-preferred political enterprises.

In underlining the non-territorial aspect of panarchism, Tucker brings to bear another point of difference with anarchism, which typically has a territorial dimension. Much of contemporary left-anarchism is very visibly anti-globalist; and experimental anarchist communities and even anarcho-capitalist enterprises (e.g. private cities, seasteading) are couched in territorial terms. A notable exception is the emergence of cryptoanarchist enterprises (e.g. Bitnation), which may come to exemplify the panarchist ideal: citizens connected in digital networks non-territorially seceding without erection of borders or movement of people.

The next panarchist point of difference is with the contractarian justification for traditional Westphalian nation-states. Panarchist theory conceives of *explicit* social contracts between citizens and non-territorial states, as opposed to the *hypothetically consented* social contract that is supposed to legitimate the territorially monopolistic nation-state. In fact panarchism, anarchism and social contractarianism share similarities in this respect: voluntary consent is the primary legitimising basis of social interaction and is the normative foundation for each political order. The difference is that social contracts are *explicit and real* (contra nation-state theorists) and between *citizens and states* (contra anarchists).

Tucker (2015) uses social contract theory to update Zube's original point about the panarchism-anarchism distinction (i.e., as a normative meta-theory), while also drawing distinction to contractarian thought. Classical contractarian political theory reasons from a mythical-historical pre-social situation, consent is hypothetical, and the social contract is metaphorical. Contrarily, the social contract is literally a negotiated and signed contract in Tucker's interpretation—and the process takes place in 'particular circumstances of time and place.' It should be noted that contemporary social contract theory claims that the hypothetical-actual divide is in fact contrived, and that hypothetical consent is meant to model, and provide the basis for, actual consent. While this might be so, and thought experiments can certainly be useful in this regard, the fact remains that the heuristic device has never *actually* been deployed in this way. Nation-states today are not formed by mutual agreement—actual, hypothetical, implied, or otherwise.

Contractarianism in panarchy also differs to classical contractarianism on the level of abstraction in the object of agreement (i.e., how fine-grained is the contract). Traditional contractarian political theories (Hobbes, Locke, Kant, Rawls, Nozick) attempt to detail the contents of a social contract. Thus the likes of Hobbes and Locke could specify their preferred terms of political association and the citizen's obligation to obey the state, because they intuited in a wide frame of comparison (i.e., life under anarchy vs. life under government). However, it becomes more difficult to hypothesise consent on more fine-grained agreements about the various functions of government. The panarchist says nothing about the contents of the social contracts and the kinds of states that might be agreeable—no such 'one size fits all' social contract could ever exist.

According to Tucker, classical contractarianism is founded on the premise of “absolute homogeneity of people who should have the same interests, information and risk analysis and tolerance” (2015: 6). Hypothetical agreement presupposes homogeneity, actual agreement presupposes heterogeneity—otherwise there would be no scope for bargaining and a single individual could indeed rationally deduce the optimal constitution for all of society. The fact of heterogeneity is what necessitates constitutional covenant in the first place. Evidently political conflict does persist in spite of the social contractarian legitimated, territorially monopolistic nation-state. Consequently, and importantly, panarchist theory locates the *source* of political conflict in the very presumption of homogeneity.

The fact of heterogeneity and the impossibility of rational construction require that political choice be founded on trial and error and experimentation. Thus panarchism “is closer in this respect to empirical science than to rationalist philosophy” (Tucker 2015: 7). Each political exit and entry represents a likely improvement, or at least an *ex ante* expectation of improvement. The iterative entry and exit into social contracts generates political conjectures and refutations, an evolutionary process akin to Popperian growth of knowledge (1963). No such mechanism exists in contractarian political theories—rather they posit a universally optimal social contract and model of the state that need not be adapted in light of later experiences. Panarchism is empirical, evolutionary, and historical, whereas classical contractarianism is rational, timeless, and ahistorical.

It is useful to put the non-territorial states concept in the context of James M. Buchanan's contractarian thought. He, too, was concerned with justifying constitutional orders of social and political institutions, but took a more nuanced approach:

We start from here, from where we are, and not from some idealized world peopled by beings with a different history and utopian institutions. Some appreciation of the status quo is essential before discussion can begin about the prospects for improvements. (1975: xv)

Thus constitutional theorising should not be ahistorical, nor should it attempt to rationally construct a model state *ab initio*, but there is some scope for justification of beneficial state forms. Buchanan developed a two-stage social contract theory: the constitutional and post-constitutional. The object of the constitutional stage is to contract for a system of constraints that promote an appropriate predation-production balance in society. Buchanan calls this the 'protective state.' The second, post-constitutional stage involves a calculus over what public goods will increase the productive possibility of society, which he calls the 'productive state.'

In the two-stage framework, granted, the theory of panarchism does not advocate any particular universal social contract, as Tucker suggests. It says nothing about the design of the productive state in the post-constitutional stage, nor does it necessarily approve of the protective state. But it *does* still make a certain conjecture at the constitutional stage: the non-territorial rule is reified in place of the rule of territorial monopolism. The claim is that citizens would sooner agree to a constitution with full freedom to enter and exit non-territorial political associations than the protective, traditionally conceived nation-state. And this really is the crux of the debate. Which system of rules promotes greater productive capacity and overall social welfare in a society: some particular universal social contract that has been rationally constructed, a more minimal protective state based on the Westphalian principle of territorial monopolism, or the panarchist meta-political framework in which multiple non-territorial states exist simultaneously?

Schlick states

While the political philosophy of panarchism laid dormant for much of the twentieth century, similar concepts appeared. One such proposal is found in a small booklet titled *Natur under Kultur* written by Moritz Schlick, the founder of the Vienna Circle and the philosophical school of logical positivism. He had intended this to become his magnum opus, broaching topics like culture, morality, history, war, and other political problems, but died prematurely in 1936 (Schleichert 2003). It wasn't until 1952 that this work surfaced, after a former student edited and released the manuscript. There is a certain irony in the founder of logical positivism proposing a political system that more closely resembles to a critical rationalist epistemology. Notwithstanding, Schlick advocated non-territorial states founded on explicit social contracts:

Suppose that the separation according to political convictions replaces the separation by geographical states. In such a case there would be no countries in the usual sense, but political organizations, the members of which would live scattered over all continents. Each of these invisible communities could have its own laws and costumes, its courts, police, and state form. There could be invisible republics and monarchies, but the presidents and kings would not rule over territories, but only over such people as voluntarily belong to their state. Since human convictions can change, it follows from the very principle that one can at any given time move from one organization to another (Schlick 1952: 102-3).

Schlick advocated a federation of states not defined by geographical borders, but by the people who freely decide to become their citizens. His motivation was to reduce the likelihood of wars between states, questioning whether if states were defined non-territorially, then territorial conflicts would disappear. Moreover, he thought that conflict *within* the state could also be resolved by devolving authority non-territorially: “the essential presupposition is that the members of the group live intermingled, for as soon as there is a territorial separation, new interests and complications arise” (1952: 103).

It is worth interpreting his idea in historical context—he was writing between World Wars, in a time when the nation-states in Eastern Europe had been carved out of the former multi-ethnic empires, amid much aggression and nationalistic hysteria. The

Ottoman Empire had dissolved and with it the non-territorial millet system disappeared, and the non-territorial national-cultural autonomy model slated for Austria-Hungary failed to eventuate (both discussed later). ‘Schlick states’ resembles to both of these systems: each group a diaspora distributed over the whole territory and thus a minority locally, and none with local territorial exclusivity. In his view if groups were not concentrated territorially it would both reduce the possibility of aggression and the vulnerability of minorities.

Moreover, Schlick did not limit the prospect of non-territorial states to national or cultural groups, but extended the right to self-determination—including the right to secede from any existing state and establish a new one—to any group sharing some abstract political or moral principle. Thus, in principle, a capitalist state and a communist state could operate simultaneously in competition for each other’s citizens. And moreover, his system was protective of territorially dispersed *ideological* minorities as well as ethnic or cultural ones.

Parallel poleis

Yet another related concept—this time for ideological affinity groups and not national or cultural self-determination—is found in the samizdat writings of Czech dissident Vaclav Benda. He wrote a short seminal tract called ‘Parallel Polis’ (translated into English in 1978 and later published in 1988) in which he made a philosophical call for his fellow dissidents to abandon hope that the repressed social, economic and political institutions in Czechoslovakia could be changed by protest. He outlined a vision of an independent civil society not oppressed by laws and decisions of communist authorities. Alternative economic, cultural, educational, scientific, and political institutions were to be incubated in the parallel polis, to shadow the ruling authoritarian regime, and to one day supplant it. Essentially this was a call for *de facto* non-territorial secession for the purpose of discovering superior institutional rules and outcompeting the incumbent state. While there

is no evidence that Benda was influenced by any of the preceding writers on panarchy or by Schlick, his parallel polis does share many similarities.

As a prominent dissident he was targeted by communist authorities and eventually imprisoned, and the notion of parallel states in Czechoslovakia was crushed. Later, following the overthrow of communism in the Velvet Revolution, the idea of Parallel Polis vanished from the political consciousness. However it has since been revived by a group of Czech political activists and bitcoin entrepreneurs, under the guise of the ‘Cryptoanarchy Institute.’ Much like Benda, this group is committed to a parallel, decentralised economy and seek independence from the prevailing state system. Instead of samizdat and secretive personal networks they use cryptographic technologies to disseminate information and fashion non-territorial, shadow institutions.

Utopia of utopias

In his 1974 book *Anarchy, State, and Utopia*, Robert Nozick developed a ‘framework for utopia’ that likens to the non-territorial states concept. The last third of this book presents a philosophical reinvention of the theory of clubs. He argues that conditions of free competition will enable the best ‘utopian’ political communities to emerge spontaneously; but also that a single, private, protective agency would arise naturally from anarchy, forming what is in effect a *de facto* ‘state.’ Thus the function of the state should be to protect individual rights and ensure that contracts and other market transactions are voluntary, and any expansion of state power beyond this minimalist threshold is unjustified. Nozick’s framework for utopia is therefore akin to Locke’s night-watchman state, or Buchanan’s protective state.

Nozick poses a thought experiment in which citizens can secede costlessly to new states, in terms of both the cost of mobility between existing states and even the cost of creation of new states. While these are far from real world assumptions, his point is to prompt examination of the patterns that might emerge from this idealised process of exit and

creation. In Nozick's view, what emerges is a competitive market for association, one that eliminates free riders and negative externalities. That is, the power of exit creates an efficient market for public goods. Nozick's framework for utopia is essentially a system of competitive clubs with voluntary entry and exit (Tiebout 1956; Ostrom, Tiebout & Warren 1961; Buchanan 1965). Each citizen will end up holding membership in that club which best satisfies their preferences, and secure a net value from the club that is at least equal to the value of his contribution to other members.

Nozick argument is based on the premise that there is no one and only 'best state' that could meet the requirements of all citizens. Indeed, there may be many best states built on a plurality of political preferences. In this case, the very idea of designing a state to be implemented from the top down is self-defeating—the best states are likely to emerge spontaneously. The task of political philosophy therefore is to explicate the necessary conditions for such a spontaneous emergence; and similarly, the task for political organisation is to implement the conditions of free competition between political systems.

Nozick's utopia is actually a meta-utopia consisting of a diverse and wide range of voluntary states. In fact, many apparently conflicting political associations may exist simultaneously, though ultimately under the auspices of the minimal state. The resemblance to the political philosophy of panarchism is clear enough: those who favour capitalism can live in a capitalist utopia and those who favour socialism, a socialist one. One might go so far as to suggest that Nozick provides a philosophical underpinning for panarchism, though it is extremely unlikely that he was ever aware of the political theory.

Virtual cantons

In 1993 Roderick T. Long outlined a form of political organisation he called 'virtual cantons.' He proposed a radical decentralisation of power and the decoupling of political jurisdiction from geographical location so that people could switch political jurisdictions without switching location. However, Long did not argue for the dissociation of jurisdiction

and territory at the national level, only the local level. ‘Local’ in this context is no longer a geographical concept but a structural one, defined as closeness to people—it is proximate social distance, not physical distance.

Each virtual canton would pass its own laws and provide its own enforcement, and citizens would be bound to only their own virtual canton, along with the national legislature. The role of the national government would be to regulate relationships among cantons, set guidelines for the adjudication of disputes among members of different cantons, resolving conflicts between laws of different cantons, and so forth; but within that nationally-determined framework, there would be free competition among virtual cantons.

Long argues that a purely majoritarian system creates negative externalities for minorities and thus his virtual canton system is more fair. That is to say a system of virtual cantons would presumably internalise these externalities: the majority cannot coerce minorities into supporting their preferred policies and must bear the full costs themselves. Any group that is opposed to policy *X* need not be subjected to it, and may instead join a virtual canton offering their preferred policy *Y*. Long suggested that the national government has a vital role to play here in providing coordination among the policies of the various cantons; however, it must be severely restricted in its powers, or the whole purpose of decentralisation will be defeated. If not, the cantons will degenerate into special interest blocs vying for centralised power.

This is an intermediate or hybrid position between the territorially sovereign state and a pure system of non-territorial governance. In essence a political market is constructed within the territorially sovereign state, which acts both as a regulator of inter-canton competition as well as a protector from foreign and domestic conflict. Thus it shares a similarity to Nozick’s and Buchanan’s conceptions of the minimal state: the sovereign state continues to exist, albeit with fewer responsibilities, and where most have been taken over by competitive (non-territorial) political enterprises.

Functional overlapping competing jurisdictions

Yet another related concept is ‘functional overlapping competing jurisdictions’ (FOCJ) advocated by Swiss economists Bruno Frey and Reiner Eichenberger (Frey & Eichenberger 1999; Frey 2001). This begins with an appreciation of the benefits of decentralisation, and of federal political structures, over a unitary state. Namely, a decentralised system is more flexible with respect to the way it fulfills the diverse political preferences of the citizenry; more efficient due to competition and the possibility of entry and exit (citizen mobility between jurisdictions); and more innovative in the supply of public goods and the tax schemes offered by jurisdictions, due to competition but also because the risks associated with innovation are less for smaller political units. The purpose of FOCJ is to promote competition between government units, in contradistinction to territorially monopolistic government that suppresses competition, as this will ultimately improve the welfare of citizens. This is a well-known line of argument, based on four important theoretical pillars: (1) fiscal equivalence (Olson 1969); (2) the theory of clubs (Buchanan 1965); (3) voting with feet (Tiebout 1956); and (4) exit and voice (Hirschman 1970).

Going beyond this, Frey and Eichenberger argue for an active institutionalisation of competition between political units, in the form of a new type of federalism, sometimes referred to as ‘functional federalism,’ or ‘functional, overlapping, competing jurisdictions’:

Functional (F): the new political units extend over variable areas, corresponding to the tasks or functions to be fulfilled

Overlapping (O): in line with the many different tasks (functions), there are corresponding governmental units extending over different geographical areas, which necessarily intersect

Competing (C): individuals and/or communities may choose to which governmental unit they want to belong, and they have political rights to express their preferences directly via initiatives and referenda

Jurisdictions (J): the units established are governmental; they have enforcement power and can, in particular, levy taxes (Frey 2001: 165)

This is a hybrid form of non-territorial political organisation; the notion that a government must have its own territory that is normally taken for granted no longer holds. In such a system there might be (in fact there likely will be) several governments within the same territory and even governments without territory.

Frey also makes mention of precedents to these concepts. Some federal political structures can already be considered systems with several governments in the same territory; for instance, special districts in the United States and cantons and political communes in Switzerland. Quasi-government organisations (QANGOs), international organisations such as the United Nations, religious organisations such as the Catholic Church, sports organisations such as FIFA, and even multinational corporations, can be considered forms of government without territory, or overlapping with existing territorial governments.

The claim that a network of FOCJs can replace monopolistic territorial governance is likewise a claim that public goods do not require a territorial basis for provision. However, commentators have contested this and argued that some sort of territorial institutional layer supporting the FOCJs would need to be included; for instance, for enforcement, legal systems, regulation, and so on (Eichberger 2001; Kerber 2001). This doesn't dampen the central message though, that territorial monopoly is not always necessary; and the concept is a valuable step in exploring alternative government structures. Frey concludes:

Functional, overlapping, and competing jurisdictions break with the ingrained notion that a government must have a well-defined territorial monopoly, but the constitutional proposal advanced here is not utopian. It has significant support from related developments stretching back for centuries, and it is also in accordance with the emergence of virtual governments in the recent past (2001: 171).

Multi-level governance

Liesbet Hooghe and Gary Marks (2001; 2003) make the distinction between two types of multi-level governance: type I, based on bundled, non-intersecting, durable, general-purpose jurisdictions; and type II, based on unbundled, intersecting, flexible, task-specific jurisdictions. Type I multi-level governance is very much the traditional conception of a jurisdiction. It pertains to jurisdictions at a limited number of levels (i.e., international, national, regional, meso, or local) and is intended to be territorial. Type II multi-level governance on the other hand will likely contain a large number of jurisdictions, all working at different scales, and some of which might be non-territorially defined. In theory they should be designed specifically to minimise spillovers and thus limit the costs of inter-jurisdictional coordination, thus resembling closely to Frey and Eichenberger's FOCJs.

Hooghe and Marks seek an explanation of why governments tend to be organised across multiple levels, as either type I or type II. More specifically, they test the hypothesis that efficiency determines these multi-level political systems; making the suggestion that efficiency constrains the common government structures we tend to see (i.e., so as to converge on efficient adaptations). In setting up the theoretical base of their analysis, the authors cover much the same economic theory of federalism literature as Frey: Olson, Tiebout, and so on. But their analysis is also rooted in the informational efficiency argument of F.A. Hayek's famous paper, 'The use of knowledge in society' (1945).

Hooghe and Marks investigate similarities and differences between the policy areas designated to various levels of government around the world, to establish the prevalence of type I and type II governments. They find that government structure, "from the local to the global level exhibits some simple design properties that appear robust across a wide variety of contexts" (2003: 226). Local governments have similar policy portfolios across the developed world, and as we move higher towards the international level, territorial authority becomes weaker and biased toward task-specific government. That is, type I government is more prevalent at lower levels, and type II at higher levels; and the authors offer an 'efficient adaptation' argument for why this is the case. Overall, their work is a fruitful empirical counterpart to the theoretical exposition of Frey and Eichenberger.

Historical and contemporary cases of non-territorial unbundling

The guiding principle behind the system of governance we have today is territoriality—sovereign, monopolistic nation-states claim absolute political authority within their respective fixed territories. Non-territorial unbundling may therefore appear radical to people who have only known and lived in nation-states. However, there are a number of historical precedents to the non-territorial governance concept. Indeed, while territorial, political monopolism is largely taken for granted today, somewhat surprisingly, for much of human history there were no such monopolies. There are records of non-territorial-like systems of governance dating back as far as ancient Greece, Sparta, and Rome; the medieval Icelandic Free Commonwealth; and the Hanseatic League of the late-middle ages and early modern period. While in more recent times examples include multi-ethnic ‘non-territorial consociation’ in nations such as Belgium, Cyprus, and Norway; practices associated with foreign embassies and consular jurisdictions; as well as maritime ship dressing conventions.

Ancient times: Greece, Sparta, and Rome

Cleisthenian Attica, in ancient Greece, administered what might be termed a ‘para-territorial’ system of governance, with ten states governing dispersed citizenries in parallel in a non-contiguous, federal structure (Lévêque, & Vidal-Naquet 1996). Geography was divided into three territories, which were then each divided into ten ‘thirdings,’ with over a hundred geographically dispersed villages distributed over the thirty thirdings. A thirthing from each territory, and its associated villages, were then recombined into the ten para-territorial states. Essentially the system of governance comprised of ten competing jurisdictions of about a dozen dispersed villages, and of equal size and strength, layered within the territory. They each contributed generals, brigades, magistrates, jurors, councilmen and administrators proportionally for the centrally administered (bundled) functions of governance, with any remaining services the province of the ten parallel states (Pomeroy 1999)—ancient non-territorial federalism.

In ancient Sparta, the ‘perioeci’ were an autonomous group of free but non-citizen inhabitants of Sparta. They enjoyed Spartan protection but were free to manage their own communities, and were the only people allowed to freely travel between cities, even Spartan full-citizens were not permitted to do so (Liu 1925). In this sense, we can say that for the perioeci the ‘defence’ or ‘protection’ function of governance remained bundled to the central Spartan state, yet the remaining functions of governance were unbundled and provided by the non-territorially-defined perioeci community.

In ancient Rome, citizenship was granted to all people within Roman territories. After the fall, however, non-territorial governance again prevailed, under what became known as the ‘Personality of Laws’ (Phillipson 1911). Romans, Lombards, Alemanns, Burgundians, Goths, Franks, and so on, managed their own communities and lived by their own laws within the encompassing Roman territory (Gibbon 1830). A Roman would be subject to customary Roman law while living in Burgundy, and a Goth living in Alemannia could adopt Roman law if so desired (Liu 1911). People could even claim allegiance to a community and its laws regardless of where they lived, and it was possible to change allegiances.

Medieval times: Icelandic Free Commonwealth

The Icelandic Free Commonwealth of the middle ages is a curious historical example of non-territoriality. This system of governance was composed of both territorial and non-territorial ‘Things’; a generic term for courts and assemblies (i.e., jurisdictions). The national legislative assembly was known as the All-Thing, and beneath it were four territorial Quarter-Thing jurisdictions, much like a contemporary federal structure. However, below each territorial Quarter-Thing were three to four non-territorial Varthings, and under each Varthing were three non-territorial Things, which were the constitutive governance units of the Commonwealth. This meant that citizens of the Icelandic Free Commonwealth were free to choose membership in any of nine or twelve Things operating within the geographical region that they resided (Friedman 1979; Solvason 1993).

Each Thing had a chief, or Godhi, who appointed judges to the courts and represented his members (Thingmen) in higher-level assemblies (the Varthing and the Quarter-Thing) and the national legislature (the All-Thing). The main function of governance provided by each Thing was of course protection; but each one also had its own judiciary for resolving intra-Thing disputes between its Thingmen and bargaining with other judiciaries over inter-Thing disputes. The lowest Thing-level therefore resembles a market for governance, as Thingmen-consumers paid their Godhi by ‘fee and favour’; and could easily switch membership simply by making a witnessed public pronouncement and henceforth paying membership fees to their new Thing, ‘voting with their tributes.’ Moreover, since switching costs in this market were far smaller than they would have been in an otherwise territorial Thing-system, Godhi were not able to extract rents (i.e., fees and favours) from their thingmen in excess of a fairly minimal, competitive level (Friedman 1979; Solvason 1993).

Not only does this demonstrate the virtue of competitive/contestable markets for governance, with the right to opt out or dissociate from a monopolistic state, but it also prompts an exposition of non-territoriality and the theory of countervailing power and ‘stationary bandits’ (Kurrild-Klitgaard & Svendsen 2003). Mancur Olson argued that under anarchy, communities are prey to ‘roving bandits’ that plunder and destroy their property, extracting rents and moving on (1993; 2000). This generates incentives for a stationary bandit, essentially a tyrant, to assume the protective function of governance and expel the roving bandits, if only to monopolistically extract rents themselves through taxation. Overall, however, this sows the seeds of civilisation; creating incentives for the people encouraging economic success and further incentives for the tyrant encouraging good governance. While this is an improvement on plunder by roving bandits, the people are still subject to an absolute tyrant and pay a monopolistic price for such governance.

Countervailence theory states that institutionalised mechanisms of diffusing power (i.e., two or more centres of power) provide counter-forces within a polity, thereby limiting the ability of rulers to oppress the people. Today this idea is most commonly expressed by constitutional separation of powers, but we can see that the Thing system of medieval Iceland provided a non-territorial system of countervailing power. In a sense Hobbesian territorial sovereignty was replaced not by the concept of checks and balances and

countervailing institutional sovereignties (as would later occur in seventeenth-century English constitutional theory) but rather by market-like competitive constraints and citizen sovereignty (Friedman 1979; Solvason 1993). The system of governance evolved from roving bandits, to a stationary bandit, and then to stationary *bandits*, plural; although the term bandits is perhaps inappropriate here given the competitive constraints of the non-territorial approach. Moreover, this medieval polycentric system of competitive governance appears to have been quite robust, having persisted for over three hundred years (930-1262).

Pre-modern times: Ottoman Empire millet system

The millet system was central to the Ottoman social system, which was multi-cultural and multi-religious in character. Different religious groups were administratively separated, with each denomination constructed as a legal entity and assigned specific communal rights and privileges. Millets enabled non-Muslims to cultivate a sense of identity and belonging to their communities, while protecting their culture, traditions, language, and religion. Millets were essentially partial ‘states within the state,’ albeit under the ultimate jurisdiction and authority of the Sultan and the encompassing empire (Barkey 2005; 2008).

Millet (“religious community,” or “people”)—in the heterogeneous Ottoman Empire (c.1300-1923), a millet was an autonomous self-governing religious community, each organised under its own laws and headed by a religious leader, who was responsible to the central government for the fulfillment of millet responsibilities and duties, particularly those of paying taxes and maintaining internal security. In addition, each millet assumed responsibility for social and administrative functions not provided by the state, conducting affairs through a communal council without intervention from outside. From 1856 on, a series of imperial reform edicts introduced secular law codes for all citizens, and much of the millets’ administrative autonomy was lost (Encyclopædia Britannica Inc., 2014).

The millet system was an institutional framework comprising multiple religious, political sub-units—the millets—that were themselves divided into ethno-linguistic,

exclusive and national groups. As such, the Ottoman Empire was able to absorb quite a lot of diversity and claims to self-determination. As Benjamin Braude and Bernard Lewis point out, the millet system was not a “uniformly adopted system” but, on the contrary, was a “series of ad hoc arrangements made over the years, which gave each of the major religious communities a degree of legal autonomy and authority with the acquiescence of the Ottoman state” (1982: 12-13). Essentially, this institutional mechanism was applied when and where it was deemed appropriate, not in a ‘one size fits all’ manner, or as a panacea to ethnic conflict or diversity management. Non-territorial governance practices were allowed to emerge quite naturally, as specific sub-group denominations required them, and in line with the pragmatic goals of the Ottoman Empire (Barkey 2005; 2008).

The Ottomans recognised non-Muslim communities as integral parts of the empire, and they were subsequently allowed a degree of autonomy, particularly with reference to matters of religion and culture. Millet comes from the Arabic word for “nation,” indicating that the Ottomans considered themselves the protectors of multiple nations. As such, the non-Muslim communities were organised so as to give minority religious, ethnic, or geographical communities a limited amount of power to regulate their own affairs, under the overall supremacy of the Ottoman central administration, of course. Each community was responsible for the allocation and collection of its taxes, education, personal status issues such as marriage, divorce and inheritance, and other local public goods (Braude & Lewis 1982; Barkey 2005; 2008).

Each millet was allowed to elect its own religious figure to lead them. The leader was charged with collection and payment of taxes to the Sultan, and obedience to the empire. They could allocate taxes and spending within their millets and were allowed to enforce their religious rules on their people. This meant that the Muslim millet, while dominant, could not impose Islamic law (Shariah) on non-Muslims and had no direct jurisdiction over them. This separation mechanism had the effect of ensuring that no single authority could dominate the whole community, whether Muslim or non-Muslim (Braude & Lewis 1982).

In cases of crime, people would be punished according to the rules of their own religion, not Islamic rules or rules of other religions. That is, if the crime was involving two people

of the same millet, the case would be heard in their court, or if it involved two people from different millets the case would be decided in the court of the aggrieved party. The only exception was if someone from the Muslim millet were involved, in which case the Muslim court would be used whether the Muslim was the victim or perpetrator. Further, non-Muslims were not obliged to always use their own court, and also had recourse to Muslim courts if they wished (Braude & Lewis 1982; Barkey 2005; 2008).

Before the period of reforms in which the millet system was introduced, the term actually referred to the community of Muslims in contradistinction to *dhimmis* (non-Muslims). In this sense, then, originally there was one millet in the Ottoman Empire, the Muslim millet, which was then added to as additional religious and ethnic groups were subsumed into the polity. The first Orthodox Christian millet was established in 1454, shortly following the conquest of Constantinople, bringing Orthodox Christians into a single community under the leadership of the Patriarch who had considerable authority given to him by the Sultan. Armenian Christian, Jewish and other millets followed in due course; at its full development the millet system comprised over a dozen 'states within the state' (Braude & Lewis 1982; Barkey 2005; 2008). The millet system was used as part of a broader strategy for controlling the new conquered territories by affording them self-governing privileges and thereby taking advantage of already existing institutions (Barkey 2005; 2008). The millet system appears to have been quite robust in this respect, having persisted for over six hundred years (c.1300-1923).

The Ottoman millet system provides an example of how non-territorial jurisdictions can be used to recognise and satisfy the preference of sub-groups within an overarching polity, thereby contributing to the successful management of diversity. It is consistently defined as a form of social organisation with *religious* character composed of *ethnically* defined sub-groups. Yet arguably it might prove instructive to contemporary problems of diversity management; for instance in trying to satisfy diverse political preferences in heterogeneous modern polities. That is to say, in abstracted form, the millet system or some non-territorial jurisdictional variant, might apply in light of the *partisan* character of modern polities and their *ideologically* defined sub-groups.

Modern times: Austro-Hungarian Empire

The idea of non-territorial federalism was developed by Austrian Social Democrats Karl Renner and Otto Bauer at the beginning of the twentieth century to accommodate the considerable ethno-national diversity of the Austro-Hungarian Empire. It has variously been referred to as national personal autonomy and national cultural autonomy, and has been evaluated in theory and practice in Coakley (1994), Nimni (2004, 2007, 2015), De Villiers (2012), and Nimni, Osipov & Smith (2013).

Karl Renner made the first proposal in his 1899 essay ‘State and nation,’ but it was Otto Bauer’s 1907 book *The Question of Nationalities and Social Democracy* that provided a more complete exposition. He advocated the radical dissociation of the nation from territory, thus remaking the nation as a non-territorial association. Geographically dispersed members of the same ethnic groups were to be gathered so as to “organize nations not in territorial bodies but in simple association of persons” (1907: 696). He called this the ‘personal principle’ in opposition to the Westphalian territorial principle.

Austro-Hungarian politics was dominated by disputes among the eleven principal national groups, so their proposal was to decouple (i.e., unbundle) certain functions of governance (relating to culture, education and justice) from geography and allow the various national groups to administer them non-territorially. That is, autonomous, non-territorial, ethno-national councils would have authority to legislate in matters of cultural policy and education, and appoint representatives to the national legislature for the remaining functions of governance. Jewish Labour Bundist Vladimir Medem encapsulated the proposal in his essay ‘Social democracy and the national question’:

All citizens belonging to a given national group would join a special organisation that would hold cultural assemblies in each region and a general cultural assembly for the whole country. The assemblies would be given financial powers of their own: either each national group would be entitled to raise taxes on its members, or the state would allocate a proportion of its overall budget to each of them. Every citizen of the state would belong to one of the national groups, but the question of which national movement to join would be a matter of personal choice and no authority would have any control over his decision. The national

movements would be subject to the general legislation of the state, but in their own areas of responsibility they would be autonomous and none of them would have the right to interfere in the affairs of the others (Medem 1904: 279-80).

Both Bauer and Renner were at various times in positions of power in the Austria-Hungary government, but were unable to bring about their theoretical system. This was a period of ‘national awakening’ in Europe preceding the two World Wars—the tide of nationalism took hold and the non-territorial proposal was swept away with the collapse of Austro-Hungarian Monarchy and disintegration of the Empire.

Belgian dual federalism

Belgium provides an interesting modern example of composite territorial and non-territorial federalism. The Belgian federation has three levels: a federal government, regional governments, and community governments. Belgians are members of both regional units and autonomous communities, and of course all Belgians are covered by the federal state. The federal level governs functions relating to justice, defense, federal police, social security, public finances, nuclear energy, state-owned companies, and foreign affairs (i.e., relations with NATO and the EU). The regional governments provide functions of governance that are broadly connected to territory; for example, agriculture, water policy, the environment and conservation, transport, town planning, public works, oversight of utility companies, and so on. The community governments oversee functions of governance that are not explicitly territorial; such as education, culture, language, health, youth services, social welfare, immigrant assistance services, and more (Hooghe 1993, 2004; Deschouwer & Reuchamps 2013).

The three regions of Belgium are: (1) northern provinces (Flanders), (2) southern provinces (Wallonia), and (3) an enclave within the Flemish region (Brussels-Capital area). People living in these regions are subject to the regional governments for territorial functions of governance. There are also three communities, although they do not coincide perfectly with the regions (i.e., there is some overlap): (1) the Dutch-speaking *Vlaamse*

Gemeenschap (Flemish community), (2) the French-speaking *Communauté Française* (French community), and (3) the German-speaking *Deutschsprachige Gemeinschaft* (German-speaking community) (Hooghe 2004; Deschouwer & Reuchamps 2013).

Technically, the communities are decoupled from territory, however they are delineated on the basis of ‘language areas’ that do have geographical boundaries, which confers upon them a *de facto* territoriality. There are four language areas: (1) the Dutch language area, which coincides with the Flanders region, (2) the French language area, which covers most of the Wallonia region, (3) the German language area, which is a small group of municipalities bordering Germany in East Wallonia, and (4) the Bilingual (French-Dutch) Brussels-Capital area. This means that the Flemish community has authority in both the Flemish and Brussels regions, the French community has authority in both the Walloon and Brussels regions, and the German-speaking community has authority in the small German language area within the Walloon region. As a result, there are five possible regional-community government combinations:

- (1) *If in Flanders: Flemish regional + Flemish community;*
- (2) *If in French language area of Wallonia: Walloon regional + Walloon community;*
- (3) *If in German language area of Wallonia: Walloon regional + German community;*
- (4) *If in Brussels: Brussels regional + Flemish community; or*
- (5) *If in Brussels: Brussels regional + Walloon community.*

Belgians living in the Brussels-Capital region have the choice between the Flemish and French community governments. This is a form of unbundled, parallel governance: non-territorial functions of governance have been unbundled from the territorial and there are two competing parallel units within the Brussels-Capital region. While it is unlikely that a French-speaking Belgian living in Brussels would choose the Flemish community unit, and vice versa, the basic design of the governance system is still non-territorial and evidently a good example of unbundled governance. And while it has not extinguished conflict altogether, the composite territorial and non-territorial constitutional architecture has certainly provided a manageable framework for mediating disagreements between Belgium’s three ethno-linguistic communities.

Swiss cantons, communes, and functional jurisdictions

In Switzerland, a multitude of governmental units exist, some of which are exemplars of non-territorial unbundled governance. Swiss citizens are subject to three legal jurisdictions: the commune, canton and federal levels. The Swiss Confederation is a federal republic consisting of 26 cantons, which have permanent constitutional status and, in comparison with other countries, a high degree of independence; each canton has its own constitution, and its own parliament, government and courts. Underneath the cantons are roughly 8,000 communes of various forms; 3,000 of which are political communes that define citizenship (i.e. a Swiss is not a citizen of the nation but of a political commune) and 5,000 of which are overlapping, functional special communes in the mold of Frey and Eichenberger's FOCJ's (Linder 1994; Obinger 1998).

Communes have considerable autonomy with wide-ranging authority to impose taxes on income and property. Tax rates between neighbouring political communes sometimes differ strongly, provoking inter-jurisdictional competition and conjectures of bundles of public services and taxes that are favorable to citizens. Political communes are responsible for many thousands of subsidiary 'communal units' that administer specific tasks such as hospitals, nursing homes, maintenance of sewage systems, refuse collection, and so on (Linder 1994; Obinger 1998).

In addition, the special communes are public jurisdictions that also levy their own taxes (the rates of which are determined at citizens' meetings) to fund the provision of various functions of governance; the most important of which are school communes (Linder 1994; Obinger 1998). Many of these 5,000 overlapping, functional governance units can be considered governments without territory (i.e., as rather they are defined by function), while this system can also be considered to have several governments layered within the same territory (i.e., as competing special communes overlap, and special communes providing different functions overlap, in certain areas). This is indeed an exemplar unbundled system of governance, with non-territorial components, and grants Swiss citizens a substantial degree of individual autonomy in choosing the kinds of associations, communities and institutions they wish to be connected to.

Non-territoriality today

Territorial disputes are at the core of most ethno-political conflicts and demands for self-determination, and while the traditional, territorial conception of federalism, or even secession, is often the first suggestion in search of a solution, this is hardly applicable when there are competing claims over territory. Similarly, in multi-ethnic states with territorially dispersed communities, traditional federalism fails to ensure fair representation of all ethnic identities, rights and concerns. And even when ethno-national communities are territorially concentrated and state power is dispersed over territorial federal sub-units relatively representatively, non-territorial minorities will not benefit from a traditional federal arrangement. Non-territorial federalism, however, has the potential to provide autonomy to territorially dispersed groups and non-territorial minorities. It can also be usefully applied to territorially concentrated groups that live outside their traditional homeland. At least in a generic context, a composite territorial and non-territorial federation offers a promising resolution to many ethno-political conflicts and demands for self-determination.

The Belgian and Swiss composite territorial and non-territorial constitutional architectures prove beneficial in two ways: (1) the non-territorial federal Belgian system helps mediate disagreements (over the unbundled functions of governance) between its primary ethno-linguistic communities, and (2) the overlapping, functional federal Swiss system promotes inter-jurisdictional competition and citizen preference matching (again, over the unbundled functions of governance). Both examples provide a glimpse into what a non-territorial unbundled future might look like; the question is then: why should we limit this constitutional architecture to ethno-national conflict and certain functions of governance? Why not extend it to mediate political and ideological differences? And moreover, why not craft a system of governance where people have the freedom to choose, and receive, the government they desire over *all* functions of governance?

The future? The role of technology

The unbundling of the territorial state may be already underway: technological developments, especially in areas such as cryptography and telecommunications, are shifting the balance away from purely territorial governance to more decentralised, non-territorial political forms. Such trends undermine the general purpose, territorial nation-state by opening up new governance structures and possibilities. Technology, of course, originally facilitated the rise of the modern territorially sovereign nation-state—military technology but also technologies of geographic and demographic legibility—but the relationship has now reversed as transnational organisations, global communications, and rival modes of public enterprise (non-territorial, functionally-specific) are increasingly rendering the work of territorial nation-states obsolete. Moreover, cryptographic technologies threaten to frustrate attempts at government legibility.

Global technological and economic trends—most obviously, the reduction of regulatory and economic restrictions on the movement of goods, people, ideas and money—have culminated in a truly borderless world where national, regional, and local government boundaries are of diminishing significance. That is, personal and economic activities can no longer be organised and controlled in discrete political-territorial units. An increasingly borderless world economy has stimulated some observable adaptations in governance. Firstly, while territoriality itself has not yet been undermined completely (and nor will it likely ever be), we have seen the efficacy of the nation-state frustrated and the economic centrality of urban-centred regions come into focus, with a correspondent regionalisation and decentralisation of governance. Indeed, moving even beyond this, the decoupling of markets and territorial states in global capitalism may in the future stimulate a correspondent decoupling of political jurisdiction and geographical location.

Another consequence of technological change is functional specialisation: special-purpose authorities, public-private partnerships, and third sector bodies are with increasing prevalence assuming functions of governance that in the past have previously been the domain of a moncentric, all-purpose government. Technological and economic advances have reduced the optimum scale of production in a wide range of industries, which is

undermining, albeit gradually, the logic of large scale centralised organisation. The growing obsolescence of large, highly capitalised, hierarchical organisation can be attributed to two factors: (1) reduced capital costs of information and material production, and (2) reduced transaction costs of coordinating action between individuals and organisations. The upshot is that parallel developments are driving this trend in many traditionally conceived functions of government, which is underwriting the rationale for small-scale, decentralised, and functionally specialised modes of governance.

This also points to the role of the Internet in creating non-contiguous communities of interest over distance, and the emergence of non-territorial public enterprises as alternatives to territorial administration for the provision of public goods and services. Technology has fed the rise of commons-based peer production in private enterprise and we should expect an attendant rise of commons-based peer production in public enterprise. Consider the drastically lowered costs of aggregating people with common interests and preference over collective goods, of taking concerted collective action in pursuit of said interests, and of sharing information on the efficiency and efficacy of such action, that is made possible with technological and economic developments.

Moreover, even when a particular collective good requires substantial capital outlays, networked technologies have radically lowered the costs of aggregating individual capital contributions. This could be termed the ‘Kickstarter effect,’ after the popular online crowdfunding platform for artists, designers, filmmakers, musicians, and the like. Encouragingly, a community of nonprofit (or charity) crowdfunding platforms for the provision of civic collective goods is also blossoming (e.g. Brickstarter, Citizeninvestor).

Social crowdfunding endeavours enable non-state solutions to collective good provision problems by nullifying the ‘prisoner’s dilemma’ aspect of public goods and free riding. For example, of recent popularity is the use of assurance contracts—where participants make a binding pledge to contribute to a collective good contingent on a quorum of a predetermined size being reached, otherwise the good is not provided and any contributions are refunded. A dominant assurance contract is a variation on this in which the social entrepreneur refunds the initial pledge plus an additional sum of money. In

game-theoretic terms, contributing becomes a dominant strategy—the best move is to pledge to the contract regardless of the actions of others (Tabarrok 1998). This is an ingenious social technology, but it is only coming to prominence today because of the tandem development of enabling physical and economic technologies. Even when capital costs required for production are non-trivial, the transaction costs of aggregating the required capital from a number of small contributors, or of connecting a user community with owners of sufficient capital, are much lower today than they have been.

Network technology has had a revolutionary effect on the transaction costs of traditional economic activity and organisation, facilitating the emergence of more effective decentralised collective action practices. It provides a platform for new, non-territorial mechanisms of collective action for potentially widely dispersed communities. The capability of ‘virtual communities’ to provide multiple, non-territorial niches for individuals to share values and interests, divide labour and capital contributions, socialise risk, and incur mutual obligations is ever-increasing. The cumulative effect is that a rapidly increasing share of the functions previously carried out by the state can now be effectively carried out by commons-based peer production, social-entrepreneurial crowdfunding, or special-purpose public enterprises. Technological and economic developments allow us to progressively remove items from the bundle of government goods and services, and reassign them to diverse, increasingly non-territorial public and private enterprises. We should be optimistic about these changes—the future could see a world in which government is organised in non-territorial, flexible, and multidimensional forms.

Cryptoanarchy as secession and statecraft

There is a demonstrable connection between technology and non-territorial governance in the theory and practice of cryptoanarchy. Cryptoanarchism in the first instance is an ideology, espousing the use of cryptographic technologies to uphold freedom of speech and prevent government control and regulation of the Internet. Central is the belief that cryptographic technologies can be used to protect the privacy and political freedom of

citizens and to evade prosecution and harassment from state authorities. The movement is often associated with the ‘cypherpunks’ who, beginning in the late 1980s, argued even further that the emergence of technologically mediated underground economies is not just possible but inevitable (Hughes 1993). It was Timothy C. May on the Cypherpunk electronic mailing list that first coined the phrase ‘cryptoanarchy’ to describe the possible political consequence of widespread adoption of the ideology and technology—namely, cyber-spatial realisation of anarchism (1992).

The cryptoanarchist ethos has manifested in increasing measure as computing and cryptographic technologies have become more sophisticated. Today it is possible to communicate over the Internet in a way that is anonymous, untraceable and tamper proof. Moreover, the growth of cryptocurrencies and other blockchain based enterprises—bitcoin, Tor browser, Silk Road, Ethereum, Bitnation, etc.—are contributing to the development of a new economic infrastructure that shadows incumbent institutions and supports an emerging ‘cryptoeconomy.’ Such technologies enable individuals to make consensual economic arrangements that escape detection by traditional nation-states and transcend national boundaries. In this sense cryptoeconomies liken to the shadow economy and *Systeme D* (Soto 1989; Schneider & Enste 2013); and also embody a technologically advanced expression of agorist counter-economics (Konkin, Conger & Seely 2006) and *parallel poleis* in civil society (Benda et. al 1988; Lagos, Coopman & Tomhave 2014).

As more and more transactions occur behind a veil of cryptography, it becomes easier for citizens to engage in coordination and exchange outside the purview of the state. There is no certainty that large, vibrant, and self-sufficient cryptoeconomies will emerge to some day eclipse state-sanctioned economies, however that is the threat. Governments object to totally anonymous interactions for many reasons, not least because they undermine state sovereignty. Crypto technologies have made various ‘illegal’ transactions more widespread, or at least easier to undertake: illicit drug trade, arms trafficking, dissemination of sensitive information, threats to national security, money laundering, tax evasion, violations to consumer protection, and more besides.

Certainly, it is state authorities' prerogative to define and enforce particular rules and behaviours—but nonetheless, the political response to the specter of cryptoanarchy does merit a brief aside on preferences and incentives. To the extent that those activities that are performed and sanctioned by nation-states conform to the underlying preferences of their citizens, the simultaneous operation of cryptoeconomies should have no effect on the overall pattern of activity in the polity-economy. Indeed, there would be no incentive for cryptographic exit in the first place. It is the incongruence of political actions and political preferences that stimulates cryptoeconomic activity; which is a corrective process just like any other mode of political exit. The prevalence of cryptographic exit signals that state action mismatches to the underlying preferences of its citizens and might be adjusted (although ironically, to the extent that exit is successful, the signal is undetectable).

In this context, we can define 'cryptosecession' as the phenomenon of individuals seceding from state-run institutions (and thus jurisdictions) not by physically leaving, but by using cryptographic technologies such as bitcoin and other blockchain applications to exit to virtual 'states.' Correspondingly, 'cryptostatecraft' is the practice of political entrepreneurs building new institutions using cryptographic technologies. Such entities are virtual states both in the sense that they have no physical-geographic presence, and because they are voluntarily consented to and thus do not conform to the classical definition of a state.

For much of history individuals who wished to escape government institutions were forced to physically leave, and the costs to physically leave a nation-state are clearly very high (often prohibitive). The implication is that cryptographic technologies enable citizens to virtually secede from governments while physically remaining within the same territorial jurisdictional borders; effectively decreasing the transaction costs of changing jurisdictions.

Cryptosecession becomes comparatively more attractive as: (1) state based institutions become more costly, inefficient, or unresponsive to citizen preferences; and (2) alternative cryptographic institutions become more efficient and responsive. Citizens perform a calculus over institutional possibilities: it is the interaction between *de jure* and *de facto* institutions that determines whether they secede to the cryptoeconomy or remain in place

under incumbents. Thus if citizens do not approve of the rules and activities undertaken by nation-states, in addition to the usual mechanisms of exit, voice, and loyalty (Hirschman 1970), citizens have recourse to cryptosecession as an alternative mode of exit.

Yet even the widespread adoption of cryptoanarchist ideology and technology arguably does *not* signal the end of the nation-state. It may, however, herald a transformation of the state system: towards non-territoriality. As the theory goes, nation-states will find it increasingly difficult to enforce their taxation laws and fund their traditionally conceived activities. This has already happened quite apart from the development of cryptographic technology (e.g. via tax havens and ‘regulatory arbitrage’) but the process only stands to accelerate and cause a very real loss of revenue for governments. At a certain critical threshold, so much wealth can escape the fiscal catchment of the nation-state that the ability to operate effectively begins to erode. At this point raising taxes would only serve to stimulate further secession of individuals and groups to the cryptoeconomy, and erode the viability of the nation-state even further. Or so the theory goes.

Bitcoin and the blockchain

Cryptoanarchists are commonly associated with the bitcoin movement and emerging blockchain based ‘bitcoin 2.0’ projects. Bitcoin is a peer-to-peer payment system and digital currency. It was the first cryptocurrency, beginning trading in January 2009; since then many more cryptocurrencies have been created based on the bitcoin model. Cryptocurrencies use cryptographic technology to facilitate secure transfer and exchange of digital tokens in a distributed and decentralised manner (Dourado & Brito 2014).

Bitcoin solved two long-standing problems in computer science: the double-spending problem and the Byzantine Generals Problem. Before this it was impossible for two parties to transact electronically without employing a trusted third party intermediary to verify the transaction—otherwise the risk was that parties could pay for multiple transactions with the same unit of currency. In 2008, the pseudonymous Satoshi Nakamoto announced

how public key cryptography could be used to overcome this problem, essentially by replacing the trusted third party with a peer-to-peer verification network. To do this the bitcoin system employs a distributed public ledger called the blockchain. All transactions in the bitcoin economy are recorded and reconciled in the blockchain, by the thousands of bitcoin users (Dourado & Brito 2014). New transactions are verified against the blockchain, thus eliminating the double-spending problem.

This removes the need for a centralised trusted third party, but engenders the Byzantine Generals Problem. If every node on the bitcoin network has a complete copy of the blockchain ledger then there exists the possibility that some node (or nodes in concert) will transmit a falsified copy of the ledger. Thus some mechanism must be employed to ensure that a consensus on the state of the ledger can be reached among distributed parties who do not trust each other. Bitcoin achieves this through a proof-of-work system: additions to the ledger must to be accompanied by the solution to a mathematical problem that is very difficult to solve but simple to verify. Each bitcoin ledger entry increases the size of the blockchain, meaning that the prospect of adding transactions to a falsified copy can be avoided by choosing to accept the longest chain (Dourado & Brito 2014). The chosen blockchain has the most processing power devoted to it (at least 51%) and is invulnerable to attack. Proof of work thus solves the Byzantine Generals Problem and protects distributed consensus on the state of the bitcoin ledger from the predations of trusted third party intermediaries.

The true innovation brought about by bitcoin is not the currency itself but the *platform* that is its underlying technology, the blockchain. Bitcoin-like blockchains allow consensus on the state of a public ownership database. Those who understand the power of the blockchain are realising new ways the technology for distributed consensus can be adapted to replace third party intermediaries. That is to say, the blockchain is not limited to monetary applications; a variety of new ‘bitcoin 2.0’ applications have adapted the blockchain protocol to fulfill different purposes. Perhaps most notably, the blockchain offers the opportunity to build encoded law that circumvents states. Since the blockchain can record contracts between individuals, if enforcement mechanisms can be coded into self-enforcing ‘smart contracts,’ then there perhaps exist a foundation for such a system.

We highlight three ‘bitcoin 2.0’ start-ups that exemplify the theory and practice of cryptoanarchism: *UnSystem*, *Ethereum*, and *Bitnation*. In the minds of these proponents, blockchain technologies are to be used not only to circumvent states, but also to craft a replacement system, superior to incumbent institutions.

UnSystem are developers of a cryptographic platform called ‘Dark Wallet.’ This is a bitcoin wallet that includes “extra protections to make sure transactions are secure, anonymous, and hard to trace—including a protocol called ‘trustless mixing’ that combines users’ coins together before encoding it into the ledger.” *UnSystem* has been described as a collective of politically radical coders and are self-proclaimed cryptoanarchists. They state:

Our goal is not to placate and obey the rules of the people responsible for navigating the world into a permanent financial crisis. With or without their permission, we are going to build a better future out of the ashes of this system.

Bitcoin is what they fear it is, a way to leave, to make a choice. There’s a system approaching perfection, just in time for our disappearance, so, let there be dark.

Essentially their goal is to take as much economic activity as possible out of the reaches of incumbent states (known as ‘economic secession’ e.g. Konkin, Conger & Seely 2006) and use cryptographic technology, namely bitcoin, to do so. In rhetoric and in practice this is an exemplar of cryptosecession.

The second group is called ‘Ethereum.’ This group is developing

a platform and a programming language that makes it possible for any developer to build and publish next-generation distributed applications. Ethereum can be used to codify, decentralize, secure and trade just about anything: voting, domain names, financial exchanges, crowdfunding, company governance, contracts and agreements of most kind, intellectual property, and even smart property thanks to hardware integration.

This is a kind of distributed operating system in which self-validating, self-enforcing smart contracts and ‘decentralised autonomous organisations’ (DAOs) operate directly on

a cryptographic blockchain with limited or no central control. In plain language, Ethereum is building the economic and legal infrastructure that would underpin a cryptoeconomy.

The third enterprise is called ‘Bitnation’ and aims to provide a platform for cryptography based self-governance—or as the catchphrase reads: “a toolbox for Do-It-Yourself governance”. Bitnation is developing a “full range of services traditionally provided by governments” including a cryptographically secure identification system, blockchain dispute resolutions, marriages and divorces, land registries, education, mutual insurance, security, diplomacy, and more. It is incorporated with the same technology cryptocurrencies use—the blockchain technology—and envisages to “create a full-blown blockchain based government service provider which is easy to use, affordable, non-geographically contingent, voluntary and trustless.” Moreover, the prospectus very explicitly states, “the blockchain technology is literally the end of the nation state”—leaving no doubt as to the organisation’s cryptoanarchist motivations.

The shared objective of these three groups is not to change existing political structures but to subvert them—in the process creating new, non-territorial polities. They do not want freedom from dictatorial minorities or to assert their right to govern as a democratic majority. They want freedom from *both* dictatorial minorities *and* democratic majorities so they (and others) can personally secede and re-coalesce in new, self-governing polities. They want to subvert the whole political apparatus and create parallel systems that people can secede into. If the likes of *UnSystem*, *Ethereum*, and *Bitnation* are successful, political-institutional structures will be profoundly disrupted; a non-territorial, unbundled system might emerge in their place.

Now consider the institutional structure of the cryptoeconomy: private ordering predominates and the constellations of economic governance institutions are overlapping and non-territorial, thus radically diverging from traditional Westphalian governance. One might be tempted to suggest another point of difference: voluntary consent replaces coercive enforcement. However, while it is true that contracts with crypto enterprises and institutions are entered voluntarily, this does not preclude coercive enforcement.

In fact, one of the defining features of the emerging cryptoeconomic paradigm is blockchain governance, in which applications are *built on* self-enforcing smart contracts. Cryptoanarchists hold that property rights and clear contracting rules can be put in place by blockchain enterprises, that will then allow optimal systems to emerge spontaneously. Decentralised blockchains are supposed to implement a series of tamper proof algorithms, which eliminates political interference. At the same time, self-enforcing algorithms can only be overridden with great difficulty; if you enter into a blockchain contract, there is no breaking out of it. Individuals might wish to renege on a contract or might find that agreements they enter into do no comport with *ex ante* expectations. Subjects therefore open themselves to potentially coercive enforcement of their contracts.

Individuals might still consent to such a contract if it passes a Buchanan-Wicksellian constitutional stage test; that is if the individual expects to benefit on net from the arrangement over the period of the social contract (Buchanan 1975; 1987). Much like the argument that *any* distribution of tax and spend, or *any* set of arrangements for implementing fiscal transfers, can be justified with general agreement at the constitutional stage test; so too can we say that *any* set of self-enforcing, algorithmic, blockchain rules must pass an analogous constitutional stage test if individuals consent to them.

The appeal of blockchain governance to cryptoanarchists is that they do not like trusted third parties—to them a trusted third party is at best an unnecessary vulnerability and at worst a source of exploitation. This stands in opposition to the Hobbesian legal tradition that asserts the necessity of a strong central authority, or what amounts to a *universal* trusted third party—the sovereign. In *Leviathan*, self-interested individuals enter into a contract with a *sovereign*—a deified personage that sets the societal rules of engagement—and in doing so exchange part of their freedom for security of self and property. Cryptoanarchists make a similarly Hobbesian abstraction when they envision self-interested individuals contracting with a *blockchain*—a deified crypto-sovereign that sets the *private* rules of engagement—and thereby relinquish control of their property into the bargain. There is not so much of a difference between the two positions: trustless algorithms floating above human affairs portend to replace the Hobbesian *sovereign* with Hobbesian *blockchain*.

What emerges therefore might not be very different to the panarchist ideal: non-territorial, temporary, voluntary, yet potentially coercive statecraft. Citizens freely and voluntarily contracting with multiple state-like entities, to which they will be subject to coercive enforcement mechanisms over the period of the contract. The advent of cryptosecession and cryptostatecraft therefore is not the end of the state; rather it is the end of the territorially sovereign state and the end of territorial borders. In its place will be multiple non-territorial states delimited by cryptographic boundaries—we might therefore call this a state of ‘*cryptopanarchy*.’

An argument in support of this follows from the ways in which the Internet and cryptography are reshaping the nature of economic infrastructure and cultural identities. These technologies do not respect international borders; and if identity remains coupled with exchange relationships (e.g. trade, commerce, community) as it seems to have been (Akerlof & Kranton 2000, 2005; Davis 2003; Herrmann-Pillath 2009), then for some individuals and groups their sense of identity will likely decouple from national borders too. The implication is that movement towards non-territorial economic infrastructures and identities should see a corresponding shift towards non-territorial governance.

The new institutions would not limit to specific geographical regions but would instead coalesce about networks of exchange relationships. A new *cryptographic* boundary would emerge that would define a distinct *non-territorial* space within which new institutions could be created (Johnson & Post 1996). The contours of the jurisdictional space would emerge from the confluence of multiple political enterprises competing for citizens—either by optimising alignment to underlying networks of exchange relationships or by providing rule sets with optimal conditions for coordination and exchange. These new jurisdictions would likely provide the cryptographic equivalent of private ordering institutions that already exist in developing countries in the absence of strong state institutions and advanced countries in the shadow of the law: dispute resolution, arbitration, and reputation systems (Benson 2000, 2005; Friedman 2005; Dixit 2007; Risse 2013).

Still, there is conceit in thinking that cryptoanarchy will prevail just as the cypherpunks envisioned. Virtual states protected by cryptographic technology may nonetheless fail the test of economic viability or be crushed by incumbent states. It may be that emerging virtual states can serve as laboratories for experimentation, places in which participants can test creative social, political, and legal arrangements. As Justice Louis Brandeis wrote: “It is one of the happy incidents of the federal system that a single courageous State may, if its citizens choose, serve as a laboratory; and try novel social and economic experiments without risk to the rest of the country” (1932: 311). Cryptoanarchist virtual states may appear on experimental, dynamic, and short-lived bases; but would provide no less a fertile ground for institutional innovation.

Chapter 3

The political-jurisdictional Coase theorem

Why does the theorem of allocational neutrality stop short at certain ill-defined institutional limits? Why can it not be extended to encompass all possible institutional variations, variations that may be broadly interpreted as differences in the assignments of property rights? If the neutrality theorem holds, why should the political economist be overly concerned about institutional reform, as such?

James M. Buchanan, *The Coase theorem and the theory of the state*

Introduction

This chapter proposes an extension of the Coase theorem to the problems of political conflict and jurisdictional change. Most political interpretations of the Coase theorem take as given a prevailing political-jurisdictional system and describe Coasean bargains within it; for instance, how post-vote trades improve efficiency or otherwise, given transaction costs and institutional rule-constraints (Parisi 1997; Klick & Parisi 2003; Luppi & Parisi 2012). But seldom do they take a wider lens to the problem; to how an encompassing political-jurisdictional system is itself an assignment of “property rights in franchise” (Buchanan 1973: 576), and to how the transformation of this very system can be evaluated in light of the Coase theorem. Given this, should there likewise be such a thing as the ‘jurisdictional Coase theorem’? If political exploits serve to reallocate property rights

within the boundaries of a state then perhaps we can trace the Coase-theoretic reallocative consequences of changes *across* jurisdictional boundaries too.

Coase—channeling Stigler—claimed that his theorem’s “logic cannot be questioned, only its domain” (1992: 717). It is my purpose to consider whether its domain extends to political and jurisdictional change. This chapter argues that changes in political jurisdictions (territorial or non-territorial) as well as the policies enacted within them (productive or redistributive) operate to reallocate property rights. And moreover, these processes are focused on internalisation of externalities while being beset by transaction costs and are therefore episodes of Coasean exchange.

To this end, a political-jurisdictional Coase theorem (PJCT) is presented here to explain how political systems and jurisdictions change. This conceptualises polities as commons and describes how changes to access rules and boundary rules serve to reallocate property rights within and across political commons. We show how the framework corresponds to a taxonomy of political-jurisdictional transitions and explore how the problem of nation/state incongruities can be reinterpreted in light of the political-jurisdictional Coase theorem.

This chapter offers a simple model analogising the distribution of citizens and property among jurisdictions to the distribution of resources among bargaining firms, and explores the implications of alternative constitutive allocations of political authority over said citizens and policy areas (cf. property rights entitlements and legal rules). Ultimately though, jurisdictions and policies serve to mediate the allocation of property rights in a polity. That is, any encompassing political-jurisdictional system—and the constitutional rules constraining or empowering political action therein—embodies a specific assignment of property rights and transactions costs. A seeming *de facto* allocation of legal entitlements can be modified by state action and transformed into a *de jure* allocation, as the result of Coasean political exchange. It is therefore perhaps more fitting to describe political action as a process of *revelation* of the *de jure* structure of property rights in a polity. In any case, whether or not this reallocative process is efficient will depend on familiar Coasean assumptions pertaining to the distributive effects of the initial allocation

(i.e., wealth and income effects) and relative impositions of political transaction costs (i.e., the costs of collective action). It is at this point that private exchanges in property rights may take place to cure any remaining inefficiencies, again contingent on familiar assumptions.

Nevertheless, once we acknowledge the modified structure of property rights in a polity resulting from political action it becomes clear that citizens have available to them additional domains over which to seek political exchange. They might bargain over policy, but they might also bargain over jurisdiction. That is, they may attempt to excise themselves from the reach of the state, or subsume others (and their property) into it. Important parameters in political-jurisdictional Coasean exchange therefore include: the initial allocation of property rights (*de facto* property relations), the initial allocation of political authority (jurisdictional and inter-jurisdictional relations), and the constitutional rules restricting or authorising transfer of entitlements through political exchange (policy modification relations)—all of which combine to produce the set of *de jure* property relations.

Put simply, political-jurisdictional change reallocates property rights within and across polities. The political-jurisdictional Coase theorem (PJCT) accordingly states that

Regardless of the initial allocation of legal entitlements (i.e., property rights, policies, jurisdictions) if transaction costs are not prohibitively high and trade in externalities is possible then bargaining will lead to an efficient allocation of property rights and political authority.

Political-jurisdictional transaction costs (PJTCs), like market transaction costs, are “often extremely costly, sufficiently costly at any rate to prevent many transactions” (Coase 1960: 15). We can therefore formulate comparable corollaries to the political-jurisdictional Coase theorem: (1) develop rules which approximate the zero transaction-cost world as closely as possible; and (2) assign property rights to agents for whom the cost of realising or resolving externalities are lowest. To these we add a third: (3) assign political authority over citizens and policy areas to jurisdictions for which the cost of realising or resolving externalities are lowest.

We conceptualise polities as commons and describe how changes to access rules and boundary rules serve to reallocate property rights within and across political commons. It is the ‘property rights in franchise’ character of a polity that lends itself to such analysis. Citizens differentially contribute to and draw from a political commons according to: *access* rules such as those that determine the decisive majority and the productive and redistributive capabilities of state action; and *boundary* rules such as jurisdictional and inter-jurisdictional relations. These rules determine the net positions citizens take vis-à-vis political commons, and changing *access* to and *boundaries* of a political commons therefore modifies an allocation of property rights in a polity.

That is, jurisdiction (or perhaps rather citizenship) is a valuable and potentially marketable legal entitlement for whomever happens to hold it, whether it is a political entrepreneur, a dictator, or a citizen. It is access to a political commons: a potentially realisable claim to the property of other citizens under the authority of that jurisdiction. Citizens implicitly (and sometimes explicitly) trade in these rights when they affect jurisdictional change—they take into account both ‘conventional’ property rights and these ‘property rights in franchise’—either by changing the boundaries of political jurisdictions or simply moving across them. When people move between jurisdictions they are essentially making an exchange of ‘jurisdictional property rights’; they are deciding where to live based on the combined value of their conventional property and property in franchise.

Finally, we explore how the thorny question of ‘problem of the nation-state’ is viewed through the Coasean lens. The political-jurisdictional Coase theorem applies at all levels of jurisdiction—such as local Tiebout sorting and internal rebordering between political sub-units—but especially to nation/state incongruities, i.e., matching maps to peoples (e.g. rebordering), matching peoples to maps (e.g. ethnic cleansing), or proposed non-territorial responses (e.g. national-cultural autonomy). Insights apply to a world of ‘territorialised’ transactions costs (e.g. rebordering/secession costs for jurisdictions and mobility costs for citizens) that is apropos to federalism and secessionism, and protection of regionally concentrated minorities. But political-jurisdictional exchange not only applies to territorial jurisdictions, but also to personal, non-territorial jurisdictions. It is therefore

also potentially relevant to a world of ‘deterritorialised’ transactions costs, i.e., one of ‘virtual’ states, national personal autonomy, non-territorial federalism and secessionism, and protective of regionally dispersed minorities.

We can reinterpret many episodes from history—how things worked, but also failures and grievances—in light of the political-jurisdictional Coase theorem. A cursory reading might suggest that in an ideal Coasean world, the optimally efficient allocation of states, nations, and nation-states—whether territorial or non-territorial, disjoint or overlapping—would emerge spontaneously from whatever initial allocation of political authority. The ever-presence of ethnic conflict and political struggle throughout history would suggest otherwise. More sagaciously, the central claim made here is simply that the problem of the nation-state is the combined expression of non-optimal allocations of political rights, prohibitive transaction costs, and/or perverse income/wealth effects, and is explicated perfectly-well within the Coasean framework. If ideal Coase-theoretic conditions were met then a political-jurisdictional system would indeed move toward the optimal allocation of property rights and political authority—of nations, states, and nation-states—but as Coase himself stated this highly stylised fiction can only ever be a “stepping stone on the way to an analysis of an economy with positive transaction costs” (1992: 717). Similarly, the zero transaction cost political-jurisdictional Coase theorem presented here is merely a stepping stone on the way to an analysis of a *polity* with positive transaction costs. Let us study the world of positive political-jurisdictional transaction costs.

Section 2 outlines the Coase theorem in its varied forms, and presents some relevant criticisms and rejoinders. Here we also outline ‘the political Coase theorem as we know it’ and review complementary work that implicitly (if not explicitly) has taken a political-jurisdictional Coase-theoretic perspective. Section 3 connects the political-jurisdictional Coase theorem to the theory of political commons and section 4 presents a simple model and taxonomy of the PJCT transitions. Section 5 then presents the PJCT and concludes with some discussion of the implications for the efficiency or otherwise of nation-states.

Coasean markets, politics, and jurisdictions

The Coase theorem

The Coase theorem characterises the efficiency of an allocation of economic activity or property rights in the presence of externalities. This well-known proposition—articulated in Coase’s 1960 article *The Problem of Social Cost*—holds that regardless of the initial allocation of legal entitlements, if trade in externalities is possible and transaction costs are not prohibitively high, bargaining will lead to an efficient allocation of property rights and economic activity, as determined by the relative valuations of affected parties. That is, any inefficient allocation cannot be a contractual equilibrium because it implies there are exploitable contractual opportunities remaining. This is a matter of transferring property rights towards their best use; that is, to realise positive externalities and resolve negative ones. For instance, consider that if an agent is not employing some property to its full potential (and another agent can improve upon this) then there are potentially realisable gains-from-trade (or gains-from-coordination) on offer. Similarly, the presence of a negative externality simply indicates an incentive for its generators and victims to negotiate towards an efficient allocation of resources that resolves the externality. So externalities are a pervasive fact of economic life and wealth is generated by internalising externalities (i.e., realising positive ones or removing negative ones) via mutually beneficial coordination and exchange. Coase was essentially arguing that all Pareto-relevant externalities would tend to be eliminated in the process of free exchange among affected parties.

In his Nobel Lecture *The Institutional Structure of Production*, Coase outlines the meaning and purpose of his theorem:

What I showed in that article, as I thought, was that in a regime of zero transaction costs, an assumption of standard economic theory, negotiations between the parties would lead to those arrangements being made which would maximise wealth and this irrespective of the initial assignment of rights. This is the infamous Coase Theorem, named and formulated by Stigler, although it is based on work of mine. Stigler argues that the Coase Theorem follows from the standard assumptions of economic theory. Its logic cannot be questioned, only its domain. I do not disagree with Stigler. However, I tend to regard the Coase Theorem as a

stepping stone on the way to an analysis of an economy with positive transaction costs. The significance to me of the Coase Theorem is that it undermines the Pigovian system. Since standard economic theory assumes transaction costs to be zero, the Coase Theorem demonstrates that the Pigovian solutions are unnecessary in these circumstances. Of course, it does not imply, when transaction costs are positive, that government actions (such as government operation, regulation or taxation, including subsidies) could not produce a better result than relying on negotiations between individuals in the market. Whether this would be so could be discovered not by studying imaginary governments but what real governments actually do. My conclusion; let us study the world of positive transaction costs (1992: 717).

Demsetz (1967: 349) said of the theorem: “There are two striking implications of this process that are true in a world of zero transaction costs. The output mix that results when the exchange of property rights is allowed is efficient and the mix is independent of who is assigned ownership (except that different wealth distributions may result in different demands).” This unfolds two propositions of the theorem: (1) efficiency, and (2) invariance. That is, under zero transaction cost and zero income effect, the final allocation of resources is efficient and invariant to different initial assignments of rights or liabilities.

Cheung (1969) explicated a third interpretation of the theorem: (3) equivalence. That is, under zero transaction cost, all institutional forms are equivalent in their ability to achieve an efficient allocation. Pigouvian taxation and subsidy, bilateral and multilateral bargaining and contracting, quasi-market mechanisms, and all manner of other institutions are equally capable of internalising an externality. This institutional equivalence result underlies the New Institutional Economics (Coase 1937, 1984; Williamson 1975, 2000; North 1980, 1986; Ménard & Shirley 2005). Given the real world of positive transaction costs, the standard of comparative institutional analysis becomes the Coasean first-best allocation of resources, and different institutional forms are evaluated according to their abilities to economise on said transaction costs, and thereby reduce the distance from the theoretical optimum result.

The main criticism to the Coase theorem pertains to the realism of the zero-transaction-cost assumption. Of course, Coase himself stated that transactions are “often extremely

costly, sufficiently costly at any rate to prevent many transactions that would be carried out in a world in which the pricing system worked without cost” (1960: 15). That is, practical impediments to bargaining mean that real-world transaction costs are rarely low enough to allow for efficient bargaining, casting doubt over the applicability of the theorem to economic reality. However, this does not undermine the use of the theoretical optimum as the benchmark for comparative analysis across positive-transaction-cost settings, and as noted it was Coase’s intention that it be used as a “stepping stone on the way to an analysis of an economy with positive transaction costs” (1992: 717).

Another criticism pertains to the assumption of no income or wealth effects. Since alternative allocations of property rights represent alternative income or wealth distributions, if demand for the resources into the Coasean bargain are dependent on income then the final allocation will be affected, and may not reach the theoretical optimum. The initial allocation of property rights retains its relevance if transaction costs cannot be neglected and wealth effects predominate (Calabresi 1965; Wellisz 1964). The assignment of legal entitlements surely matters to the parties that are lacking them and are required to make side payments in order attain them, and is likely to constrain the outcome. Note, however, that subsequent contributions by Calabresi (1967; 1968) and Demsetz (1972) suggest that this might not be fatal to the operation of the Coase theorem. Different initial endowments generate different wealth distributions and generate different final allocations, all due to the wealth effect. In practice, this effect may be small, perhaps even negligible, but should not be assumed away or simply ignored.

The final broad class of criticisms pertains to strategic bargaining, private information, and free riding (Calabresi 1965; Wellisz 1964; Hahnel & Sheeran 2009). These can be subsumed under the transaction costs rubric by expanding it to include not only the costs of bargaining but also costs of asymmetric information, adverse selection, hold-up strategies, as well as monitoring and enforcement costs. Again, these augmentations of transaction costs threaten to compromise the ability of the Coasean approach to obtain efficient outcomes. According to Demsetz (1972), however, even when this is the case the final result need not diverge from the optimal equilibrium—that is, strategic bargaining only affects the distribution of surplus between bargaining parties—but, again, this is

contingent on zero income effects. Hahnel and Sheeran (2009) show that when individuals have private information (i.e., they are able to obscure their true costs and valuations from each other) the Coasean mechanism fails to produce efficient results. The holder of the legal entitlement has an incentive to overstate either their benefits (i.e., as the generator of the externality) or damages (i.e., as the victim), and the suitor of the legal entitlement has an incentive to understate their valuations. If there are multiple parties affected by the externality, the problem is compounded, and manifests as free riding on side payment contributions. As a result, under incomplete information, the Coasean efficiency and invariance conclusions are not expected to hold.

Such doubts over the applicability of the positive conclusions of the Coase theorem in a real world setting beset with non-zero transaction costs and non-zero income effects, have informed a range of normative corollaries to it. These can be summed up in two: (1) develop rules which approximate the zero transaction-cost world as closely as possible; and (2) assign property rights to agents for whom the cost of realising or resolving externalities are lowest. The first corollary runs parallel to the theme of New Institutional Economics; that comparative institutional analysis be conducted relative to the benchmark of minimised transaction costs, thereby allowing for misallocations of resources to be corrected to the fullest extent possible. The second corollary follows from the first, and the acknowledgement that due to the inevitability of transaction costs, the further an initial allocation of property rights is from the theoretic optimum, the less likely is an efficient outcome.

The problem is, of course, that the most valued allocation of resources is unknowable in advance. So given a particular initial allocation, the problem shifts back to identifying the legal rules and remedies that replicate the hypothetical first-best Coasean bargaining setting. This is usually characterised as the choice between property rules (entitlement transferable only at owner's discretion), liability rules (other parties may impinge on the entitlement but will be required to pay an objectively determined value for it), or inalienability rules (transfer of the entitlement is fully prohibited). Calabresi and Melamed (1972) develop this tripartite choice, and argue that liability rules outperform property and inalienability according to the normative, transaction-cost-minimising standard.

It is important to note that the system of interconnected externalities that stimulates Coasean exchanges, and the rights and legal entitlements that enter into the bargains, are contingent on the presiding political-legal system. Just as the political system creates legal entitlements, it also modifies legal entitlements. That is, an initial allocation of rights and liabilities among citizens depends on not only nominal property holdings but also the encompassing political regime within which they are located. As a result, much importance is placed not only on the initial allocation of legal entitlements, but also the parameters of encompassing political-institutional system. These include the tripartite choice of legal rules (property vs. liability vs. inalienability rules) as developed by Calabresi and Melamed (1972), but also constitutional rules that constrain or authorise the transfer of entitlements through the political process and jurisdictional and inter-jurisdictional relations.

Finally, it is worth noting the position of James M. Buchanan (1984) that the Coase theorem accommodates the fallacy that an optimum allocation of rights can even be defined, let alone identified: “It is unfortunate that Coase presented his argument [...] largely in terms of presumably-objectively measurable and independently-determined harm and benefit relationships” (Buchanan 1984: 11). Conversely, according to Buchanan, no external observer can determine an efficient allocation, or whether a particular trade falls short of some theoretical optimum. Therefore, each and every trade that takes place must be considered optimal, given the constraints of the overarching institutional framework. That is, the post-trade allocation of legal entitlements must be considered efficient, irrespective of the size and imposition of transaction costs, but the institutional setting itself might not. Then, when parties are unsatisfied with the institutionally-contingent allocation of property rights they will attempt to affect reallocative change via changing the institutional framework within which they operate. “If the initial [constitutional] constraints are deemed to be ‘inefficient’ potential traders will, themselves, find it advantageous to invest resources in efforts to shift them” (1962: 268). This draws attention to the costs of negotiating political bargains, and is subject of what has been labeled ‘the political Coase theorem.’

The political Coase theorem

The Coase theorem is usually presented in relation to interactions between individual property owners and externalities therein. That is, in settings of voluntary coordination and exchange in the absence of state intervention; or otherwise in settings characterised as unanimously consenting to the activities of the state. But it can also be used to describe the efficiency of an allocation of political authority. Work on politics and exchange is generally found in three places: (1) Chicago-style ‘politics-as-market’ economics; (2) constitutional economics and public choice economics; and (3) new institutional economics. It is in these broad literatures that we find connections of political and institutional outcomes to Coase-theoretic mechanisms. But similar connections exist in work on *jurisdictions* and exchange: Tiebout sorting, secession, size of nations, rebordering/redistricting, federalism, polycentrism, functional overlapping competing jurisdictions (FOCJ), multi-level government, unbundled and non-territorial governance, and national-cultural autonomy. The arguments found in these literatures all appeal to efficiency explanations and describe reallocative processes; both of which are emblematic of Coase-theoretic mechanisms.

Politics-as-markets metaphors form the foundation for much of the Chicago school of political economy (Stigler 1971; Becker 1983; Pelzman 1990). The ‘efficiency hypothesis’ states that political markets are generally clearing so that in equilibrium no individual or group can improve their wealth (or utility) without reducing that of some other individual. The Virginia school of political economy is built on similar foundations. In *The Calculus of Consent* James M. Buchanan and Gordon Tullock were referring to Coasean the gains from political exchange when they wrote: “with all side payments prohibited, there is no assurance that collective action will be taken in the most productive way” (1962: 152). To put this in Coase-theoretic language one might say that when political transaction costs are high (in this case infinite, since trade is prohibited), political exchange will not take place, externalities will persist, and an inefficient allocation of rights will persist. Moreover:

Permitting those citizens who feel strongly about an issue to compensate in some way those whose opinion is only feebly held can result in a great increase in the well-being of both groups, and the prohibition of such transactions will serve to prevent movement toward the conceptual social optimality surface, under almost any definition of this term (1962: 133).

Then, a corollary of this is, to the extent that political bargains are feasible but prevailing transaction costs are positive (or prohibitive), alternative rules could contribute to the minimisation said political transactions costs, and thereby reduce the social harm implicit in foregone bargaining opportunities. That is, the criterion of choice among alternative political decision rules should be extended to account for the potential gains from trade in political markets. Though the assumption of frictionless bargaining is unrealistic, the goal of bringing a policy outcome closer to the ideal, yet unobtainable, outcome of a frictionless political market remains.

Buchanan and Tullock's (1962: 133) insight on the limits of democracy without political markets motivated subsequent elaborations of a 'political Coase theorem' by both Cooter (2000) and Parisi (2003). They consider hypothetical markets for votes operating within an encompassing unitary, democratic institutional setting (i.e., without jurisdictional change). That is, political actors are able to engage in either retail (individual) or wholesale (voting blocks/coalitions) vote trading (or buying) once the democratic majority has identified a policy to be pursued. Their results validate Tullock's (1981) insight that if political actors are allowed to enter into Coasean bargains over policy (i.e., bargains are possible and enforceable) then a unique, stable, and efficiency-enhancing policy outcome will obtain, that is invariant to the initial majoritarian policy decision. This is of course analogous to the efficiency and invariance results of the Coase theorem. Parisi (2003) shows that even if political decision-making would nominally return inefficient policies, if people can vote-trade policies will be efficient. Parisi's political Coase theorem is elaborated in a series of propositions and corollaries as below (2003: 11-14):

Proposition 1: If the conditions for the Coase theorem are present for all voters, different initial majority coalitions will lead to the same final policy outcome.

Proposition 2: In a world of zero transaction costs, the choice of alternative decision rules has no effect on the policy outcome.

Corollary 2.1: At the limit, in a world with zero transaction costs, dictatorship and unanimity rules would be conducive to identical policy outcomes.

Corollary 2.2: Likewise, the choice of different majority or super-majority decision rules would have no impact on the final outcome.

In what is a relatively little recognised contribution to Coasean politics, James M. Buchanan (1973) parsed the implications of Coase-theoretic efficiency and allocational neutrality on the theory of the state. His aim was to “extend the Coase analysis, within his assumptions of zero transactions costs and insignificant income-effect feedbacks, to differing institutional settings than those that have normally been implicitly assumed in the discussions of the neutrality theorem” (1973: 580). Moreover, he ponders:

Why does the theorem of allocational neutrality stop short at certain ill-defined institutional limits? Why can it not be extended to encompass all possible institutional variations, variations that may be broadly interpreted as differences in the assignments of property rights? [...] If the neutrality theorem holds, why should the political economist be overly concerned about institutional reform, as such? [...] The central theorem of classical economics might be summarized as the demonstration of the differences in allocational results under divergent institutional structures. [...] One implication of the theorem, so interpreted, would be that the thrust of classical political economy may have been misdirected (1973: 580-1).

According to Buchanan, the theorem of allocational neutrality casts a shadow over much of political economics as we know it, which is overly concerned with institutional reform as a means to overall efficiency—after all, the point has been to demonstrate that different allocations of property rights (in different political-institutional structures) do indeed result in different efficiency outcomes. But given zero transaction costs (or no prohibitive impediments to bargaining), any inefficient allocation of property rights

embodied in a political-institutional allocation of state authorities leaves unexploited contractual opportunities. It thus cannot be a contractual equilibrium and will be resolved with political Coasean bargaining.

Buchanan makes the point that the encompassing political-institutional system (i.e., the constitutionally-determined bounds of state) can be correctly interpreted as embodying a specific structure of property rights for individuals, and itself reflects an assemblage of (former) externalities among citizens, that have been internalised through state action. He argues that unanimity rules, majority rules, and social planning all adhere to the Coase theorem when we interpret institutions as embodying specific property rights and acknowledge the modified structure of property rights prevailing in a polity under unanimity, majority, or bureaucratic rules. If we retain the assumptions about unprohibitive transaction costs and inconsequential wealth effects then differences in initial allocations of rights, whether political or property, might generate differences in distributional outcomes (sharing of the gains-from-trade among participants), but the final allocation of rights in the polity will be both efficient and invariant.

If a state is capable of intervening in private economic affairs, in effect redefining or making transfers of property, then the individual property rights claims that preceded intervention were in fact not as they first appeared. The true *de jure* allocation is revealed following the political process and in the event of redistributive political actions will be different to the apparent initial *de facto* allocation. In this way, different states with different constitutional permissions over political actions can translate seemingly identical initial *de facto* allocations of property entitlements into different final *de facto* allocations. Only in a strictly contractarian-voluntary 'state' are individual property rights claims preceding collective action unobscured or unambiguous.

Consider simple majority voting. In a majoritarian-democratic state the decisive majority actually has effective rights over the property of those outside the majority coalition, to the extent that they can enact redistributive policies and given prevailing constitutional limits on the state. Here, the actual structure of property rights is obscured, ambiguous, or 'in franchise,' pending revelation of the effective majority. On first thought,

it may seem that the Coase theorem fails here. After all, if a decisive subset of the population can make policy decision that are binding over out-group members, then there is no guarantee that collective action will generate an efficient outcome (they may affect policy that simply improves their own position). Yet as Buchanan reminds us, we must acknowledge how the majority voting rule has modified the structure of property right in the polity: “A new and ambiguous set of rights is brought into being by the authorisation of governmental action taken without the approval of all parties” (1973: 585). Members of the decisive coalition have been granted additional ‘rights in franchise’ over the nominal holdings of the minority, while the property claims of out-group members are no longer inviolate against those of the majority. In light of this—given the prevailing allocation of *de jure* property rights, and given the zero transaction cost, no wealth effect assumptions—efficient and invariant allocational outcomes will still obtain.

The same applies to a bureaucratic-administrative polity or even a dictatorial polity: *de facto* allocations of property holdings are modified by political rules and transformed into *de jure* allocations. Given these *de jure* allocations, and ideal Coase-theoretic assumptions, the optimally efficient outcomes will still obtain. In an authoritarian state (or, e.g., a state in which an individual is charged with the authority to determine/plan policy) the structure of property rights is again not quite as it initially might seem, prior to collective action. The ‘planner’ has been constitutionally assigned valuable, potentially realisable property rights that will likely be taken into account in decision-making. Nevertheless, in the ideal Coasean setting, once identified political insiders and incumbent ‘rights in franchise’ owners hold potential marketable rights that: “may be exchanged, directly or indirectly, and the contractual process will again insure that the efficient allocative outcome will be achieved, and that this will be invariant, given the appropriate assumptions about transactions costs and income effects” (1973: 586).

New institutionalists have also been influenced by the work of Coase, although their work is less explicitly based on political markets per se (i.e., vote buying and selling) and focuses more on institutional efficiency and change broadly conceived. Rather they extend the logic of the economic market to the political sphere by relying *implicitly* on what can be called a “political Coase theorem”:

Given an initial distribution of political entitlements, such as voting rights, lobbying rights, etc., within a given constitutional framework, the optimal institutional outcome will be achieved if there are no political transaction costs, and this outcome does not depend on the initial allocation of political entitlements (Vira 1997: 770).

Initially it was assumed that socially beneficial institutional change would ensue but new institutionalists soon came to admit the possibility that such change might not be forthcoming and hence “abandoned the efficiency view of institutions” (North 1990: 7). The task then shifted to examination of the political factors that impede the adoption of collectively beneficial institutional structures, with high political transaction costs used to explain institutional failure. High political transaction costs are modeled as the key impediment to efficiency-enhancing institutional change with the implication that efficient institutions would prevail if political bargaining were costless, and again, invariance to the initial allocation of political entitlements. Douglass North, following Coase, sums up the new institutionalist bent thusly: “make the political market approximate the zero transaction cost model for efficient economic exchange” (1990: 109). He also describes how the state is sometimes unable to enact growth-enhancing institutions or efficient policy for fear of provoking powerful constituents. His diagnosis is that inefficient structures persist when political transaction costs are high, constraints on side payments to incumbent political (franchise) and property right holders are binding, subjective models used by political actors about the costs and benefits of institutional changes are imperfect, and path dependence of costs and benefits are biased in favor of the status quo (1990: 93-6).

The concern for income and wealth effects that is part of the augmented Coase theorem also makes an appearance in new institutional economics. For instance, Libecap (1989) suggests that conflict over distributional outcomes prevents socially desirable institutional reform—conflict that can only be resolved with political bargaining. He equates institutional inefficiency to wasteful management of the political common pool; that is, due to poor policy implemented within a unitary state. The concept can also extend to a compound jurisdictional setting with multiple political common pools (e.g. a federation). He argues, “the heart of the contracting problem is devising politically acceptable allocation mechanisms to assign the gains from institutional change” (1989b: 5). That is,

the political process is about affecting institutional changes that both reduce the perceived losses from a sub-optimal institutional structure and achieve consensus on the distribution of the expected net benefits that obtain. This can only be achieved, however, by negotiating side payments for influential losers, i.e., incumbent political (franchise) and property right holders.

The problem is that the nexus of institutions and property right allocations “simultaneously define a distribution of wealth and political power” (1989b: 116). That is, initial allocations matter. And due to the “property rights in franchise character” of the political commons, rights are less-than-well-defined and the distributional consequences of institutional change are often ambiguous, foreshadowing conflict. Overcoming this ambiguity is a perpetual difficulty, but it remains the case that political consensus is only possible by “compensating those potentially harmed in the proposed definition of rights” (1989b: 121). The upshot is that we once again return to the recommendation of the need to facilitate private bargaining over side payments or—in the familiar Coasean language—to reduce political transaction costs and mitigate income and wealth effects of the prevailing distribution of political and property rights.

More recently Daron Acemoglu (2003) has argued against the applicability of the Coase theorem to politics. A strong-form political Coase theorem would suggest that policies *should* be efficient, but since in some countries they manifestly are *not*, he investigates why this could be the case. Acemoglu’s attempt at a political Coase theorem:

The Coase theorem maintains that, if property rights are well-defined and there are no transaction costs, economic agents will contract to achieve an efficient outcome, irrespective of who holds the property rights on particular assets. An extension of this reasoning to the political sphere suggests that political and economic transactions create a strong tendency towards policies and institutions that achieve the best outcomes given the varying needs and requirements of societies, irrespective of who, or which social group, has political power (2003: 621).

Curiously, his conclusion that “inefficient institutions and policies are chosen because they serve the interests of politicians or social groups that hold political power at the expense of the rest” (2003: 620) runs parallel to those of prior new institutionalists and would seem to be accommodated within most readings of Coasean politics. It is worth remembering Coase’s appeal to study the world of positive transaction costs, and the subsequent augmentations of the Coase theorem to subsume income and wealth effects. For instance, if it is accepted that the reluctance of special interests to relinquish political power (i.e., property in franchise) is due to a constraint on compensatory side payments (i.e., wealth effects afflict would-be rival property holders), there can be little wonder inefficient outcomes prevail. Acemoğlu, however, goes further than this in arguing that—even abstracting from transaction costs and wealth effects—political bargains are not enforceable. That is, inherent commitment problems in political exchange undermine the applicability of the Coase theorem: “parties holding political power cannot make commitments to bind their future actions because there is no outside agency with the coercive capacity to enforce such arrangements” (2003: 620).

Jurisdictional Coase theorems?

Acemoğlu correctly points out that only incentive compatible or self-enforcing arrangements are feasible when political transfers between the citizens and the state (or groups controlling the state) can be reneged on. However, by viewing the political Coase theorem through the lens of political exchange in a unitary state, he underrates the potential for self-enforcement in compound jurisdictional systems. That is, the presence of distinct jurisdictions with some protected authority within a constitutional federation inhibits coercive behavior by the state or those groups controlling it and creates the conditions for a political-jurisdictional Coase theorem to apply. Barry Weingast’s (1995; 1997) work on market-preserving federalism, for instance, argues that if a government wants to make a credible commitment to respect property rights—in order to increase national wealth or placate some group threatening its power, for example—one way to do this is to create a federal system which limits central control. More recently, Peter Leeson

(2011) has echoed this claim when arguing that competition within a system of governance clubs increases constitutional enforceability. He outlines three features that improve on the self-enforceability of political exchange in a unitary system (2011: 303-4):

First, in the system of clubs governance suppliers are residual claimants on revenues they generate through constitutional compliance. The second reason the system of clubs facilitates constitutional self-enforcement is that it's highly competitive. [...] The third reason the system of clubs facilitates constitutional self-enforcement is that it's highly assortive.

He argues convincingly that even despite the unreliability of third-party enforcement and the incentives for politically incumbent groups to defect, when citizens possess viable exit options the ability of groups controlling the state to renege on political bargains is severely curtailed. The result is a constitution that creates mutual gains for all parties—or in other words (and contra Acemoğlu) one that opens the opportunity for efficient reallocative political-jurisdictional exchanges.

There are therefore many other implicitly, if not explicitly, Coasean literatures worth considering. These involve political exchanges within compound jurisdictions or processes of jurisdictional change, such as: federalism, competitive governance, and Tiebout sorting (Tiebout 1956; Ostrom, Tiebout & Warren 1961; Buchanan 1965; Tullock 1969; Ostrom 1973, 1976); economic integration and political disintegration, the size and scope of nations, and secession (Friedman 1977; Bolton, Roland & Spolaore 1996; Alesina & Spolaore 1997, 2005; Alesina, Spolaore & Wacziarg 1997; Bolton & Roland 1997; Alesina, Easterly & Matuszeski 2011); and non-territorial, overlapping, multi-level, and polycentric governance (Casella & Frey 1992; Frey & Eichenberger 1999; Frey 2001; Hooghe & Marks 2001, 2003; Coakley 1994; Nimni 1999, 2004, 2007, 2015). The adjustment of political jurisdictions (territorial or non-territorial) is based on internalisation of externalities, transactions costs, and exchange of political and property rights; and is therefore an expression of the Coase theorem. This is a point seldom made plain, albeit perhaps it is so trivial and well understood as to suitably remain implied.

The political Coase theorem advises that the reach of the state is simply an embodiment of specific property rights, and as long as bargaining can occur between citizens (i.e., those whose property rights would be channeled through the state if collective action were to occur), an efficient outcome will occur regardless of the initial allocation of property. That is, not just an efficient allocation of private property rights, but of state-mediated property rights too—we arrive at an efficient allocation of state authority, and efficient policy is enacted. Political Coasean bargaining is most often depicted as vote trading within an institutional setting of a monocentric, democratic state; that is, where one policy is enacted at a time and citizens bargain over this policy by trading property rights for side payments. But the Coase theorem must be applicable to *any* initial institutional embodiment of property rights—and, moreover, if an initial allocation can be changed via bargaining (transfers of property rights and side payments) then this should also leave open the opportunity for *all* possible institutional variations to eventuate (if efficient).

Such institutional variations (in initial allocations and outcomes) should then also include polycentric systems of jurisdictions, where multiple policies can be enacted simultaneously and citizens have the option of remaining in situ to bargain, moving to another jurisdiction, or altering the assignment of jurisdictions. However, most, if not all, expositions of the political Coase theorem operate within a monocentric framework. They thus consider only initial political-jurisdictional allocations of property rights and state authority constituting a *single* jurisdiction, and preclude the prospects of citizen mobility and decentralisation into multiple jurisdictions (territorial or non-territorial) from eventuating. Conversely, a political-jurisdictional Coase theorem would extend analyses to polycentric jurisdictional arrangements as well.

To this end, consider the Coasean take on federalism. Most generally, federalism, Tiebout sorting, competitive governance, jurisdictional arbitrage, and the like can be conceptualised as varieties of ‘jurisdictional markets.’ These processes provide the means to facilitate efficient transfers of authority between government units of various size, scope, and scale (Guerra-Puyol 2010). Coase’s insight regarding the transferability of legal rights applies here too—it is ‘property rights in franchise’ that are exchanged when citizens (and

their property) move between jurisdictions. The provision of public goods and the enforcement of laws are embodiments of political and property rights. Competition in governance markets maximises social benefits by facilitating Coase-like bargaining and movement towards efficient structure of property and authority. In the end, when people can freely move between jurisdictions, government powers—which ultimately manifest in the ability to affect reallocative changes in property rights via deliberate redistribution or discriminatory public good provisions—will gravitate into the hands of the decisive majorities who value them the most.

When a citizen remains in situ it is because they are satisfied with the initial allocation of property rights, even given how political authority relations might potentially altered them. The citizen might be in the decisive majority and will have a preferred policy enacted, or they might be in a position to influence the policy via bargaining once the majority has been revealed (i.e., the standard political Coase-theoretic line with a unitary state). Conversely, it might be tempting to suggest that when a citizen moves to another jurisdiction (i.e., Tiebout sorting) they are engaging in something that is analogous to a Coasean trade—after all, they appear to be (presumably) transferring between two political-institutional embodiments of property rights, and paying a cost to do so (i.e., incurring mobility costs). But this is not the case.

If the encompassing political-institutional system is a federation that allows for citizens to sort themselves between jurisdictions, then if and when this occurs it does not reflect an alteration of the initial allocation of property rights but in fact is a *revelation* of the initial embodiment of property rights. The more appropriate comparison is a post-intervention, pre-bargaining structure of rights in a unitary-state system. If an individual decides that they should move between jurisdictions, it might indeed be the case that they are outside of the decisive majority in the former jurisdiction, but also that they are inside the decisive majority in the new jurisdiction. In fact, they form part of the greater majority within the encompassing political-institutional system that is able to have their preferred policy enacted without having to resort to political Coasean bargaining and side payments. So even if they move jurisdictions it is more accurate to say they are in fact satisfied with the initial allocation of property rights and political authority in the encompassing political-

institutional system *in its entirety*. That is, relative to how political authority relations might have reallocated property rights in a monocentric alternative. Once the ambiguous, obscured (actual) structure of rights has been revealed (i.e., citizens have sorted themselves into jurisdictions), then Coasean bargains can proceed within each jurisdiction.

In the Tiebout (1956) model of decentralised local governments and fiscally motivated migration, each jurisdiction offers a (potentially) different bundle of public goods and tax prices, so that each individual will reveal his or her preference for public services simply by moving into the community of choice. Inman and Rubinfeld (1988) make the Tiebout-Coase connection in describing a federalist public economy in which resources are efficiently allocated and fairly distributed. They argue, however, that the demands of a first-best Tiebout-Coase world are unrealistic: (1) a public sector operates in a technically efficient manner so as to generate perfectly competitive supply of all factors of production; and (2) fully informed and mobile consumers capable of negotiating *all* trades of mutual advantage. They contrast the perfect Tiebout-Coase construct to an imperfect world with imperfect information and imperfect contracting; and conclude that both inter-jurisdictional and intra-jurisdictional inefficiencies can arise and the political process will lead to a misallocation of resources within and between jurisdictions. But this conclusion, like that of Acemoglu, would seem to cast doubt only over the applicability of the strong-form version of the model; not the Coase theorem properly understood in a world of non-zero transaction costs. The invalidity of any of the Tiebout-Coase assumptions would indeed lead to a failure of that federalist public economy to achieve an efficient allocation of social resources; but this is precisely what the Coase theorem predicts outside of the zero transaction cost rubric.

Political sorting changes jurisdictional relations via citizen mobility, but jurisdictional change also occurs when political boundaries themselves move. For a long while economists have taken political borders as given. One of the first challenges to this was by David Friedman (1977) who argued that, in equilibrium, borders maximise the rents of ‘Leviathan’ states, because territories tend to end up with the states who have more to gain from holding them—a sort of Coase theorem for Leviathans. Similar to this is the theory in which the size of the (extractive) state is determined by the minimum efficient

scale of military control, which depends in turn on relative prices, technology, and costs of command-and-control (which are arguably transaction costs) (Olson 1993; Volckart 2002).

In recent years a small but expanding economic literature has begun to address questions of country formation and break-up with the tools of economic analysis. Alesina and Spolaore (1997; 2003) investigate the number and size of nations under different solution concepts: efficient borders (i.e., welfare-maximising), voting equilibria, unilateral secessions, and rent-maximising Leviathans. Bolton and Roland (1997) study the break-up of nations by direct majority vote, when income distributions differ across regions, and regional median voters have different preferences over redistribution. The relationship between economic integration and the size of countries has been analysed by Alesina and Spolaore (1997) and Alesina, Spolaore and Wacziarg (2000; 2005).

These authors do come close to espousing a political-jurisdictional Coase theorem in their work on how transactions costs impact the size and scope of nations. They however stop short of addressing this in full, only to state that transactions costs delimit the borders of nations. That is, that borders create transactions costs for economic actors, and that there is some mechanism for this to be reflected in the way borders are shaped. There is an imperative for cross-border transactions costs to be minimised, subject to other considerations such as preference heterogeneity and economies of scale in production of public goods.

While a larger polity provides public goods more efficiently in per capita terms (i.e., fixed costs are shared among more taxpayers) and can better internalise cross-border externalities, there are also associated costs. As polities become larger, congestion may overcome some of the benefits; and since citizens share in jointly supplied public goods and policies a larger polity is also likely to bring about higher heterogeneity of political preferences across different citizens. But there are also costs to small polities as well: a smaller polity implies a smaller market and reduces gains from trade and the efficiency of private contracting. Of course, living under different governments need not preclude individuals or firms from engaging in cross-border voluntary trade, but borders do increase costs; governments restrict trade across borders by means of tariffs, subsidies, and quotas.

The trade-offs between benefits and costs of size can be subverted by international economic integration, e.g. free trade areas, customs unions, supranational organisations, confederations, and so on (see Alesina & Spolaore 1997; Alesina, Spolaore & Wacziarg 2000; 2005). That is, the efficiency costs of small polities can be lessened through international economic integration—market size depends both on polity size and on the trade regime, and can therefore be increased with reduction in trade barriers. Market size and political size would be uncorrelated in a world of perfect free trade in which political borders imposed no costs on international transactions.

Jurisdictional boundaries also change through secession. This has been addressed in the abovementioned literature on political (dis)integration; in addition, constitutional political economy has contributed to the economics of secession (see e.g. Lowenberg & Yu 1992; Chen & Ordeshook 1994; Young 1994; Kurrild-Klitgaard 2002; Graziosi 2007). Alesina and Spolaore (1997) and Bolton and Roland (1997) show how ‘internal exit’ is a means of avoiding the tyranny of the majority or, in other terms, of providing a ‘government closer to the people.’ This is tantamount to avoiding efficiency costs of mismanaged political commons and providing policy that reallocates political and property rights ‘closer to efficiently.’

However, the seminal contribution to the economic of secession is that of Buchanan and Faith (1987). They demonstrate how, in much the same way as sorting, “the prospects for removal from authority might exert limits on the taxing proclivity of government” and “threat of secession offers a means of insuring that the central government will, indeed, stay within those boundaries of political action deemed by the general interests of all citizens in the inclusive territory” (1987: 1023). Again, this is equivalent to enacting efficient policy; and again, this outcome will be prevented if “secession is prohibitively costly due either to the locational interdependence among people in a polity or to the difficulties of forming coalitions among potential members of any seceding group” (1987: 1023).

Sorting and secession are typically conceived of territorially, but there also exist comparable, quasi-non-territorial modes of political organisation and exchange. Bruno Frey applies an economic analysis to political structures that are varieties of federalism, ultimately making an argument for ‘functional, overlapping, competing, jurisdictions’ that are not necessarily territorially sovereign (Casella & Frey 1992; Frey & Eichenberger 1999; Frey 2001). In such a system there might be (in fact there likely will be) several governments within the same territory and even governments without territory. This work aims to promote competition between government units, in contradistinction to territorially monopolistic government that suppresses competition, as this is argued to improve the welfare of citizens (i.e., promoting efficiency-enhancing institutions). Political scientists Liesbet Hooghe and Gary Marks (2001; 2003) analyse the ways that government is often multi-level with a nested hierarchy of overlapping, task-specific political units and consider how efficiency constrains these structures. In this sense their work resembles the approach of territorial federalism and secession; the difference is that jurisdictions are sometimes non-territorial, like Frey’s FOCJs. Any exposition of a political-jurisdictional Coase theorem should likewise accommodate the possibility of non-territorial jurisdictional exchange.

Polities as commons

People in positions of political authority often extend the gamut of political governance beyond what might be otherwise agreeable dimensions. Economists generally agree on the minimal functions of the state as comprising provision of protective services (such as military, police, and courts) and certain collective productive services (as defined by ‘publicness’). But modern states do much more on top of this—providing a wide range of goods and services such as social security, education, health, and economic infrastructure such as energy, road, rail, and port facilities. Governments also execute various regulatory interventions, with the purpose of managing the economy for growth and stability, handling risk in society, determining the size and composition of migration, and more.

James M. Buchanan (1975) makes the conceptual distinction between the protective and the productive states. The protective state maintains the framework of private property and freedom of contract that governs the interactions of individuals in a market economy. The productive state is an active participant in the organisation of economic activity, via the formation of state enterprises (akin to private enterprises) such as schools, hospitals, and transport systems. Political authorities meet with incentives to push beyond the minimally protective state and basic productive state, effectuating a redistributive state. They can use their position to extract surplus resources from the productive capacity of the economy in the form of fiscal transfers to themselves and favoured groups. These may take the form of money or other benefits in kind, or they may use government to produce non-public goods for their own consumption, or for the entire population but according to their own political preferences.

If this is the case it is unlikely that the provision of collective goods and services in the public sector—and the performance of the polity-economy as a whole—will be efficient. Misdirected application of political authority can lead to inefficiency but it can also be characterised as exploitative. Political economists often invoke the metaphor of the ‘tragedy of the commons’ to describe this outcome (Wagner 1992, 2012a,b; Yoon 2000; Buchanan & Yoon 2001, 2004; Jakee & Turner 2002; Buchanan 2003a; Raudla 2010). The familiar tragedy involves the overexploitation of a common resource as many users are given open access rights (Gordon 1954; Scott 1955; Hardin 1968). Yet Elinor Ostrom (1990; 2010) has shown that in many cases commons users are capable of developing methods, institutions, and practices of governance that manage to avert overdepletion.

In the political setting, the fiscal capacity of the whole economy becomes the analogous exploitable resource. State fiscal processes typically transform private property into common property, with the state becoming the forum where rules for governing the commons are decided (Wagner 1992, 2012a,b). Common property follows from collective ownership, where some collective body holds property jointly but ownership shares (i.e., access rights) are not distributed evenly among members of that body. When private property is converted into common, as per political action, the value consequences of the

use of that property are diffused throughout society, and thus the owners (controllers) can offload negative externalities on outsiders with impunity.

The fiscal commons are stocked through taxation, and different people within society have differential obligations to contribute to them. They are depleted through spending, and again citizens have differential rights of access. Contribution and access to the fiscal commons are obtained through a competitive process, whereby more effective political agents (i.e., individuals, interests groups, coalitions) gain larger shares of the fiscal commons. At the end of this, citizens differ in net positions vis-à-vis the fiscal commons; in their obligations to stock the commons and in the amount of access they have secured. Those who are politically favoured accept lower tax prices and receive greater spending provisions, while political outsiders compensate for the budgetary shortfall with higher tax prices and lower spending provisions.

More generally, social surplus—whether in the form of individual income or utility or some measure of aggregate value or welfare—can be styled as a common pool resource. Different political-jurisdictional frameworks generate different distributions of people, property, and policies, and thus attain different levels of social welfare. The differentials therein are a measure of social surplus, which is an exploitable and potentially depletable resource. Maximum social surplus corresponds to a condition of optimal efficiency in the Coasean sense and can only be secured if exploitative usage of the political commons is somehow restricted.

Like the overexploited natural resource commons, the tragedy of the fiscal commons occurs when access is left too open or when users are given differential access rights. At the individual level, this can be a source of inframarginal rents to politically expedient agents and citizens. At the systemic level, in the very least this portends to political and economic inefficiency. In the extreme the counterpart of natural resource depletion is political-economic collapse or regress to a kind of Hobbesian anarchy. Citizens treat the value of each other as their own, and the common resource of social surplus is fully depleted. In the limit is the worst of all political-economic orders; and at other gradations of unrestrained access, we arrive at other variously inefficient allocations of people, property, and policies.

Within fiscal commons, like in common property arrangements more generally, the self-interest of fiscal participants alone does not guarantee sustainable fiscal management. A good fiscal order, and thus a good economic order, requires constraints on fiscal authorities. Economists have recommended the assignment of separate and transferable property rights to overcome problems of overexploitation of common property resources. Property rights realign incentives for owners to maximise rents and thus tend towards efficiency in resource use. For political commons, this means that common property should be converted into private property, to the extent that is possible, which corresponds to a minimal protective and perhaps basic productive state. This solution is however often problematic in the political domain. How can we think of privatising the functions of governments?

For one, a single person or entity (i.e., a dictator or an elite group) could be assigned exclusive governance rights in a polity. As the theory goes, the ‘owners’ of the polity would then implement a political-jurisdictional order that maximises social surplus in the productive potential of the polity. While tending toward an efficient outcome this would surely prove a politically infeasible distributional outcome—the authority receives all social surplus and the subjects are no better off than in the overexploited alternative.

Moreover, even discounting the distributional problem, a single authority may not be able to secure full social surplus even if its incentives are appropriately aligned through private ownership of the former fiscal commons. If the authority faces knowledge limitations or can only imperfectly discriminate among its subjects, then its actions are likely to induce distortive behavioural responses, and thus fail to maximise the productive potential of the polity (Buchanan & Yoon 2001, 2004; Buchanan 2003a). Despite the assignment of property rights, there is a value shortfall from the excess burden of taxation that is symptomatic of both a tragedy of political commons and Coasean inefficiency.

In any event, a model of singular authority hardly comports to political-jurisdictional systems as we observe them in the real world. More often, political systems are compounds of multiple authorities—sitting somewhere along the spectrum from monocentrism towards polycentrism. In this setting collective political actions emerge from multiple

simultaneously acting political enterprises, but the metaphor of the fiscal commons still applies (perhaps even more aptly). Under a polycentric political-jurisdictional order, as previously, the common resource is social surplus over the fiscal capacity of the polity-economy. And the fiscal commons is accessible by several independent users much like the classic commons example—each political authority can withdraw from the fiscal commons by imposing taxes on the entirety of the population, and spending as they so determine.

The distinction between the single authority and multiple authority fiscal commons is analogous to that of monopoly and oligopoly. Aggregate taxes will be higher than under a single authority, and so will be the excess burden of taxation (Buchanan & Yoon 2001, 2004). Quite apart from knowledge or competence limitations, the tragedy of the political commons is accentuated. As the number of political units increases, more and more of social surplus is extracted from the polity-economy until, in the limit, the outcome for citizens likens to a fully depleted commons.

While this model of multiple authorities at first appears more descriptive of political reality than the monopolistic model, there is at least one common political-jurisdictional feature missing from it: majoritarianism. In principle, political units in polycentric democracies must find a majority of supporters before they can affect political actions and draw from fiscal commons. On first consideration, majoritarian democracies seem no less tragic in their proclivity to overexploit the general tax base. However, political economists have found that the equilibrium that emerges in settings where differing majority coalitions operate simultaneously can be efficient under certain conditions.

The function of multiple majorities is to attenuate the tragedy of the political commons. A ‘membership externality’ emerges from the necessarily intersecting membership bases of simultaneous majority coalitions, which acts to limit fiscal exploitation. There must always be some overlap between members in multiple majorities—fully disjoint, mutually exclusive majorities can never exist concurrently. This means that citizens will reflect the prospect of winning multiple majorities in making their demands on the fiscal commons. The upshot is that externalities are at least partially internalised and complete

overdepletion is avoided, depending on the structure of overlapping majorities in the multiple authorities (Buchanan & Yoon 2001, 2004; Buchanan 2003a).

The challenge of political commons management is to discover political-jurisdictional rules that minimise the distance between actual and potential social value—rules that cultivate efficient allocations of people, property, and policies. It is therefore useful to view political systems as a commons—as complex institutional structures of *access rules* and *boundary rules* that sustain or deplete social value. The common property character of political action typically dissociates fiscal authorities from the value consequences of their decisions; but the extent of that disconnect depends on the set of rules that govern *access* to the fiscal commons. Further, just as states and political units typically do not operate in isolation, neither do political commons. The ability to exit to other political enterprises (or create them anew) can mitigate over exploitation; but this depends on the set of rules that delimit the *boundaries* of fiscal commons. There are thus two margins along which to seek efficiency enhancing institutional change: access rules and boundary rules.

Access rules stipulating non-discriminatory financing and provision of political goods is one possible avenue to non-exploitative, efficient ends. If individual citizens each have equal access to fiscal commons then they equally bare the value consequences of collective decisions over political actions. There therefore should be no systemic bias in the direction and use of common property, at least with respect to fiscal exploitation or appropriation of social value (knowledge problems and the like could persist, of course). This is reflected in the liberal democratic concepts of the *rule of law* and the constitutional *generality* norm—the requirements that all citizens in a polity be subjected to the same law, and that government programs provide benefits and compel contributions uniformly across the polity, respectively. If political authorities cannot discriminate on imposition of costs and dispensation of benefits, the incentive to exploit potential social surplus disappears.

The extent to which a public budgetary process descends into fiscal tragedy depends on how consistent the process is with the framework of private property and freedom of contract. Another such access rule is Wicksell's (1896) theory of just taxation and of unanimity rules, which was later subsumed into Buchanan and Tullock's (1962)

formulation of constitutional political economy. Wicksell believed if a parliament is selected through proportional representation and its members are broadly representative of society, then a unanimity rule within parliament would approximate unanimity within society at large. Then there would exist no conflict between private property of the citizenry and the commons of the state.

Whether government acts consistent with the rules of property and contract and manages to resolve this basic conflict is an empirical question. There are likely many more access rules that restrict exploitation of the fiscal commons without fully coupling political choice to value consequences in the way private property does. While these rules might variously restrict access to the commons, the principle of common property still operates to some extent. Overall fiscal overexploitation in the polity-at-large will depend on the underlying complex constellation of rules and interactions on the fiscal commons.

The abovementioned model of multiple majorities is an example of a *boundary rule* that limits the tragedy of political commons. It should be noted that such a jurisdictional rule resembles to political unbundling. In a system of *unbundled governance*, independent single-purpose governments or public enterprises are functionally specialised and provide collective goods and services separately. In principle, each function of government could be provided by a unique political enterprise under a majoritarian decision making rule. Each unbundled political unit would then entail their own majority, with the ability to place charges on the general fiscal capacity of the whole polity (and provide the political good in return). Multiple majority coalitions in the unbundled political units are thus authorised to impose taxes separately and simultaneously within the same encompassing political unit. And as above, the necessary membership externalities among citizens in the various prospective majorities serve to limit fiscal exploitation and stave off the tragedy of political commons.

Political commons typically do not operate in isolation. Polycentric governance systems (whether bundled or unbundled, territorially decentralised or non-territorial) play an important role in moderating the tragedy of the fiscal commons. First, the multiple majorities model can be applied to polycentric systems, in which citizens are members of

several nested political units at different scales (e.g. local, state, and federal), each with the authority to draw from the fiscal capacity of the polity-economy. Here, as above, the prospects for individual membership in more than one decisive authority ('membership externalities') will temper majoritarian exploitation.

Another feature of polycentric systems is exit. When citizens come together to form an enterprise over some common pool, their options are not only to contribute or free ride, but also include the possibility of simply not taking part or exiting the arrangement. Elinor Ostrom (1990; 2010) found that in many cases of successful commons management the ability of participants to choose *not* to participate supported the governance solution. Yet, she does not explicitly model common resources problems as including exit options. Vincent Ostrom (1971; 1972; 1991), however, did emphasise how the ability to opt in or out of collectivised interactions impacts the dynamics of polycentric arrangements.

Since political commons are not natural objects (like a vital local water resource) but are artificial creations, it is possible to imbed exit options in the set of boundary rules constituting a political unit. Then people will participate in the commons only if they believed it to be well managed, putting incentives before commons managers to find and implement sustainable, efficient access rules. Conversely, when citizens do not possess exit options and are forced to participate in political commons the fiscal budgetary process is likely to be irresponsible and replete with opportunities for exploitation.

Shifting the boundaries that delimit fiscal commons also affects the prevalence of access rules, and thus efficiency versus overexploitation, in a polycentric polity-at-large. Consider a polity that is constituted by two sub-units with different access rules (i.e., one is well managed, the other is not); a change of the internal boundary to subsume the underperforming political commons may prove an efficiency enhancing institutional change. This will depend on the new structure of rules and interactions on the successive fiscal commons, but suffice to say the change in boundary rules is what will precipitate any changed outcome.

Private property and commons property are indeed opposing systems of ordering societies, and the choice between the two generate clashes and conflicts between individuals and enterprises within each regime. For instance, the comparative inefficiency of political enterprises on the fiscal commons creates potential profit opportunities for competitive private enterprises. Political discrimination generates incentives to serve the citizen-consumers who lose from the political process, either by providing the same product at lower price, or different, more preferred products. The same conflict, and resulting drive to efficient, sustainable governance also applies among competing political commons. In a polycentric setting, the inefficiency of political enterprises on *one* fiscal commons creates potential profit opportunities for competitive political enterprises on *other* fiscal commons (i.e., in other states). This is the rationale of political sorting and jurisdictional change in the context of fiscal commons.

We began this section by outlining how polities are constituted as fiscal commons, and describing how this often portends to exploitation and inefficiency. Governance rules that constrain appropriation of social value (access rules) and delimit authorities in a way that internalises overexploitation (boundary rules) temper the tragedy of the fiscal commons. The objective is to discover access rules and boundary rules for the political commons that enable an efficient, non-exploitative political-jurisdictional order. In terms of access, the rule of law, a generality norm, or proportional representation and a unanimity rule may form such a rule set, but there are potentially many others. Boundary rules should include viable exit options and generate membership externalities in multiple, overlapping majorities, but again there are potentially many variations thereon that produce the desired effect. In this context, the political-jurisdictional Coase theorem proposes that under ideal conditions, other such rules sets (or *the* rule set, if there is only one) will be discovered. We now turn attention to this possibility.

Model and taxonomy of political-jurisdictional transitions

This section presents a model of the relationship between political, jurisdictional, and contracting reallocations of property rights in the political-jurisdictional Coase theorem. The purpose is to show how changes to the structure of jurisdictions in a polity-economy have consequences for the allocation of property rights, and how as a result jurisdictional change should form part of the Coase theorem (along with changes in the nominal allocation of property rights, and policy changes within jurisdictions). The secondary purpose is to illustrate a simple taxonomy of political-jurisdictional reallocations (or transitions) that follow from the model of political, jurisdictional, and market exchanges.

In this model, the polity-economy comprises of citizens, their property, and the structure of jurisdictions. In addition, we make the distinction between ‘territorial’ property, defined as that which cannot move from territorially defined jurisdictions, and ‘non-territorial’ property, defined as that which can be exchanged across territorial borders or can move with mobile citizen owners.

The polity-economy comprises of:

The set of items of territorial, immobile property $T = \{t_1, t_2, t_3, \dots, t_t\}$

The set of items of non-territorial, mobile property $M = \{m_1, m_2, m_3, \dots, m_{\hat{m}}\}$

The set of individual citizens $I = \{i_1, i_2, i_3, \dots, i_i\}$

The set of states $S = \{s_1, s_2, s_3, \dots, s_{\hat{s}}\}$

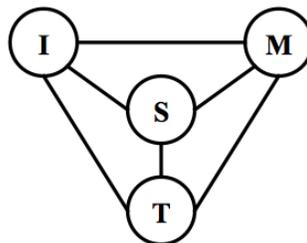


FIG 3.1 Relationships between individual citizens I , mobile property M , territorial property T , and states S

These elements—people, property, and states—connected in manifold ways to form the institutional structure of the economy, which is essentially a structure of jurisdictional and property rights relations. That is, citizen-state relations and citizen-property relations. First we define ‘*de facto* property relations’ as the mappings between individual citizens and either their territorial, immobile property or their non-territorial, mobile property. These are labeled ‘*de facto*’ because they are the apparent or nominal property right claims that individuals hold prior to the reallocative actions of states.

Define ‘de facto property relations’:

$$N_T: I \leftrightarrow T$$

$$N_T = \begin{bmatrix} n_{1,1} & \cdots & n_{1,\hat{t}} \\ \vdots & \ddots & \vdots \\ n_{i,1} & \cdots & n_{i,\hat{t}} \end{bmatrix} \quad n_{i,t} \in \{0, 1\}$$

Where $n_{i,t} = 1$ if citizen i nominally owns territory t ; and $n_{i,t} = 0$ if not

That is, N_T is an incidence matrix representing the nominal property rights claims that individual citizens I have over territorial, immobile property T

$$N_M: I \leftrightarrow M$$

$$N_M = \begin{bmatrix} n_{1,1} & \cdots & n_{1,\hat{m}} \\ \vdots & \ddots & \vdots \\ n_{i,1} & \cdots & n_{i,\hat{m}} \end{bmatrix} \quad n_{i,m} \in \{0, 1\}$$

Where $n_{i,m} = 1$ if citizen i nominally owns property m ; and $n_{i,m} = 0$ if not

That is, N_M is an incidence matrix representing the nominal property rights claims that individual citizens I have over non-territorial, mobile property M

Thus define $N = \{ \{N_T\}, \{N_M\} \}$ as the structure of *all* nominal property rights claims that individual citizens I have, over both over territorial, immobile property T , and non-territorial, mobile property M

States can have jurisdiction over territory, as is conventional, or they can have jurisdiction over individual citizens, which is the non-territorial concept. To accommodate both possibilities, we define the structure of ‘jurisdictional relations’ as the mappings

between states and either their territory (e.g. territorial jurisdictions) or their citizens (i.e., non-territorial or personal jurisdictions).

Define ‘jurisdictional relations’:

$$J_T: S \leftrightarrow T$$

$$J_T = \begin{bmatrix} j_{1,1} & \cdots & j_{1,t} \\ \vdots & \ddots & \vdots \\ j_{\hat{s},1} & \cdots & j_{\hat{s},t} \end{bmatrix} \quad j_{s,t} \in \{0, 1\}$$

Where $j_{s,t} = 1$ if state s has jurisdiction over territory t ; and $j_{s,t} = 0$ if not

That is, J_T is an incidence matrix representing the direct jurisdiction that states S have over territorial, immobile property T (i.e., ‘territorial jurisdiction’)

$$J_I: S \leftrightarrow I$$

$$J_I = \begin{bmatrix} j_{1,1} & \cdots & j_{1,i} \\ \vdots & \ddots & \vdots \\ j_{\hat{s},1} & \cdots & j_{\hat{s},i} \end{bmatrix} \quad j_{s,i} \in \{0, 1\}$$

Where $j_{s,i} = 1$ if state s has jurisdiction over citizen i ; and $j_{s,i} = 0$ if not

That is, J_I is an incidence matrix representing the direct jurisdiction that states S have over individual citizens I (i.e., ‘personal jurisdiction’)

Further to this, the political-jurisdictional Coase theorem extends to polycentric jurisdictional arrangements as well, such as local government, economic clubs, federalism, international relations, and so on. Accordingly, we define the structure of ‘inter-jurisdictional relations’ as the mappings between states and other states. In this way inter-jurisdictional relations mediate personal and territorial jurisdictional relations between states, citizens, and territory. For instance, state s_1 might not have jurisdiction over a citizen i_1 , but if state s_2 *does* have jurisdiction over the citizen and there is an inter-jurisdictional relation between states s_1 and s_2 , it might be the case that state s_1 does in fact have some influence over the property and person of the citizen. The set of direct territorial and personal jurisdictional relations and inter-jurisdictional relations therefore define the set of all jurisdictional relations in the polity-economy.

Define 'inter-jurisdictional relations':

$$J_s: S \leftrightarrow S$$

$$J_s = \begin{bmatrix} j_{1,1} & \cdots & j_{1,\bar{s}} \\ \vdots & \ddots & \vdots \\ j_{\bar{s},1} & \cdots & j_{\bar{s},\bar{s}} \end{bmatrix} \quad j_{s,\bar{s}} \in \{0, 1\}$$

Where $j_{s,\bar{s}} = 1$ if state s has inter-jurisdictional relation with state \bar{s} ; and $j_{s,\bar{s}} = 0$ if not

That is, J_s is an incidence matrix representing the inter-jurisdictional relations that mediate personal and territorial jurisdiction relations between states S , individual citizens I , and territorial, immobile property T

Thus define $J = \{J_T, J_I, J_S\}$ as the structure of all direct jurisdictional relations that states S have over territorial, immobile property T , individual citizens I , and between themselves

Next we define the set of 'state reach relations,' which represent the effective jurisdiction that states have over citizens, territory, and property. That is, by combining the sets of direct territorial and personal jurisdictions and inter-jurisdictional relations with *de facto* property relations, this expresses which states have the potential reach over territorial, immobile property and non-territorial, mobile property (via jurisdiction over citizen owners), and can therefore potentially affect reallocative changes in property rights. The set of all state reach relations therefore defines the structure of effective (direct plus indirect) jurisdictional relations that states have over citizens and their territorial and mobile property.

Define 'state reach relations':

$$R_T: S \leftrightarrow T$$

$$R_T = \{J_T, J_I \cap N_T, J_S \cap J_T, J_S \cap J_I \cap N_T\}$$

$$R_T = \begin{bmatrix} r_{1,1} & \cdots & r_{1,t} \\ \vdots & \ddots & \vdots \\ r_{\bar{s},1} & \cdots & r_{\bar{s},t} \end{bmatrix} \quad r_{s,t} \in \{0, 1\}$$

Where $r_{s,t} = 1$ if state s has reach over territory t ; and $r_{s,t} = 0$ if not

That is, R_T is an incidence matrix representing the effective (direct plus indirect) jurisdiction states S have over territorial, immobile property T (i.e, relations between states S and the territorial, immobile property T that they can potentially redistribute)

$$R_I: S \leftrightarrow I$$

$$R_I = \{ \{J_I\}, \{J_T \cap N_T\}, \{J_S \cap J_I\}, \{J_S \cap J_T \cap N_T\} \}$$

$$R_I = \begin{bmatrix} r_{1,1} & \cdots & r_{1,i} \\ \vdots & \ddots & \vdots \\ r_{\hat{s},1} & \cdots & r_{\hat{s},i} \end{bmatrix} \quad r_{s,i} \in \{0, 1\}$$

Where $r_{s,i} = 1$ if state s has reach over citizen i ; and $r_{s,i} = 0$ if not

That is, R_I is an incidence matrix representing the effective (direct plus indirect) jurisdiction states S have over individual citizens I

$$R_M: S \leftrightarrow M$$

$$R_M = \{R_I \cap N_M\}$$

$$R_M = \begin{bmatrix} r_{1,1} & \cdots & r_{1,\hat{m}} \\ \vdots & \ddots & \vdots \\ r_{\hat{s},1} & \cdots & r_{\hat{s},\hat{m}} \end{bmatrix} \quad r_{s,m} \in \{0, 1\}$$

Where $r_{s,m} = 1$ if state s has reach over property m ; and $r_{s,m} = 0$ if not

That is, R_M is an incidence matrix representing the effective (direct plus indirect) jurisdiction states S have over non-territorial, mobile property M (i.e, relations between states S and the non-territorial, mobile property M that they can potentially redistribute)

Thus define $R = \{ \{R_T\}, \{R_I\}, \{R_M\} \}$ as the structure of all effective (direct plus indirect) jurisdictional relations that states S have over territorial, immobile property T , individual citizens I , and non-territorial, mobile property M

Next we define the set of ‘policy modification relations,’ which represent the modifications to nominal property rights claims of citizens that are revealed once the polity decides upon a policy. By definition these modifications (either revoking or granting property) cannot be identified prior to the reallocative actions of states. However, the state

reach relations do identify which citizens and which property could potentially be affected (i.e., are modifiable or not). Following political action, the policy modification relations show which citizens have benefited or have been harmed and which territorial or mobile property has been reallocated.

Define 'policy modification relations':

$$L_T: I \leftrightarrow T$$

$$L_T = \begin{bmatrix} l_{i_1,t_1} & \cdots & l_{i_1,t} \\ \vdots & \ddots & \vdots \\ l_{i,t_1} & \cdots & l_{i,t} \end{bmatrix} \quad l_{i,t} \in \{-1, 0, 1\}$$

Where if $r_{s,t} = 0 \forall s$ then $l_{i,t} \equiv 0$ and ownership of territory t by citizen i is unmodifiable by any state s ; if some $r_{s,t} = 1$ and $l_{i,t} = -1$ then ownership of territory t by citizen i is modified (revoked); if some $r_{s,t} = 1$ and $l_{i,t} = 1$ then ownership of territory t by citizen i is modified (granted); and if some $r_{s,t} = 1$ and $l_{i,t} = 0$ then ownership of territory t by citizen i is modifiable yet remains unmodified

That is, L_T is an incidence matrix representing the latent modifications to the nominal property rights claims that individual citizens I have over territorial, immobile property T , that are revealed once the polity decides upon a policy

$$L_M: I \leftrightarrow M$$

$$L_M = \begin{bmatrix} l_{i_1,m_1} & \cdots & l_{i_1,m} \\ \vdots & \ddots & \vdots \\ l_{i,m_1} & \cdots & l_{i,m} \end{bmatrix} \quad l_{i,m} \in \{-1, 0, 1\}$$

Where if $r_{s,m} = 0 \forall s$ then $l_{i,m} \equiv 0$ and ownership of property m by citizen i is unmodifiable by any state s ; if some $r_{s,m} = 1$ and $l_{i,m} = -1$ then ownership of property m by citizen i is modified (revoked); if some $r_{s,m} = 1$ and $l_{i,m} = 1$ then ownership of property m by citizen i is modified (granted); and if some $r_{s,m} = 1$ and $l_{i,m} = 0$ then ownership of property m by citizen i is modifiable yet remains unmodified

That is, L_M is an incidence matrix representing the modifications to nominal property rights claims that individual citizens I have over non-territorial, mobile property M , that are revealed once the polity decides upon a policy

Finally, the set of ‘*de jure* property relations’ can be defined as the sum of nominal *de facto* property relations and policy modifications. *De jure* property relations are also mappings between individual citizens and either their territorial, immobile property or their non-territorial, mobile property. These are labeled ‘*de facto*’ because they are the effective or final property right claims that individuals hold subsequent to political reallocative actions of states.

Define ‘de jure property relations’:

$$P_T: I \leftrightarrow T$$

$$P_T = N_T + L_T$$

$$P_T = \begin{bmatrix} p_{i_1, t_1} & \cdots & p_{i_1, t} \\ \vdots & \ddots & \vdots \\ p_{i, t_1} & \cdots & p_{i, t} \end{bmatrix} \quad p_{i, t} \in \{0, 1\}$$

Where $p_{i, t} = 1$ if citizen i effectively owns territory t ; and $p_{i, t} = 0$ if not

That is, P_T is an incidence matrix representing the effective property rights claims that individual citizens I have over territorial, immobile property T , which will be manifest once the polity enacts policy

$$P_M: I \leftrightarrow M$$

$$P_M = N_M + L_M$$

$$P_M = \begin{bmatrix} p_{i_1, m_1} & \cdots & p_{i_1, m} \\ \vdots & \ddots & \vdots \\ p_{i, m_1} & \cdots & p_{i, m} \end{bmatrix} \quad p_{i, m} \in \{0, 1\}$$

Where $p_{i, m} = 1$ if citizen i effectively owns territory t ; and $p_{i, m} = 0$ if not

That is, P_M is an incidence matrix representing the effective property rights claims that individual citizens I have over non-territorial, mobile property M , which will be manifest once the polity enacts policy

Thus define $P = \{ \{P_T\}, \{P_M\} \}$ as the structure of *all* effective property rights relations, both territorial, immobile T and non-territorial mobile M

Now that we have set out the basic structure of the polity-economy—comprising citizens, property, and states—we can explore the consequences of changes to the structure of jurisdictions for the allocation of property rights, and for the political-jurisdictional Coase theorem. Consider the following model in which W denotes aggregate social welfare $W = F(P, X)$ where X is a vector of economic, geographic, social or other characteristics that are taken as given and that influence social welfare directly, and P is the structure of all effective property rights relations in the polity-economy, as above. Define $\mathbb{P}(\cdot|X)$ as the set of effective property rights relations that maximise welfare, given a vector of characteristics X , so that

$$P^*(X) \in \mathbb{P}(\cdot|X) \Leftrightarrow P^*(X) \in \arg \max_P F(P, X).$$

The Coase theorem maintains that there are forces leading the polity-economy towards some $P^*(X)$ in $\mathbb{P}(\cdot|X)$. That is, to some allocation of effective property rights relations that is optimally efficient and maximises social welfare. If a polity-economy is at some property allocation $P(X) \notin \mathbb{P}(\cdot|X)$ a reallocation to $P^*(X) \in \mathbb{P}(\cdot|X)$ would create aggregate welfare gains. If the gains were Pareto improving they could be apportioned to citizens as side payments and the polity-economy would approach the optimal allocation. $\mathbb{P}(\cdot|X)$ is the set of property allocations that maximise welfare and is therefore not necessarily a singleton. There could be appreciably different property allocations in two polity-economies, but with equivalent levels of aggregate welfare. Or there could be identical property allocations with different levels of welfare. This is because the vector of economic, geographic, social or other characteristics X is also in the argument, and each polity-economy will move to the allocation of property rights that are appropriate for their own situations. That is, two polity-economies with characteristics X and $X' \neq X$ do not have equivalent welfare optimums $F(P^*(X), X) \neq F(P^*(X'), X')$. And moreover, the welfare in each polity-economy (given its other characteristics) is greater than if it were to adopt the other's optimal property allocation; so that $F(P^*(X), X) > F(P^*(X'), X)$ and $F(P^*(X'), X') > F(P^*(X), X')$.

But notice, however, that there are many ways those polity-economies can differ aside from just their final *de jure* property right allocations. Property rights also change through political-jurisdictional reallocations (or transitions). Recall that $P = F(N, L)$ where N is the

structure of all nominal property rights claims, and L is the modifications to those nominal property rights claims that are revealed once the polity decides upon a policy. What this means is that changes and differences in *de jure* property rights P are in fact the result of changes and differences in *de facto* property rights N and policy modifications L .

But again recall that $L = F(R, V)$ where R is the structure of all effective jurisdictions of states over property rights claims, and V is defined as the set of revealed modifications (i.e., actual redistributions, either revoking or granting property) that follow from the political reallocative actions of states. Again this means that changes and differences in policy modifications L can be due to changes and differences in the reaches of states in the polity-economy.

Finally recall that $R = F(N, J)$ where N is the structure of all nominal property rights claims, and J is the structure of all direct jurisdictions that states have over territory, citizens, and between themselves. That is, transitions in the structure of *de jure* property rights relations P are a function of transitions in *de facto* property rights relations N and transitions in jurisdictional relations J , as well as political reallocations V . The upshot is that in this model *de facto* property rights and jurisdictions are the most basic connections forming the institutional structure of the economy. Constitutional rules (or norms) permitting or constraining political redistribution are also an important feature.

Now reconsider the model of aggregate social welfare $W = F(P, X) = F(N, J, V, X)$. Define $\mathbb{N}(\cdot|J, V, X)$ as the set of nominal property rights claims that maximise welfare, given vector of characteristics X , political reallocations V , and the set of direct jurisdictions J , so that

$$N^*(J, V, X) \in \mathbb{N}(\cdot|J, V, X) \Leftrightarrow N^*(J, V, X) \in \arg \max_N F(N, J, V, X).$$

Also define $\mathbb{J}(\cdot|N, V, X)$ as the set of direct jurisdictions that maximise welfare, given a vector of characteristics X , political reallocations V , and the set of nominal property rights claims N , so that

$$J^*(N, V, X) \in \mathbb{J}(\cdot|N, V, X) \Leftrightarrow J^*(N, V, X) \in \arg \max_J F(N, J, V, X).$$

And finally define $\mathbb{V}(\cdot|N,J,X)$ as the set political reallocations that maximise welfare, given a vector of characteristics X , the set of direct jurisdictions J , and the set of nominal property rights claims N , so that

$$V^*(N,J,X) \in \mathbb{V}(\cdot|N,J,X) \Leftrightarrow V^*(N,J,X) \in \arg \max_N F(N,J,V,X).$$

Then, as per the political-jurisdictional Coase theorem, the forces leading polity-economies towards some $P^*(X)$ in $\mathbb{P}(\cdot|X)$ are rather leading them towards some $N^*(J,V,X)$ in $\mathbb{N}(\cdot|J,V,X)$, some $J^*(N,V,X)$ in $\mathbb{J}(\cdot|N,V,X)$, and some $V^*(N,J,X)$ in $\mathbb{V}(\cdot|N,J,X)$. Put simply, the optimally efficient allocation of property rights that maximises social welfare can be achieved by making reallocations in markets, jurisdictions, or politics. If a polity-economy is at some property allocation $P(X) \notin \mathbb{P}(\cdot|X)$ a reallocation to $P^*(X) \in \mathbb{P}(\cdot|X)$ could proceed by moving to a combination of optimal nominal property allocation, optimal jurisdictional structure, and optimal political reallocations. This could occur by making adjustments in one, two, or all three of these domains (i.e., markets, jurisdictions, or politics). By the same token, an adjustment that creates aggregate welfare losses (say, inefficient political reallocation) can be repaired with recourse to the other domains (in this case, private exchange or jurisdictional change). Market, jurisdictional, and political exchange work in tandem to bring about the Coase-theoretic optimal allocation of property rights.

Moreover, $\mathbb{N}(\cdot|J,V,X)$, $\mathbb{J}(\cdot|N,V,X)$, and $\mathbb{V}(\cdot|N,J,X)$ are the *sets* of nominal property allocation, jurisdictional structure, and political reallocations that maximise welfare and are therefore not necessarily singletons. This means that there are potentially very many optimal combinations of nominal property rights, jurisdictions, and political reallocations that could produce the welfare maximising outcome. In fact, in theory *any* combination of two out of the three components could produce the result, if the third mechanism is used judiciously to calibrate and repair the allocation of property rights. For example, conceivably a monocentric state and nominal allocation in which all property rights are assigned to a single citizen could fall within the optimal set of rights, jurisdictions, and policies provided that the political mechanism works perfectly to reallocate property in the direction of the social welfare maximising outcome.

Now, not only could it be that two polity-economies with appreciably different *de jure* property allocations could have equivalent levels of aggregate welfare (or identical property allocations and different welfare levels). Further to this, two polity-economies with *identical de jure property allocations* could have equivalent levels of aggregate welfare despite considerably different *de facto* property allocations, jurisdictional structures, and redistributive politics. This is not just because they have different other characteristics $X \neq X'$ but due to the three reallocative mechanisms available to them. To demonstrate this, consider two polity-economies with identical other characteristics $X = X'$ (or put another way, different configurations of the same polity-economy). The optimal allocations of *de jure* property rights will therefore be identical and produce identical maximum aggregate welfare $F(P^*(\cdot), X) = F(N^*(\cdot), J^*(\cdot), V^*(\cdot), X) = F(N'^*(\cdot), J'^*(\cdot), V'^*(\cdot), X')$, despite the fact that *de facto* rights, jurisdictions, and policies could be different $N^*(\cdot) \neq N'^*(\cdot)$, $J^*(\cdot) \neq J'^*(\cdot)$, and $V^*(\cdot) \neq V'^*(\cdot)$. And moreover, the welfare in each polity-economy would diminish if it were to partly adopt the other's optimal configurations of *de facto* rights, jurisdictions, or policies (i.e., they are only optimal in tandem).

The conclusion of this model is that the transitioning of effective *de jure* property rights in a polity-economy is actually coeval of nominal *de facto* property rights N , jurisdictions J , and redistributive politics V . The transitions of nominal property rights N occur when the relations $N_T: I \leftrightarrow T$ and $N_M: I \leftrightarrow M$ change; that is, when individuals trade T and M in free exchange. The transitions in jurisdictions J occur when the relations $J_T: S \leftrightarrow T$, $J_I: S \leftrightarrow I$, and $J_S: S \leftrightarrow S$ change; that is, when territorial jurisdictional boundaries change (J_T), when non-territorial (personal) jurisdictional boundaries change (J_I), and when inter-jurisdictional boundaries change (J_S). And the transitions in redistributive policies V occur when the polity decides upon a policy and the reallocative actions of states have taken place, and are represented as changes in the relations $L_T: I \leftrightarrow T$ and $L_M: I \leftrightarrow M$.

All transitions in the institutional structure of the economy (property rights) must derive from transitions in N , J , and V (with subsequent side payments). The upshot is that property right transitions associate to 'flipping' in the elements of the *de facto* property rights relations (N_T , N_M), jurisdictional relations (J_T , J_I , J_S), and policy modification relations (L_T , L_M). For N and J , flipping the $\{0, 1\}$ elements $n_{i,t}$, $n_{i,m}$, $j_{s,t}$, $j_{s,i}$, or $j_{s,\bar{s}}$ will

change the reach of states over citizens and their property, and therefore potentially lead to a change in the *de jure* allocation of property rights. For V , flipping the $\{-1, 0, 1\}$ elements $l_{i,t}$ or $l_{i,m}$ will change policy modifications of *de facto* rights and therefore cause reallocative changes to the *de jure* allocation of property rights.

Note that various constraints could be placed on the elements and flipping, depending on the institutional rules in play. For example, a constraint could be placed on elements $n_{i,t}$ and $n_{i,m}$ to ensure an exclusive ownership rule e.g. if $n_{i,t} = 1$ then $n_{\bar{i},t} = 0 \forall \bar{i} \neq i$; and if $n_{i,m} = 1$ then $n_{\bar{i},m} = 0 \forall \bar{i} \neq i$. If this were the case then a flip in element $n_{i,t}$ would need to be accompanied by a corresponding flip in some element $n_{\bar{i},t}$ as the property is transferred from citizen i to citizen \bar{i} . Similarly, a flip in any $n_{i,m}$ would need to be accompanied by a corresponding flip in some other element $n_{\bar{i},m}$ under this exclusive ownership rule. Conversely, communal ownership relations could be made possible using different constraints on the elements (or none at all).

For jurisdictional exchanges, in the most general case, flips in elements $j_{s,t}$, $j_{s,i}$, or $j_{s,\bar{s}}$ need not be accompanied by a corresponding flip in some other element. However, some constraints could be placed on the flipping of these elements as indicative of some constitutional rules pertaining to the jurisdictional structure of a polity-economy. For example, the constraint $\sum_{s=1, \forall t}^S j_{s,t} = 1$ would indicate an exclusive territorial jurisdiction rule (i.e., no two states could have jurisdiction over the same territory). Constraints on the jurisdictional form, to the extent that they prohibit certain forms, can be conceptualised as imposing infinite (or prohibitive) transaction costs on jurisdictional exchanges (i.e., citizen mobility, re-bordering, secession). Generally, a flip in any $l_{i,t}$ or $l_{i,m}$ would need to be accompanied by a corresponding flip in some other element $l_{\bar{i},t}$ or $l_{\bar{i},m}$ respectively (i.e., what is redistributed must be revoked from one citizen and granted to another). Further constitutional rules could be imposed on the flipping of these elements in much the same way the ‘constitutional constraints’ are generally conceived (i.e., on rent seeking, taming leviathan, etc.).

More to the point of the political-jurisdictional Coase theorem, the exchanges in nominal property rights and jurisdictional transitions correspond to a taxonomy of

political-jurisdictional phenomena. These include private exchange between individuals, and territorial and non-territorial secession, union, sorting, and rebordering (see the appendix). For now, let us note that each type of political-jurisdictional exchange has a different type of transaction cost associated with it—whether it is a within-jurisdictional private exchange in territorial property, or a between-jurisdictional private exchange in mobile property, or territorial sorting between jurisdictions, or non-territorial secession from a jurisdiction, or so on. The comparative impositions of transaction costs will therefore bias the path of political-jurisdictional transitions, with implications for the efficiency of property right allocations (and underlying formations of people, polities, and policies).

The political-jurisdictional Coase theorem

A simple analogy

The Coase theorem can be applied to a bargaining problem between polities. This section offers a simple illustration of this by drawing an analogy between the distribution of resources among bargaining firms and the distribution of citizens and property among jurisdictions. We then use this to explore the implications of alternative constitutive allocations of political authority over said citizens and policy areas (cf. property rights entitlements and legal rules). The main purpose is to clarify the logic of the political-jurisdictional Coase theorem before moving on to a more detailed account of it.

The upshot from the simple two-state example is that the logic of Coasean bargaining potentially undermines the ideal of a monocentric political-jurisdictional order. Any such state can only be justified insofar as it does not suppress the formation of new states (i.e., does not quell secession). That is to say, the transaction costs of affecting political-jurisdictional change should be non-prohibitive (converging on zero). If this is not the case, then the prevailing institutional arrangement is suspect, from a Coasean perspective—we cannot be sure that it is optimal or if further, efficiency enhancing political-jurisdictional exchanges could be made.

The Coasean dictum is that in a world without transaction costs, people would bargain with one another to produce the most efficient distribution of resources, regardless of the initial allocation of property rights over said resources. One possible jurisdictional analogy is to say, in a world without *mobility* costs, states would bargain with one another to produce the most efficient distribution of *citizens*, regardless of the initial allocation of *authority* rights over said citizens. Or more accurately, it is the citizens themselves that would bring about this result. This is, of course, the Tiebout (1956) model of political sorting in a federalist public economy.

But the analogy is perhaps more interesting in relation to secession and the formation of new states. When the initial allocation of authority is monopolistic the Coasean dictum becomes: in a world without *secession* costs, states will bargain to produce the most efficient distribution of *citizens*, regardless of the initial allocation of *authority* rights over said citizens. Put another way, the optimal end state (i.e., monocentric versus polycentric, or monopolistic versus partitioned) is invariant to an initial allocation of political authority *only if* Coasean bargaining with zero secession costs is allowed to proceed between affected states (i.e., an incumbent state and latent states). If ideal Coase-theoretic conditions are not met—or rather, if they are actively manipulated or suppressed—then a prevailing monopolistic state is difficult to justify in Coasean perspective.

To illustrate, consider the familiar example of the cattle farmer and the crop farmer. In *The Problem of Social Cost*, Coase uses the example of two neighbouring farming properties with no fencing, such that straying cattle from one farm trample and destroy the crops of the other. This, of course, imposes a negative externality from one farm to the other, which is given as an assumption: no matter what, economic activity on the part of the cattle farmer imposes a negative externality on the crop farmer.

The question is, how much activity (i.e., how many cattle) will the cattle farmer undertake? The more cattle, the greater the externality, up to some point. Coase argued that if we lived in a world without transaction costs, the two farmers would bargain with one another to produce the most efficient distribution of resources, regardless of the initial allocation. That is to say, they would coordinate activities (the cattle farmer would raise

so many cattle and the crop farmer would plant so many crops) so as to maximise the joint value of their economic activity, and side payments would be arranged as part of the bargain. If cattle raising was more productive, the cattle farmer would raise more cattle and compensate the crop farmer. In the extreme, the cattle farmer would ‘rent’ both properties and the crop farmer would plant no crops but receive income solely in the form of a side payment from the cattle farmer (or visa versa).

So in this example: (1) two farmers are endowed with an initial allocation of property rights over plots of land; (2) the object of each farm is to maximise income; (3) this is achieved by utilising their property to produce value (via goods); (4) one farmer imposes a negative externality on another; and (5) if the two farmers can easily bargain with each other they will internalise the externality with transfer of property and side payments. Essentially, the cattle farmer generates an external cost on the crop farmer by reducing the income derived from the crop farmer’s plots of land. If the cattle-good is more valuable than the crop-good, the cattle farmer will take over more and more plots of land from the crop farmer, until the efficient distribution of resources is achieved. Of course this depends on zero transactions costs (or tolerable operation of bargaining) (see FIG 2 below).

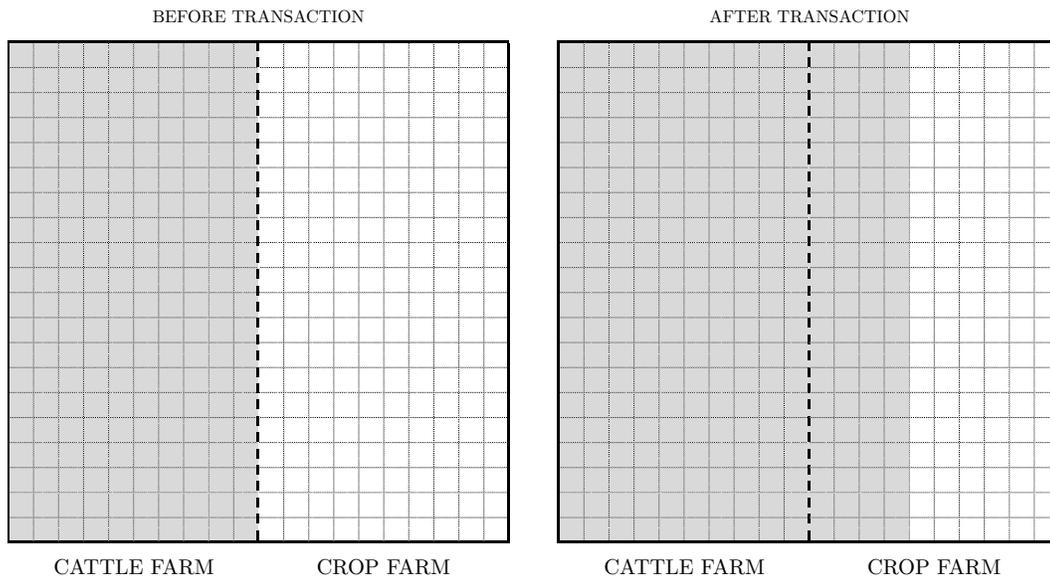


FIG 3.2 Cattle farmer bargains so as to raise more cattle and control more plots of land (without transaction costs)

Now consider that instead of bargaining over control of plots of land like the farmers, states bargain over control of citizens. Further, states ‘use’ citizens to produce welfare (cf. income) by way of policy (cf. goods). In this analogy: (1) two states are endowed with an initial allocation of authority rights over citizens; (2) the object of each state is to maximise utility; (3) this is achieved by utilising their authority to produce welfare (via policy); (4) one state imposes a negative externality on another; and (5) if the two states can easily bargain with each other they will internalise the externality with transfer of authority and side payments. Essentially, the incumbent state generates an external cost on the latent state by reducing the utility derived from the latent state’s citizens. If incumbent-policy is generates more social welfare than the latent-policy, the incumbent state will take over more and more citizens from the latent state, until the efficient distribution of resources (citizens) is achieved. And again, this is all dependent on zero secession costs (or tolerable operation of bargaining).

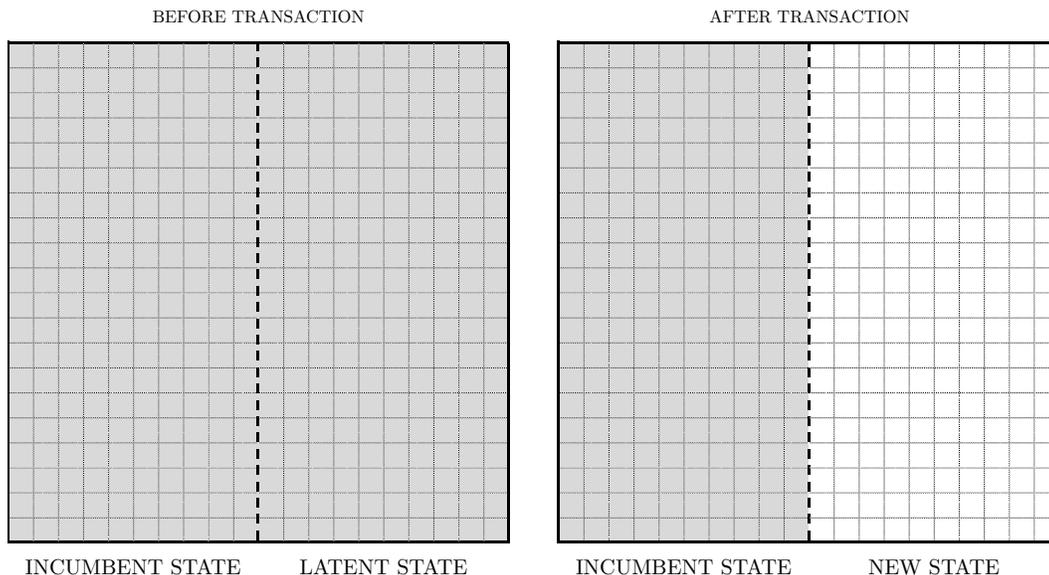


FIG 3.3 Latent state bargains so as to enact policy of its own
and control its own citizenry (without secession costs)

The example of secession, however, begins with a monopolistic allocation of authority rights over citizens. In such a case, the incumbent state is imposing a negative externality on the latent state, since it is reducing the utility of potential latent-state citizens and is

thus reducing the welfare that would otherwise be produced by the latent state (if it were to exist). Assuming zero secession costs, the latent state would be able to bargain with the incumbent state for authority over its potential citizenry, and we would arrive at the externality internalising efficient outcome of two states (FIG 3 above).

We know however, that secession costs are rarely, if ever, tolerable. This is because the chief arbiter of these costs is the incumbent state itself; and incumbent states often actively quell secession and suppress bargaining efforts. This tendency might be explained by Coase’s insight as to the reciprocal nature of externality. Notwithstanding, if secession costs are indeed a barrier to bargaining and the efficient outcome then the result that we are left with a monopolistic incumbent state is a perverse one (see FIG 4 below).

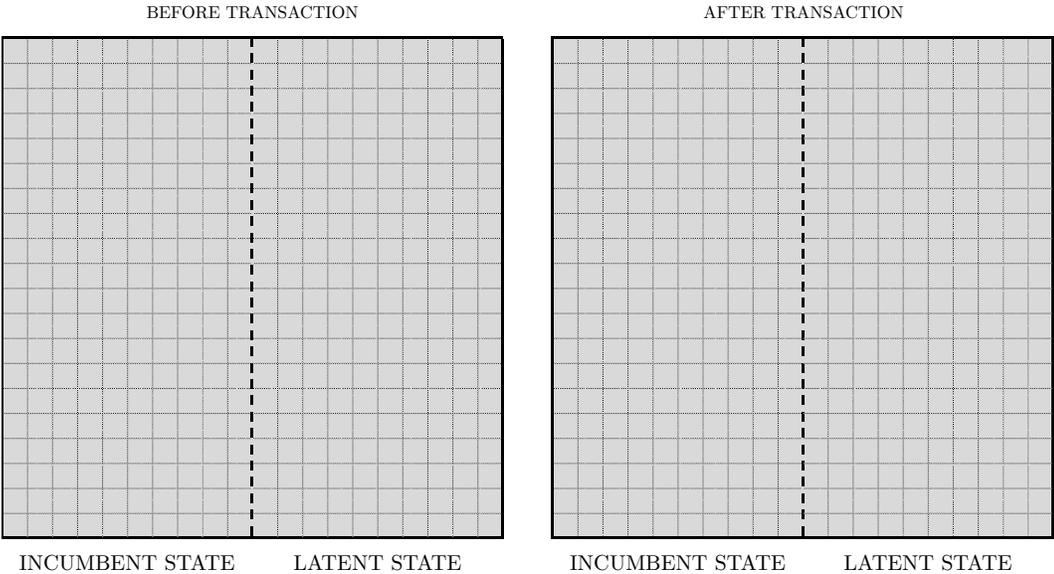


FIG 3.4 Latent state is unable to bargain for policy authority and control of its own citizenry (with secession costs)

Conversely, if secession costs are zero and the bargaining process results in a monopolistic state, then this is evidence that there was in fact no latent state to begin with, and all is well in the world (FIG 5 below). The upshot of all of this is that a monopolistic outcome can only be justified by appeal to the logic of Coasean bargaining and transaction cost economics when secession costs are demonstrably small and the

bargaining process operates tolerably well. Since the incumbent state is the arbiter of these costs, rather than suppressing bargaining efforts it should support the emergence of latent states. Paradoxically, anything less would seem to undermine the legitimacy of an observed monopolistic outcome.

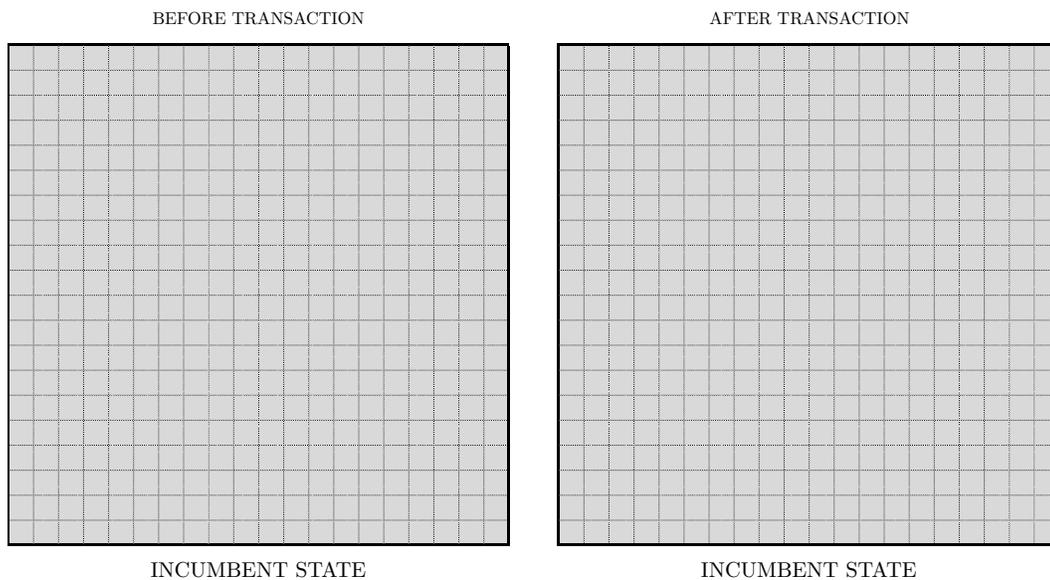


FIG 3.5 There is no latent state and no need for bargaining (without secession costs)

The political-jurisdictional Coase theorem

Let's now elaborate on the simple model of Coasean jurisdictional change by outlining a 'political-jurisdictional Coase theorem' proper. As mentioned, the 'political' side to this task has been covered before (e.g. Buchanan & Tullock 1962, Vira 1997; Acemođlu 2003; Parisi 2003). Similarly, arguably the 'jurisdictional' side has been covered too (e.g. Friedman 1977; Frey 2001; Alesina & Spolaore 2005), but these authors do not frame their work in Coasean terms. The objective is a framework that subsumes both political and jurisdictional interpretations of the Coase theorem.

In the PJCT framework there are three ways that property rights can be exchanged or reallocated within a society: (1) private exchange; (2) political exchange; and (3) jurisdictional exchange. The purpose of these mechanisms is to reduce or eliminate externalities by reallocating rights in such a way as to approach the ‘efficient’ allocation of rights for that society. And there are transaction costs associated with private, political, and jurisdictional exchange: (1) contracting transaction costs; (2) political transaction costs; and (3) jurisdictional transaction costs. We have externalities, exchange, and transaction costs—all the requisite components to use the Coase theorem to talk about these phenomena.

Political interpretations of the Coase theorem take as given the prevailing political system and describe Coasean bargains within it; for example, how post-vote trades improve efficiency, given transactions costs and institutional rule-constraints. But the Coase theorem can also be used to describe the efficiency of an allocation of political authority. It also explains how policies within a polity change, and how citizens conduct transactions with the state to influence policy.

Distributional conflicts are central to political economy and new institutional economics. These are conflicts over who gets what and how much they get; the item to be distributed is usually tangible—money, land, better housing, better schools, or better jobs, for example. The ‘political’ in the political-jurisdictional Coase theorem can be thought of in these terms. Distributional conflict is borne out when citizens bargain over government policies that effect property right reallocations within a polity; this might be through direct redistribution of property and income, or through indirect means via unevenly distributed tax incidences and public good provisions. Given the zero transaction cost assumption, citizens will continue to bargain until externalities have been exhausted—efficient policy is thereby enacted and property rights are efficiently allocated.

The adjustment of political jurisdictions is also based on internalisation of externalities, transactions costs, and Coasean bargaining; we often talk of efficiency in the matching of policy, jurisdictions, and citizens in compound political systems. That is, political integration and disintegration is a Coasean phenomenon in which transfers of property

rights are made to internalise externalities and realise potential gains (e.g. Alesina & Spolaore 2005). Tiebout sorting, too, is an expression of the Coase theorem—a point seldom made explicit, perhaps so trivial as to suitably remain implicit—but since there are constraints on jurisdictional boundaries, it is people who sort themselves among jurisdictions in ways that realise gains from trade and exchanges of political and property entitlements. Similarly, a world of deterritorialised political jurisdictions (e.g. Frey 2001; Hooghe & Marks 2001) would also be governed by Coase-theoretic transfers—in this setting it is jurisdictions themselves that adjust in such a way to transfer property rights and realise gains from trade (i.e., much like in Alesina & Spolaore 2005).

Another component of the political-jurisdictional Coase theorem is to think of a state as a sort of ‘political commons.’ The resource that is being managed is the allocation of property rights within a society; or more accurately, it is the level of social value that is determined by the efficient (or not) allocation of rights. That is, the state can be used to reallocated rights in an efficient manner (tantamount to a properly managed commons) or it can reallocate property rights to individuals in their own personal interest but so that efficiency is compromised (a poorly managed commons).

Citizens differentially contribute to and draw from a political commons. Net positions vis-à-vis a political commons modify the (nominal) allocation of property rights in a polity. Changing *access* to and *boundaries* of a political commons therefore modifies an allocation of property rights. This occurs either politically (access) or jurisdictionally (boundaries). Politically—citizens change access to political commons via: (1) *production* of public goods (i.e., provision and tax incidence), *protection* of law (i.e., constraints on use of property), and *redistribution* of property. Jurisdictionally—citizens change boundaries of political commons via: (2) *secession* from polity; (3) *union* of polities; (4) *sorting* between polities, or (5) *re-bordering* of polities. Note that these jurisdictional changes might be territorial or non-territorial (e.g. non-territorial secession).

So further to private exchanges of property rights, these processes effect changes in an allocation of property rights—such political and jurisdictional exchanges are the subject of the political-jurisdictional Coase theorem. The PJCT characterises the efficiency of an

allocation of political-economic activity (i.e., property rights as mediated by jurisdictions and political exchanges) in the presence of externalities:

Regardless of the initial allocation of legal entitlements (i.e., property rights, jurisdictions, policies) if transaction costs are not prohibitively high and trade in externalities is possible then bargaining will lead to an efficient allocation of property rights and political authority.

Political-jurisdictional *transaction costs*: (1) are positive; (2) manipulable; (3) often inhibitive and sometimes expressly prohibitive of certain exchanges; (4) differ by types of exchanges; and therefore (5) unevenly fall on different groups and individuals. *Income and wealth effects* are pervasive—relative positions (i.e., the initial allocation of property rights, jurisdictions, policies) influence value determinations and the final allocation; individuals and groups must not be constrained in their ability to make side payments that compensate political-jurisdictional exchanges. And strategic behaviour, information asymmetries, and free riding may beset bargaining processes.

Under such conditions the political-jurisdictional Coase theorem doesn't break down but rather tells a double-edged story: (1) casting doubt over the efficiency of prevailing allocations of property rights and political authority; but also (2) predicting that the prevailing allocation might not necessarily move toward an optimally efficient outcome in the future. My claim is *not* that any allocation of property rights and political authority will *inevitably* move toward an efficient (say, non-territorial, unbundled) allocation. Rather we can only say simply that in the *highly stylised* (and fictional) world without transaction costs, wealth effects, and strategic behaviour citizens would be able to bargain to the outcome—this is only a starting point for analysis and comparison. The initial allocation of legal entitlements (i.e., property rights, jurisdictions, policies) and the manipulability of transaction costs therefore become *all the more important* in the real world of positive transaction costs, non-trivial wealth effects, and strategic behaviour.

Therefore normative corollaries to the PJCT are: (1) develop rules that approximate the zero transaction-cost setting as closely as possible; and (2) assign legal entitlements (i.e., property rights, jurisdictions, policies) to citizens for whom the cost of realising or resolving externalities are lowest, i.e., as close to the optimal outcome as possible.

However, the most valued allocation of entitlements is unknowable in advance—no external observer can determine the efficient allocation (or could only pick it by happenchance, with vanishingly small probability) or whether a particular trade falls short of some theoretical optimum (so the second corollary is no good). Political-jurisdictional transaction costs are therefore the only available proxy of efficiency. Or put another way, it is these transaction costs that prevent curative trades in political-jurisdictional externalities and obstruct an efficient allocation of legal entitlements (i.e., property rights, jurisdictions, policies)—and should be the focus of institutional reform.

Political-jurisdictional transaction costs are manipulable (i.e., as a form of rent-seeking) (Twight 1988; 1994; 2003). ‘Natural’ PJTCs are those that would exist even if all political actors tried to minimise transaction-cost impediments to political-jurisdictional exchanges. Whereas ‘contrived’ PJTCs on the other hand are created by political actors as the product of their self-interested use of the mechanisms of government. By manipulating the costs of collective action encountered by individuals and groups political actors control or bias the possible paths that future exchanges in property rights and political authority might take.

Political-jurisdictional transaction costs are sometimes expressly prohibitive of certain exchanges (i.e., PJTCs $\rightarrow \infty$); examples of this include inalienable rights (e.g. slavery) or rights that are as yet largely unconceived (e.g. access to non-territorial or unbundled political commons). Accordingly, political-jurisdictional transaction costs differ by types of exchanges. Political transaction costs (re: *access* to political commons) are costs incurred in making a political exchange, and thereby modifying the allocation of property rights, via: (1) *productive*, *protective*, or *redistributive* functions of the state. Jurisdictional transaction costs (re: *boundaries* of political commons) are costs incurred in making a (territorial or non-territorial) jurisdictional exchange, and thereby modifying the allocation of property rights, via: (2) *secession*; (3) *union*; (4) *sorting*, or (5) *re-bordering*.

The relative sizes and incidences of PJTCs also bias the possible paths that future exchanges in property rights and political authority might take. Political-jurisdictional transaction costs fall unevenly on individuals and groups; this too biases future exchanges

in property rights and political authority. As a result, political-jurisdictional changes (and attendant changes in the allocation of property rights) exhibit path dependence within and about basins of attraction. The upshot is that a prevailing allocation of property rights and political authority, given relative sizes and incidences of PJTCs, might fall outside the basin of attraction of the ‘optimum.’ If this is the case the system is constrained and can only reach the optimum by reducing PJTCs or by sudden shift in institutional space. This is explored in the following two sections on the political-jurisdictional possibilities frontier and the political-jurisdictional transformation frontier.

The PJCT is not limited to ideal Coase-theoretic conditions but describes how and why political-jurisdictional solutions fail to eventuate: namely, when transactions costs are non-zero (or prohibitively high). We can interpret many episodes from history in light of this:

Non-optimal initial allocation of political authority + prohibitive political transaction costs + perverse income/wealth effects = inefficient allocation of political authority

This applies at all levels of jurisdiction, but especially to nation/state incongruities or ‘the problem of the nation-state’—e.g. matching peoples to maps (ethnic cleansing), matching maps to peoples (re-bordering), and proposed non-territorial responses (e.g. national-cultural autonomy). The Coasean corollaries actually inform us as to why the current state of the world might not be optimal. That is to say when transaction costs are prohibitive we have no reason to believe the current allocation of state authorities (jurisdictional design, nation-state mappings) is efficient or optimal. This would only be the case if the initial allocation was optimal, or close enough to optimality such that the efficiency-enhancing political transactions that *are* possible can be carried out.

The corollary to the Coase theorem is that the initial allocation of people to countries becomes *all the more important* in a world with positive transaction costs. My claim is that if the initial allocation is inefficient (i.e., nation-states as we know them) prohibitively high transaction costs will impede a more efficient allocation from obtaining, whatever that may look like. This may explain why non-territorial and unbundled states are rare in

history. Conversely, notwithstanding prohibitive transaction costs, non-territorial unbundled states might simply be inefficient.

In any case, the upshot (running parallel to the point made in new institutional economics) is that we should strive to reduce political-jurisdictional transaction costs if we wish to obtain an efficient allocation of policies, peoples, and polities. Indeed, the theoretical optimum in a zero transaction cost world is still the benchmark (though it may ultimately be unattainable) and we move towards it by reducing transaction costs as far as possible.

To the extent that transaction costs are relevant one should be sceptical that a prevailing allocation of rights is efficient. The very presence of political transaction costs therefore casts doubt over the efficiency of prevailing allocations of political rights in, for example, traditionally conceived nation-states (i.e., territorially monopolistic, non-overlapping). On the one hand, granted, transaction costs might impede non-territorial states from emerging, on the other hand it is transaction costs that explain why current states are probably sub-optimal.

Similarly, the purpose of the theorem (as other economists have augmented it) is to state that wealth effects do matter. Income and wealth effects do also imply an externality. What matters is which agent has the ability to put the property to its most valuable use not that they have equal ownership of assets. In other words, wealth effects only matter if someone who could put the property to better use is constrained in their ability to make an exchange with the current owner of that property. When they matter, as they inevitably do, the initial allocation of property rights retains importance.

Therefore, when wealth or income effects are present the initial allocation of political authority in jurisdictions is important and these effects might prevent the system from moving towards the efficient outcome. Again the contention is not that any allocation of political authority will automatically move toward an efficient non-territorial allocation, simply that in a world without wealth effects citizens would be able to bargain to the

outcome. But this is only a starting point of comparison because clearly in the real world wealth effects matter.

Like transaction costs, the existence of wealth effects actually explains why current allocations of property rights (and political authority) could be suboptimal. As mentioned above, the Coase theorem doesn't break down but rather (1) implies that the current allocation is inefficient and (2) predicts that it might not necessarily move toward to optimal outcome in the future. Again, this sheds light on a likely explanation for why political authority is not currently allocated optimally: disenfranchised citizens lack the requisite wealth to make political exchanges and effect jurisdictional change. This is fully consistent with the Coase theorem, properly understood. And again, this is a double-edged sword: the extent to which wealth effects are prevalent (1) casts doubt on prevailing allocations of political authority in traditionally defined nation-states, but also (2) likely prevents a more efficient allocation of political authority from emerging.

While transaction costs and wealth effects might thwart the claim that political exchanges necessarily lead to an optimally efficient non-territorial unbundled jurisdiction; that is not my claim. The prerogative is only to show how the Coase theorem can be applied to political and jurisdictional exchanges. In perfect Coase-theoretic conditions a political-jurisdictional system will arrive at an optimally efficient outcome; in imperfect real-world conditions there is no such guarantee.

Chapter 4

Political-jurisdictional possibilities and transitions

Exit and voice, that is, market and non-market forces, that is, economic and political mechanisms, are two principal actors of strictly equal rank and importance. This reciprocity has been lacking in recent interdisciplinary work as economists have claimed that scarcity and resource allocation can be successfully used for explaining political phenomena as diverse as power, democracy and nationalism.

Albert O. Hirschman, *Exit, Voice, and Loyalty*

The political-jurisdictional possibilities frontier

Next we present a framework describing the tradeoff between inefficient markets, politics, and jurisdictions, and apply it to the problem of jurisdictional design. The framework adapts the Djankov et al. (2003) model of the comparative social costs associated with an institution to analyse the institutional structures that exist in the political-jurisdictional Coase theorem. Different allocations of property rights and political authority associate to different institutional systems, which can be arrayed along a political-jurisdictional possibility frontier. We consider the tradeoffs as we move around that frontier, and suggest further applications of the model. Our approach provides an institutional efficiency based approach to the evaluation of mixes of political-jurisdictional rules.

We introduce a political-jurisdictional possibilities frontier (PJPF) to illustrate the space of property-authority allocations (as political-jurisdictional rules) and a political-jurisdictional transformation frontier (PJTF) to illustrate movements about property-authority allocations. These build on the political-jurisdictional Coase theorem from the previous chapter, where three sources of inefficiencies were outlined: (1) political transaction costs (PTCs); (2) jurisdictional transaction costs (JTCs); and (3) market (contracting) transaction costs (CTCs). Consequently, these form the three axes of an institutional possibilities space, the contours of which represent the property right allocations (and hence societal efficiency) that are possible for a given society.

In this framework the efficient allocation of property rights, given the comparative impositions of transaction costs, is the point along the PJPF surfaces that intersection with a 45-degree triangular total efficiency cost minimisation plane. Yet irrespective of transaction costs, whether or not a society moves toward the efficient point on the PJPF surface also depends on the initial allocation of legal entitlements (i.e., property rights, policies, jurisdictions). If a property holder cannot be adequately compensated for the transfer (i.e., if the other party is constrained by wealth) then no political, jurisdictional, or market exchanges will take place. The political-jurisdictional transformation frontier (PJTF) traces the path of a society within and between property-authority allocations (i.e., the PJPF surfaces). We use the possibilities space and the transformation frontier to demonstrate various political-jurisdictional transitions in some stylised examples.

Through the institutional literature on property rights and transaction costs (e.g. the new institutional economics), economists have come to appreciate that good institutions are a prerequisite of long run economic performance (North 1990, Glaeser et al. 2004). In the first instance, good economic institutions must secure property rights as this enables people to keep the returns on their investments, make contracts, resolve disputes, and so on (i.e., the protective state). This in turn promotes market coordination and exchange and fosters conditions for economic growth. Other significant institutions include those that function to select political leaders and governments (i.e., voice), produce certain public goods and regulations (i.e., the productive state), and reallocate property and wealth (i.e., the redistributive state) (Buchanan 1975; Buchanan, Tollison & Tullock

1980). Others still are those that protect citizens from the potential abuses of state intervention, which may involve constitutional constraints on state actions (i.e., taming leviathan) but also include constitutional level rules about mobility and migration of peoples and state jurisdiction reformation (i.e., exit).

But how do we know which institutions are good institutions? And can they be simply designed or wholly transplanted from other contexts? Boettke et al. (2005, 2008) make the broader case for comparative historical analysis in institutional economics. Djankov et al. (2003) and others (e.g. Whitford & Lee 2012; Davidson & Potts 2015; in critique see Rosser & Rosser 2008) have used the ‘new comparative’ approach to analyse historical and contemporary institutions, including institutional transitions and transplantations. The central idea of the new comparative economics is that “to understand capitalist institutions, one needs to understand the basic tradeoff between the costs of disorder and those of dictatorship” (Djankov et al. 2003: 595). In this framework ‘disorder’ arises when individuals impose harm on each other and ‘dictatorship’ occurs when the state (government) imposes harm on individuals. All institutional orders impose social costs in some way, and often an attempt to address one source of social costs will impose social costs from elsewhere. In recognition of the tradeoffs inherent in institutional orders the institutional possibility model assumes convexity to generate interior solutions.

Our main premise is that the same arguments can be made about the mix of political-jurisdictional institutions, but instead of social losses from disorder and dictatorship, social losses come from political, jurisdictional, and market exchanges. From our Coasean perspective, the three main obstacles that any polity-economy must overcome are market, political, and jurisdictional transaction costs. These inhibit efficient exchanges and optimal reallocation of property rights. Institutions function to mediate these threefold obstacles, but there is a fundamental tradeoff inherent in such control. Specifically, a polity-economy that attempts to redress market failures by investing more power in the state may be courting greater inefficiencies of government failures. Similarly, when citizens exit jurisdictions that are prone to government failure they sacrifice erstwhile social and economic agglomeration efficiencies, prompting a kind of sorting failure. Other such tradeoffs in reallocative efficacy exist between markets, politics, and jurisdictions.

Analogously to Djankov et al.'s (2003) model of an institutional possibility frontier (IPF), the mix of political-jurisdictional institutions can be arrayed along a political-jurisdictional possibility frontier (PJPF) that maps the mix in terms of social losses due to market contracting transaction costs (CTCs) versus social losses due to political transaction costs (PTCs) versus social losses due to jurisdictional transaction costs (JTCs). We use this as a framework to formulate the analytic concept of efficient political-jurisdictional institutions. That is, to describe the efficiency of allocations of property rights and political authority and model the political-jurisdictional Coase theorem.

The political-jurisdictional Coase theorem is about efficiency, but three transaction costs stand in the way of the perfect Coasean outcome. (1) Political transaction costs (PTCs): the process about deciding policy is imperfect and polity-economies often enact inefficient policies. (2) Jurisdictional transaction costs (JTCs): if only citizens could create new jurisdictions (or move between them) costlessly, inefficient policy would have little consequence. (3) Market contracting transaction costs (CTCs): even if PTCs and JTCs prevent the polity-economy from reaching an efficient outcome, if CTCs are low citizens can bargain *ex post facto* to cure the remaining political-jurisdictional externalities. For our purposes the framework as presented here is a simplification; 'everything that can go wrong with the Coase theorem' has been included under the transaction costs rubric, and there are various other issues like information, wealth, etc. that can be additionally taken into consideration (which are addressed in the next sections).

The comparative institutional approach sets up the problem of designing any institution as minimising the social losses associated with the tradeoff between market, political, and jurisdictional transaction costs. The key insight is that different mixes of political-jurisdictional institutions are *not equivalent* in respect of social losses: some risk greater social losses due to contracting transaction costs, or *market failure*; others risk greater social losses due to political transaction costs, or *government failure*; others still risk greater social losses due to jurisdictional transaction costs, or *sorting failure*.

The social losses from market failure are those that stem from coordination problems, free riding, agency problems, informational asymmetry, strategic bargaining, and so forth.

Comparative institutional analyses calls for symmetrical deviations from ideal assumptions about motivation and information (e.g. ‘limited benevolence’ and ‘limited rationality’) in both private and public domains. As such, social losses from government failure are associated with special interests and rent seeking, regulatory capture and agency problems, bureaucratic administration, problems of majoritarian decision-making and voter irrationality, and risk distortions due to political decision-making. The social losses from sorting failure result from imperfect mobility processes (migration thresholds), constitutional constraints on jurisdictional reorganisation (absent secession clauses), opportunity costs of changing jurisdiction (social and economic agglomerations), cross-border trade restrictions (tariffs, subsidies, and quotas), and legal and cultural differences.

In actuality social losses from market, government, and sorting failures are all distortative efficiency losses due to a suboptimal allocation of property rights (as per the Coase theorem). We have merely isolated the social losses along three dimensions because they appear to be suitably distinct sources of misallocation: inefficient markets, governments, and jurisdictions. Additionally, there might be tradeoffs between the three mechanisms in terms of the ability to exchange and reallocate property rights efficiently. That is, if attempts to address the problems of one (e.g. market failure) engender greater costs from another (e.g. government failure) then there is convexity to interior solutions, which requires each mechanism be separated along its own dimension in the model.

An outline of the tradeoffs between social losses in markets, politics, and jurisdictions is presented in TABLE 1 below. When market transaction costs are lowered and the social losses in market exchanges are reduced, increased private wealth becomes both a larger target and platform for distributional coalitions (i.e., special interests, electoral majorities), which portends to inefficacious political processes. This also has the effect of increasing the opportunity costs of jurisdictional exchange (i.e., rebordering, migration), as citizens must forgo the benefits of larger, more efficient markets and agglomerations (assuming less-than-perfect economic integration). When political transaction costs are lowered and the social losses in politics are reduced, property rights of private market participants become less secure (reducing the efficacy of markets) and cost-benefit calculi of duplicating state functions become relatively less attractive (reducing efficacy of jurisdictional exchange).

Finally, the tradeoff from reducing the social losses of inefficient jurisdictions is such that lowering jurisdictional transaction costs (e.g. creating many jurisdictions or making exit easier) increases both cross-jurisdictional market transaction costs and policy spillovers.

Reduce social losses in:	Impact on social losses in:		
	Markets	Politics	Jurisdictions
Markets	—	<i>Greater:</i> larger target for distributional coalitions	<i>Greater:</i> opportunity costs of exit increase (no integration)
Politics	<i>Greater:</i> property rights less secure	—	<i>Greater:</i> duplication costs of exit increase (scale economies)
Jurisdictions	<i>Greater:</i> cross-jurisdiction market transaction costs increase	<i>Greater:</i> cross-jurisdiction policy spillovers increase	—

TABLE 4.1 Tradeoffs between social losses in markets, politics, and jurisdictions

The PJPF is assumed to be convex to the origin as per the standard neoclassical marginality assumption; e.g. marginal reductions in losses from one kind of transaction cost produce progressively larger increases in losses from others. This is to say that social losses from inefficient political interventions become larger as the efficacy of markets improves, or the problems of incongruous jurisdictions worsen as the political processes within states becomes more effectual. This assumption need not hold, and the analysis could be modified to accommodate PJPFs with non-convex portions. By doing so the model might predict multiple equilibria but the efficient point(s) would still be found on the convex portion of the PJPF.

The approach we propose here builds upon Djankov et al.'s (2003) concept of an institutional possibility frontier that maps the tradeoff between the costs of disorder and the costs of dictatorship for any set of institutions aimed at some socially desirable end. The political-jurisdictional possibility frontier maps tradeoffs between the social losses from market, political, and jurisdictional transaction costs for the sets of institutions aimed at the socially desirable end of optimal efficiently allocated property rights and political authority. Coase understood that the zero transaction cost models is merely a “stepping stone on the way to an analysis of an economy with positive transaction costs” (1992: 717). A *perfect* institutional order could only exist in a world of zero transaction costs, whereas *real* institutional orders always face a tradeoff between the three transaction costs.

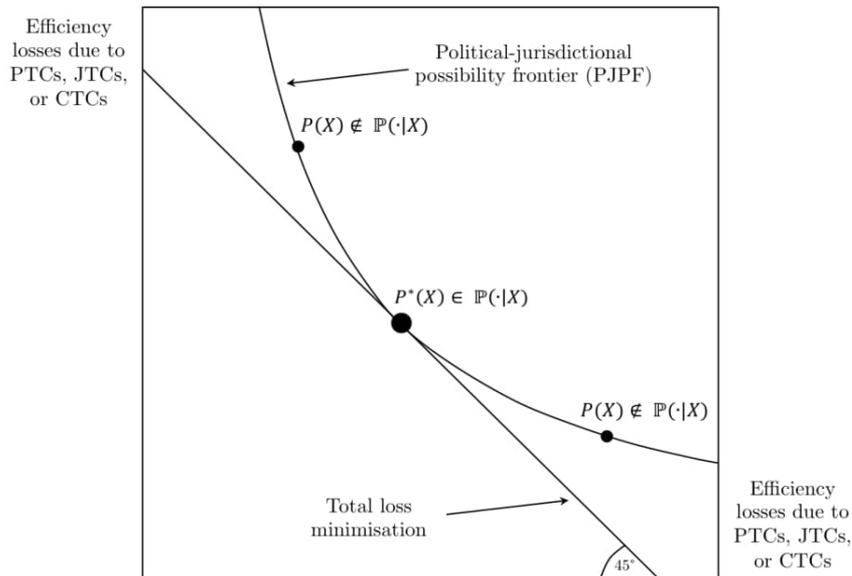


FIG 4.1 Pairwise political-jurisdictional possibility frontier curve

FIG 1 above depicts a pairwise political-jurisdictional possibility frontier for a polity-economy. On the x -axis, the social losses from one of the three transaction costs (say market inefficiencies) are measured relative to a perfect institutional order of zero transaction costs. On the y -axis, the social losses from another transaction cost (say political inefficiencies) are measured relative to the zero transaction costs benchmark. We measure the costs of both transaction costs in the same units to examine the tradeoff. The PJPFC reflects the political-jurisdictional possibilities of the polity-economy, e.g. how much

market inefficiency can be reduced with an incremental increase in political inefficiency. A point on the PJPF is an allocation of property rights and political authority such that market inefficiency cannot be reduced without increasing political inefficiency.

The downward sloping 45-degree line in FIG 1 holds constant the total social costs of (two of) market, political, or jurisdictional transaction costs. Since we measure the contribution of each transaction cost in the same units the point of tangency with the PJPF represents the point of total loss minimisation and is therefore the efficient institutional choice for a given polity-economy. Put another way, this point represents the allocation of property rights and political authority that is optimal in the Coasean sense and maximises social welfare. As we have seen, the Coase theorem maintains that there are forces leading the polity-economy towards some $P^*(X)$ in $\mathbb{P}(\cdot|X)$, which is the point of tangency between the PJPF and the 45-degree total loss minimisation line. If a polity-economy is at some property allocation $P(X) \notin \mathbb{P}(\cdot|X)$ a reallocation to $P^*(X) \in \mathbb{P}(\cdot|X)$ would create aggregate welfare gains. This would require a reduction in transaction costs and social losses along one or multiple dimensions in the model and a movement along the PJPF towards the optimum.

The standard IPF model deals with the position a polity-economy takes across a spectrum of institutions in dealing with the tradeoff between social losses from dictatorship versus disorder. It is essentially a two-dimensional loss minimisation problem. The PJPF model follows the same logic but forms a three-dimensional loss minimisation problem. Rather than dealing with social losses from dictatorship or disorder the tradeoff is between efficiency losses from transaction costs in markets, politics, and jurisdictions (see FIG 2 below). In the three-dimensional loss minimisation problem the institutional possibility frontier is a surface instead of a curve (see FIG 3 below). The surface represents all the institutions (political-jurisdictional) that are possible in a polity-economy, but as has been shown previously, this actually also represents all allocations of property rights that are possible. However a polity-economy decides to do things politically, jurisdictionally and commercially, it ends up with some allocation of property, which might be efficient or not. This is contingent on the predetermined space of institutional possibilities available to the society, and institutions delimit transaction costs, and therefore efficiency.

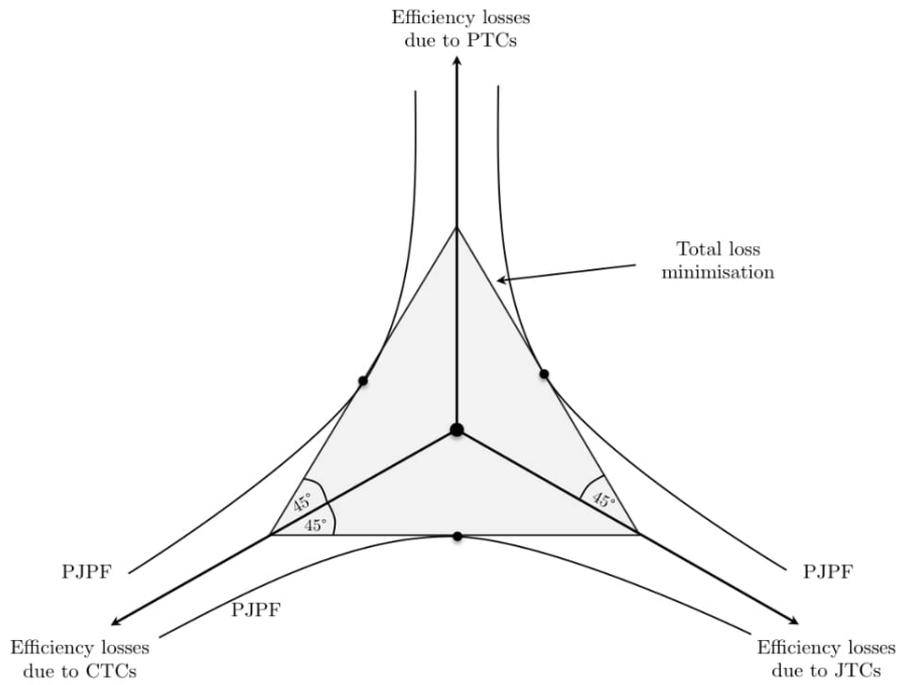


FIG 4.2 Three-dimensional political-jurisdictional possibility frontier curves

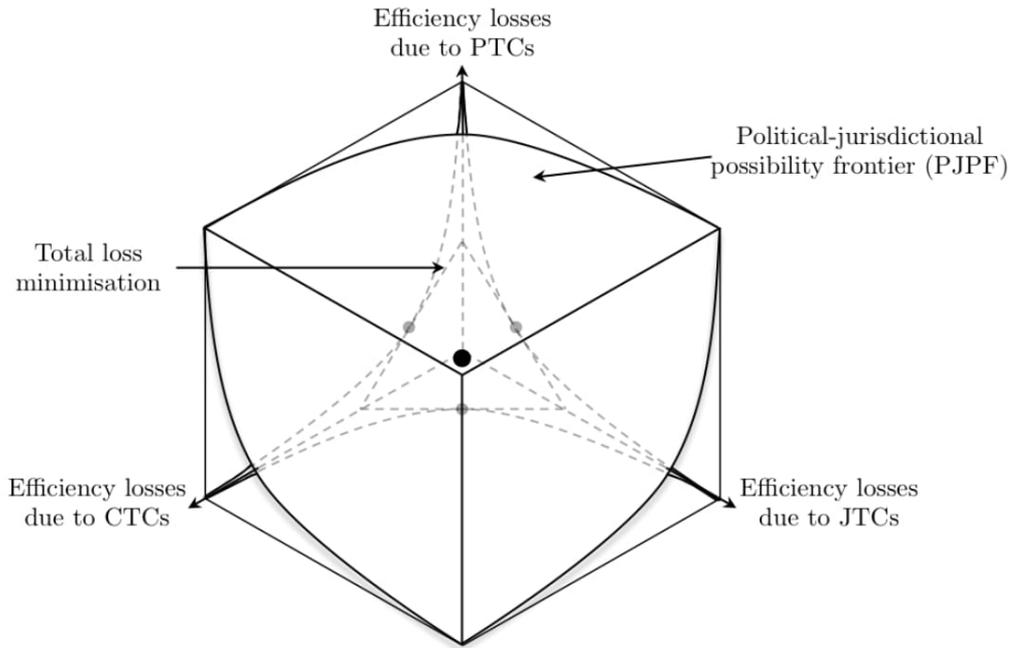


FIG 4.3 Three-dimensional political-jurisdictional possibility frontier surface

We frame the social losses due to inefficient markets, politics, and jurisdictions as the x , y , and z -axes of FIG. 2 and FIG. 3 above. Different points along the PJPF represent different allocations of property rights as afflicted by different kinds of transaction costs. There is an institutional structure underlying these property allocations, but we cannot identify what it is specifically (i.e., for reasons discussed previously). We do not describe what each institutional order looks like in terms of “this many jurisdictions” or “states that do these policies.” Djankov et al. (2003) outline how different institutions (e.g. subsidies, redistributions, a federation, free markets) have different social losses due to their ability or inability to bring about optimal allocation of property rights (and thus produce certain products, policies, public goods, innovations, etc.) but that is not our task. We aim to show how minimising transaction costs in each of these domains will bring out the optimal allocation (and the associated products, policies, etc.). This is simply an analytic framework for the political-jurisdictional Coase theorem.

We have seen how a *de jure* allocation of property rights can be decomposed into a *de facto* allocation, a structure of jurisdictions, and political reallocations. Then, as per the political-jurisdictional Coase theorem, the forces leading polity-economies towards some $P^*(X)$ in $\mathbb{P}(\cdot|X)$ are rather leading them towards some $N^*(J, V, X)$ in $\mathbb{N}(\cdot|J, V, X)$, some $J^*(N, V, X)$ in $\mathbb{J}(\cdot|N, V, X)$, and some $V^*(N, J, X)$ in $\mathbb{V}(\cdot|N, J, X)$. So underlying the movement along the PJPF towards the optimum are market exchanges, jurisdictional transitions, and changes in redistributive policies. And if a polity-economy is at some suboptimal $P(X) \notin \mathbb{P}(\cdot|X)$, reallocation to $P^*(X) \in \mathbb{P}(\cdot|X)$ proceeds by making adjustments in any or all of the three domains and moving along the PJPF surface in any of the three dimensions.

The location of the PJPF varies most significantly across societies. The political-jurisdictional possibilities—and thus the efficiency of the allocation of property rights and political authority—of modern Australia, or even China, are far superior to those of Syria or Somalia. Australia could pursue a range of property allocations, jurisdictional systems, and reallocative government policies and still achieve decent outcomes. Somalia, on the other hand, could choose a perfect balance of property, jurisdiction, and policy for its PJPF and level of development and modernisation but outcomes would still be substandard. FIG 4 below could be interpreted as such, e.g. PJPF₃ corresponding to

Australia, $PJPF_2$ corresponding to China, and $PJPF_1$ corresponding to Somalia. Each polity-economy is at its respective optimal allocation of property rights and political authority, but outcomes greatly diverge.

When we consider the PJPF model in its fullness, the three sets of pairwise PJPF curves form a bowl-like PJPF *surface*. Of course, the precise position and shape of the PJPF surfaces depend on underlying conditions (i.e., social losses and tradeoffs) but a general impression of the scheme is presented above in FIG 5. The three PJPF surfaces could be interpreted as above (e.g. Somalia the dark upper surface, China the intermediate surface, and Australia the lighter bottom surface) or they could represent a single polity-economy transitioning through time. A given polity-economy can traverse the space of possible allocations of property rights and political authority in coming to arrive at the optimally efficient point that is closest to the origin. This is the point of tangency between the bowl-like PJPF surface and the planar total loss minimisation *surface*. If and when conditions change the PJPF surface might shift in location or deform in shape causing a cascade of market, political, and jurisdictional exchanges in search of the new optimum.

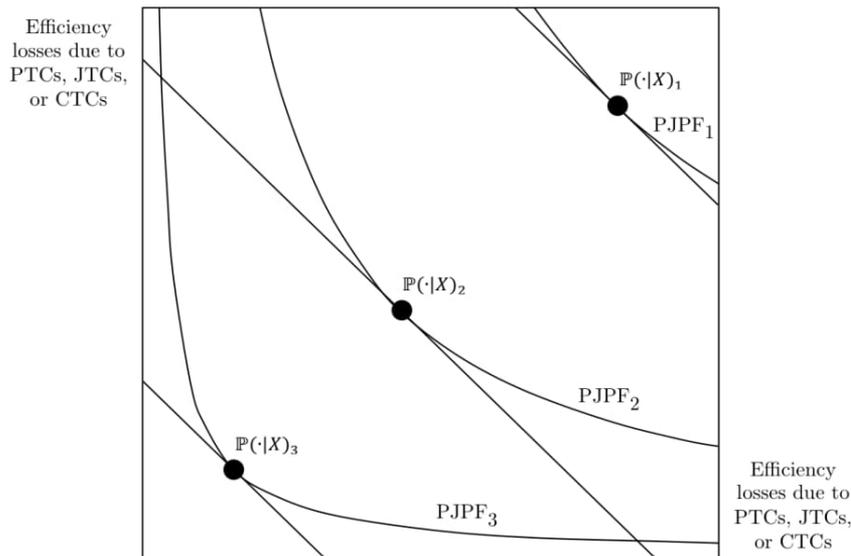


FIG 4.4 Political-jurisdictional possibility frontier curves for three polity-economies

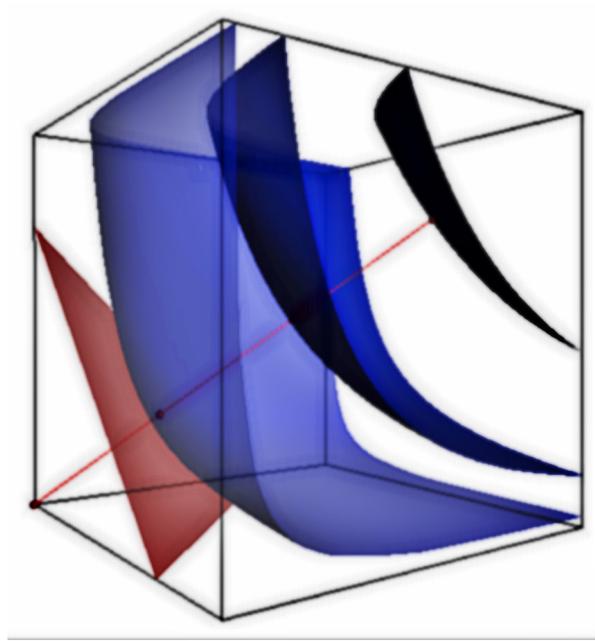


FIG 4.5 Graphical impression of political-jurisdictional possibility
frontier surfaces for three polity-economies

The location and the shape of the political-jurisdictional possibility frontier, and hence the efficient choice, are determined by a number of factors. In the Djankov et al. (2003) model the level of ‘civic capital’ in the relevant society determines the position of the institutional possibility frontier. In this way civic capital contributes to an underlying cost-benefit calculus over the relative transactions and governance costs of various institutions (i.e., dictatorship versus disorder). The determinants of civic capital include the history of cooperation or conflict (Easterly & Levine 1997; Alesina et al. 1999), social capital (Putnam 1993), culture (Landes 1998), morality and ideology (Acemoglu et al. 2001; McCloskey 2010, 2015), and factor endowments and physical environment (Diamond 1997; Engerman & Sokoloff 1991, 2002). Accordingly, in the political-jurisdictional model it is the levels of market, political, and jurisdictional transaction costs that determine the position and shape of the PJPF in the relevant polity-economy. The extent of transaction costs (i.e., absolute levels) determine the position of the PJPF vis-à-vis the origin, and the tradeoffs between transaction costs (i.e., relative levels) determine the shape of the convexity. Polity-economies with more such civic capital, and a PJPF closer to the origin,

are more capable of achieving coordination and exchange among their citizens, and ultimately, the optimally efficient allocation of property rights and political authority.

However there are other institutions besides civic capital that serve to delimit transaction costs and contribute to the position and shape of the PJPF. These include market-supporting institutions such as the rule of law, respect for property rights, and monitoring, dispute resolution, and enforcement mechanisms. Regulations, tariffs, taxes, and price controls, too, affect the costs of market exchange, as do the types of organisations that exist in the polity-economy (i.e., private, public, and cooperative). Improvements in market-supporting institutions and repeal of market-controlling policies serve to shift the PJPF inwards along the market transaction cost dimension.

For political transaction costs, an inward shift associates not only to a general *reduction* in the costs of political decision-making and action, but also to a general *equalisation* of PTCs to be more evenly dispensed among the population, since disparities create potential for distributional coalitions that seek to distort policy. So political transaction costs are also reflected in the costs of collective action (i.e., the differential therein for distributional coalitions versus the public at large) and the distribution of the politically ineffective or unrepresented versus the politically connected or highly organised. Constitutional rules constraining or abetting fiscal surplus extraction, and the efficiency of taxation, bureaucracy, and public administration also affect the position of the PJPF along the political transaction cost dimension.

Constitutional permissibility of jurisdictional change (e.g. introducing secession clauses) and removing barriers to citizen mobility (e.g. migration quotas, internal passports) will shift the PJPF inwards along the jurisdictional transaction cost dimension. The extent of locational interdependence (e.g. agglomeration economies \Leftrightarrow outwards shift, economic integration \Leftrightarrow inwards shift) and the cost function for jurisdiction functions (e.g. scale economies \Leftrightarrow outwards shift) also impact on the social losses from JTCs and the position of the PJPF.

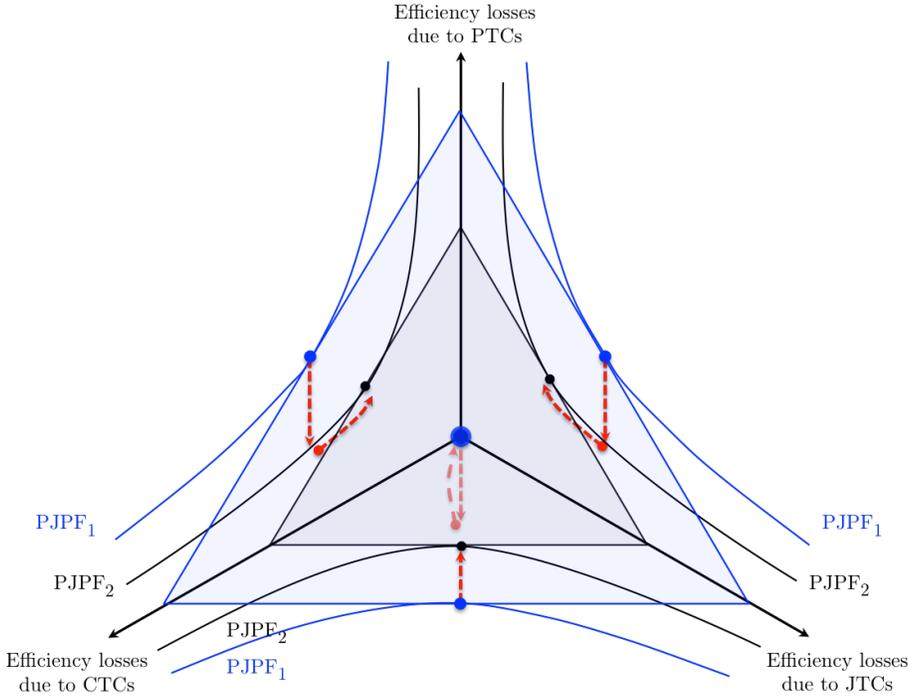


FIG 4.6 Transition between political-jurisdictional possibility frontier curves

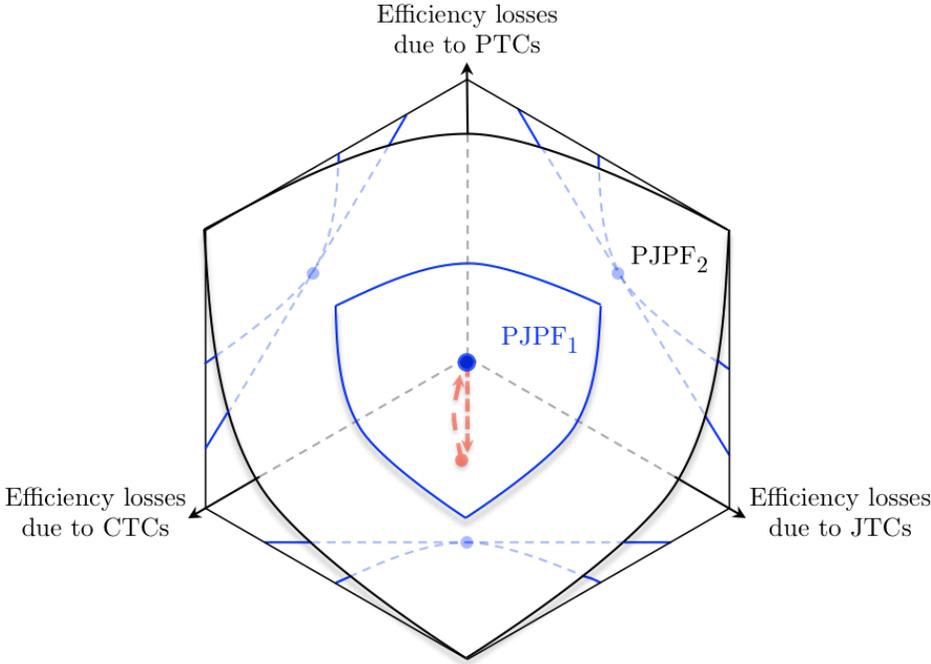


FIG 4.7 Transition between political-jurisdictional possibility frontier surfaces

A shift in the PJPF is represented in FIG 6 and FIG 7 above. Transition from $PJPF_1$ to the new optimum on $PJPF_2$ could take place along any of the three dimensions, depending on which of the three transaction costs has been affected (in this example, it is a reduction in political social losses). As has been discussed, the spur to such a transition could perhaps be an improvement in market-supporting institutions, or a technological change that equalised costs of collective action, or decentralisation to local jurisdictions. In the first instance the polity-economy will shift directly inward along the affected dimension to the new surface, and secondly it will traverse along the new surface in the remaining dimensions until reaching the new optimum point. The allocation of property rights and political authority shifts from the upper possibility surface to some point on the lower, more efficient, possibility surface and then moves to the new optimum balance of market, political, and jurisdictional social losses.

The political-jurisdictional possibility frontier model comports with the Coasean assessment of allocations of property and political authority. In our framework, there are two accounts of inefficiency. First, the polity-economy might be positioned somewhere on the PJPF that is not the optimum because of an inefficient tradeoff between social losses in markets, politics, and jurisdictions. The polity-economy has not yet found the set of institutions on the balance minimising total social costs. If optimisation occurs over a long time horizon it is certainly possible that a polity-economy could find itself at an inefficient position in the short run. Second, the polity-economy might simply be on a relatively unattractive PJPF that is far from the origin. The polity-economy could be implementing the set of political-jurisdictional institutions that minimises total social losses, given its underlying conditions and the PJPF it finds itself on, but could benefit from institutional change. This is perhaps not fairly labeled 'inefficient' but still provides an account of why certain institutional forms might not eventuate.

These also comport with the previous account of why the institutions of non-territorial unbundling only occasionally eventuate. First, perhaps non-territorial unbundling is located at the social loss minimising optimum and most polity-economies are simply yet to reach it. Second, perhaps non-territorial unbundling corresponds only to allocations of property rights and political authority on lower, unobtainable PJPFs. Finally, non-

territorial unbundling might be inefficient; perhaps the optimum for the great majority of polity-economies simply does not entail non-territorial unbundling and the institutional balances that minimise social losses correspond to jurisdictional structures of other forms.

The political-jurisdictional transformation frontier

There is yet another possible explanation of inefficient allocations of property rights and political authority. It is not just transaction costs that prevent a polity-economy from bargaining its way to its optimum point; side payments must also be made. Ruling out compensation of former property holders is a sure way to generate inefficient institutional outcomes. Moreover, if prospective property holders are lacking in their ability to make side payments—perhaps trade in the externality is constitutionally prohibited or wealth effects are binding—then initial allocations of property and power might constrain or prevent the necessary market, political, and jurisdictional exchanges from taking place. So if *wealth effects* into the bargain are a factor, then *distributions* of property and power matter. Moreover if *subjective valuations* into the bargain are a factor, then political ideas and *ideologies* matter.

To incorporate these arguments, this section employs another political economy model known as a ‘political transformation frontier’ (Rodrik 2014). This defines the set of maximal economic outcomes achievable by a society, given the interests of the elites that are in power. In the model, elites don’t allow an institutional change unless they receive a sufficient share of the social gains, i.e., it’s in their interests. Like a production possibility frontier, the political transformation frontier can be shifted out by ‘political innovations’ (new political ideas) that clarify the gains to be made by an institutional change. We present a framework describing the set of maximal outcomes—allocations of property rights and political authority—achievable by a polity-economy, given the interests of the incumbent holders of private property rights and political property rights in franchise. The framework adapts the Rodrik (2014) model of interests, ideas, and innovations to examine initial allocations impact latter transitions in the political-jurisdictional Coase theorem.

In the new comparativist political-jurisdictional possibilities framework, it was argued that over time a polity-economy will move to the institutional balance (point on its PJPF) that minimises the total social costs of market, political, and jurisdictional transaction costs. Yet even if we accept the assumption that optimisation does occur over some long time horizon, a polity-economy could find itself at an inefficient point on its PJPF in the short run. Moreover, it is far from obvious why this should be only temporary. A more general model would allow for the polity-economy to remain away from the optimal allocation of property rights and political authority for even very long periods of time, perhaps indefinitely.

Institutional economists (e.g. Olson 1965, 1982; North 1990), public choice and constitutional economists (Buchanan & Tullock 1962; Brennan & Buchanan 1985), and regulatory economists (Stigler 1971; Krueger 1974; Peltzman 1976) alike have concluded that political choice is often to blame for inefficient policies and institutions. Consider, for example, a polity-economy in which those with political power (e.g. a dictator, elites, or an ascendant social class) accrue economic rents at the expense of the general public (i.e., holding political-jurisdictional institutions in a sub-optimal state). Or a democracy beset by special interest groups that lobby successfully for inefficient redistributive policies. And even besides blatant rent seeking, popular democratic choices are often far from otherwise efficient policies and political-jurisdictional institutions, and remain so for sustained periods of time.

As such we require an amendment to the political-jurisdictional possibility model that incorporates the role of vested interests in obstructing efficiency enhancing exchanges. The approach we propose here builds upon Rodrik's (2014) concept of a political transformation frontier that maps the set of maximal economic outcomes that are achievable given the vested interests and elites currently in power. The political-jurisdictional transformation frontier (PJTF) maps the set of maximal outcomes—in terms of the efficiency of economic and political allocations—that are achievable given the interests of incumbent holders of property rights and beneficiaries of political reallocations in current jurisdictional structures. In the Rodrik (2014) model 'elites' are defined as the group in society with both veto and agenda-setting power, in contrast to powerless

‘citizens.’ In the PJTF model ‘incumbent entitlement holders’ are comparable to elites in the sense that they have veto power over whether they accept market exchanges for an entitlement or political-jurisdictional institutional changes that will see their entitlements reallocated. ‘Prospective entitlement holders’ in contrast can make exchange offers or agitate for institutional change, but must wait on incumbents to agree to them.

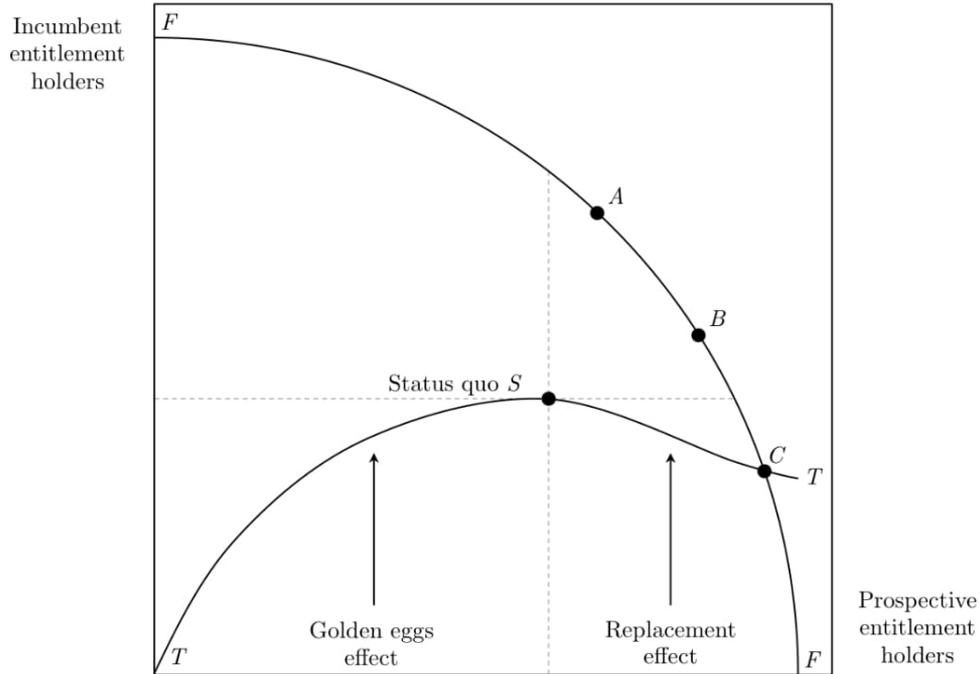


FIG 4.8 Economic possibility frontier and political-jurisdictional transformation frontier

Both the political transformation frontier of Rodrik (2014) and the political-jurisdictional transformation frontier are akin to an economic transformation constraint in that they describe the actual path a polity-economy takes through its space of institutional possibilities. In FIG 8 above the political-jurisdictional possibility frontier corresponds to the curve FF and its interior. In this model the PJPF shows the social welfare tradeoff between incumbent and prospective (*de jure*) entitlement holders. For instance, a move along the PJPF from point A to point B represents a change in ownership in the polity-economy, although property is still allocated in an optimally efficient way. The frontier corresponds to the total social loss minimising point in the PJPF model, and there are potentially multiple. Recall that in the political-jurisdictional Coase theorem the set of

property allocations that maximises welfare $\mathbb{P}(\cdot|X)$ is not necessarily a singleton. The interior of the frontier, say point S for example, corresponds to the otherwise non-optimal portions of the PJPF surface. The curve FF expands or contracts in accordance with outwards and inwards shifts of the PJPF surfaces in the previous political-jurisdictional possibility frontier model.

The PJPF model shows the full space of allocations of property rights and political authority that are *possible* for a polity-economy, given the prevalence of market, political, and jurisdictional transaction costs. The PJTF model, on the other hand, shows the compact trajectory of allocations that the polity-economy *actually* charts as it undergoes political-jurisdictional transformation. The PJTF is a means to describe how a polity-economy moves within the possibilities space, given the PJPF it finds itself on (so incorporating transaction costs) but, moreover, given the interests of incumbents and the ability of prospectives to compensate with side payments (so incorporating wealth effects). It therefore demonstrates how initial allocations matter in the Coase theorem; that is, how distributions of property and power affect the ability of citizens to make side payments. The PJPF and the PJTF combine to chart the trajectory a polity-economy takes through the space of possible property and authority allocations, and together they furnish a fuller model of the political-jurisdictional Coase theorem.

In FIG 8 above the political-jurisdictional transformation frontier corresponds to the curve TT . It depicts the maximum level of value (i.e., total social welfare) that incumbent entitlement holders can accrue in equilibrium, taking into account that other citizens can make exchange offers or agitate for reallocative political-jurisdictional changes. The rising part of the TT curve depicts what Rodrik (2014) calls the ‘goose that lays the golden eggs effect.’ Along this portion of the curve, incumbents benefit from the enrichment of other citizens, and there is therefore no tradeoff between economic efficiency and incumbent interests. That is to say as the polity-economy moves from the origin to the point S , property and authority reallocations are being made, and the gains from market, political, and jurisdictional exchanges are being distributed in such a way as to benefit all citizens. Importantly, both incumbents and prospectives *believe* this. Prospective entitlement holders have the inclination and means to compensate incumbents with side payments that

are agreeable to all parties. Wealth effects into the bargain are potentially still a factor, though not limiting, and do not prevent efficiency enhancing exchanges from eventuating.

The declining part of the TT curve, in turn, depicts what Acemoglu and Robinson (2006) call the ‘political replacement effect.’ Along this portion of the curve, incumbents and prospectives can no longer come to agreement on the distribution of gains from potential exchanges. That is to say the polity-economy remains at the point S because the value that incumbents accrue from holding particular entitlements exceeds the capacity of prospectives to make side payments. Put another way, to reach the optimally efficient allocation of property rights and political authority requires that incumbents be net disadvantaged while prospectives are over-proportionately enriched. Of course, a further movement along the TT curve to point C *should* be possible, given that it sits on the PJPF and, as an optimum, is a Pareto-improvement. Yet Pareto-improving exchanges cannot proceed unless accompanied by compensation. There are gains to be made, but obstructions in the way: either wealth effects into bargains are limiting (i.e., initial allocations prevent efficient allocations from arising) or some reallocative mechanisms are unavailable (i.e., certain market, political, or jurisdictional exchanges are prohibited).

The location and shape of the transformation frontier is codetermined by the subjective valuations of incumbent and prospective entitlement holders: *beliefs and ideas* about the value of entitlements, the efficacy of policies, or the effect of a jurisdictional change. Thus ideas and ideology also affect the trajectory of political-jurisdictional transformations. Moreover, citizens are not always correct in their estimations, which is why many exchanges turn out to benefit those who previously opposed them. In FIG 9 below, the transformation frontier is the binding constraint on the polity-economy. The allocation of entitlements and authority, and overall social welfare, are determined not by technical constraints, but by the PJTF trajectory. The polity-economy will remain stationed at point 3 inside the PJPF (the status quo point S in FIG 8 above) unless new beliefs assuage resistance to change and allow the polity-economy to move closer to the efficient frontier.

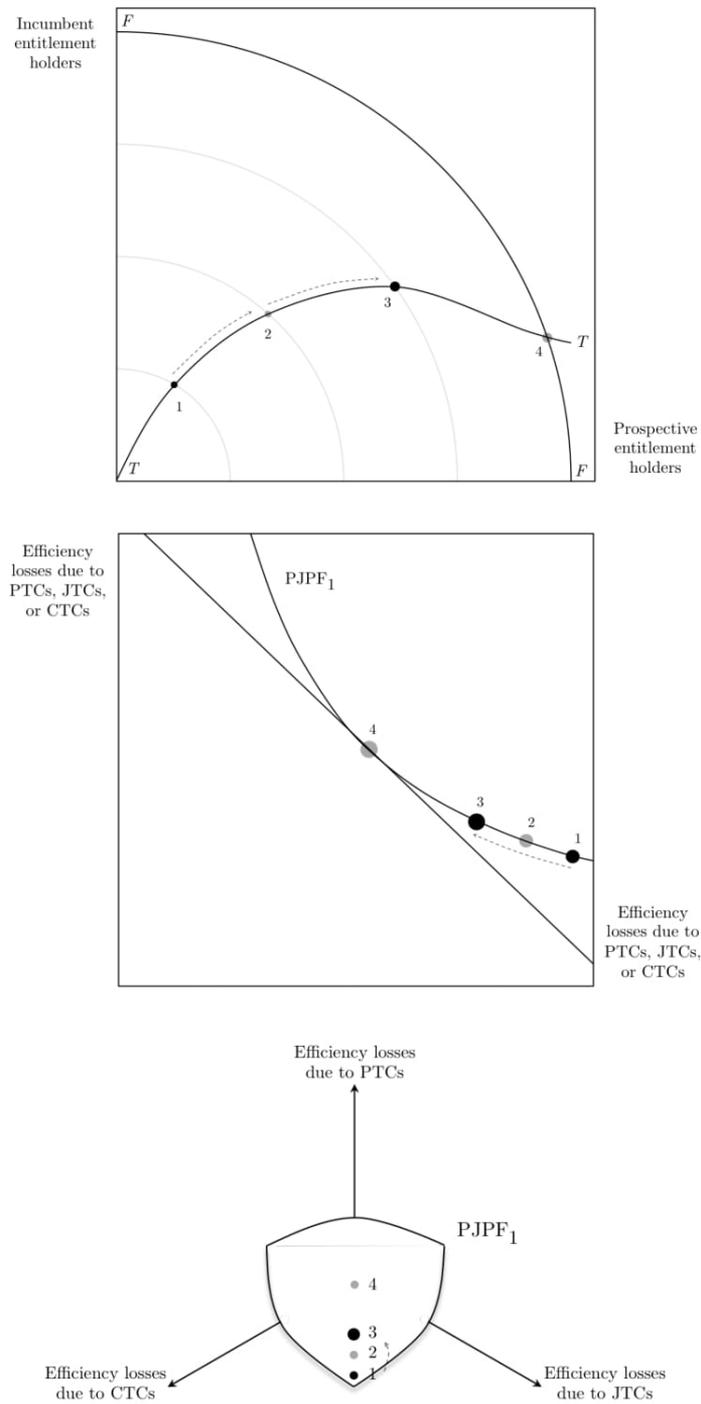


FIG 4.9 PJTF, pairwise PJPf curve, and PJPf surface illustrating an incomplete, suboptimal transformation

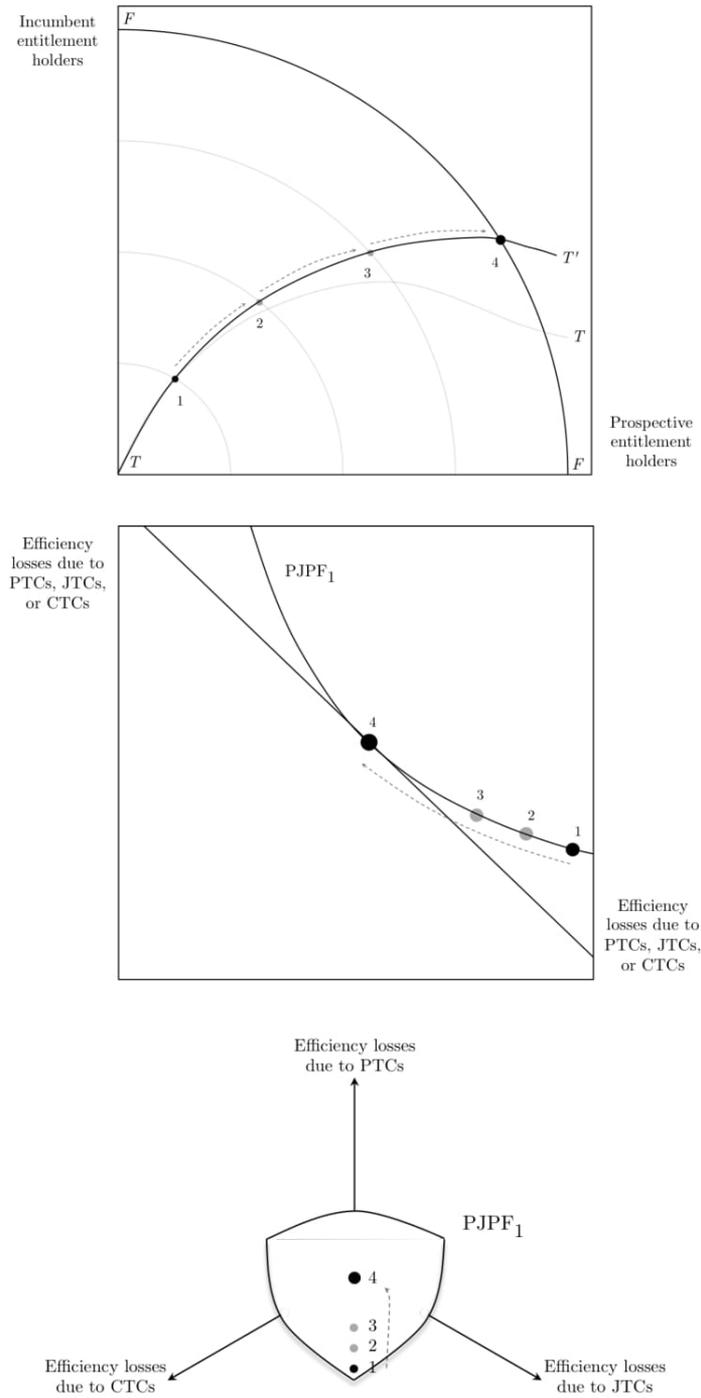


FIG 4.10 PJTF, pairwise PJPF curve, and PJPF surface illustrating an optimised transformation (political-jurisdictional innovation)

According to Rodrik (2014) the ideas-based approach improves on the ‘vested interests’ account of the conditions under which political systems move towards efficient outcomes. The role of ideas in shaping the transformation frontier further clarifies why inefficient policies sometimes persist for lengthy periods of time. Not only do political elites favour growth-suppressing policies because they accrue rents that would otherwise disappear (without compensation); additionally, elites and citizens both routinely misjudge Pareto-improving exchanges. As such, new ideas about the value of entitlements, the efficacy of policies, or the effect of a jurisdictional change can serve to unlock the otherwise iron grip of vested interests, moderate the effect of the distribution of property and power, and enable transformations that enhanced allocations of entitlements and authority.

Taking ideas into account provides a more convincing account of both stasis and change in political-economic life. The PJPF and PJTF combine to chart the trajectory a polity-economy takes through the space of possible property and authority allocations. In FIG 10 above, a polity-economy that would otherwise have settled at a status quo below point 3 has been affected by innovation in political-jurisdictional ideas. This shifts the PJTF from TT to TT' and enables a movement to point 4 on the efficient frontier. FIG 11 below depicts the same polity-economy responding to an inward shift of its possibility frontier from $PJPF_1$ to $PJPF_2$, perhaps due to a reduction in transaction costs along some dimension. In the PJTF diagram this is represented by a shift outward from FF to $F'F'$, however, the new transformation frontier $T'T'$ is such that the polity-economy can only move to the status quo point 5 and not fully to the efficient frontier. In the PJPF surface diagram the polity-economy jumps from the optimum of the upper surface to a comparatively more efficient though suboptimal point in the lower surface, and remains there. FIG 12 depicts another bout of innovation in political-jurisdictional ideas (PJTF shifts from $T'T'$ to $T'T''$) and the ensuing movement to point 6 on the efficient frontier. In the PJPF surface diagram the polity-economy moves to the optimum of the lower surface.

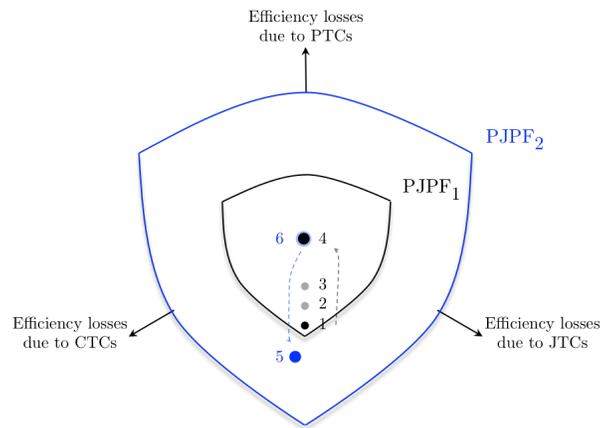
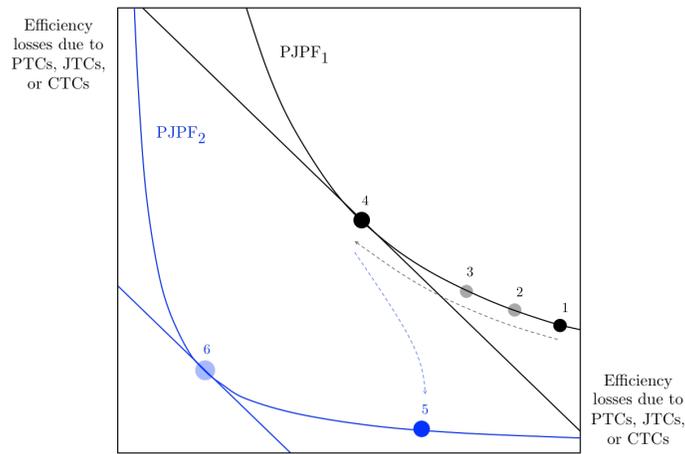
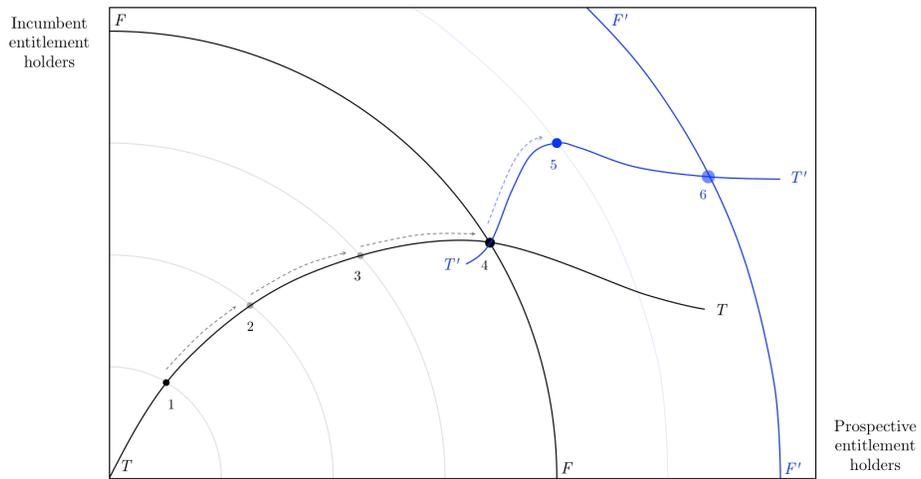


FIG 4.11 PJTF, pairwise PJPF curve, and PJPF surface illustrating an incomplete, suboptimal transformation (shift in PJPF)

POLITICAL-JURISDICTIONAL POSSIBILITIES AND TRANSITIONS

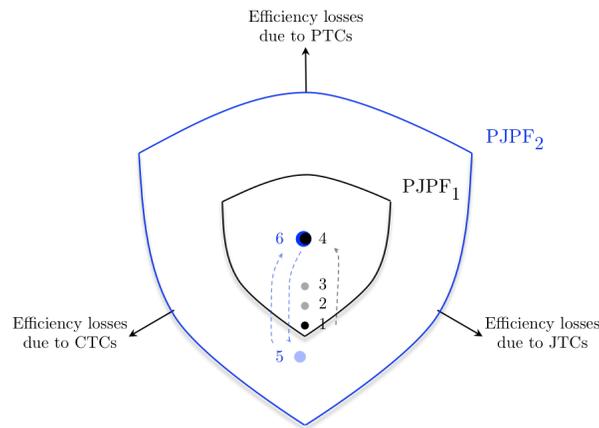
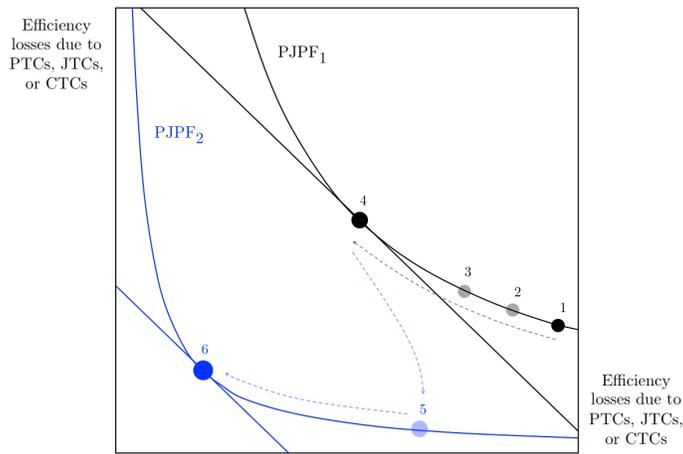
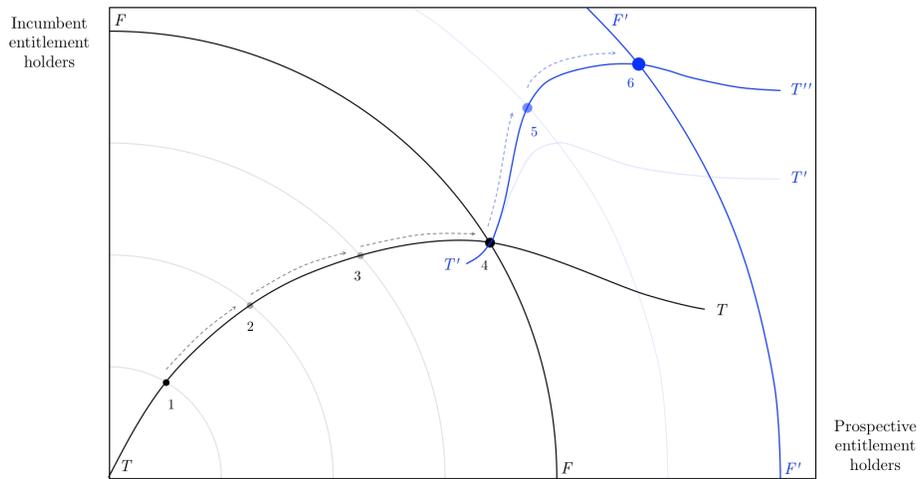


FIG 4.12 PJTF, pairwise PJPF curve, and PJPF surface illustrating an optimised transformation (shift in PJPF and political-jurisdictional innovation)

In summary, the political-jurisdictional possibility frontier framework enables us to analytically consider the alternative means to an efficient allocation of property rights and political authority. The efficient institutional choice is determined by the slope of the PJPF surface, which varies across countries and over time. In a polity-economy with low market transaction costs, comparatively more changes in property rights will be carried out in markets, as compared to politically or by jurisdictional change. In others, political transaction costs might be lower (and relatively evenly dispensed) allowing for efficacious political exchange in bringing about the optimal political-jurisdictional outcome. In others still, the comparative social costs of market, political, and jurisdictional exchanges are such that citizen mobility or jurisdictional reorganisations are the more efficient mechanism. Ultimately, efficient political-jurisdictional institutional design depends on the specific characteristics of countries, which can only be discovered empirically.

But efficient policies and institutions do not inevitably eventuate. The political-jurisdictional transformation frontier clarifies how beliefs and ideas about the value of entitlements, the efficacy of policies, or the effect of a jurisdictional change also influence political-jurisdictional outcomes. New ideas can exert an independent effect on equilibrium outcomes even in the absence of changes affecting the possibility frontier, like transaction costs, civic capital, or other institutions. Ideas are subject to both manipulation and innovation, and beneficial innovations shift the political-jurisdictional transformation frontier outward. They enable the capture of efficiency gains in ways that sufficiently compensate incumbents and enrich prospectives, thus moving the polity-economy toward the optimal allocation of entitlements and authority. On the other hand, harmful ideas and ideologies can restrain a polity-economy in a suboptimal status quo position with a certain segment of society extracting rents. The preceding analysis can be reversed: transformation frontiers shift outward *and* inward. And moreover, this dynamic unfolds not only under authoritarian regimes or elite dictatorships, but also in democracies—with “appeals to nationalism, or racism, or ethnocentrism, or religious identity, or some other prejudice or fervor unconnected to economic efficiency per se” (Rosser & Rosser 2008: 86). Again, ultimately, the function of ideas and ideologies, and the likely political-jurisdictional transformation path, depends on the particulars of the society under examination.

Chapter 5

Theory of non-territorial internal exit

A spectre is haunting the modern world, the spectre of crypto anarchy. Computer technology is on the verge of providing the ability for individuals and groups to communicate and interact with each other in a totally anonymous manner. The State will of course try to slow or halt the spread of this technology, citing national security concerns, use of the technology by drug dealers and tax evaders, and fears of societal disintegration. Many of these concerns will be valid.

Timothy C. May, *The Crypto Anarchist Manifesto*

Introduction: Efficiency and exploitation

It is no overstatement that James M. Buchanan was one of the most influential economists of the twentieth century. He is also, somewhat curiously, one of the most subversive—laying the theoretical foundations that explain a political dynamic that is only just beginning to unfold, and with the potential to transform governance as we know it.

A Nobel laureate for his development of the contractual and constitutional bases for the theory of economic and political decision-making, Buchanan made seminal contributions to several fields within economics and was a major figure in the revival of classical liberal political economy in the late twentieth century. He founded no less than *two* distinctive schools and research programs: (1) public choice theory, applying the tools of economic

analysis to traditional problems of political science and turning on its head the notion of the benevolent, omniscient government social-planner ('politics without romance') (Buchanan & Tullock 1962; Buchanan & Wagner 1977; Buchanan & Tollison 1984); and (2) constitutional economics, the study of the legal-institutional-constitutional rules that constrain the choices and activities of economic and political agents ('the rules of the game') (Brennan & Buchanan 1985; Buchanan 1987, 1990).

But it is one of his lesser-known articles—'Secession and the limits of taxation: Toward a theory of internal exit'—that promises to be the most revelatory. And more surprisingly—for a product of rural Rutherford County, Tennessee, accustomed to hoeing his own cabbages, and a self-described "outdated freak whose functional role in the general scheme of things has passed into history" (Buchanan 1979: 279)—it is bitcoin and emerging second-generation blockchain based cryptographic technologies that provide the platform for his theory of internal exit to play out.

Acclaimed technologist and formative cypherpunk writer Timothy C. May might have declared "A spectre is haunting the modern world, the spectre of crypto anarchy" in his *Crypto Anarchist Manifesto* (1992), but already in *The American Economic Review* in 1987 Buchanan and co-author Roger L. Faith had outlined the necessary conditions for the spectre to ever materialise. May envisioned a future in which cryptography and self-executing, self-enforcing, 'smart' contracts would empower individuals to make voluntary economic arrangements that transcend unresponsive or predatory government. In effect, citizens would be able to economically secede from an existing political unit, establish new institutions to provide collective goods or services, and reorder the jurisdictional system to more closely align with their underlying preferences. Indeed, bitcoin enthusiasts and crypto-evangelists believe we are on the cusp of such a transformative horizon. But while they valorise figures in the cypherpunk tradition, including mythical bitcoin inventor Satoshi Nakamoto and WikiLeaks founder Julian Assange, they find no room in their Pantheon for Nobelist Buchanan.

In this chapter, we first outline the basic set up and assumptions of the Buchanan and Faith (1987) model of internal exit, which is essentially a model of secession, as we know

it. We examine the general results of the model and implications, and discuss how these can be extended to shed light on the dynamics of ‘non-territorial secession’ (pertaining to an institutionalised mechanism) or ‘cryptosecession’ (a non-sanctioned mode of seceding that is exemplified by bitcoin and emerging blockchain based technologies). We then develop a game-theoretic model of cryptosecessionist internal exit that we argue captures the dynamic of non-territorial unbundling.

One of the main contentions of non-territorial unbundling is that it corresponds to a political-jurisdictional order in which the alignment of citizens and policies is optimally efficient (MacDonald 2015). That is to say there is allocative efficiency in the provision of political goods; no citizen would be better off by moving between jurisdictions and no groups of citizens would seek to form new jurisdictions with new policies. This in turn means that non-territorial unbundling reduces, or in the limit entirely eliminates, ‘fiscal exploitation.’ Individuals or groups pay the average cost of political good provision so there is no scope for fiscal redistribution (i.e., no transfers), and the bundles of political goods match the preference-cost valuations of all citizens (i.e., no forced consumption of non-preferred political goods). Conversely, when there *is* fiscal exploitation some subset of the population of citizens is either: (1) paying above average cost for their preferred bundle of political goods with the resulting fiscal surplus being transferred to others; or (2) forced to consumer a non-preferred bundle of political goods (or elements within that bundle) at a non-exploitative tax price; or (3) getting some combination of exploitative tax prices and non-preferred policy bundle elements.

Thus if a political-jurisdictional order is not yet allocatively efficient—and some subset of citizens is being fiscally exploited—the process of non-territorial unbundling should see taxes converge on average costs of provision, fiscal surpluses disappear, and transfers cease. Moreover, non-territorial unbundling is a process of jurisdictional proliferation. For instance, a unitary, exploitative state would be decentralised along functional and personal dimensions to form overlapping constellations of citizens in which political preferences were homogenous and political goods were non-discriminately financed and provided. So non-territorial unbundling is characterised by both resistance to fiscal exploitation and jurisdictional reorganisation—where the purpose of the latter is to underwrite the former.

We could delineate this process by the multitudes of latent and emergent political groups, or we could conceptualise it more simply as the interplay between two encompassing groups: those who are net beneficiaries from the political process and those who on net contribute more than they receive. Within these there are many constituent groups with varying net positions vis-à-vis political provisions and redistributions, depending on the extent to which their political preferences are satisfied and the fiscal transfers they finance and extract. But even so, if non-territorial unbundling *does* promote an optimally efficient alignment of citizens and policies, then the underlying dynamics of political group formation and sorting (among variously unbundled and non-territorial units) must ultimately manifest as attrition of political winners and losers.

This is a complex and multifaceted process directed at a non-exploitative and optimally efficient allocation of people and policies to jurisdictions. That is to say, since non-territorial unbundling is aimed at unwinding complexes of discriminatory fiscal transfers, the patterns of jurisdictional change will also assume a certain requisite complexity. Nevertheless, it can be represented as the interplay between political winners and losers, whereby both groups contract until fiscal exploitation ceases, and hence all members of the encompassing polity become fiscally equivalent. As such, we model jurisdictional change—whether political unbundling or non-territorial decentralisation—as a two-player game between the encompassing groups of the politically expedient (i.e., net transfer recipients) and the politically ineffective (i.e., net losers from the political process).

Non-territorial unbundling is a variant of internal exit that is akin to partial secession. Internal exit is defined as secession by a coalition of people into a newly formed political unit, in contradistinction to external exit, which is typically defined as mobility between pre-existing political units. Both of these are complete ‘all-or-nothing’ decisions: internal exit is the typical idea of secession as full disintegration of political units, and external exit is complete relocation between fully disintegrated political units.

Non-territorial unbundling, on the other hand, can be considered as partial secession. Individual citizens are potentially members of multiple functionally defined political units at once, and multiple political units operate simultaneously in the same location. Within

the non-territorial unbundled system, jurisdictional changes attending to fiscal equivalence are not limited to complete realignments of citizens and jurisdictions, but also extend to changes in the distribution of political-economic activity that citizens conduct in their multiple political units.

For instance, consider a group of citizens that are members of two political units both offering a particular political good; if the group decides to switch between providers they have affected a jurisdictional change (which may have reduced fiscal exploitation) but have done so by only *partially* exiting. In this way citizens that are outside the dominant political coalition are able to moderate the circumstances of their fiscal exploitation without having to completely secede from all aspects of polity, economy, and society. As such, we model non-territorial unbundling as partial secession; both the politically ineffective *and* expedient are able to shift economic activity among political units to maximise post-tax payoffs.

This model also comports with the political-jurisdictional Coase theorem presented in chapter 3. An efficient allocation of people and policies to jurisdictions corresponds to an efficient allocation of property rights, which in turn means that the political-jurisdictional order is non-exploitative. We conceptualise fiscal surplus and transfers not as literal cash transfers but as a condition where some subset of the population is politically satisfied at the expense of others, whose political preferences remain unsatisfied. Fiscal exploitation then signals that there are potentially realisable gains-from-reorganisation on offer; and if non-territorial unbundling leads to fiscal equivalence then the political-jurisdictional change is efficiency enhancing in the Coasean sense.

We proceed as follows. In the next section we review the model of internal exit and the limits of fiscal exploitation by Buchanan and Faith (1987) that is the basis for our model of partial internal exit. We then argue that non-territorial unbundling in general, and cryptosecession in particular, is a form of partial internal exit and outline a model of cryptosecessionist partial internal exit. We conclude by discussing the implications of the model for non-territorial unbundling and blockchain based cryptosecession.

Buchanan and Faith on internal exit and fiscal exploitation

In the first instance Buchanan and Faith (1987) are concerned with the central problem of public economics—ensuring allocative efficiency in the provision of public goods. Economists who focus on the *free rider problem* and the subsequent *underprovision* of some public good have tended to recommend centralised (monopoly) provision of public goods, financed perhaps by a proportional tax on the income of all citizens in a polity. This solution does indeed have the capacity to generate sufficient funds for financing public goods, but often comes at the cost of *overprovision* or, as the case may be, *overtaxation*. Politically connected insiders, special interests, or decisive coalitions can extract the resulting fiscal surplus as a form of political redistribution (fiscal transfer). In short, this engenders what can be called the *exploitation problem*.

In response, economists have studied the role of *external exit* and ‘voting with feet’ as a means to limit *overprovision* and *overtaxation*, and ensure allocative efficiency. This work is based on the seminal Tiebout (1956) sorting model, whereby competitive government units (cf. monopolism) provide public goods *in parallel*, and are incentivised to provide them at the efficient level and tax-price (i.e., in line with citizens’ preferences). Buchanan and Faith (1987) use this as the departure point for their analysis, and introduce the concept of *internal exit*—“secession by a coalition of people from an existing political unit along with the establishment of a new political unit that will then provide public goods to those who defect from the original unit” (1023). They argue that this too is an alternative means to efficient governance.

The main connection between these three approaches is that: (1) the *free rider problem* can be overcome by the monopoly provision of public goods, but in turn generates an *overprovision*, *overtaxation*, and *exploitation problem*; (2) the competitive provision of public goods via *external exit* can then overcome these problems, but assumes a multiplicity of jurisdictions in competitive supply without describing how such jurisdictions came to be formed (i.e., assumes exogenously-determined jurisdictional structure); and subsequently (3) The Buchanan and Faith (1987) theory of *secession* and *internal exit* fills the gap in describing how multiple jurisdictions come to be

(i.e., endogenously), while also describing how the exploitation problem can be overcome without even having to ‘vote with feet’ or any such exit at all (external *or* internal).

Buchanan and Faith (1987) provide an analytic model that demonstrates the logic of internal exit as a political mechanism restricting the size of fiscal surplus and transfer by monopoly government. As they put it, they show “how the prospects for removal from authority might exert limits on the taxing proclivity of government” (1031). They also suggest the model “may be helpful in deriving testable implications relative to the growth of tax evasion-avoidance” (1023). In addition to this, I claim that it can also be modified and applied to the emerging phenomena of ‘cryptosecession.’ Cryptosecession is the process in which citizens secede from an incumbent state and reconstitute in new ‘virtual states’ that are akin to non-territorial public good clubs (Ludlow 2001; MacDonald 2015). It can be described as a form of tax evasion, but it is more accurately classified as a process of partial secession and *de facto* jurisdiction formation.

Buchanan and Faith (1987) note that the previous lack of consideration for internal exit (secession) is likely due to the prevailing perception that secession is legally or constitutionally impermissible, and therefore prohibitively costly to effect. Other factors aside from unconstitutionality that make internal exit prohibitively costly (and thus less likely) include locational interdependences among people in a polity (i.e., agglomeration economies, positive spillovers in spatial distribution of people and property) and difficulties in forming coalitions among potential members of a seceding group (i.e., transaction costs or collective action problems).

The upshot, however, is these become the conditions for when internal exit is a viable response to fiscal exploitation. Buchanan and Faith (1987) assume that citizens possess a legal-constitutional right of secession that is effectively ‘costless’ to exercise in and of itself. They also assume that political conflict between groups or collective action difficulties in forming the new political unit are not limiting factors. The main considerations are then the opportunity cost of reduced private product (i.e., forgone agglomeration economies) and the cost of providing political goods independently (i.e., foregone economies of scale), from leaving the larger polity-economy. The costs of secession lessen and internal exit

becomes a more viable option in a world where people can easily form political groups, can then secede without having to sacrifice locational interdependences and agglomeration economies (i.e., with perfect economic integration or via non-territorial secession), and once they have done so find that scale economies of political good provision are attenuating (i.e., average costs are converging or constant).

Arguably this describes the conditions and consequences of cryptographic technology: (1) secession is ‘permissionless’; (2) it is non-territorial, so locational interdependences need not be sacrificed in seceding; and (3) the cost of forming seceding groups is greatly diminished. The legal-constitutional permissibility assumption is meaningful (and contestable) when applied in the model of *de jure* internal exit; but due to the ‘permissionless’ character of cryptosecession, it is definitional to a model of *de facto* internal exit. Similarly, in the cryptographic world where the costs of collective action are greatly diminished, internal exit is becoming evermore viable. The implication is that permissionless cryptosecession, like internal exit, “imposes constraints on the potentially exploitative behavior of those in the dominating or ruling political coalition” (1024). That is to say, the ability of the politically expedient to extract fiscal transfers is restricted in a way that is analogous, perhaps even superior, to both external-exit territorial mobility and internal-exit territorial secession.

Competitive political sorting is more commonly observed than secession, and therefore appears more a realistic and relevant mechanism of fiscal equivalence; but we do occasionally observe secession in various forms. Moreover, it is possible that the mere *threat* of secession induces a fiscal competition between the incumbent government and the government of the potential new jurisdiction, without internal exit actually eventuating. We can say the same thing of non-territorial unbundling in general and cryptosecession in particular. Both are uncommon and largely unobserved modes of jurisdictional change—in fact cryptosecession by its very nature is unobservable. Nevertheless the *capability* of citizens to reconfigure their political memberships or to use cryptography to remove themselves from incumbent institutions could still play an important role in curtailing fiscal exploitation, short of unbundling or cryptosecession actually occurring.

This is reflected in the Buchanan and Faith (1987) model too. The threat of secession is a means of avoiding the tyranny of the majority, or dominant minority. Internal exit need not actually occur; the mere possibility acts as a brake on the exploitative actions of the politically expedient coalition, which adjusts the tax rate to an equilibrium ‘secession-proof’ level. At equilibrium, fiscal surplus and transfer still occurs, but not beyond the point that would induce secession. We arrive at an equilibrium level of fiscal exploitation. The contention is that cryptosecession might further lower the secession-proof equilibrium to the point of non-exploitation. Then, neither secession nor cryptosecession would obtain, and the polity would remain in non-exploitative, fiscally equivalent, efficient equilibrium.

Of course, in reality not all governments adhere to the secession-proof rule. The equilibrium condition can be a useful tool for interpreting episodes where government do overstep the mark, people agitate for secession, and indeed when they succeed in removing themselves from circumstances of fiscal exploitation. Buchanan and Faith (1987: 1023) note, “secession in various forms does occur”—whether at the scale of the nation-state (e.g. “threats and declarations of independence from existing national governments”) or at the level whereby subsets of citizens seek exemption from an existing jurisdiction to provide and finance public goods privately (e.g. special districts, private schooling, lighthouses). Again, we might note that forms of non-territorial cryptosecession also do occur—these include cryptoanarchist enterprises (e.g. bitcoin, *UnSystem*, *Ethereum*, *Bitnation*), but also the shadow economy and *Systeme D* (Soto 1989; Schneider & Enste 2013); agorism and counter-economics (Konkin, Conger & Seely 2006); and *parallel poleis* in civil society (Benda et. al 1988; Lagos, Coopman & Tomhave 2014).

By manipulating the basic internal exit model, we can garner insights into how current trends might play out in the future concerning allocations of political goods and jurisdictions. It appears that institutional and technological trends could have the impact of drastically reducing the costs of secession, and in a non-territorial way, so as to overcome the cost of foregone locational interdependences and agglomeration economies. The effect could be an upsurge in ‘group secession’ where people excise their economic activity from an encompassing jurisdiction and coordinate on institutions to provide public goods competitively and in parallel. Or we might observe ‘personal secession’ where people

individually secede before reconstituting as groups by coordinating with extant governance providers.

Or, perhaps less radically, the proclivities of governments to overtax and provide fiscal transfers might be appropriately curtailed, to the point even of elimination, without inducing cryptosecession (i.e., the secession-proof condition lowered to the average cost of provision). This will depend on how incumbent governments respond to changing circumstances, as represented by inclusion of the cryptosecession option in the internal exit model. But in the very least, to paraphrase Buchanan and Faith, such a model may be helpful in deriving testable implications relative to the growth of cryptography-mediated internal exit, or conversely, to the pressures for fiscal reform.

The basic internal exit model

In the simplest version of the internal exit model, the polity is comprised of two groups. (1) The *sharing coalition* has the ability to extract fiscal surplus, due perhaps to being active participants in the political process. It includes “all groups that are successful in obtaining net transfers from the government” (1024). They do so via fiscal redistribution, but this could occur otherwise, for instance with discriminatory spending on political goods that are consumed only by the sharers. (2) Those *outside* the sharing coalition (*non-sharers*) are net losers from the political process as they have wealth partially redistributed away from them, over and above the average cost of the public good. This is “the politically ineffective, unrepresented, or rationally nonparticipating segment of the population” (1024) but this group also presents a potential for secession.

The basic model assumes that the public good to be provided is inherently monopolistic and must be provided for any private production to take place. The public good is financed with a non-discriminatory, proportional tax on income, levied on all members of the polity. Hence, the minimum (non-exploitative) tax rate would be equal to the average cost of the public good. However, since provision is monopolistic the sharing coalition (who

has control of the government) uses its power to tax above the non-exploitative rate. The resulting fiscal surplus is transferred to sharers in equal proportions. This is a highly stylised model where the benefit of being in the sharing coalition is ostensibly a cash transfer, although the logic also applies to ‘benefits in kind’ or preferential spending on other political goods that are consumed only by sharers (i.e., rent-seeking, porkbarrelling). The sharers’ net position after the political process is improved by the amount of one share of the total fiscal surplus (net of the proportional income tax), however it is administered.

The main constraint to fiscal exploitation is the ‘liberty of secession.’ Non-sharers can secede without cost, but must then finance and provide the public good (which *must* be provided for the new polity to produce any private income) themselves. Thus the threat of secession and the extent of fiscal surplus extraction are largely determined by the cost function for public good provision and the production function for citizens in the private sector. The impact of other factors such as economic characteristics of citizens in the polity (differentiated according to income product) and the size of the polity in terms of number of member citizens are investigated by Buchanan and Faith (1987) and Graziosi (2007), but are not relevant to our purposes here. We require only the previous authors’ derivations of the equilibrium secession-proof tax rate, transfers, and sharer and non-sharer post-tax payoffs.

Consider a community of K people, in which each person has an individual private product, or income, of $g(K)$. Some government must provide a public good or no private product is possible in the community. The cost of provision for the public good is $f(K)$ where $f'(K) \geq 0$. Assume that community income (total private product) is sufficient to finance the public good $Kg(K) > f(K)$. Fiscal surplus (transfer) is the difference between total tax revenue and the cost of public good provision $T = tKg(K) - f(K)$. The non-exploitative tax rate $t_0(K) = \frac{f(K)}{Kg(K)}$ covers provision cost without generating fiscal surplus. Non-sharer post-tax income is simply private product minus tax paid $P = g(K)(1 - t)$. There are M citizens in the sharing coalitions, who each receive an equal share of fiscal surplus; and sharer post-tax income is therefore $B = g(K)(1 - t) + \frac{T}{M}$.

Now consider a polity that consists of N identical individuals; the remaining $S = N - M$ citizens therefore form the set of potential seceders. Assume seceders will employ the non-exploitative tax rate $t_0(S) = \frac{f(S)}{Sg(S)}$ in the potential new polity. If secession obtains, seceder post-tax income will be:

$$P(S) = g(S)(1 - t_0(S))$$

$$P(S) = g(S) \left(1 - \frac{f(S)}{Sg(S)} \right)$$

$$P(S) = g(S) - \frac{f(S)}{S} \tag{1}$$

The equilibrium secession-proof tax rate t^* maximises the post-tax net income of sharers without inducing secession of non-sharers. At equilibrium, secessionists are indifferent between leaving the original polity and receiving $P(S)$ or remaining and receiving $P^*(N)$. So the equilibrium secession-proof condition is:

$$P^*(N) = P(S)$$

$$g(N)(1 - t^*) = P(S)$$

$$t^* = 1 - \frac{P(S)}{g(N)} \tag{2}$$

$$t^* = 1 - \left(\frac{g(S)}{g(N)} - \frac{f(S)}{Sg(N)} \right)$$

$$t^* = 1 - \frac{g(S)}{g(N)} + \frac{f(S)}{Sg(N)}$$

$$t^* = \frac{g(N) - g(S)}{g(N)} + \frac{f(S)}{Sg(N)} \tag{3}$$

If there are agglomeration economies or efficiency losses from separation, then secession reduces private income, so that $\frac{g(S)}{g(N)} < 1$ and $t^* > \frac{f(S)}{Sg(N)}$. Therefore the equilibrium secession-proof tax rate in the original polity is higher than the non-exploitative tax rate in the potential new polity $t^* > t_0(S)$ because potential seceders must sacrifice agglomeration economies. If there are no agglomeration economies (or seceders need not sacrifice them) then $t^* = t_0(S)$, which means that the equilibrium rate in the full polity is the non-exploitative rate in the potential new polity. Thus if citizens can non-territorially secede then the polity will be forced to implement a tax rate that is closer to the non-exploitative rate, which means that fiscal surplus and transfers will approach zero.

Equilibrium fiscal surplus (i.e., transfers) is:

$$T^* = t^*Ng(N) - f(N) \quad (4)$$

$$T^* = \left(\frac{g(N) - g(S)}{g(N)} + \frac{f(S)}{Sg(N)} \right) Ng(N) - f(N)$$

$$T^* = \left(g(N) - g(S) + \frac{f(S)}{S} \right) N - f(N)$$

$$T^* = Ng(N) - Ng(S) + \frac{Nf(S)}{S} - f(N)$$

$$T^* = (Ng(N) - f(N)) - \frac{N}{S}(Sg(S) - f(S))$$

$$T^* = W(N) - \frac{N}{S}W(S) \quad (5)$$

Where $W(K) = Kg(K) - f(K)$ is welfare (i.e., total private income net of public good provision cost). Transfers are positive if total welfare in the original polity is at least as large as total welfare in the potential new polity scaled up by a factor of $\frac{N}{S}$. Put another way, transfers per citizen $\frac{T^*}{N}$ are positive if welfare per person $\frac{W(N)}{N}$ in the original polity is

at least as large as welfare per seceder $\frac{W(S)}{S}$ in the potential new polity (dividing (5) through by N). If so, potential seceders will remain in the original polity and accede to fiscal transfers rather than secede to the new polity.

As below, equilibrium non-sharer post-tax income is one share of total welfare in the potential new polity (i.e., average welfare), which corresponds to the equilibrium condition that non-sharers are indifferent between seceding or not.

$$P^* = g(N)(1 - t^*) \quad (6)$$

$$P^* = g(N) \left(1 - \left(\frac{g(N) - g(S)}{g(N)} + \frac{f(S)}{Sg(N)} \right) \right)$$

$$P^* = g(S) - \frac{f(S)}{S} \quad (7)$$

$$P^* = \frac{Sg(S) - f(S)}{S}$$

$$P^* = \frac{W(S)}{S} \quad (8)$$

Finally, equilibrium sharer post-tax income is one share of the excess of total welfare in the original polity over total welfare in the potential new polity.

$$B^* = P^* + \frac{T^*}{M} \quad (9)$$

$$B^* = \frac{W(S)}{S} + \frac{W(N)}{M} - \frac{N}{MS}W(S)$$

$$B^* = \left(\frac{1}{S} - \frac{N}{MS} \right) W(S) + \frac{1}{M} W(N)$$

$$B^* = \frac{1}{S} \left(1 - \frac{N}{M} \right) W(S) + \frac{1}{M} W(N)$$

$$B^* = \frac{1}{S} \left(\frac{M - N}{M} \right) W(S) + \frac{1}{M} W(N)$$

$$B^* = \frac{1}{S} \left(\frac{-S}{M} \right) W(S) + \frac{1}{M} W(N)$$

$$B^* = \frac{W(N) - W(S)}{M} \tag{10}$$

These are generic derivations of the equilibrium secession-proof tax rate, transfers, and sharer and non-sharer post-tax payoffs. Let's now consider the above model with various combinations of assumptions about scale economies in public provision, i.e., average cost of public good $\frac{f(K)}{K}$, and agglomeration economies in private production, i.e., average income $g(K)$. Decreasing average cost in polity size $f(K) = F \Leftrightarrow \frac{f(K)}{K} = \frac{F}{K}$ is standard in public economics; it corresponds to the notion of non-rivalry in consumption, and hence, increasing returns over group size. We also examine constant average cost $f(K) = \bar{f}K \Leftrightarrow \frac{f(K)}{K} = \bar{f}$, which may be interpreted as the absence of scale economies; polities of different sizes would provide the public good for the same unit cost to citizens. We don't consider increasing average cost of provision since under this condition a polity would break apart into smaller polities to avoid the diseconomies of scale, quite independently of the taxing proclivity of the government.

Increasing average private product in polity size $g(K) = K$ indicates agglomeration economies, and constant average product $g(K) = \bar{g}$ may be interpreted as an absence of agglomeration economies. Constant average product could be construed as a setting in which individuals generate private product in proportion to the same size market, irrespective of the polity they are located in. Put another way, constant average product captures the case where citizens can secede without having to sacrifice locational interdependences and agglomeration economies (i.e., with perfect economic integration or via non-territorial secession).

Calculations for the combinations of average cost and average product assumptions can be found in the appendix. The results in TABLE 1 below are fairly intuitive. Compare the two sets of results when average cost is decreasing: when there are no production agglomeration economies (column 2) fiscal transfers are lower $\frac{MF}{S} < NM + \frac{MF}{S}$ and the tax rate is lower $\frac{F}{S\bar{g}} < \frac{MS+F}{SN}$ than when average private product increases in polity size. The benefit to potential seceders from removing agglomeration economies outweighs the cost from sustained scale economies. Since there are no foregone agglomeration economies, the threat of secession does further restrict fiscal exploitation, but not entirely; there is still some fiscal transfer $\frac{MF}{S} > 0$ and the tax rate is above average cost $\frac{F}{S\bar{g}} > \frac{F}{N\bar{g}}$.

Avg. cost public good	<i>Decreasing</i>	<i>Decreasing</i>	<i>Constant</i>	<i>Constant</i>
Avg. private product	<i>Increasing</i>	<i>Constant</i>	<i>Increasing</i>	<i>Constant</i>
t^*	$\frac{MS+F}{SN}$	$\frac{F}{S\bar{g}}$	$\frac{M+\bar{f}}{N}$	$\frac{\bar{f}}{\bar{g}}$
T^*	$NM + \frac{MF}{S}$	$\frac{MF}{S}$	NM	0
P^*	$S - \frac{F}{S}$	$\bar{g} - \frac{F}{S}$	$S - \bar{f}$	$\bar{g} - \bar{f}$
B^*	$2N - M$	\bar{g}	$N + S - \bar{f}$	$\bar{g} - \bar{f}$

TABLE 5.1 Basic internal exit model results for various assumptions

Now compare the results when average product is increasing: when there are no governance scale economies (column 3) total fiscal transfers are lower than when there are scale economies $NM < NM + \frac{MF}{S}$ but the tax rate is slightly higher $\frac{M+\bar{f}}{N} > \frac{MS+F}{SN}$. Again the effect of agglomeration economies outweighs that of scale economies: both total product and total cost would be lower in the seceding group's new polity, but total product more so. Since the average cost of provision is higher in the original polity when there are no scale economies (compared to when there are) the portion of the tax rate that finances the

public good will be higher, quite apart from the size of fiscal transfers. There is less fiscal exploitation than otherwise, but it still persists $NM > 0$, and the less-exploitative tax rate is higher than if there were scale economies, and above that for paying average cost $\frac{M+\bar{f}}{N} > \frac{\bar{f}}{N}$.

Finally consider the results for the model with no agglomeration economies in private production and no scale economies in public provision (column 4). There is no fiscal surplus and transfers; the secession-proof tax rate $\frac{\bar{f}}{\bar{g}}$ is set so that each citizen pays an equal share of the total cost in proportion to their income (i.e., non-exploitative); and therefore both sharer and non-sharer post-tax income $\bar{g} - \bar{f}$ is average product net of average cost. There is no longer any fiscal exploitation. Fiscal equivalence indicates that no subset of the population is politically satisfied at the expense of others. While secession has not taken place, we can say that the political-jurisdictional order is also efficient; no citizen or groups of citizens would be better off by moving between jurisdictions or forming new jurisdictions with new policies. That is to say, the threat of secession has induced a fiscal competition between the incumbent government and that of the potential new jurisdiction, and actuated allocative efficiency in policies, peoples, and polities.

Cryptosecession as partial internal exit

In the basic model, private product is a function of the size of polity, which may be interpreted as a state of full economic disintegration between the two polities after secession. Therefore we could say that seceders cannot generate private product within the entire community, only their fellow cohort, because they would be excluded access to markets, courts, or such, in the original polity. The order produced in the original polity is worthless to them; they can't use it. Similarly for remaining citizens, they cannot use the order produced in the potential new polity without paying for access to their market infrastructure and institutions.

Citizens face a trade-off between smaller incomes in smaller polities (albeit with smaller tax costs) versus larger incomes in larger polities (although with larger tax costs). The model *assumes* this—when seceders stop paying the tax they lose access to the public good, and thus lose access to the larger market in the larger polity, so their individual private product falls. Conversely, citizens of the original polity pay their own price for their public good and can only trade among themselves, so their individual private product falls too. It is up to the sharing coalition in the original polity to set the ‘secession-proof’ tax rate that maximises their post-tax post-transfer income. Non-sharers have little recourse; they must accept the state of ‘optimal exploitation’ since secession would only reduce their post-tax income.

Likewise, in the cryptosecession example two polities produce ‘order’ simultaneously. The original polity continues to produce the public good for its citizens, and the potential new polity will produce order for the seceders. And again, the point of the ‘order’ public good is simply to make private product possible in each domain. But we argue that with *de facto* cryptosecession (in contradistinction to *de jure* secession) there is an asymmetry: citizens pay for order in their polity and can only trade among themselves, while cryptoseceders pay for order in the new polity (to a provider of ‘crypto infrastructure’ that we label a ‘virtual state’) but can still trade with everyone remaining in the original polity as well as among themselves. The question to be asked of the basic internal exit model is then: Can seceders retain access to order and markets in the original polity (and thus generate larger private product) but not pay tax for it? Arguably, their model *does* capture this when the assumption of no agglomeration economies (i.e., constant private product with respect to polity size) is made, but we seek an extension that models this dynamic explicitly.

In the cryptosecession case, seceders can still trade within both polities to generate their private product, so they benefit from the order produced by both polities, and they retain access to the larger market for generating their private product. The point of secession is to evade (or minimise) the non-discriminatory tax that is levied on the incomes of all citizens in the original polity. Instead, or in addition, cryptoseceders pay a ‘virtual state’

for access to its ‘crypto infrastructure’ and are then able to conduct economic activity not only among themselves but also with citizens remaining in the original polity.

In the perfectly veiled case, cryptoseceders pay tax only to the ‘virtual state’ (and this is a lower price than that paid by the remaining citizens) because they appear to the original polity to have zero private income (or a negligibly small amount approaching zero). In other more limited cases, the cryptoseceder pays tax to both polities; either: (A) they veil the majority of their activity and income in the crypto economy and thus report and pay only a small amount to the original polity; or (B) their economic activity in formal sectors is documented, so the government knows their income in the original polity and taxes them on it (without knowing about informal crypto activity and income). A third option (C) is that some proportion of economic activity and income within the bounds of (A) and (B) is reported/documented that is arbitrary and thus not determined by either the cryptoseceder or the state.

In any case, because the process of cryptosecession is *de facto* and not *de jure*, the seceders still retain their citizenship in the original polity, they just appear to have lower income, and thus pay lower taxes. In (A) income appears to be negligibly small (near zero), and thus so are taxes paid; and in (B) income appears less than it really is (though not zero) and taxes paid are smaller too. The seceders simply direct (or generate) some portion of their income into the virtual state, so as to evade the non-exploitative tax on income. From the perspective of the sharing coalition in the original polity, a seceder appears to be a low-income citizen; they pay their meagre contribution to the order public good and are allowed to trade in the original polity.

Note also that both non-sharers *and* sharers can be *de facto* cryptoseceders. Thus a model of cryptosecession permits citizens an additional third option over the internal exit model: (1) remain in the original polity as a sharer or non-sharer; (2) secede to a potential new polity as a non-sharer (recall there is no fiscal surplus in the new polity); or (3) partially cryptosecede to another potential new polity as a non-sharer (again, with no fiscal surplus) while remaining in the original polity under the appearance of a lower-income citizen, and as a sharer or non-sharer.

In modelling this we introduce a coefficient β that represents the portion of income that is unreported (or generated) behind the veil of cryptography versus the portion that is reported (generated) in the original polity $\alpha = 1 - \beta$. In the setting with perfect ‘crypto infrastructure,’ individuals can generate all of their income in the crypto economy (notwithstanding a negligible portion that remains in the original polity) so $\beta \rightarrow 1$. They then have access to order and markets in both polities and their individual income is larger (generated in proportion to the entire community size) but they only pay the non-exploitative tax rate on income in the crypto economy. In the mixed setting, individuals generate income in both polities (i.e., the entire community size) and they pay tax in both polities depending on *where* they generate the income, so $0 < \beta < 1$.

The coefficient β could be interpreted as representing the state of cryptosecessionist technology: the lower is β , the lower is the prospect of cryptosecession and the closer to the basic internal exit outcome; the higher is β , the more advanced is the technology and the closer to the non-exploitative outcome. Moreover, this is probably related to crypto technology’s *relative* development. Technologies of *legibility* support efforts “to arrange the population in ways that simplified the classic state functions of taxation, conscription, and prevention of rebellion” while technologies of *opacity* subvert these attempts at exploitation, abet citizen non-compliance, and shrink “State-Accessible Product” (Scott 1998: 24). A similar interaction exists between technologies that introduce points of *control* and thus lower elasticities to government taxation, regulation, and exploitation, versus technologies of *resistance* that circumvent points of control (Dourado 2011). Thus, as technologies of opacity and resistance exceed technologies of legibility and control, the sharing coalition is constrained in its ability to extract fiscal surplus, and fiscal exploitation converges on fiscal equivalence.

The cryptosecession internal exit model

Cryptoseceders generate income in both the original polity *and* the crypto economy. They are taxed on the income they generate in each polity. The question they face is: How much economic activity to conduct in each polity? The original polity is larger, and hence private product is larger, but so is the tax rate. The crypto economy is smaller, and hence private product is smaller, as is the tax rate (i.e., the non-exploitative rate). Now in the partial internal exit model, the decision to secede is not ‘all-or-nothing’ as in the basic internal exit model—individuals can strike a balance between larger polity and private product (and tax losses) and smaller polity and private product (and tax losses). Like Buchanan and Faith (1987), we solve the cryptosecession model to find the equilibrium secession-proof and cryptosecession-proof tax rate; but we also solve it to find the equilibrium split of economic activity between polities (i.e., ‘all-or-nothing’ or some α : β).

The logic of the model is as follows. Initially, all citizens earn income in the original polity; $g(N)$ is increasing in polity size N such that $g(N) > g(N - 1)$. There is a cost of public good provision; and average cost $\frac{f(N)}{N}$ is decreasing in polity size N such that $\frac{f(N)}{N} < \frac{f(N-1)}{N-1}$. Sharers set the tax rate t in the original polity and use it to generate fiscal surplus, which is transferred to the M sharers such that $\frac{T}{M} = \frac{tNg(N) - f(N)}{M}$.

Individuals earn less in the potential new polity because it is smaller than the original polity. It also costs more to provide the public good of order (i.e., average cost) in the potential new polity and thus the potential seceders face a higher non-exploitative tax rate than otherwise $t_0(S) = \frac{f(S)}{Sg(S)}$. But they do not pay for fiscal surplus and transfer; so the choice is between a relatively ‘higher’ non-exploitative rate and an *even higher* exploitative rate (if this wasn’t the case, they would not secede). So for potential seceders the tradeoff is: higher private product (larger market) + higher tax cost (fiscal exploitation, but with scale economies) vs. lower private product (smaller market) + lower tax cost (higher average cost, but with no fiscal exploitation).

At equilibrium, private product, average cost, and taxes are balanced so non-sharers are not induced to secede: if the tax rate is higher, they will secede; if it is lower, sharers can and will raise it. In the first instance potential seceders appear to face an ‘all-or-nothing’ choice: if they secede they must remove *all* economic activity to the new polity. But what if they could secede partially? If the secession-proof tax rate were breached no potential seceder will maintain *any* stake in the original polity; but even in equilibrium (at the secession-proof rate) there are incentives to reduce tax burden by conducting economic activity elsewhere or hiding income. Partial secession also presents the possibility that non-sharers will decide *not* to formally secede if the sharers set an over-exploitative tax rate, and rather cryptosecede from within a unitary state. That is, the capacity to cryptosecede could undermine the secession-proof condition if payoffs are larger for non-sharers in the unitary polity, cryptosecession scenario.

The point of partial secession (for the S potential cryptoseceders) is to generate income in proportion to the *full* population N , while evading the higher tax rate. The typical example is the individual who removes $\beta\%$ of their income (e.g. 99%) to the crypto economy to evade tax, but leaves $1 - \beta = \alpha\%$ (e.g. 1%) in the original polity to maintain access to larger markets of N people. Thus there are two possibilities: (1) the cryptoseceder is able to do this because private product is generated informally in the full market without being documented, and only a small fraction is reported to authorities; or (2) the portion of income that is generated in the original polity is documented and taxed at the appropriate rate, and the portion generated in the crypto economy is undocumented and taxed at its lower rate.

In (1) the cryptoseceder pays tax on 99% of income in the lower taxing virtual state, and on 1% of income in the higher taxing original polity; while in (2) the cryptoseceder pays tax in the polity where it is generated. Intuitively the cryptoseceder will allocate the majority $\beta \rightarrow 1$ of private product to the crypto economy of size S and report only the negligible amount $\alpha \rightarrow 0$ to the original polity; thus minimising tax burden but ensuring that private product is generated in proportion to N . But the amount of activity that can be undertaken in the crypto economy is dependent on the relative development of crypto

technology and thus may have some upper bound less than 1, so that even if citizens attempt to cryptosecede as much as possible $\beta \rightarrow \beta^U < 1$.

To model this, let there be $i = 1, 2$ groups, where group 1 is the sharers and group 2 is the non-sharers. Let there be $\rho = 1, 2, 3$ polities, where polity 1 is the original polity, polity 2 is the potential new polity, and polity 3 is the crypto polity-economy. There are K_ρ^i individuals from group i in polity ρ , $K_\rho = \sum_i K_\rho^i$ individuals from all groups in polity ρ , and $K_i = \sum_\rho K_\rho^i$ individuals from group i in all polities.

The private product (income) of an individual from group i in polity ρ is g_ρ^i and the private product of an individual from any group in polity ρ is $g_\rho = g(K_\rho) = g(\sum_i K_\rho^i)$, where $g(\cdot)$ is an increasing function on polity size K_ρ . Note that individuals only generate private product from a polity if located in it $K_\rho^i = 0 \Leftrightarrow g_\rho^i = 0$; and all individuals in the same polity ρ generate the same private product $K_\rho^i > 0 \Leftrightarrow g_\rho^i = g_\rho$; which means that private product (income) of an individual from group i in polity ρ is $g_\rho^i = \{0, g_\rho | K_\rho^i = 0, K_\rho^i > 0\}$.

Note also that individuals only generate private product from a polity in proportion to the amount of activity they undertake in it. So let θ_ρ^i be the share of activity an individual i conducts in polity ρ , where $\theta_1^i, \theta_2^i = \alpha^i$ is the share conducted in the visible economy (polities) and $\theta_3^i = \beta^i = 1 - \alpha^i$ is in the hidden economy (crypto). When an individual decides not to cryptosecede $\alpha^i = 1$ and $\beta^i = 0$ and when an individual cryptosecedes $\alpha^i = 1 - \beta$ and $\beta^i = \beta$, where β is the share of activity that *can* be carried out in the crypto economy. We understand this to be determined by the relative state of technology (i.e., legibility versus opacity, Scott 1998; or control versus resistance Dourado 2011) and assume that both groups have equal access to the technology of cryptosecession.

Therefore the actual income an individual i generates in polity ρ , given the relative shares of economic activity, is $\theta_\rho^i g_\rho^i$. We can see that visible income in the *de jure* polities is $g_V^i = \alpha^i (g_1^i + g_2^i)$ and hidden income in the crypto polity is $g_H^i = \beta^i g_3^i$. The total income of an individual from group i is the sum of visible income in the *de jure* polities and hidden income in the crypto polity $g^i = \sum_\rho \theta_\rho^i g_\rho^i$.

The total cost of public good provision in polity ρ of size $K_\rho = \sum_i K_\rho^i$ is $f_\rho = f(K_\rho)$. The total fiscal transfer (surplus) in polity ρ is the difference between tax revenue and public good provision cost $T_\rho = t_\rho(\sum_i K_\rho^i \theta_\rho^i g_\rho^i) - f(K_\rho)$; and therefore the tax rate applied to the visible and hidden income of individuals in polity ρ will be $t_\rho = \frac{f(K_\rho) + T_\rho}{\sum_i K_\rho^i \theta_\rho^i g_\rho^i}$. Finally, the payoff of an individual from group i is $\Pi^i = \sum_\rho (1 - t_\rho) \theta_\rho^i g_\rho^i + \frac{T_{\rho=i}}{K_{\rho=i}}$.

At this point it is worth considering how the threat of cryptosecession impacts the secession-proof condition. Since players can now use cryptosecession as a means of escaping fiscal exploitation, the secession-proof condition will be changed. If cryptosecession does in fact impose greater restrictions on fiscal exploitation than basic internal exit, one might expect the incentive for cryptosecession to persist even at the former secession-proof tax rate t^* . Put another way, the secession-proof rate in the cryptosecession model might be lowered compared to the basic internal exit model.

To see this consider the secession-proof condition that non-sharers are indifferent between remaining in the original polity and seceding to a new polity. We define t_S^* as the *new* secession-proof tax rate when potential seceders also have the option of cryptoseceding. If non-sharers do not secede their payoff is $\Pi^2 = (1 - t_S^*)\alpha g(N) + (1 - t_0(S))\beta g(S)$ (from subgame 5 in FIG 7 below). The payoff for non-sharers if they do secede will be either $\Pi^2 = (1 - t_0(S))g(S)$ when they do not also cryptosecede or $\Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$ when they do cryptosecede (both from subgame 6 in FIG 8). The first condition is therefore:

$$(1 - t_S^*)\alpha g(N) + (1 - t_0(S))\beta g(S) = (1 - t_0(S))g(S)$$

$$t_S^* = 1 - \frac{g(S)}{g(N)} - \frac{f(S)}{Sg(N)} = t^* \tag{11}$$

When $\alpha = 1, \beta = 0 \Leftrightarrow t_S^* = t^*$

And the second condition is:

$$(1 - t_S^*)\alpha g(N) + (1 - t_0(S))\beta g(S) = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$$

$$t_S^* = \frac{\alpha - \beta}{\alpha} t^* + \frac{\beta}{\alpha} t_0(N) \quad (12)$$

When $\alpha < 1, \beta > 0 \Leftrightarrow t_S^* < t^*$

The expression for t_S^* from the first condition is nested in the expression from the second condition so we conclude that the *new* secession-proof tax rate when potential seceders also have the option of cryptoseceding is $t_S^* = \frac{\alpha - \beta}{\alpha} t^* + \frac{\beta}{\alpha} t_0(N)$. The added threat of cryptosecession has the effect of lowering the secession-proof tax rate compared to the basic internal exit model. Now the sharing coalition must reduce their taxing proclivity from the *old* optimally exploitative t^* towards the non-exploitative $t_0(N)$, in respect of the cryptosecessionist capability of citizens β . The derivative of the secession-proof tax rate with respect to the development of technologies of opacity $\frac{\partial t_S^*}{\partial \beta} = \frac{1}{\alpha^2} (t_0(N) - t^*) < 0$ is negative, so the sharing coalition must lower the optimally exploitative tax rate as crypto technology progresses (vis-à-vis technology of legibility and control).

As the relative state of crypto technology improves $\beta \rightarrow 1$, the secession-proof tax rate converges on the non-exploitative $t_S^* \rightarrow t_0(N)$ and the equilibrium outcome converges on fiscal equivalence. Over the range $0 < \beta < \alpha$ the secession-proof rate $t_S^* > t_0(N)$, which indicates fiscal exploitation; and the point $\beta = \alpha$ corresponds to a state of non-exploitation $t_S^* = t_0(N)$. Note that when $\beta > \alpha \Leftrightarrow t_S^* < t_0(N)$, which means that sharing coalition must set a tax rate *below* the non-exploitative rate to prevent secession. Since any $t_S^* < t_0(N)$ will not be sufficient to finance the public good, sharers will not be able to prevent non-sharers from seceding. Thus when opacity balances legibility $\beta = \alpha$ the model predicts a non-exploitative outcome; when legibility trumps opacity $\beta < \alpha$ there is fiscal exploitation of those outside the sharing coalition; and when $\beta > \alpha$ there is secession of political outsiders.

Alternatively, as crypto technology catches up $\beta \rightarrow \alpha$ to balance opacity and legibility, the incentive to continue its development diminishes; that is given the best outcome for non-sharers is to remain in the full sized polity in non-exploitative, fiscal equivalence. Put simply: the better is crypto technology, the more sensitive are non-sharers to fiscal exploitation, the more credible are their threats of secession, and the more empowered they are to remedy exploitation should it arise.

Because non-sharers now have recourse to cryptosecession in escaping fiscal exploitation, there is an additional ‘cryptosecession-proof’ condition that the sharing coalition must take into consideration. We define the ‘cryptosecession-proof’ tax rate t_C^* as the tax rate at which non-sharers are indifferent between cryptoseceding or not. If t_C^* prevents cryptosecession then non-sharer payoff will be $\Pi^2 = (1 - t_C^*)g(N)$ when they do not also secede (from subgame 1 in FIG 3 below) or $\Pi^2 = (1 - t_0(S))g(S)$ when they do secede (from subgame 2 in FIG 4). We use the first of these in the cryptosecession-proof condition, since it contains the variable t_C^* that we are solving for. The payoff for non-sharers if they do cryptosecede will be either $\Pi^2 = (1 - t_S^*)\alpha g(N) + (1 - t_0(S))\beta g(S)$ when they do not also secede (from subgame 1) or $\Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$ when they do secede (from subgame 2). The first condition is therefore:

$$(1 - t_C^*)g(N) = (1 - t_S^*)\alpha g(N) + (1 - t_0(S))\beta g(S)$$

$$(1 - t_C^*)g(N) = \left(1 - \frac{\alpha - \beta}{\alpha}t^* - \frac{\beta}{\alpha}t_0(N)\right)\alpha g(N) + (1 - t_0(S))\beta g(S) \quad \text{From (11)}$$

$$t_C^* = \alpha t^* + \beta t_0(N) \quad (12)$$

And the second condition is:

$$(1 - t_C^*)g(N) = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$$

$$t_c^* = \alpha t^* + \beta t_0(N) \quad (12)$$

Thus the cryptosecession-proof tax rate is $t_c^* = \alpha t^* + \beta t_0(N)$. This is the average of the optimally exploitative tax rate from the basic internal exit model and the non-exploitative tax rate, weighted by the balance of opacity and legibility. Given $0 < \beta < 1$, the cryptosecession-proof tax rate will be lower than the optimally exploitative t^* , but never quite reduced to the non-exploitative $t_0(N)$. Accordingly, the rate of change with respect to the development of technologies of opacity $\frac{\partial t_c^*}{\partial \beta} = t_0(N) - t^* < 0$ is negative, so crypto technological progress (vis-à-vis technology of legibility and control) further restricts the taxing proclivities of the government and brings the polity closer to fiscal equivalence. FIG 1 shows that the secession-proof tax rate is less than the cryptosecession-proof tax rate over all values of relative opacity-legibility technological development.

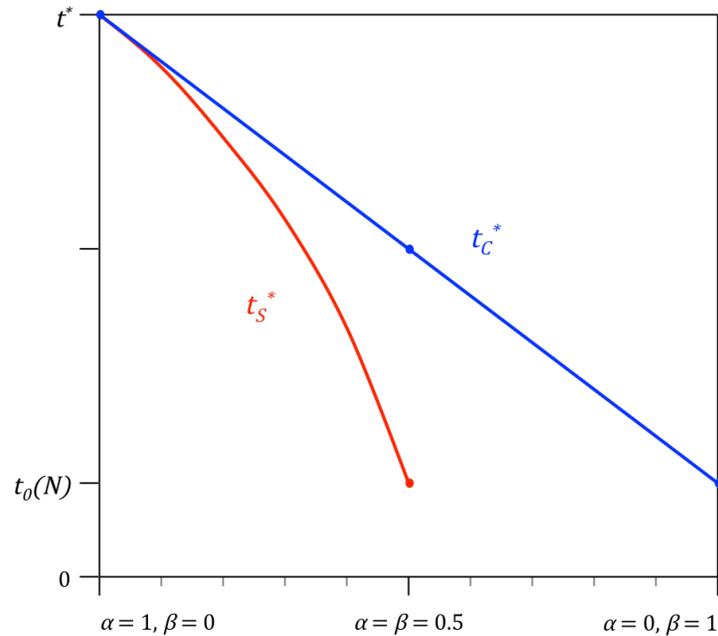


FIG 5.1 Secession-proof and cryptosecession-proof tax rates

The cryptosecession game

We can represent the decisions to secede or cryptosecede in the form of a game. The ‘cryptosecession game’ is played between two players: sharers and non-sharers. The two groups are playing a multi-stage game: in the first stage sharers set the tax rate; in the second stage non-sharers decide to secede or not; and in the third stage both sharers and non-sharers simultaneously decide to cryptosecede or not.

We allow sharers to choose from four different tax rates. (1) The ‘over-exploitative’ tax rate t_X exceeds both equilibrium conditions and will thus induce cryptosecession and secession. The remaining sharers levy a non-discriminatory tax among themselves to finance public good provision, with no surplus or transfers.

(2) The cryptosecession-proof tax rate $t_C^* < t_X$ is the maximum tax rate the original polity can set without inducing *cryptosecession* of non-sharers, and since it is above the secession-proof rate we use it as the second choice point for sharers. Put another way, it is the minimum tax rate sharers will set in response to the threat of cryptosecession. Even though cryptosecession obtains, there will still be a fiscal surplus generated on the remaining state-accessible product, which is then distributed equally among sharers as a fiscal transfer.

(3) The secession-proof tax rate $t_S^* < t_C^*$ also generates a fiscal surplus in excess of the cost of public good provision, which is distributed equally among sharers as a fiscal transfer, and transfers to the sharing coalition. This is the maximum tax rate the original polity can set without inducing secession of non-sharers so we use it as the third choice point for sharers. It is also the most fiscally equivalent outcome short of complete non-exploitation.

(4) The ‘non-exploitative’ tax rate $t_0 < t_S^*$ generates no fiscal surplus and transfers, and thus raises just enough tax revenue to finance the provision of the public good. This is the minimum tax rate a polity could possibly set in our simple model (absent a fiscal debt mechanism) and so we use it as the lower bound of the choice range for sharers.

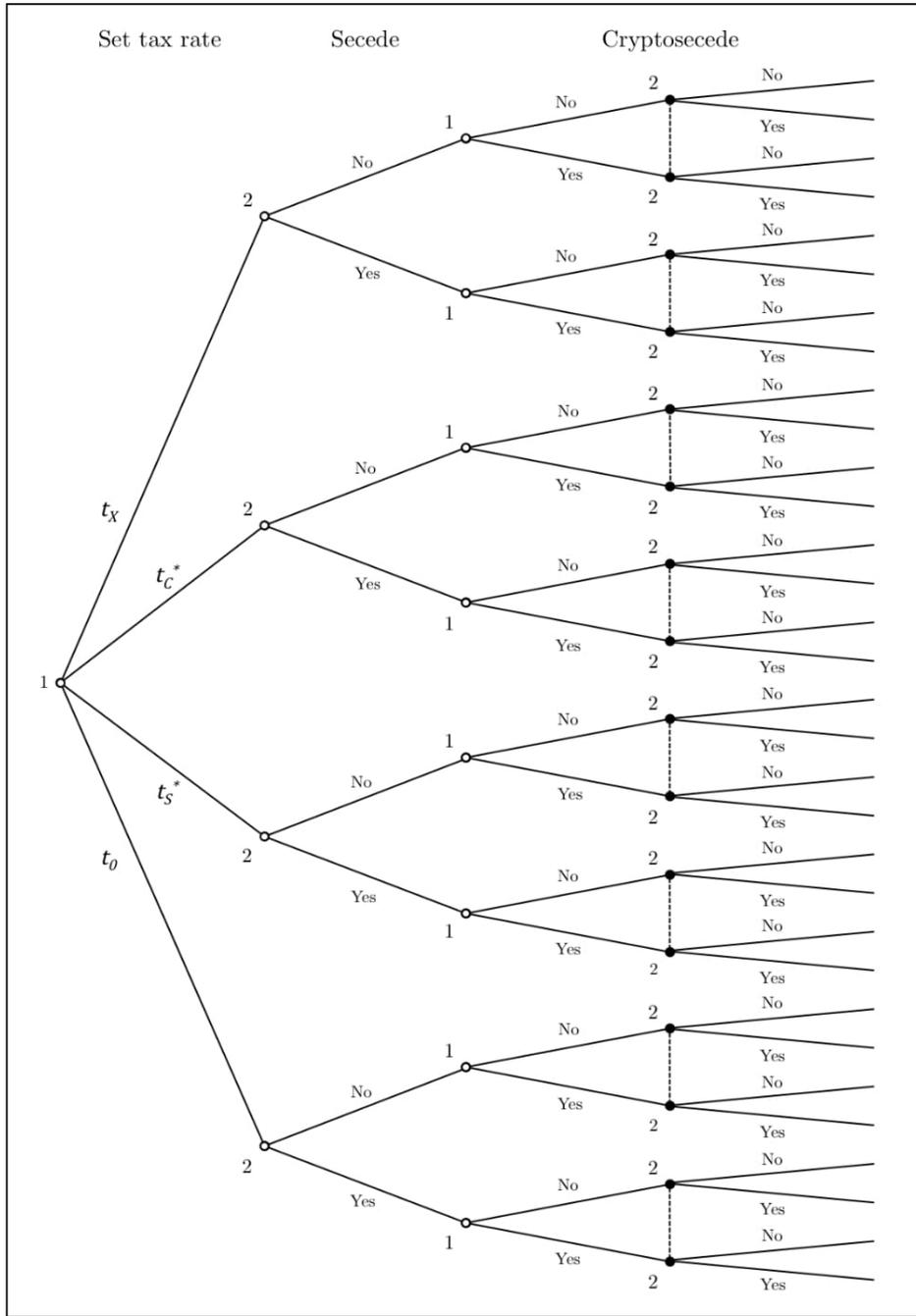


FIG 5.2 Extensive-form representation of the cryptosecession game

Next, non-sharers choose to secede or not. If they decide to secede we assume they will employ the non-exploitative tax rate to finance the public good in the new polity. Even if the government in the new polity behaves exploitatively, Buchanan and Faith (1986) show that if the size of the sharing coalition in proportion to the size of the new polity is the same as that in the original polity, then the same outcome obtains. Essentially, the new non-sharers will again secede, and so on until all polities are behaving non-exploitatively; and there is incentive to secede only once so as not to dilute the benefits of polity size (i.e., private product, average cost of public good provision).

Finally, sharers and non-sharers choose to cryptosecede or not. In this stage players choose between $\beta^i = \beta$ and $\beta^i = 0$. At this decision point the players do not know what each other will decide, since they make the decision simultaneously. Again, we assume that the non-exploitative tax rate will be employed in the new crypto polity.

An extensive-form representation is used to formalise the cryptosecession game in FIG 2 above. This is a multi-player generalisation of the decision tree facing sharers and non-sharers and can be solved using backward induction over the first two decision points (i.e., set tax rate and secede or not). The final decision point consists of eight simultaneous-move subgames (i.e., dotted lines represent that players do not know if the other player has cryptoseceded or not). Payoffs are calculated in the appendix and normal-form representations of the subgames are presented below in FIG 3 to FIG 10. The solution concept is a simple comparison of payoffs for each player (i.e., Nash equilibrium) given the branch of the decision tree they find themselves on (i.e., what tax rate was chosen, and whether or not secession has taken place). If each player has chosen a strategy and no player can benefit by changing strategies while the other player keeps theirs unchanged, then that set of strategy choices and the corresponding payoffs constitutes the equilibrium solution. Then by using backward induction we eliminate non-credible threats and deduce the subgame perfect Nash equilibrium solution of the cryptosecession game.

Consider first subgame 1, where the sharers have set an ‘over-exploitative’ tax rate and yet the non-sharers have not seceded. If non-sharers do not cryptosecede, then the payoff for sharers when they do cryptosecede is less than their payoff when they do not. This

means that *if non-sharers do not cryptosecede, then sharers will not either*. Similarly, if non-sharers do cryptosecede, again the payoff for sharers when they cryptosecede is less than when they do not. So *if non-sharers do cryptosecede, then sharers still will not*. No matter what non-sharers do, sharers will not cryptosecede—this only reduces fiscal transfers or the private product of the economic activity they shift to the smaller crypto economy. Next we can deduce the non-sharer decision by considering their payoffs when sharers do not cryptosecede. The payoff when non-sharers cryptosecede is more than that when they do not, which indicates that *non-sharers will cryptosecede, given that sharers do not cryptosecede*. The Nash equilibrium is the shaded cell in FIG 3 below.

		Non-sharers	
		No crypto	Yes crypto
Sharers	No crypto	$\Pi^1 = (1 - t_x)g(N) + \frac{t_x N g(N) - f(N)}{M}$ $\Pi^2 = (1 - t_x)g(N)$	$\Pi^1 = (1 - t_x)g(N) + \frac{t_x(M + \alpha S)g(N) - f(N)}{M}$ $\Pi^2 = (1 - t_x)\alpha g(N) + (1 - t_0(S))\beta g(S)$
	Yes crypto	$\Pi^1 = (1 - t_x)\alpha g(N) + (1 - t_0(M))\beta g(M) + \frac{t_x(\alpha M + S)g(N) - f(N)}{M}$ $\Pi^2 = (1 - t_x)g(N)$	$\Pi^1 = (1 - t_x)\alpha g(N) + (1 - t_0(N))\beta g(N) + \frac{t_x \alpha N g(N) - f(N)}{M}$ $\Pi^2 = (1 - t_x)\alpha g(N) + (1 - t_0(N))\beta g(N)$

FIG 5.3 Normal-form subgame 1: Over-exploitative t_x and no secession

Next consider subgame 2, where the sharers have set an ‘over-exploitative’ tax rate and the non-sharers have responded by seceding. Like in subgame 1, if non-sharers do not cryptosecede, then the payoff for sharers when they do cryptosecede is less than their payoff when they do not. This means that *if non-sharers do not cryptosecede, then sharers will not either*. However, if non-sharers do cryptosecede, the payoff for sharers is more if they cryptosecede also. Since the polity is already disintegrated, when both groups cryptosecede they actually generate a *higher* average private product for the portion of activity they conduct in the crypto economy than in their respective polities (i.e., the

whole population of citizens can be found there). The same applies to the non-sharers—if sharers do not cryptosecede, then non-sharers will not either and if sharers do cryptosecede, then non-sharers will also. There are therefore two Nash equilibriums: (1) both players do not cryptosecede, and (2) both players do cryptosecede.

		Non-sharers	
		No crypto	Yes crypto
Sharers	No crypto	$\Pi^1 = (1 - t_0(M))g(M)$ $\Pi^2 = (1 - t_0(S))g(S)$	$\Pi^1 = (1 - t_0(M))g(M)$ $\Pi^2 = (1 - 2t_0(S))g(S)$
	Yes crypto	$\Pi^1 = (1 - 2t_0(M))g(M)$ $\Pi^2 = (1 - t_0(S))g(S)$	$\Pi^1 = (1 - t_0(M))\alpha g(M) + (1 - t_0(N))\beta g(N)$ $\Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$

FIG 5.4 Subgame 2: Over-exploitative t_x and secession

Note also that the payoffs are higher for both players when they both cryptosecede than when they both don't. This is a coordination game (i.e., the 'stag hunt') and the players are subject to a coordination problem: they can realise mutual gains, but only by making a mutually consistent decision (i.e., if they cooperate by cryptoseceding together). However, cooperation might fail because each player has an alternative that is safer: choosing not to cryptosecede does not require cooperation to succeed and the difference between payoffs is zero. If a player decides not to cryptosecede and the other does they will still receive the same payoff, while if they cryptosecede alone they will be worse off. For each player, not cryptoseceding is risk-dominant while cryptoseceding is payoff-dominant. Arguably either of the equilibriums could be focal; both cryptoseceding has higher payoffs but neither cryptoseceding has lower coordination failure losses.

In subgame 3 sharers have set a ‘cryptosecession-proof’ tax rate and non-sharers have not seceded. Like previously, *if non-sharers do not cryptosecede, then sharers will not either* because if they cryptosecede on their own they generate a lower average private product for the portion of activity they conduct in the crypto economy. And again, like subgame 1, *if non-sharers do cryptosecede, then sharers still will not*, for the same reasons. Unlike previously, since this is a cryptosecession-proof subgame, *non-sharers will not cryptosecede, given that sharers do not cryptosecede*. Therefore the Nash equilibrium is both players do not cryptosecede.

		Non-sharers	
		No crypto	Yes crypto
Sharers	No crypto	$\Pi^1 = (1 - t_c^*)g(N) + \frac{t_c^*Ng(N) - f(N)}{M}$ $\Pi^2 = (1 - t_c^*)g(N)$	$\Pi^1 = (1 - t_c^*)g(N) + \frac{t_c^*(M + \alpha S)g(N) - f(N)}{M}$ $\Pi^2 = (1 - t_c^*)\alpha g(N) + (1 - t_0(S))\beta g(S)$
	Yes crypto	$\Pi^1 = (1 - t_c^*)\alpha g(N) + (1 - t_0(M))\beta g(M) + \frac{t_c^*(\alpha M + S)g(N) - f(N)}{M}$ $\Pi^2 = (1 - t_c^*)g(N)$	$\Pi^1 = (1 - t_c^*)\alpha g(N) + (1 - t_0(N))\beta g(N) + \frac{t_c^*\alpha Ng(N) - f(N)}{M}$ $\Pi^2 = (1 - t_c^*)\alpha g(N) + (1 - t_0(N))\beta g(N)$

FIG 5.5 Subgame 3: Cryptosecession-proof t_c^* and no secession

Next consider subgame 4, where the sharers have set a ‘cryptosecession-proof’ tax rate and the non-sharers have responded by seceding. The payoffs for both players are the same as those in subgame 2, and thus so are the Nash equilibriums: (1) both players do not cryptosecede, and (2) both players do cryptosecede. Both players cryptoseceding is the higher payoff, but cannot be guaranteed due to the coordination problem.

		Non-sharers	
		No crypto	Yes crypto
Sharers	No crypto	$\Pi^1 = (1 - t_0(M))g(M)$ $\Pi^2 = (1 - t_0(S))g(S)$	$\Pi^1 = (1 - t_0(M))g(M)$ $\Pi^2 = (1 - 2t_0(S))g(S)$
	Yes crypto	$\Pi^1 = (1 - 2t_0(M))g(M)$ $\Pi^2 = (1 - t_0(S))g(S)$	$\Pi^1 = (1 - t_0(M))\alpha g(M) + (1 - t_0(N))\beta g(N)$ $\Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$

FIG 5.6 Subgame 4: Cryptosecession-proof t_C^* and secession

In subgame 5 sharers have set a secession-proof tax rate and non-sharers have not seceded. For the sharers this game is played like subgame 1, but for the non-sharers the decision is reversed and they will *not* cryptosecede. If non-sharers do not cryptosecede, then the payoff for sharers when they do cryptosecede is less than their payoff when they do not. Since the polity is still integrated in the secession-proof tax rate scenario, if the sharers cryptosecede on their own, they generate a lower average private product for the portion of activity they conduct in the crypto economy. This means that *if non-sharers do not cryptosecede, then sharers will not either*. And if non-sharers do cryptosecede, the payoff for sharers is less if they cryptosecede also, so *if non-sharers do cryptosecede, then sharers still will not*. Evidently the gain from cryptoseceding together (higher individual private product and non-exploitative tax rate) is overshadowed by the loss in fiscal transfers. The payoff when non-sharers cryptosecede is less than that when they do not, which indicates that *non-sharers will not cryptosecede, given that sharers do not cryptosecede*. Therefore the Nash equilibrium is both players do not cryptosecede.

		Non-sharers	
		No crypto	Yes crypto
Sharers	No crypto	$\Pi^1 = (1 - t_s^*)g(N) + \frac{t_s^*Ng(N) - f(N)}{M}$ $\Pi^2 = (1 - t_s^*)g(N)$	$\Pi^1 = (1 - t_s^*)g(N) + \frac{t_s^*(M + \alpha S)g(N) - f(N)}{M}$ $\Pi^2 = (1 - t_s^*)\alpha g(N) + (1 - t_0(S))\beta g(S)$
	Yes crypto	$\Pi^1 = (1 - t_s^*)\alpha g(N) + (1 - t_0(M))\beta g(M) + \frac{t_s^*(\alpha M + S)g(N) - f(N)}{M}$ $\Pi^2 = (1 - t_s^*)g(N)$	$\Pi^1 = (1 - t_s^*)\alpha g(N) + (1 - t_0(N))\beta g(N) + \frac{t_s^*\alpha Ng(N) - f(N)}{M}$ $\Pi^2 = (1 - t_s^*)\alpha g(N) + (1 - t_0(N))\beta g(N)$

 FIG 5.7 Subgame 5: Optimally exploitative t_s^* and no secession

In subgame 6, where the sharers have set a secession-proof tax rate and the non-sharers have responded by seceding, the payoffs for both players are the same as those in subgames 2 and 4, and so are the ‘stag hunt’ equilibrium solutions.

		Non-sharers	
		No crypto	Yes crypto
Sharers	No crypto	$\Pi^1 = (1 - t_0(M))g(M)$ $\Pi^2 = (1 - t_0(S))g(S)$	$\Pi^1 = (1 - t_0(M))g(M)$ $\Pi^2 = (1 - 2t_0(S))g(S)$
	Yes crypto	$\Pi^1 = (1 - 2t_0(M))g(M)$ $\Pi^2 = (1 - t_0(S))g(S)$	$\Pi^1 = (1 - t_0(M))\alpha g(M) + (1 - t_0(N))\beta g(N)$ $\Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$

 FIG 5.8 Subgame 6: Optimally exploitative t_s^* and secession

In subgame 7 sharers have set a ‘non-exploitative’ tax rate and non-sharers have not seceded. If non-sharers do not cryptosecede, then the payoff for sharers when they do cryptosecede is less than their payoff when they do not. And if non-sharers do cryptosecede, the payoff for sharers is more if they cryptosecede also. The same applies to the non-sharers. So again there are two Nash equilibriums: (1) both players do not cryptosecede, and (2) both players do cryptosecede. This is another coordination game (i.e., the typical ‘choosing sides’ variant). Since the payoffs for both players when they both cryptosecede are the same as when they both don’t, they cannot realise mutual gains by coordinating, but can avoid the lower payoffs of making mutually inconsistent decisions. Arguably either of the equilibriums could be focal since they have equal payoffs and the other payoffs are symmetrical, but since the non-exploitative tax rate is less than the cryptosecession-proof tax rate it seems more likely the status quo of not cryptoseceding would prevail.

		Non-sharers	
		No crypto	Yes crypto
Sharers	No crypto	$\Pi^1 = (1 - t_0(N))g(N)$ $\Pi^2 = (1 - t_0(N))g(N)$	$\Pi^1 = (1 - t_0(N))g(N)$ $\Pi^2 = (1 - t_0(N))\alpha g(N) + (1 - t_0(S))\beta g(S)$
	Yes crypto	$\Pi^1 = (1 - t_0(N))\alpha g(N) + (1 - t_0(M))\beta g(M)$ $\Pi^2 = (1 - t_0(N))g(N)$	$\Pi^1 = (1 - t_0(N))g(N)$ $\Pi^2 = (1 - t_0(N))g(N)$

FIG 5.9 Subgame 7: Non-exploitative t_0 and no secession

		Non-sharers	
		No crypto	Yes crypto
Sharers	No crypto	$\Pi^1 = (1 - t_0(M))g(M)$ $\Pi^2 = (1 - t_0(S))g(S)$	$\Pi^1 = (1 - t_0(M))g(M)$ $\Pi^2 = (1 - 2t_0(S))g(S)$
	Yes crypto	$\Pi^1 = (1 - 2t_0(M))g(M)$ $\Pi^2 = (1 - t_0(S))g(S)$	$\Pi^1 = (1 - t_0(M))\alpha g(M) + (1 - t_0(N))\beta g(N)$ $\Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$

FIG 5.10 Subgame 8: Non-exploitative t_0 and secession

Finally, in subgame 8 sharers have set a ‘non-exploitative’ tax rate and non-sharers have responded by seceding. The payoffs and solutions are the same the previous ‘stag hunt’ subgames: neither player cryptosecedes versus both players cryptosecede. The higher payoff from both cryptoseceding cannot be guaranteed due to the coordination problem.

To play the cryptosecession game we use backward induction, beginning with the decision by player 2 (non-sharers) to secede or not. In the first branch of the decision tree (where player 1 has chosen the over-exploitative tax rate t_x) the payoff from not seceding $\Pi^2 = (1 - t_x)\alpha g(N) + (1 - t_0(S))\beta g(S)$ is the equilibrium in the first normal-form subgame. There are two possible equilibrium payoffs from seceding in the second normal-form subgame: neither player cryptoseceding $\Pi^2 = (1 - t_0(S))g(S)$ and both players cryptoseceding $\Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$. Since the smaller of the two possible payoffs from seceding in the second subgame (neither cryptosecede) is more than the payoff from not seceding in the first subgame, player 2 will decide to secede (see appendix for calculations). This is to be expected since the over-exploitative tax rate is by definition above the secession-inducing threshold.

In the second branch of the decision tree (where player 1 has chosen the cryptosecession-proof tax rate t_C^*) the payoff from not seceding is the equilibrium in the third normal-form subgame $\Pi^2 = (1 - t_C^*)g(N)$. There are two possible equilibrium payoffs from seceding in the fourth normal-form subgame: neither player cryptoseceding $\Pi^2 = (1 - t_0(S))g(S)$ and both cryptoseceding $\Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$. Since the payoffs from seceding in the fourth subgame are more than or equal to the payoff from not seceding in the third subgame, player 2 will secede. Again this is the intuitive outcome, since the cryptosecession-proof tax rate is in excess of the secession-proof rate.

In the third branch of the decision tree (where player 1 has chosen the secession-proof tax rate t_S^*) the payoff from not seceding is the equilibrium in the fifth normal-form subgame $\Pi^2 = (1 - t_S^*)g(N)$. There are two possible equilibrium payoffs from seceding in the sixth normal-form subgame: neither player cryptoseceding $\Pi^2 = (1 - t_0(S))g(S)$ and both cryptoseceding $\Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$. The larger of the two possible payoffs from seceding in the fourth subgame is less than the payoff from not seceding in the third subgame. This is the branch where the sharers set the secession-proof tax rate so this is expected; and we conclude that player 2 will decide not to secede.

In the fourth branch of the decision tree (where player 1 has chosen the non-exploitative tax rate $t_0(N)$) in both equilibriums of the fifth normal-form subgame the payoff from not seceding is $\Pi^2 = (1 - t_0(N))g(N)$. There are two possible equilibrium payoffs from seceding in the sixth normal-form subgame: neither player cryptoseceding $\Pi^2 = (1 - t_0(S))g(S)$ and both players cryptoseceding $\Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$. Since the larger of the two possible payoffs from seceding in the eighth subgame (both cryptosecede) is less than the payoff from seceding in the seventh subgame, player 2 will not secede.

Now consider the decision by player 1 (sharers) to set the tax rate in the original polity. There are two possible equilibrium payoffs in the second subgame of the first branch of the decision tree: if player 1 chooses to set an over-exploitative tax rate t_X the payoff will be $\Pi^1 = (1 - t_0(M))g(M)$ if neither player cryptosecedes or $\Pi^1 = (1 - t_0(M))\alpha g(M) + (1 - t_0(N))\beta g(N)$ if both players do. The payoff from

setting a cryptosecession-proof tax rate t_C^* is $\Pi^1 = (1 - t_C^*)g(N) + \frac{t_C^*Ng(N) - f(N)}{M}$, and $\Pi^1 = (1 - t_S^*)g(N) + \frac{t_S^*Ng(N) - f(N)}{M}$ from a secession-proof tax rate t_S^* . Lastly, the payoff from a non-exploitative tax rate $t_0(N)$ is $\Pi^1 = (1 - t_0(N))g(N)$.

Player 1 will prefer the cryptosecession-proof tax rate t_C^* to the over-exploitative tax rate t_X since the payoff is more than the largest of the two over-exploitative payoffs (see appendix). Next, the payoff from setting a secession-proof tax rate t_S^* is more than the payoff from the cryptosecession-proof tax rate t_C^* . And finally, the payoff from the secession-proof tax rate t_S^* is more than the payoff from a non-exploitative tax rate $t_0(N)$, due to the extract fiscal transfers. Player 1 will decide to set a secession-proof tax rate t_S^* .

The backward induction solution to the cryptosecession game is shown in extensive-form representation in FIG 11 below. The outcome: player 1 sets the secession-proof tax rate t_S^* ; player 2 does not secede; and neither player cryptosecedes. The polity remains integrated in both the territorial *de jure* sense and the non-territorial *de facto* sense. While neither secession nor cryptosecession obtain, the capability of non-sharers to use them curtails the taxing proclivities of the government. The threat of secession and the threat of cryptosecession combine to reduce fiscal exploitation as much as possible, though not entirely. Fiscal exploitation versus equivalence is ultimately determined by the relative development of crypto technology: legibility α versus opacity β .

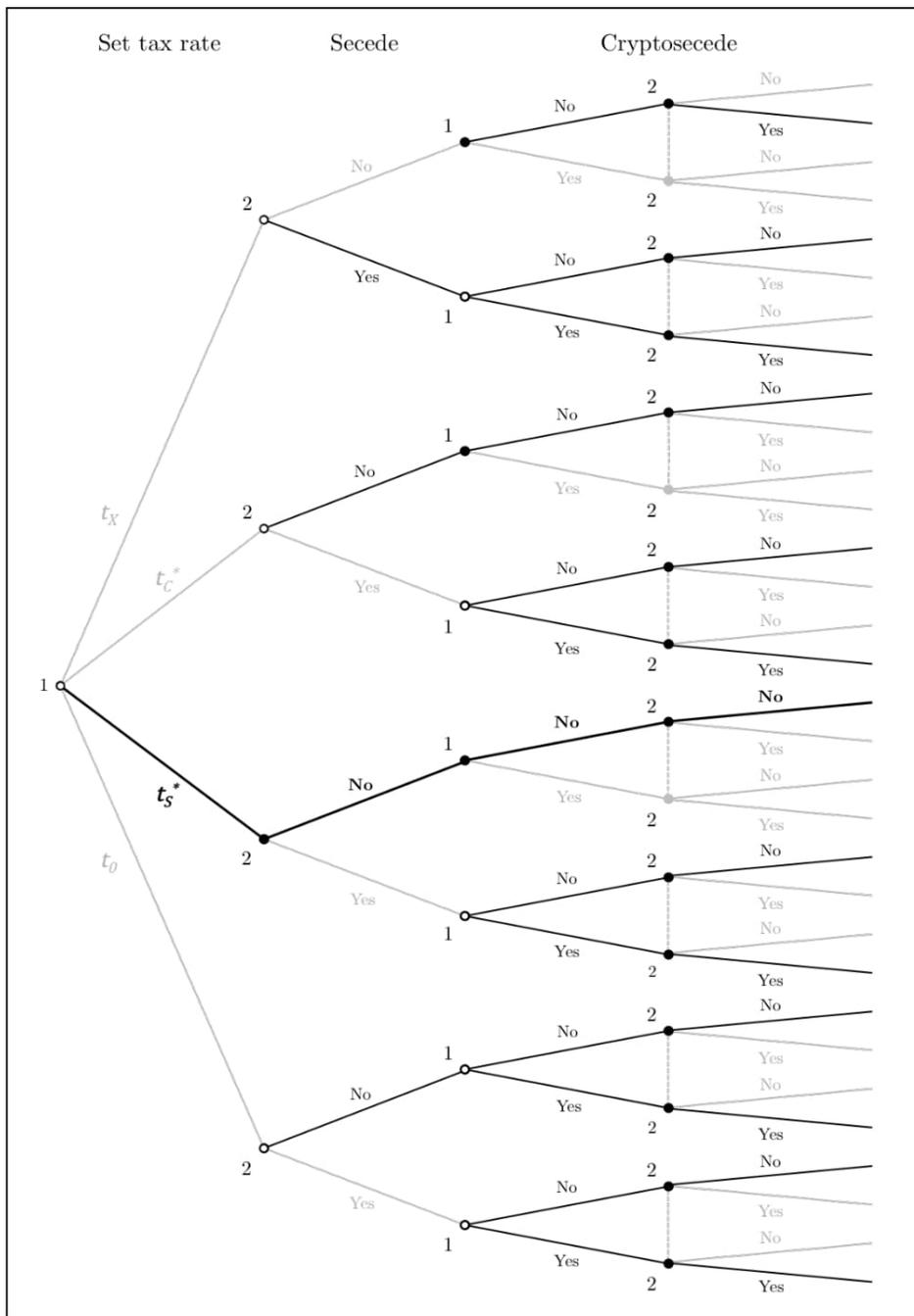


FIG 5.11 Backward induction solution of the cryptosecession game

Cryptosecession and non-territorial unbundling

Somewhat ironically, the solution to the cryptosecession game is that there is no cryptosecession. But this mirrors the outcome in Buchanan and Faith's (1987) model of internal exit. That is to say, while secession and cryptosecession do not occur, their presence as options for non-sharers serves to limit the exploitative behaviour of the sharing coalition, and ensures an optimally efficient outcome. It is precisely the capability to secede—whether fully or partially, territorially or non-territorially—that induces a fiscal competition between incumbent and potential governments, and which restricts fiscal exploitation. The threatened actions need not ever actually materialise; the mere possibility disciplines the exploitative ambitions of the politically expedient coalition.

Fiscal exploitation is restricted and the post-tax position of non-sharers is enhanced due to the ability to excise activity from the reaches of government. The secession-proof tax rate that is implemented $t_S^* = \frac{\alpha-\beta}{\alpha}t^* + \frac{\beta}{\alpha}t_0(N)$ is less than the basic internal exit model, set somewhere between t^* and $t_0(N)$. All depends on the ability to shift activity to the crypto economy, which in turn depends on the relative state of crypto technologies of opacity versus state technologies of legibility. Since by definition non-sharers must maintain *some* activity in each of the original polity and the crypto economy $0 < \beta < 1$, the actual tax rate will always be lower when cryptosecession is a possibility than if basic internal exit is the only recourse $t_S^* < t^*$. Moreover, the secession-proof tax rate will be reduced all the way to the non-exploitative $t_0(N)$ if the state of crypto technology is such that citizen opacity and government legibility are perfectly balanced $\beta = \alpha$.

Any $\beta > \alpha$ will undermine the ability to finance the public good in the original polity and precipitate political disintegration. Yet the threat of cryptosecession is fully realised once crypto technology catches up to balance opacity and legibility. At the point of fiscal equivalence there is no longer any incentive for crypto technological progress since exploitation is no more and governance is efficient. And by provoking secession, payoffs for each group fall, as they must duplicate the cost of public good provision in their respective polities. Moreover, it is difficult to imagine the situation where 50% of the economy could be hidden from the reaches of the state—or put another way, where the *de facto* crypto

economy eclipses the *de jure* visible economy. Cryptosecessionist capabilities are currently very small, and likely to remain that way for some time. Polity-economies are well and truly still within the $\beta < \alpha$ range of the opacity-legibility technology spectrum, and thus gradual reduction of fiscal exploitation is more probable than impending political disintegration from excessive cryptosecession.

The results from the cryptosecession model mirror the results from the basic internal exit model (in TABLE 1) when there are no agglomeration economies in private production and no scale economies in public provision. That is, *if* crypto technology is developed to the point that citizen opacity balances government legibility. Moreover, this occurs in the cryptosecession model under the more reasonable assumptions of *positive* agglomeration economies *and* scale economies. Cryptosecessionist partial internal exit overcomes the disadvantages of territorially moving from a larger polity-economy, which are characteristic of secession, as we know it. It is thus a more potent force for correcting inefficient allocations of policies, peoples, and polities than is basic internal exit.

As discussed earlier, we have conceptualised what is a complex constellation of groups, jurisdictions, and transfers therein, as the interplay between the politically expedient (i.e., net transfer recipients) and the politically ineffective (i.e., net losers from the political process). But underlying this might be a compound federation or polycentric system of jurisdictions, albeit under the ultimate authority of an encompassing sovereign state. Likewise, in equilibrium, potentially many latent political groups are subject to optimal exploitation and thus do not agitate for political-jurisdictional change.

So while the outcome of the cryptosecession game is that neither secession nor cryptosecession obtain, this does not tell us what is the underlying political-jurisdictional order. There is ‘one polity’ in the sense that non-sharers do not create a separate new state in not seceding from sharers, but this does not mean, literally, that there is just one political entity or jurisdiction. Rather, whatever the initial jurisdictional order, non-sharers do not secede from it to create *additional* territorial jurisdictions, and neither do they partially secede from it to create *additional* non-territorial or unbundled jurisdictions.

In the limit, where $\beta = \alpha$, there might exist many groups in multiple jurisdictions, but no group benefits at the expense of others, so there is no distinction to be made between sharers and non-sharers. There might even exist a structure of inter-group or inter-jurisdictional transfers, but on net they would necessarily negate each other for there to be fiscal equivalence. In fact, it is likely that the non-exploitative order would be polycentric, due to the inherent difficulty in centrally planning an optimally efficient jurisdictional allocation. We cannot say precisely what the underlying order of policies and jurisdictions looks like, merely that it is non-exploitative, and there is therefore no inducement to exploitation reducing, efficiency enhancing change.

Outside of equilibrium, however—following a change in some model parameter, e.g. cost function $f(K)$, product function $g(K)$, or crypto technology legibility-opacity coefficients α and β —there *is* scope for political-jurisdictional change. Consider crypto technological progress $\beta \rightarrow \alpha$. An initial optimally exploitative political-jurisdictional order will transform into some new alignment of citizens and policies. This might take the form of an overall reduction in a non-discriminatory tax rate, or policy changes that remove discriminatory financing and provision arrangements, or jurisdictional changes that reorganise boundaries more efficiently (i.e., internal rebordering or transfer of responsibilities between political sub-units).

We have claimed that the model of partial internal exit presented here captures the dynamic of non-territorial unbundling. There are two ways political-jurisdictional re-equilibration (e.g. following crypto technological change) can be related to non-territorial unbundling. First, the capability of citizens to reconfigure their political memberships in an unbundled system or to switch between jurisdictions non-territorially incentivises incumbent institutions to dispense of inefficient or exploitative policies. In the cryptosecession model non-sharers are more sensitive to fiscal exploitation and incumbent governments must pay more heed to their threats of secession. And secondly, if non-territorial unbundling does indeed promote an optimally efficient alignment of citizens and policies (as argued elsewhere in this thesis) then the patterns of political-jurisdictional re-equilibration should reflect this. In responding to the threat of secession, the sharing coalition should permit non-territorial unbundled political relations to emerge.

These are testable implications of the model: that the growth of cryptography-mediated internal exit will exert pressures for fiscal reform, and subsequent patterns of change will resemble to the non-territorial unbundled form. Additionally, governments may redouble their efforts at exploitation and seek to prohibit or regulate cryptosecessionist technologies and enterprises. While the cryptosecessionist turn is still young, it does appear to broadly conform to these patterns.

For instance, in 2014-15 the Australian senate undertook an inquiry into how to develop an effective regulatory system for digital currency, showing particular concern for the potential consequences of the technology on fiscal projections, tax evasion, and the effectiveness of monetary policy (Australian Senate Standing Committee on Economics 2014). A seed funding crowd sale for the cryptosecessionist *Bitnation* governance platform was disrupted when the equity vendor withdrew, days after an Australian Securities and Investments Commission ruling on the legal status of digital currencies.

Many blockchain based startups are directed at specific applications and do not offer comprehensive bundles of services. For instance, *DarkWallet* provides encryption, mixing, and payment services, but nothing in the way of governance services or ‘political’ goods; *Ethereum* is a decentralised platform for coordination and exchange; and *Bitnation* aspires to provide various traditional government services, including dispute resolution, insurance, basic income, and notary services. The emerging ecosystem of cryptosecessionist service providers is purposely fashioned in a modular and unbundled way.

It is clear that increased burden of taxation, perverse regulations, poorly performing ‘official’ economies, and deficient quality of public goods and services are significant drivers of both crypto and shadow economies. But we must concede that cryptosecessionist technologies are currently underdeveloped and the crypto economy is trivially small compared to formal markets and even the informal shadow economy. Cryptocurrency market capitalisation as of 2015 is approximately 4 billion US dollars, whereas world market cap is estimated in the realm of 40 trillion dollars, or four orders of magnitude larger (Coin Market Cap 2015; World Bank 2015). The estimated weighted average size of informal markets in 162 countries around the world, including developing and high-income

OECD countries, is 17% of official GDP and trending downwards; although it is up to 37% in Sub-Saharan Africa and transitional European and Central Asian countries (Schneider, Buehn & Montenegro 2010; Buehn & Schneider 2012; Schneider & Enste 2013).

The model presented here suggests that for fiscal exploitation to be eliminated the cryptosecession coefficient should converge on the official economy coefficient $\beta \rightarrow \alpha$ or $\beta \approx 50\%$. So it is equally clear that it could be some time before partial internal exit in turn becomes a significant driver of political-jurisdictional reform and reorganisation—notwithstanding a gradual reduction of fiscal exploitation is certainly possible. How then do we characterise the current state of affairs? Like James M. Buchanan’s critique of the Coasean efficiency concept, we do not wish to slip into the mistaken presumption that a minimally exploitative political-jurisdictional order is “objectively measurable [in terms of] independently-determined harm and benefit relationships” (Buchanan 1984: 11). Yet the cryptosecession model does offer several possible readings.

The stylised facts are that cryptosecession is trivially small relative to the official economy, and the informal economy is small as well but not insignificant. Our model indicates that the low prevalence of cryptosecession might correspond to a state of optimal exploitation or, on the other hand, non-exploitation. Given that cryptosecession happens at all, albeit uncommonly, it is unlikely that this could be evidence of non-exploitation. Rather, on first estimation we take this as implying optimally exploitative fiscal conditions (though perhaps close to the non-exploitative end) or as indicative that non-sharer groups are negligible in size compared to the sharing coalition.

If small groups of non-sharers do not contribute much to private product in the original polity (by way of agglomeration economies), then the sharing coalition will have less incentive to prevent secession. This could plausibly explain the persistence of crypto economies in spite of the model prediction that incumbent states should respond by modifying policies or jurisdictions to reduce fiscal exploitation. Likewise, informal economies are persistent and incumbent states have not responded as expected. And likewise, if informal sector non-sharers do not add appreciably to the individual private product of members of the sharing coalition—that is, the product function $g(K)$ is not

increasing in polity size for these citizens—then they will be allowed to non-territorially secede to the shadow economy. If and when the product function changes to meet to the agglomeration economies assumption of our model (i.e., through development or as the crypto or informal economies increase in size) then perhaps the sharing coalition will again be incentivised to entice non-sharers back into the original polity, by lowering the tax rate or making policy changes that moderate fiscal exploitation.

Another possible explanation for small but persistent crypto and informal economies is that non-sharer perturbation and sharer re-equilibration does not happen instantaneously. We can thus account some time to the adjustment process—partial internal exit might occur while the model is out-of-equilibrium, and precipitate an exploitation reducing re-equilibration and reintegration (i.e., lowering the tax rate or policy change or jurisdictional change). Moreover, we might expect patterns of change in re-equilibration to mirror the change of the initial perturbation. For instance, if cryptoseceders find that crypto technology has progressed in advance of the current cryptosecession-proof equilibrium, rather than simply waiting for the sharing coalition to respond they will partially exit to whatever crypto institutions have become available to them. If and when the government does respond, adjustments would likely emulate the temporary crypto institutions. That is to say, patterns of change resemble a co-evolutionary ebb-and-flow between permissionless cryptosecessionist innovations and government accommodations.

Finally, the persistence of crypto and informal economies could be due to asymmetries in information and diffusion of crypto technologies. The model assumes that all individuals in each group have identical cryptosecessionist capabilities; if this is not the case then the model results and implications might not hold. First, if non-sharers have differential access to crypto technologies (among themselves) then this could generate ongoing bouts of cryptosecession and accommodation. As each non-sharer subgroup gains access to the technology their threat of cryptosecession becomes credible, and only then will government respond—resulting in a lumpy and piecemeal pattern of political-jurisdictional change.

Finally, the model might also be extended so that sharers and no-sharers have differential access to the crypto technology $\beta^1 \neq \beta^2$ and incomplete knowledge of each other's capabilities. The most obvious scenario to investigate is where non-sharers have superior crypto technologies $\beta^2 > \beta^1$ and sharers have limited knowledge of this, perhaps wrongfully assuming equal capabilities $\beta^2 = \beta^1$. An interesting variant of this would be to model sharers as having no cryptosecessionist capability $\beta^1 = 0$ and $\beta^2 > 0$, while assuming the same of sharers $\beta^2 = \beta^1 = 0$ (i.e., having no knowledge of cryptosecession).

Like the Buchanan and Faith (1987) paper, perhaps we might well have titled this chapter '*Toward a theory of non-territorial internal exit,*' because the assumptions underlying our basic model are rather restrictive. Despite this, the implications derived are both interesting and potentially relevant, especially if the promises of cryptoanarchy are realised. The inclusion of the capability to partially and non-territorially shift political-economic activity among jurisdictions reduces fiscal exploitation over the basic internal exit mechanism. And the balance of citizen opacity and government legibility ultimately determines the balance of fiscal exploitation versus equivalence. To paraphrase Buchanan and Faith (1987) a final time—the non-territorial secession models presented in this chapter provide a useful basis for more complex analyses of how the prospect of non-territorial unbundling might exert limits on the taxing proclivity of government.

Chapter 6

Spontaneous order in the formation of non-territorial political jurisdictions

Given our lack of knowledge about how to carry out radical institutional change, combined with human infallibility, the likelihood of systematic success is a genuine concern. Given what is at stake both in purely monetary terms, but also in terms of human lives and well-being, proponents of an activist empire must demonstrate the robustness of interventions in the face of these limitations on our knowledge and the realities of domestic and international political institutions.

Christopher J. Coyne & Abigail R. Hall, *The Empire Strikes Back*

Introduction: The knowledge problem of the nation-state

Citizens, as consumers of political goods, face a cost-benefit calculus associated with the decision to stay in a particular jurisdiction—a state, whether a nation-state or a regional state—or whether to exit to one with a better ratio of benefits to costs. In this way, Charles Tiebout (1956) argued that if different states made different competitive offerings of local public goods, and people were free to move between states in the direction of their preferences and willingness to pay, the result would be an efficient allocation of policies and people over jurisdictions. The Tiebout model was expressed as ‘voting with one’s feet’

but it is equally valid to think of this as ‘shopping for public goods.’ The significance of the Tiebout sorting model is usually presented as a non-political solution to the free-riding problem, but at a deeper level it highlighted a basic symmetry between the redrawing of political maps—whether by war and conquest, by negotiation and purchase, or by secession or integration—and the movement of people. If people could move, states didn’t have to. In this chapter we are interested in the other side of this symmetry: if states could move, then will people not have to? Moreover, we explore how the jurisdictional shape of states can be understood as a spontaneous order outcome of this process at the level of personal secession and group formation.

Which is to say that there are two limitations on the Tiebout model: (1) the spatial map of jurisdictions is in an important sense both given and arbitrary; and (2) the resulting constellations of citizens as groupings, which is an emergent property of the Tiebout sorting, takes place primarily over individuals selecting bundles of public goods (and, importantly, not bundles of other citizens). Both of these are problematic in real economies in real political systems. First, political choices are always bundled with economic choices (Tiebout’s original model assumed this complexity away by making all income a rent), and often the economic choices will be primary (Schleicher 2010). Second, citizens do seek to agglomerate with specific other citizens (usually in homophilic affinity groups; see McPherson, Smith-Lovin & Cook 2001; Currarini, Jackson & Pin 2009) and so choose groups as much as they choose local public goods.

The upshot is that a territorially focused analysis, whether moving people or redrawing boundaries, forecloses on a broad class of non-territorial solutions in which people seek out other people to form club-like associations to furnish erstwhile public goods (or externalities) among each other (Kealey & Ricketts 2014). The resulting jurisdictions are an emergent property of the process of group discovery and formation, and are thus a spontaneous order. Or, perhaps more accurately, under certain conditions the various kinds of jurisdictional changes—citizen mobility and migration, but also external and internal re-bordering, and secession and integration—constitute their own spontaneous orders. Jurisdictional spontaneous orders emerge and evolve in an orderly yet unplanned way due to shared rules of procedure, simplified feedback mechanisms, freedom of entry and exit,

and equality of status among participants. Like other *cosmos*, jurisdictional spontaneous orders are complex discovery procedures that coordinate the distributed knowledge of participants.

This chapter seeks to extend existing theories of spontaneous order in politics to a new theory of spontaneous order in jurisdictions. In particular, we focus on the theories of ‘democracy as a spontaneous order’ (diZerega 1989), ‘the higher-level spontaneous order of polycentric democracy’ (Andersson 2012), and ‘states as polycentric orders’ (Eusepi & Wagner 2011). The new theory of ‘spontaneous order in the formation of jurisdictions’ will then be outlined and personal secession and non-territorial governance will be parsed through the framework as potential mechanisms of jurisdictional change. Finally, we discuss some implications of technological change for the theory of jurisdiction formation, and the larger ‘problem of the nation-state.’ The upshot is a new line on non-territorial federalism as a form of polycentric democracy, model of competitive governance, and solution to the problem of nation-state incongruity and relocation.

We argue that this matters because on a deeper level this is about the interplay between spontaneous order and rational constructivism, with the arena not markets versus state, but nations versus state. The problem of the nation-state is how to design a jurisdictional order and assign political authority so as to discover a harmonious allocation of nations, states, and nation-states. This is most often confronted (‘solved’) with rational constructivist planning, and what is a weak correcting force of controlled migration. This portends to a variant of Thomas Duncan and Christopher Coyne’s (2015a,b) argument about foreign intervention and the limits of human reason and planning—however applied to the carving out of international (and sub-national) borders, not the political actions that occur within them. And much like the knowledge problem critique of attempts to replicate market allocations with central planning, rational constructivist planning of jurisdictional orders succumbs to what we call ‘the knowledge problem of the nation-state.’

Speculatively, we suggest that technological advances, particularly in cryptography and blockchain based applications, may have tipped the balance in favour of spontaneous order in the formation of jurisdictions. This would greatly benefit citizens of would-be nations

that have been suppressed by the homogenising forces of ‘the hyphen’ (Antonsich 2009) and harmed by the failures of planning. Increasingly, networked individuals have the capacity to create institutions parallel to the nation-state and to exit to them. This provides a more potent correcting force to the mislaid designs of jurisdictional planners, and potentially abets a ‘more spontaneous’ jurisdictional order.

The question of jurisdictional order is basically about the formation of political groups or what John Hartley and Jason Potts (2014) call *demes*. A deme is a culture-made group or association forming a ‘we-community,’ which can then proceed to decision-making, action and enterprise. Part of the logic of allowing citizens to sort non-territorially into demes is that as social distance decreases the cost of public goods decreases and the efficacy of enforcement increases: in essence, you don't free ride on ‘your people.’ In addition individuals can move across group boundaries with more-or-less ease, depending on prevailing group rules, higher-level constitutional rules, and associated mobility (and transaction) costs. An enhanced sorting process means that the ‘optimal’ allocation of peoples to demes is more likely to be discovered. We will propose the concept of a ‘constellaxy’ as the analytic conception of a spontaneous demic order.

We proceed as follows. In section 2 we review the current theories of spontaneous order in politics, and show that a non-territorial model is an extension of these. We then present a new theory of spontaneous jurisdictional change in terms of personal secession and non-territorial governance in section 3 and examine the (cryptographic) technologies behind such *de facto* jurisdictional change as non-territorial personal secession in section 4. We conclude in sections 5 and 6 by showing how spontaneously ordered non-territorial political jurisdictions—the constellaxy—solve the knowledge problem of the nation-state.

Current theories of spontaneous order in politics

Already there are three established theories of more-or-less consciously planned or spontaneous orders in politics: (1) Gus diZerega on ‘democracy as a spontaneous order’ (1989; 1994; 2000); (2) David Emanuel Andersson on ‘the higher-level spontaneous order of polycentric democracy’ (Andersson 2012; Andersson & Taylor 2012); and (3) Richard E. Wagner on ‘states as polycentric orders’ (Martin & Wagner 2009; Eusepi & Wagner 2011). We compare and contrast these theories, and include the new theory, as below:

diZerega: monocentric democracy + civil society ⇔ spontaneous political order

*Andersson: polycentric democracy + citizen mobility = jurisdictional change
⇔ spontaneous political order*

*Wagner: polycentric state organisation + competitive political enterprise
⇔ spontaneous political order*

*MacDonald: polycentric democracy + **boundary** mobility = jurisdictional change
⇔ spontaneous political order*

diZerega makes a similar distinction between ‘state’ and ‘democracy’ to that of F.A. Hayek between ‘economy’ and ‘catallaxy.’ He argues that democracy properly understood is a spontaneous order that cultivates a civil society freely pursuing diverse and disparate goals; whereas the state is an organisation of domination aimed at or biased towards the specific goals of those in power. diZerega’s theory of democracy as a spontaneous order can be characterised as an ‘ideal theory’ in the sense that actually existing democracies are not as neat and tidy as he describes. Democracy as we know it is plagued by special interests, various inequities, and are generally unresponsive, so does not liken to the ideal theory of democracy as a spontaneous order. Of course diZerega himself makes this point—that democracies are only spontaneous orders when they are being procedurally democratic and not behaving like states—and as such this work is an ideal stepping stone on the way to an analysis of polities with less-than-pure spontaneous ordering processes.

While diZerega's theory of democracy as a spontaneous order has been worked out within a monocentric polity, Andersson extends the analysis to a polycentric setting (i.e., local government, economic clubs, federalism, international migration, etc.). He argues that democracy in fact comprises of *two* spontaneous orders; the lower level order that diZerega describes and the higher-level order in which citizens signal dissatisfaction (or assent) of political conditions by relocating between jurisdictions. This classification of democracy as comprising of two spontaneous orders seems apt, but is limited or incomplete in a certain sense. There are two means of jurisdictional change via exit in polycentric democracies: (1) citizen mobility and (2) boundary mobility. The way citizens move within a polycentric democracy and policies change in response is indeed a spontaneous order—but the way *boundaries* move within a polycentric democracy and policies change is a complementary process of jurisdictional ordering. Together citizen and boundary mobility contribute to the jurisdictional order, and under certain conditions, form a higher-level spontaneous order of polycentric democracy.

Both Andersson's and Wagner's work builds on the core concept of polycentricity that was central throughout the career of Vincent Ostrom, and first developed in a classic article in the *American Political Science Review* in 1961, co-authored with Charles Tiebout and Robert Warren:

“Polycentric” connotes many centers of decision-making which are formally independent of each other... To the extent that they take each other into account in competitive relationships, enter into various contractual and cooperative undertakings or have recourse to central mechanisms to resolve conflicts, the various political jurisdictions in a metropolitan area may function in a coherent manner with consistent and predictable patterns of interacting behavior (Ostrom, Tiebout & Warren 1961: 831).

Polycentric governance entails a complex combination of multiple levels and diverse types of organisations drawn from the public, private, and voluntary sectors with overlapping realms of responsibility and functional responsibilities. Andersson's theory of of spontaneous political order focuses on polycentricity *among* states (i.e., local governments, regional states, etc.), while Wagner's focuses on polycentricity *within* a singular state (i.e., public enterprises, bureaucracies, etc.).

In a sense, Wagner's theory of states as polycentric orders also intertwines both diZerega and Andersson: he argues that states are orders and not organisations (*contra* diZerega), and even monocentric states can be polycentric orders in and of themselves (*contra* Andersson). That is, the state is an arena of interaction—not an organisation but an arena hosting *many* distinct organisations—like market activity, state activity emerges out of entrepreneurial action (i.e., say between political factions, special interests, etc.), and is therefore spontaneously ordered and not planned. This point is indeed significant, and is incorporated into the following analysis: even when initiated from within the state, jurisdictional processes (like population transfer or rebordering) can resemble market processes in that they operate through knowledge that is distributed among participants, and jurisdictional outcomes can thus be the product of spontaneous ordering that emerges from competitive interaction among political enterprises.

New theory of spontaneous order in jurisdictions

A new theory of spontaneous political order is developed by combining the approaches of diZerega, Andersson and Wagner, and extending them to jurisdictional boundary dynamics. Like these three approaches, this too describes political-jurisdictional change as a process that falls somewhere along the spectrum of consciously-planned-to-spontaneous orders. The focus, however, is not on policy or citizen mobility, but boundary mobility. Like diZerega, in this theory jurisdictional change can come about as the result of the democratic process and emanate from civil society; like Andersson, pressures from citizen mobility contribute to such change; and like Wagner, the process can even emanate from a competitive process of political entrepreneurship within the state. It should be clear enough that such an approach explicitly seeks to *extend* the above three, not supplant them: whether boundary change catalyses from civil society or from within the state, it, too, is a higher-level spontaneous order of polycentric democracy. But instead of policy and jurisdictional change being linked solely to citizen mobility across pre-existing boundaries, the spontaneous order is also stimulated by *boundary mobility*: external and internal rebordering, and secession and integration.

Democratic politics is not just a process of deciding how to do things or what things to do, but also a process of deciding to whom those things apply, i.e., group/polity boundary formation. The spontaneous order of group/polity boundaries is an important part of the democratic process, and should form part of any theory of ‘democracy as spontaneous order.’ However, it is thus far underappreciated and underexplored—in particular, while exit via citizen mobility is recognised, exit via boundary mobility is overlooked.

Of the two dynamic mechanisms of jurisdictional ordering—people moving, or boundaries moving—the boundary mobility side of jurisdictional change (to move borders or secede) typically requires collective action and cannot be achieved unilaterally or without some sort of collective legitimation, such as citizen (demos) assent; it therefore often falls into the domain of democratic decision-making. In other cases, boundary change has been the result of political machinations within and between state actors, and falls into the domain of elite competition within a polycentric state organisation. In addition, there is a third theory of how boundary change processes operate: increasingly the catalyst for such change is spontaneously arisen, networked individuals.

That is, boundary change (rebordering or secession) can happen in three ways: (1) the political elite can instantiate the change (i.e., as consciously planned *or* emergent/spontaneous order); (2) the citizenry-at-large can use democratic means (i.e., referenda, elections); or (3) individual citizens can *personally* secede. These correspond to three ways that citizen mobility can affect jurisdictional change: (1) the elite can plan and execute population transfers; (2) the demos can decide on population transfers; or (3) individual citizens can personally move. Moreover, we can position each mode of jurisdictional ordering along a spectrum from consciously planned to spontaneous. As a cursory reading, one might suggest that moving from (1) to (3) jurisdictional change becomes ‘more spontaneous’ and that this applies for both citizen mobility and boundary mobility. FIG 1 below represents the proposed spectrum of jurisdictional orders.

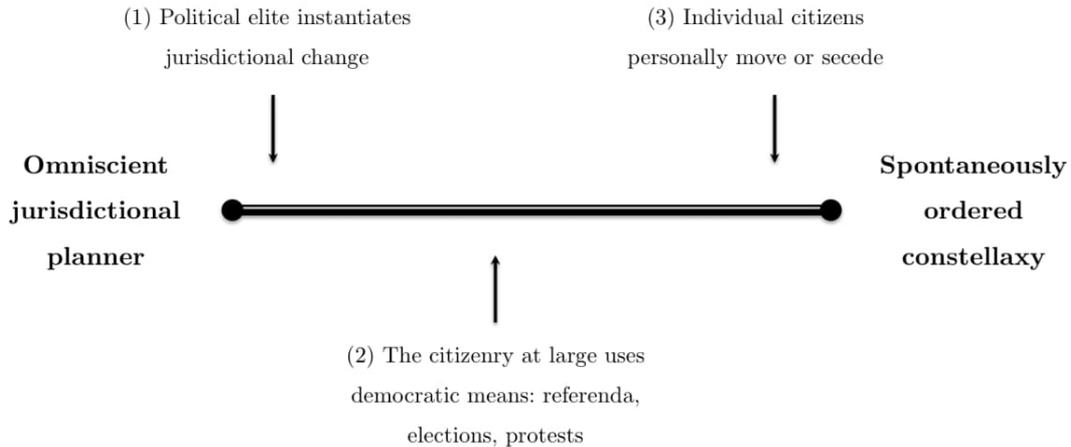


FIG 6.1 Spectrum of jurisdictional orders

Jurisdictional change emanating from the state is closest to the rational constructivist end of the spectrum, depending on the conditions of political entrepreneurial competition within the state organisation: a more highly concentrated arena of interaction (e.g. dictatorial decision making) is more monocentric, while a more competitive arena (e.g. many competing factions and interests) is more polycentric and tends towards jurisdictional outcomes that are products of spontaneous ordering. Consider an internal rebordering between multiple ethno-linguistic regions in a multinational state: contrast a strong unitary power that deigns the specifics of the boundary change to the uncertainty, conflict, and bargaining over a negotiated outcome between affected communities. The second scenario can perhaps be labelled ‘more spontaneous’ than the first, and we might expect relatively more dispersed knowledge to be incorporated into the final boundary change decision.

Next, jurisdictional change emanating from civil society or democratic assent is likely further along the spectrum towards a spontaneous jurisdictional order. When political rules are procedurally democratic and not biased towards specific individuals or groups, and the citizenry-at-large uses democratic means such as referenda, elections, or protest movements to affect change (i.e., rebordering or population transfers), jurisdictional outcomes will be the products of spontaneous ordering, in the same way as described by diZerega. Returning to the case of boundary change between ethno-linguistic regions, potentially the entirety of

all affected communities could be included in the decision making process (i.e., via referendum), which is certainly ‘more spontaneous’ than competitive machinations between political representatives within the arena of the state.

Finally, we submit that the ‘most spontaneous’ of the modes of jurisdictional ordering is when individual citizens personally move between or secede from jurisdictions. Andersson (2012) argues that polycentric democracy works more effectively than monocentric democracy because signalling of citizen preferences is stronger. In a monocentric democracy the systemic resource (i.e., the signal that individuals look to for coordinating plans) is votes, but this is rather vague, bundled, and undifferentiated. Because citizens cannot exit, the systemic constraint is not particularly tight: change only occurs periodically (at elections) and policies need not be particularly responsive to citizen preferences (typically pitched at the median voter). In contrast, the systemic resource in a polycentric democracy is the *voters themselves* as well as their movable assets: mobility differentials are the signal. So the systemic constraint is much tighter in a polycentric democracy since citizens have exit options and political units face competition from each other.

We argue that personal secession and personal mobility are comparable forms of jurisdictional change. The easier it is for citizens to move between jurisdictions, the more spontaneously ordered is the resulting jurisdictional order. Consequently, boundary mobility should have the same effect as citizen mobility: the easier it is to reborder or secede from jurisdictions, the more spontaneously ordered is the resulting jurisdictional order. Personal secession is a comparable form of exit to personal mobility, and tightens the systemic constraints in a polycentric democracy—making it a more effective and ‘more spontaneous’ mode of boundary change than those derived from collective action.

As we move along the spectrum from left to right personal exit becomes easier, and jurisdictional ordering becomes more fluid. It’s easier to exit if individuals do not have to move; and ease of exit correlates to the quality of the signals that political agents look for in a polycentric democracy. Essentially, it is the ease of exit that tightens the systemic constraint—and therefore promotes responsiveness and effectiveness—for a political-jurisdictional order. This is a function of the costs and benefits of exit: costs are lower

when exit-related transaction costs and opportunity costs are lower and benefits are higher when the number of viable exit options is large (or new options can be created). Opportunity costs of exit basically refer to jurisdiction-specific attachments, like agglomeration economies (both social and economic), that must be forfeited when a citizen moves between jurisdictions. These are the spillovers that citizens reap by collocating and intermingling together, conferring externalities upon each other; they are typically higher with closer proximity (Marshall 1920) and with greater diversity (Jacobs 1961).

Personal secession would therefore appear to outperform *personal mobility* on both of these scores: citizens are able to move to a new jurisdiction without having to move location (hence they retain benefits of collocation and intermingling) and in theory they can even create a new jurisdiction of their own if they find no better exit options among pre-existing jurisdictions. For this reason it is tentatively suggested that personal secession is the ‘most spontaneous’ of spontaneous jurisdictional orders.

Non-territorial personal secession in practice

To summarise so far, personal secession is equivalent to non-territorial governance. It is also a mechanism and catalyst for spontaneous jurisdictional ordering. Moreover, it is arguably the ‘most spontaneous’ of boundary mobility mechanisms—comparable to and possibly exceeding jurisdictional ordering via citizen mobility.

This notion of personal secession might seem unrealistic in practice—and it is currently illegal in most (but not all) constitutions. What would it actually mean for there to be a legal institutionalised right of individuals (or groups, or institutions) to exit from larger political jurisdictions without having to change location? Personal secession is defined by a right of each person to choose a jurisdiction without territorial bounds. It goes as far as the concept of secession can possibly go: to the individual, and not necessarily in association with a collective (although that is always a possibility and quite likely). Personal secession therefore presents a stark alternative to the nation-states of today:

hundreds or even thousands of autonomous, networked, or loosely confederated individuals and communities. The dynamic of spontaneous secession and reintegration of citizens and jurisdictions would be a natural evolutionary feature of all political-jurisdictional orders.

It must be admitted that an institutionalised right to personally secede would be extremely difficult to implement, at least in the pure form of allowing each and every citizen to completely exit their jurisdiction at will. This doesn't disqualify the principle altogether, but does raise further questions. Can the right of personal secession be qualified? Perhaps along lines of citizen identity, giving certain minorities the right to self-govern? Might there be conditions on the right to exit around the minimum size of a seceding group? Or the actions they will be allowed to undertake when they have exited? Further questions present themselves on appreciation of the vast number of possible exit options the stem from *partial* exit. That is, individuals and groups might exit in only one or few of the complete bundle of government functions. This is precisely how the non-territorial 'national-cultural autonomy' model of ethno-linguistic conflict management is understood: minorities are given self-governing capabilities over a subset of government responsibilities, typically relating to cultural practices.

However, as we have seen, a different approach is found in technology oriented solutions by cryptosecessionists, which is a *de facto* rather than *de jure* mechanism of jurisdictional change. The logic of this plays out as follows. Personal secession is akin to non-territorial secession. Cryptographic technologies facilitate non-territorial, personal secession. This process of *de facto* jurisdictional change contributes to spontaneous jurisdictional ordering in non-territorial polycentric democracies.

Technology, in particular cryptography, facilitates personal secession as it empowers individuals to evade state monitoring and charges (i.e., 'cryptosecession'). As we have shown previously, this is a sort of partial exit from incumbent institutions and policies. But a further, somewhat unanticipated implication is that networked individuals have the option to *create parallel institutions* and exit to them (i.e., 'cryptostatecraft'). They may choose this instead of choosing to exit in isolation, move to other jurisdictions in a polycentric democracy, or stay in place to reform incumbent institutions.

Cryptoanarchist technologies including bitcoin, blockchain, etc. currently empower individuals to ‘economically secede’ from incumbent states—future developments might enable full ‘personal secession.’ Cryptoanarchism is consequently an emerging form of personal secession and *de facto* non-territorial governance; however there are other forms of *de facto* jurisdiction, e.g. the shadow economy and *Systeme D* (Soto 1989; Schneider & Enste 2013); agorism and counter-economics (Konkin, Conger & Seely 2006); and *parallel poleis* in civil society (Benda et. al 1988; Lagos, Coopman & Tomhave 2014).

Technologically enabled secessionists are perhaps early adopters in the diffusion of a larger political innovation—they fashion *de facto* non-territorial governance, but as trends develop additional mechanisms of (possibly even *de jure*) non-territorial governance may become available. Citizens that use technology (or otherwise) to disappear (secede, exit) are engaging in a bottom-up process of political-jurisdictional change: ‘spontaneous personal secession.’ The upshot is that if technologies are making non-territorial governance increasingly more feasible, then the spontaneous order of polycentric democracy will become ‘more spontaneous’ and we less have to rely on rational constructivist to solve the knowledge problem of jurisdictional design.

Spontaneous order and knowledge problems of nation-states

As with the political-jurisdictional Coase theorem, the theory of spontaneous order in the formation of jurisdictions applies at all levels of jurisdiction, beginning at local Tiebout sorting and internal rebordering between political sub-units, and moving upwards to nation/state incongruities, i.e., matching maps to peoples (e.g. rebordering), matching peoples to maps (e.g. ethnic cleansing), or proposed non-territorial responses to diversity (e.g. national-cultural autonomy). This leads us to now consider what this means for the future of the nation-state. The central implication of technologically enabled, non-territorial personal secession is that spontaneously ordered non-territorial political jurisdictions solve the ‘knowledge problem of the nation-state.’

Historically, people form an idea of the area that they live in: its extension and its boundaries. Groups that settle in a given area for a long period of time develop concepts of common identity and of a 'homeland.' Prior to the advent of the territorially monopolistic nation-state, the boundaries of political groups (e.g. tribes) were mostly determined by nature and features of the landscape, and territorial borders remained flexible. Boundaries between what the groups saw as their homelands were not yet borders in the sense that commerce, culture or language were not restricted by the boundaries. Feudal structures emerged, with flexible, ever-changing boundaries and overlapping assemblages of power. In some times and places monarchies and multi-ethnic empires arose, but they too had constantly changing borders and many different languages and constituent ethnic and religious communities (e.g. Roman Empire, Austro-Hungarian Empire, Ottoman Empire, British Empire).

With the appearance of the nation-state came a highly developed monopoly on political authority and relative ossification of political boundaries (outside of international conflicts). The nation-state sought to monopolise all social and political processes: diversity and plurality were to be homogenised, an approach that led into assimilation at best and ethnic cleansing and genocide at worst. The homogeneous national-cultural society is an artificial construct, a product of rational constructivism *par excellence*. The limits of human reason and planning apply here as they apply elsewhere. Much like the knowledge problem critique of attempts to replicate market allocations with central planning, rational constructivist planning of jurisdictional orders succumbs to what we call 'the knowledge problem of the nation-state.'

The task of the jurisdictional designer is analogous to that of the central planner charged with determining the welfare maximising allocation of resources in an economy. Beginning in the 1920s it was Ludwig von Mises and Friedrich Hayek who were the primary opponents of market socialist economic planning. The socialist calculation debate was carried out between Austrian economists Mises and Hayek and neoclassical and Marxist economists Oskar Lange, Abba Lerner, and Fred Taylor. The position of Mises and Hayek was to highlight the economic calculation problem: economic planning was no substitute for market allocation of resources due to the absence of the price mechanism.

That is, “rational economic activity is impossible in a socialist commonwealth” (Mises 1990: 33) because the information provided by market prices is lacking in a system of bureaucratic or technocratic allocation (Mises 1920, 1990; Hayek 1935; Buchanan 1982). Designing a continuously optimal jurisdictional order, just like designing a market order, is well beyond the bounds of human cognition and machine computational abilities.

Similar critiques can be mounted against the hypothesis that a welfare maximising jurisdictional design (i.e., an allocation of policies and people to jurisdictions) can be planned for by solving the system of inter-jurisdictional externality optimality conditions. Just as an economy cannot be seen as a set of equations, neither can the jurisdictional design of a polity be reduced to rational construction: it is impossible to calculate an optimal solution of jurisdictional allocations. The system of equations would require too much information, information that is inherently dispersed throughout the polity. A crucial condition for economic calculation is the existence of genuine entrepreneurship and market rivalry; and this condition is lacking when a jurisdictional planner has predetermined the jurisdictional contours of the polity.

The standard approach jurisdictional planning does not take the computational limitations induced by the combinatorial nature of the problem into account. If we were to proceed from a true appreciation of the overwhelming size and complexity of the jurisdictional design space, we would have profoundly less optimism in our ability to rationally construct an optimal jurisdictional architecture. Instead we require a framework that is capable of generating experimentation and institutional diversity from within; that is, for non-territorial polycentric democracy and political entrepreneurship.

The ‘problem of the nation-state’ is how to design a jurisdictional order and assign political authority so as to discover a harmonious allocation of nations, states, and nation-states. The problem has been created by past attempts at rational constructivist jurisdictional design, notwithstanding the weak spontaneous correcting force of controlled migration. This portends to a variant of Thomas Duncan and Christopher Coyne’s (2015) argument about foreign intervention and the limits of human reason and planning and Christopher Coyne and Abigail Hall’s (2014) robust political economy critique of empire.

However, this argument also applies to the carving out of international (and sub-national) borders, not only the political actions that occur within them.

Much like the knowledge problem critique of attempts to replicate market allocations with central planning, rational constructivist planning of jurisdictional orders succumbs to what we call ‘the knowledge problem of the nation-state.’ Spontaneously ordered political jurisdictions in a non-territorial polycentric democracy is the proposed general solution. In the first instance, it is better to have a system that generates jurisdictional rules from within, i.e., to constitutionally permit non-territorial secession and enable political entrepreneurship. In the absence of this, cryptoanarchist technologies enable a sort of *de facto* mechanism for non-territorial secession and governance.

We can reinterpret many episodes from history—how things worked, but also failures and grievances—in light of the theory of spontaneous jurisdictional ordering. A cursory reading might suggest that in an ideal world, the optimally efficient allocation of states, nations, and nation-states—whether territorial or non-territorial, disjoint or overlapping—would emerge spontaneously from whatever initial allocation of political authority. The ever-presence of ethnic conflict and political struggle throughout history would suggest otherwise.

More sagaciously, the central claim made here is simply that the problem of the nation-state *can* be explicated within the spontaneous jurisdictions framework: as the combined expression of non-optimal allocations of political rights (potentially due to a rational constructivist design) and ‘insufficiently spontaneous’ correcting forces. If ideal conditions were met then a political-jurisdictional system would indeed move toward the optimal allocation of jurisdictions and political authority—of nations, states, and nation-states—but such a highly stylised fiction can only ever be a stepping stone on the way to an analysis of a polity with less-than-pure spontaneous jurisdictional ordering processes.

The theory of spontaneous order in political jurisdictions therefor runs parallel to political-jurisdictional Coase theorem, in this sense that a pure spontaneous ordering setting corresponds to the zero transaction cost, zero wealth effect setting.

The constellaxy: Toward a more harmonious nation-state

Language, culture, civil society, and other ‘demic orders’ (Hartley & Potts 2014) are largely spontaneously ordered. The nation-state as we know it is not. Sometimes these are complementary relations; other times they are in conflict. Non-territorial polycentric democracy as animated by cryptosecession is a spontaneous order, and therefore potentially in harmony with other demic orders. The benefit of this is that in principle this leads to less political conflict. We should look to the model of non-territorial polycentric democracy if we wish to stimulate spontaneous ordering of jurisdictional space and a more harmonious alignment of demic orders. In fact, going further is to suggest that this is precisely why technologically enabled cryptosecession threatens to outcompete current modes of jurisdictional change: *de facto* jurisdictions form around networks of individuals (i.e. social media demes) rather than forcing latent demes to conform to pre-existing jurisdictional structures.

The upshot is a more dynamic and entrepreneurial solution to the knowledge problem of the nation-state. Under the non-spontaneous nation-state, citizens attempt to organically grow their own demes, but are frustrated by the pre-existing top-down plan imposed on them. Under spontaneous ordering, political-jurisdictional entrepreneurs (who seek new boundaries, or seek non-territorial realignment) and citizens (who personally move and secede) are able to provide correcting forces to an initially sub-optimal rational constructivist jurisdictional design. Interestingly, diZerega (2003) identified how an established jurisdictional order comes into conflict with would-be emergent, spontaneous orders from below—and even went so far as to advocate a non-territorial response:

Forest Trusts free protection of some public values from traditional political forms rendered less competent through globalization, market values, and complexity. They demonstrate that political democracy need not be confined solely to geographical boundaries when such boundaries undermine the vitality and value of the democratic process. As such, they broaden the horizon of democratic possibilities and create new spheres of active and responsible citizenship. They seek to make the fluidity and openness of democratic political boundaries sources of strength rather than weakness (diZerega 2003: 176, emphasis is my own).

While he never took his analysis further, diZerega's explication of what constitutes a spontaneous democratic order and his recognition of the conflict between presumptive territoriality and would-be 'non-territorial publics' gives us a basis to make sense of how these two threads are related to each another. That is, (1) jurisdictional orders can be more-or-less spontaneous, and (2) they should be just so as to complement any demic orders they entangle or govern. The upshot is that the spontaneous order of non-territorial polycentric democracy is capable of adapting to the increasingly complex, intermingled, and multidimensional compound of publics that prevail today. The contention then is that many more areas of governance (in addition to the given example of forest trusts) should be constituted as non-territorial publics.

The literature about non-territorial, national-cultural autonomy (Nimni 2004; 2007; 2015) can be reviewed through this lens of conflict and complement between the order of the nation-state (hitherto consciously-planned, top-down, imposed) and various other demic orders. The central theme here is to highlight the inherent dilemma generated in the tension between political (or ethno-linguistic) geography (i.e., the patterns of settlement and dispersal of co-existing groups) and political economy (i.e., jurisdictional order). Ethno-linguistic groups vary in the extent to which they are territorially concentrated, and therefore in the degree to which self-governing jurisdictional arrangements for them should be territorial or non-territorial. The implications of political (ethno-linguistic) geography for conflict resolution are well known and correspond to the three modes of jurisdictional ordering discussed earlier; either: (1) grant autonomy on a territorial basis; (2) execute population transfers to accommodate groups to existing political structures; or (3) grant non-territorial autonomy.

Consider (1) granting autonomy on a territorial basis. This basically equates to matching maps to people—redrawing state structures to match political or ethnic diversity, e.g. breaking multinational empires into national components. Quite often this proves a superficially attractive option to those of the rational constructivist mindset. However, reminiscent of the knowledge problem, attempts to resolve problems of multinational states by managing their decomposition into a set of new, territorially defined, uninational states only gives rise to more problems. Typically this results in a

multiplication of the initial problem by merely reproducing diversity in the constituent states, only with different dominant groups. For one, patterns of ethnic geography are often simply too complex to reduce to compact territorial jurisdictions. Group boundary lines can be uncertain at the individual level: people may belong to not only one but several groups, or none at all. Moreover, group identity does not always unambiguously prefigure political preferences or indicate to which state an individual wishes to join.

Nevertheless, ‘matching maps to people’ was the dominant principle of the twentieth century, with plans to create new states that would match the boundaries of existing nations or communities, e.g. Eastern Europe and the Balkans. It proved impossible to draw lines on the map in such a way that no new minorities were created; the new states were each profoundly politically and ethnically divided. Of course, similar problems have been faced elsewhere and elsewhere, and the creation of new states and the partition of existing states (e.g. regionalisation or federalisation) are enduring challenges. From the ‘knowledge problem of the nation-state’ perspective, there should be nothing surprising about this: planners do not have the requisite knowledge to make such calculations, particularly when they foreclose on the possibility of non-territorial solutions.

Next, consider (2) executing population transfers to accommodate groups to existing political structures. This basically equates to matching people to maps—instead of redrawing the map of state structures to reflect existing political-ethno-linguistic realities, reshaping the existing realities on the ground to conform to a new political-jurisdictional map, e.g. transferring populations between regions to execute a given jurisdictional plan. Population transfers are a much more brutal option than simply recarving boundaries to reflect existing patterns of political or ethnic geography (and allowing people to sort themselves). Profoundly harmful human consequences have followed from attempts to match people to borders, rather than seeking to match borders to people: large scale population displacement and expulsions of peoples from their homelands (also known as ‘ethnic cleansing’). This approach surrenders any pretence of trying to solve the knowledge problem of the nation-state by using the dispersed knowledge and preferences of the population, or to find arrangements vaguely in the interests of all citizens. In a certain morose sense, however, it does illustrate the appalling failures of ‘planning.’

Finally, consider (3) granting non-territorial autonomy. This amounts to an abandonment of maps—neither redrawing the map of state structures nor reshaping political-ethno-linguistic geographies, but allowing sub-state structures to emerge from and coalesce around existing constellations of people, whether on a territorial or non-territorial basis. When groups lack clearly defined territorial boundaries, attempts to specify them as so will be not only administratively (and epistemically) demanding but likely also politically controversial. Under such conditions non-territorial governance may have a role to play. It is the interplay between political (or ethno-linguistic) geography at different scales that indicates the desirability and practicability of territorial versus non-territorial governance. The composition (i.e., homogeneity or heterogeneity) of political units at higher-level scales (e.g. countries, provinces) and lower-level scales (e.g. cantons, municipalities) demarcate the possible approaches:

- (1) when spatial *segregation* is almost complete (e.g. high-level units are homogeneous and hence within each of these, low-level units are also homogenous) then territorial governance is probable;
- (2) when spatial *intermingling* is almost complete (e.g. high-level units are heterogeneous and so are low-level units) then governance will need to be non-territorial;
- (3) when there is spatial *ghettoisation* (e.g. high-level units are heterogeneous but low-level units are homogeneous) then territorial governance is conceivable but will need to be non-contiguous and non-compact; and
- (4) the combination of homogenous high-level units and heterogeneous low-level units is not a likely or even coherent combination.

So we have a spectrum of political (or ethno-linguistic) geographies: at one end is *complete segregation* into compact territories, where all units are homogeneous (no members of other groups) and inclusive (all members of own group); at the other end is *complete intermingling* over the entire territory, where groups are identically distributed over geographic space; and in-between are varying gradations of *ghettoisation*, where no groups have complete compact territories of their own at the national or regional level but groups are variously segregated at local levels, producing something of a checkered patchwork effect. To put it simply, the question is what kind of patchwork quilt does the

political geography resemble: are there few, large, disjoint pieces; are there many, small, checkered pieces; or are there such a great many, smaller-still, pieces so tightly inter-stitched so that no clear pattern can be discerned?

The models of governance and jurisdictional orders that are implied by these patterns are clear enough: complete segregation lends itself to territorial polycentric democracy (e.g. federalism as in Andersson 2012); complete intermingling lends itself to non-territorial polycentric democracy (e.g. panarchism as in Tucker & de Bellis 2015); and, depending on the scale and degree of local segregation, ghettoisation might benefit either a territorial approach (albeit lacking of complete compactness, homogeneity, and inclusiveness) or a non-territorial solution (albeit with some territorial complement at the local level).

So the prospect of non-territorial polycentric democracy depends on the extent to which the political geography (distribution of groups) within a given polity conforms to these patterns. What then are the patterns like today? With the fast pace of international migration political, cultural, and ethno-linguistic diversity is increasingly becoming the norm in many societies. The heterogeneity of modern societies increasingly highlights the inadequacy of the nation-state to effectively deal with diversity: to manage potentials for conflict and seize opportunities for shared prosperity. Certainly in consideration of high-level political units (e.g. countries, provinces) heterogeneity has deepened, and notwithstanding a predilection for groups to cluster together in localities, it appears that even in low-level political units (e.g. cantons, municipalities) compactness, homogeneity, and inclusiveness is a thing of the past. That is to say, societies have left the segregated extreme of the political geography spectrum and are moving through gradations of ghettoisation and intermingling.

This is not simply an arbitrary or chance outcome but is occurring for good reason, as the cost-benefit ratio of intermingled diversity outstrips that of segregated conformity. Essentially, what is desirable is deep heterogeneity (intermingling) in economies and civil societies and deep homogeneity (sorting) in polities. Intermingling promotes heterogeneity in economic and social interaction, which stimulates gains-from-exchange and produces potentials for knowledge spillovers, innovation, and market and social entrepreneurial

discovery. Sorting promotes homogeneity in political interaction, which stimulates gains-from-coordination and reduces potentials for redistributive externalities, exploitation, and political entrepreneurial predation.

If a polity-economy is to remain heterogeneous in social-economic interactions and yet promote homogeneity in political interactions, then signalling and networking are especially important to the process of political group sorting and formation. If the matching process is to be effective, individuals must signal their identity, what they can contribute, and what they wish to obtain from group membership. The outcome will be the growth of networks of individuals in a constellation of political-jurisdictional groupings.

We therefore designate the groupish spontaneous order of jurisdictional formation a ‘constellaxy’—a neologism combining ‘catallaxy’ and ‘constellation.’ Catallaxy is derived from the Greek *katalatto*, with the several meanings: “to exchange” or “to become reconciled with” and “to admit into the community” or “to change from an enemy into a friend.” Constellation is derived from the Latin *constellatio*, with the meaning: “set with stars” (*con-* “with” and past participle of *stellare* “to shine”). Constellaxy therefore captures the character of spontaneous order in jurisdictional formation: networking (“with”) and signalling (“to shine”) in a constellation, hence *constell-*; and coordination (“exchange” and “reconciled”) and cooperation (“community” and “friend”) in a catallaxy, hence *-axy*.

Of course catallaxy is the term that Hayek gave for the study of the perfect free market order; similarly ‘constellaxy’ is the term we give to the perfect free jurisdictional order, as above, in which the tension between homogenous sorting and heterogenous agglomerations is balanced. F.A. Hayek defined the catallaxy as “the order brought about by the mutual adjustment of many individual economies in a market” (1976: 109). His point was that many *economies* (plural) constitute a market, and that the emergent properties of the market order—prices, division of labour, growth, etc.—are not the product of a singular community with common and congruent values and goals, but rather stem precisely from the opposite: free pursuit of the diverse and disparate goals of individuals and *communities* (again, plural).

In similar fashion, the cognate constellaxy is an alternative expression for the term ‘polity.’ We might paraphrase Hayek and define the constellaxy as “the order brought about by the mutual adjustment of many individual *polities* in a *society*.” Our preferred definition of constellaxy is the order brought about by the mutual adjustment of many individual *citizens* in a *demic order*. Constellaxy then refers to a pattern of mutually beneficial social interactions—networking, signalling, coordination, and cooperation—that does not require that participants share the same goals. From this perspective, the emergent properties of the political-jurisdictional order—tax rates, political good provisions, bundles, memberships, identities, etc.—are the outcomes of free pursuit of diverse and disparate goals of citizens and polities, and *not* the outcome of some omniscient and benevolent central planner. Moreover, jurisdictional *constellactics* is the study of the perfect free jurisdictional order. The aim of a constellactics research program would be to provide a more accurate and inclusive description of the social-political phenomena of jurisdiction formation and dynamics—given that participants are subject to shared rules of procedure, can parse simplified feedback mechanisms, and have status equality and freedom of entry and exit in pursuing their diverse ends.

Existing jurisdictional orders are not yet perfect constellaxies. It is the forced folding of the political onto the social and economic that necessitates a compromise between intermingling and sorting that currently limits that potential. More accurately, it is the assumption that political jurisdictions must be territorial. Non-territorial polycentric democracy cultivates both intermingled civil society and economy and sorted polity: groups are overlapping and self-governing. Moreover, cryptosecession—the harbinger of non-territorial polycentric democracy—promotes both intermingling and sorting by subverting the conflict between the nation-state and other demic orders. It entails the creation of *de facto* jurisdictions formed around networks of individuals (i.e., demes) rather than forcing latent demes to conform to pre-existing jurisdictional structures. It is an emergent response to various coordination failures in matching of jurisdictions-to-peoples (nations-to-states). We should fear not the spectre of cryptoanarchy, for it heralds spontaneous order in politics and spontaneous order in jurisdictions, and the answer to the knowledge problem of the nation-state.

Summary and conclusion

The modern nation-state is a bundled territorial form of political organisation. The purpose of this thesis has been to explore variants of the political system almost diametrically opposed to this: unbundled and non-territorial governance. I have developed models and arguments drawing on new institutional, public choice, and Austrian economic theory in undertaking these explorations. Particular focus has gone to panarchist and cryptoanarchist political theory (Tucker & Aviezer 2015; Ludlow 2003); the Coase theorem, the theory of fiscal commons, and the new institutional economics (Coase 1960; Wagner 1992); institutional possibilities, political transformations, and the new comparative economics (Djankov et al. 2003; Rodrik 2014); the theory of fiscal exploitation and internal exit (Buchanan & Faith 1987); and polycentric spontaneous political orders (diZerega 2000; Andersson 2012; Martin & Wagner 2009). All these diverse threads come together to analyse the theory of unbundled and non-territorial governance.

The thesis started with an appreciation of the many paradoxes and problems of majoritarian voting in in bundled, territorially monopolistic nation-states, and made the contention that a more efficient system of governance is one in which citizens relate their political preferences in detailed and filigreed ways. I used what was predominantly a public choice style framework to find that decoupling political jurisdiction from geographical location (so that citizens can switch political jurisdictions without switching location) and unbundling government (so that collective goods and services can be provided separately by independent public enterprises) leads to greater efficiency in public good provision and more citizen welfare. The conclusion to this first chapter was not to rule out all political bundling but rather to promote an ‘unbundleable’ system of governance so that political entrepreneurs could discover ways to *rebundle* the various political goods and services. Non-territorial unbundling forms a platform for experiments in bundling, unbundling, and rebundling, and ultimately, fosters discovery of optimal scale of scope in political bundles.

The idea of non-territorial unbundling has appeared a number of times throughout history in both theory and practice. The classical foundations of the political philosophy of panarchism were laid more than a century and a half ago by Belgian political economists Gustave de Molinari and Paul Émile de Puydt. Subsequent related ideas include ‘Schlick states’ (Schlick 1952), the framework for utopia (Nozick 1974), parallel poleis (Benda 1988), virtual cantons (Long 1993); functional overlapping competing jurisdictions (Frey & Eichenberger (1999); and multi-level governance (Hooghe & Marks 2001). Historical precedents to the concept date back as far as ancient Greece, Sparta, and Rome, the medieval Icelandic Free Commonwealth, the pre-modern Ottoman Empire millet system, and early twentieth century Austro-Hungary non-territorial federalism. More recently, Belgium and Switzerland have applied composite territorial and non-territorial federal systems to some success. Finally, an emerging and most demonstrable case of non-territorial governance is found in the theory and practice of cryptoanarchy: citizens connected in digital networks non-territorially seceding without erection of borders or movement of people. After tracing the history of the idea in political-economic thought, and uncovering past and contemporary cases of non-territorial unbundling, I conclude that that the ‘pure’ version of the theory has yet to fully arise in practice, but emerging examples of cryptographic ‘virtual states’ come close to realising non-territorial unbundled forms of political organisation.

The Coase theorem was used to expand on how political systems and jurisdictions change. The point of the political-jurisdictional Coase theorem model was to clarify the conditions under which non-territorial unbundling might emerge, or conversely, to explain why it has yet to eventuate. This model conceptualised polities as commons in which the fiscal capacity of the whole economy is the analogous exploitable resource. The political-jurisdictional system is a complex institutional structure of access rules and boundary rules, which either sustain or deplete social value. I argue that changes to access rules and boundary rules serve to reallocate property rights within and across political commons and show how the framework corresponds to various political-jurisdictional transitions, including non-territorial unbundling. I determine that by generating viable exit options

and membership externalities in multiple, overlapping majorities, non-territorial unbundling tempers the tragedy of the fiscal commons.

The institutional structures that exist in the political-jurisdictional Coase theorem—including non-territorial unbundling—were then analysed in greater detail using a framework for political-jurisdictional possibilities and transitions. I introduced two new concepts to the field of comparative institutional analysis: the ‘political-jurisdictional possibilities frontier’ (PJPF) that describes the space of *possible* allocations of property rights and political authority, given the prevalence of market, political, and jurisdictional transaction costs; and a ‘political-jurisdictional transformation frontier’ (PJTF) that shows the compact trajectory of *actual* allocations that might obtain, given the prevalence of ideas, interests, and wealth effects. Different allocations of property rights and political authority associate to different institutional systems, which array along the political-jurisdictional possibility frontier. This maps tradeoffs between the social losses from market, political, and jurisdictional transaction costs; and minimising transaction costs in each of these dimensions brings about optimally allocated property rights and political authority. Yet irrespective of transaction costs, whether or not a society moves toward the efficient outcome also depends on the initial allocation of property rights, policies, and jurisdictions. If a property holder cannot be adequately compensated for the transfer (i.e., if the other party is constrained by wealth) then no political, jurisdictional, or conventional exchanges will take place. The transformation frontier defines the set of maximal outcomes—allocations of property rights and political authority—achievable by a polity-economy, given the interests of the incumbent holders of private property rights and political property rights in franchise.

The Coasean reading of this model suggests that the optimally efficient allocation of property rights that maximises social welfare can be achieved by making reallocations in markets, jurisdictions, or politics. I find that it is the relative imposition of transaction cost over different modes of jurisdictional change as well as wealth effects that enable or prevent non-territorial unbundling. The implication for the prospect of non-territorial unbundling is that if the initial allocation of political authority among jurisdictions is inefficient, then prohibitively high transaction costs will impede a more efficient allocation

from obtaining. Similarly, wealth effects could prevent an optimal allocation of political authority if citizens lack the requisite wealth to make political exchanges and effect jurisdictional change. That is, even *if* non-territorial unbundling is optimal, it will not eventuate. I conclude that this may explain why non-territorial and unbundled states are rare in history—or, of course, it might simply be the case that non-territorial unbundling is comparatively inefficient.

Non-territorial unbundling elicits a competitive dynamic between incumbent and potential governments. I developed a model of this dynamic that demonstrates how non-territorial unbundling reduces and eventually eliminates fiscal exploitation as the capability of citizens to move to non-territorial and unbundled jurisdictions increases. If a political-jurisdictional order is not yet allocatively efficient—and some subset of citizens is being fiscally exploited—then the process of non-territorial unbundling should see taxes converge on average costs of provision, fiscal surpluses disappear, and transfers cease. Within the non-territorial unbundled system, jurisdictional changes attending to fiscal equivalence are not limited to complete realignments of citizens and jurisdictions, but also extend to changes in the distribution of political-economic activity that citizens conduct in their multiple political units. The model of non-territorial internal exit is therefore a model of partial internal exit, and particularly applies to the case of ‘cryptosecession’ that appears the most likely avenue for non-territorial unbundling to ever eventuate.

The partial internal exit model takes the forms of a cryptosecession game played between politically connected insiders and ineffective outsiders. This is a multi-stage game that is solved by simple comparison of payoffs for each player (i.e., Nash equilibrium) and backward induction. I find that the outcome to the cryptosecession game is that there is no cryptosecession; but even though secession and cryptosecession do not occur, their presence as options for citizens serves to limit fiscally exploitative behaviour, and ensures an optimally efficient outcome. When interpreted as a model of cryptosecession, it shows how the balance of citizen opacity and government legibility determines the balance of fiscal exploitation versus equivalence. I conclude that once crypto technology develops beyond a certain critical threshold, fiscal exploitation is fully eliminated and the resulting political-jurisdictional order is optimally efficient. These are testable implications of the

model: that the growth of cryptography-mediated internal exit will exert pressures for fiscal reform, and subsequent patterns of change will resemble to the non-territorial unbundled form.

Finally, I take an Austro-evolutionary perspective on the theory of non-territorial unbundling, proposing a new theory of spontaneous order in the formation of non-territorial political jurisdictions. I argued that under certain conditions the various kinds of jurisdictional changes—citizen mobility and migration, but also external and internal re-bordering, and secession and integration—constitute spontaneous orders. ‘The knowledge problem of the nation-state’ was defined as the challenge of designing a political-jurisdictional order given that the knowledge required for rational jurisdictional planning is distributed among individual actors throughout the polity and thus unavoidably exists outside knowledge of a central authority. Attempts at redrawing borders or executing population transfers have proven appalling failures in rational constructivist planning: political division, large-scale population displacement, and ethnic cleansing. In contrast, spontaneously ordered political jurisdictions are the general solution to the knowledge problem of the nation-state. Much like how the spontaneous order of a free market system is designated a ‘catallaxy’ I defined a ‘constellaxy’ as the spontaneous order of a free jurisdictional system.

I argued that the pure theory of non-territorial unbundling resembles to the constellaxy, and suggest that in the absence of a *de jure* constitutional mechanism for this, a solution might be found in technologies of cryptosecession. While this is necessarily speculative in nature, such discussions are of value if we are to advance the quality of governance and meet with the challenges of an increasingly complex future. Nation-states are not yet perfect constellaxies and as such there is an imperative to discover alternative models of governance that are capable of adapting to the increasingly complex, intermingled, and multidimensional compound of publics that prevail today. In this endeavour, I suggest that it is crucial that we understand institutional mechanisms supporting unbundled and non-territorial polycentric democracy.

Appendices

Taxonomy of political-jurisdictional transitions

Consider an initial state of the polity-economy $P_0 = F(N_0, J_0)$, where:

J_0^0 denotes a unitary jurisdiction with no partitions;

J_0^0 compound jurisdiction with territorial partition; and

J_0^0 compound jurisdiction with non-territorial partition.

The political-jurisdictional transitions that might occur include:

B denotes bargaining between individuals (ΔN_T or ΔN_M);

C^T territorial secession (add new $s \in S$, ΔJ_T , and ΔJ_S);

C^{NT} non-territorial secession (add new $s \in S$, ΔJ_I , and ΔJ_S);

U^T territorial union (delete some $s \in S$, ΔJ_T , and ΔJ_S);

U^{NT} non-territorial union (delete some $s \in S$, ΔJ_I , and ΔJ_S);

S^T territorial sorting (across-jurisdiction ΔN_T);

S^{NT} non-territorial sorting (ΔJ_I);

R^T territorial rebordering (ΔJ_T , and possibly ΔJ_S); and

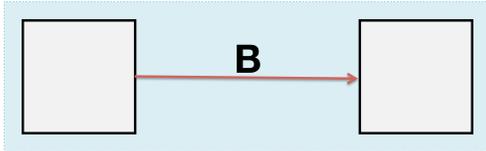
R^{NT} non-territorial rebordering (ΔJ_I , and possibly ΔJ_S).

From this a simple taxonomy of political-jurisdictional reallocations (transitions) follows:

Initial state of polity-economy is unitary jurisdiction with no partitions

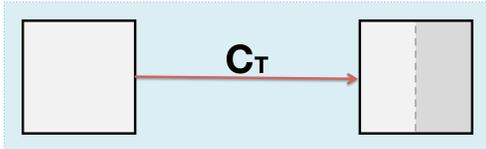
1. Bargaining within a unitary state:

Initial state $P_0 = F(N_0, J_0^0)$; transition B ; subsequent state $P' = F(N', J^0)$



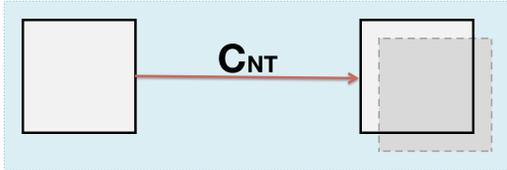
2. Territorial secession from a unitary state:

Initial state $P_0 = F(N_0, J_0^0)$; transition C^T ; subsequent state $P' = F(N, J^T)$



3. Non-territorial secession from a unitary state:

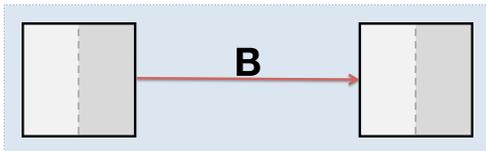
Initial state $P_0 = F(N_0, J_0^0)$; transition C^{NT} ; subsequent state $P' = F(N, J^{NT})$



Initial state of polity-economy is compound jurisdiction with territorial partition

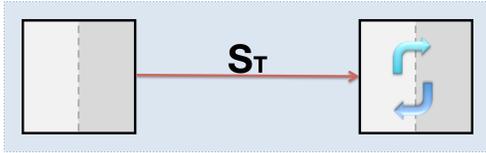
1. Bargaining within a territorial compound state:

Initial state $P_0 = F(N_0, J_0^T)$; transition B ; subsequent state $P' = F(N', J^T)$



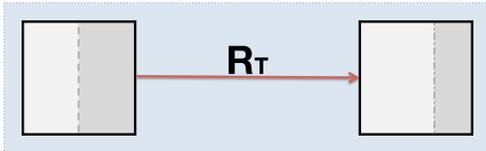
2. Territorial sorting within a territorial compound state:

Initial state $P_0 = F(N_0, J_0^T)$; transition S^T ; subsequent state $P' = F(N', J^{T'})$



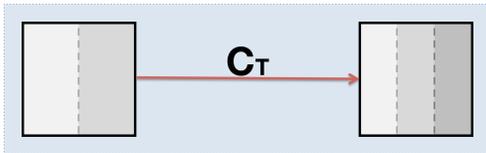
3. Territorial rebordering within a territorial compound state:

Initial state $P_0 = F(N_0, J_0^T)$; transition R^T ; subsequent state $P' = F(N, J^{T'})$



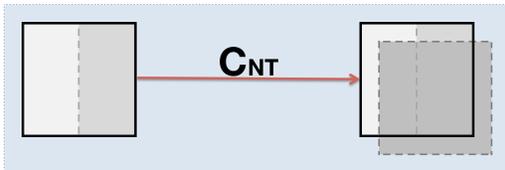
4. Territorial secession from a territorial compound state:

Initial state $P_0 = F(N_0, J_0^T)$; transition C^T ; subsequent state $P' = F(N, J^{T'})$



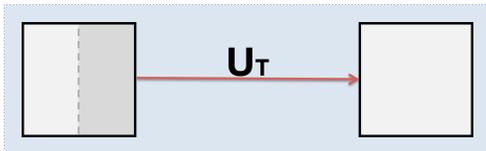
5. Non-territorial secession from a territorial compound state:

Initial state $P_0 = F(N_0, J_0^T)$; transition C^{NT} ; subsequent state $P' = F(N, J^{T, NT'})$



6. Territorial union over a territorial compound state:

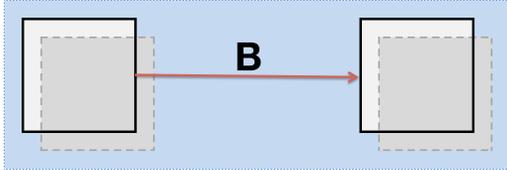
Initial state $P_0 = F(N_0, J_0^T)$; transition U^T ; subsequent state $P' = F(N, J^{0'})$



Initial state of polity-economy is compound jurisdiction with non-territorial partition

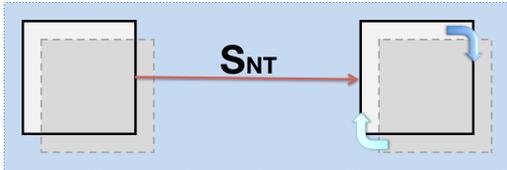
1. Bargaining within a non-territorial compound state:

Initial state $P_0 = F(N_0, J_0^{NT})$; transition B ; subsequent state $P' = F(N', J^{NT})$



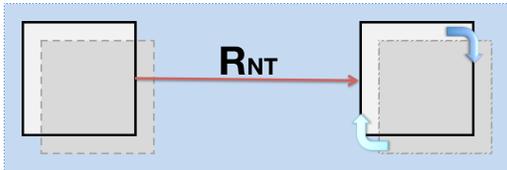
2. Non-territorial sorting within a non-territorial compound state:

Initial state $P_0 = F(N_0, J_0^{NT})$; transition S^{NT} ; subsequent state $P' = F(N, J^{NT'})$



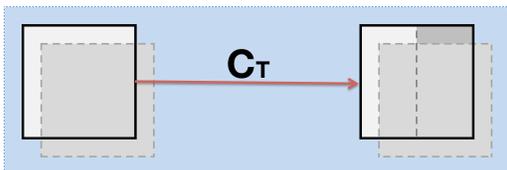
3. Non-territorial rebordering within a non-territorial compound state:

Initial state $P_0 = F(N_0, J_0^{NT})$; transition R^{NT} ; subsequent state $P' = F(N, J^{NT'})$



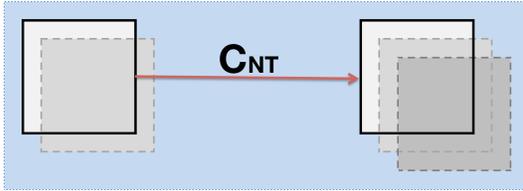
4. Territorial secession from a non-territorial compound state:

Initial state $P_0 = F(N_0, J_0^{NT})$; transition C^T ; subsequent state $P' = F(N, J^{T,NT'})$



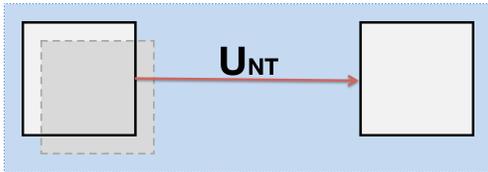
5. Non-territorial secession from a non-territorial compound state:

Initial state $P_0 = F(N_0, J_0^{NT})$; transition C^{NT} ; subsequent state $P' = F(N, J^{NT'})$



6. Non-territorial union over a non-territorial compound state:

Initial state $P_0 = F(N_0, J_0^{NT})$; transition U^{NT} ; subsequent state $P' = F(N, J^{0'})$



Basic internal exit model

1. Decreasing average cost of public good provision and increasing average product of private enterprise (i.e., agglomeration economies):

$$\text{Let } f(K) = F \Leftrightarrow \frac{f(K)}{K} = \frac{F}{K}$$

$$\text{Let } g(K) = K$$

$$T^* = W(N) - \frac{N}{S}W(S) \quad \text{From (5)}$$

$$T^* = (N^2 - F) - \frac{N}{S}(S^2 - F) = N^2 - F - NS + \frac{N}{S}F = NM + \frac{MF}{S}$$

$$P^* = \frac{W(S)}{S} \quad \text{From (8)}$$

$$P^* = \frac{S^2 - F}{S} = S - \frac{F}{S}$$

$$B^* = P^* + \frac{T^*}{M} \quad \text{From (8)}$$

$$B^* = \left(S - \frac{F}{S}\right) + \frac{NM}{M} + \frac{MF}{MS} = S + N = 2N - M$$

$$t^* = \frac{g(N) - g(S)}{g(N)} + \frac{f(S)}{Sg(N)} \quad \text{From (3)}$$

$$t^* = \frac{N - S}{N} + \frac{F}{SN} = \frac{M}{N} + \frac{F}{SN} = \frac{MS + F}{SN}$$

2. Decreasing average cost of public good provision and constant average product of private enterprise (i.e., no agglomeration economies):

$$\text{Let } f(K) = F \Leftrightarrow \frac{f(K)}{K} = \frac{F}{K}$$

$$\text{Let } g(K) = \bar{g}$$

$$T^* = W(N) - \frac{N}{S}W(S) \quad \text{From (5)}$$

$$T^* = (N\bar{g} - F) - \frac{N}{S}(S\bar{g} - F) = N\bar{g} - F - N\bar{g} + \frac{N}{S}F = \frac{MF}{S}$$

$$P^* = \frac{W(S)}{S} \quad \text{From (8)}$$

$$P^* = \frac{S\bar{g} - F}{S} = \bar{g} - \frac{F}{S}$$

$$B^* = P^* + \frac{T^*}{M} \quad \text{From (8)}$$

$$B^* = \left(\bar{g} - \frac{F}{S}\right) + \frac{MF}{MS} = \bar{g}$$

$$t^* = \frac{g(N) - g(S)}{g(N)} + \frac{f(S)}{Sg(N)} \quad \text{From (3)}$$

$$t^* = \frac{\bar{g} - \bar{g}}{\bar{g}} + \frac{F}{S\bar{g}} = \frac{F}{S\bar{g}}$$

3. Constant average cost of public good provision and increasing average product of private enterprise (i.e., agglomeration economies):

$$\text{Let } f(K) = \bar{f}K \Leftrightarrow \frac{f(K)}{K} = \bar{f}$$

$$\text{Let } g(K) = K$$

$$T^* = W(N) - \frac{N}{S}W(S) \quad \text{From (5)}$$

$$T^* = (N^2 - \bar{f}N) - \frac{N}{S}(S^2 - \bar{f}S) = N^2 - \bar{f}N - NS + \bar{f}N = NM$$

$$P^* = \frac{W(S)}{S} \quad \text{From (8)}$$

$$P^* = \frac{S^2 - \bar{f}S}{S} = S - \bar{f}$$

$$B^* = P^* + \frac{T^*}{M} \quad \text{From (8)}$$

$$B^* = (S - \bar{f}) + \frac{NM}{M} = N + S - \bar{f}$$

$$t^* = \frac{g(N) - g(S)}{g(N)} + \frac{f(S)}{Sg(N)} \quad \text{From (3)}$$

$$t^* = \frac{N - S}{N} + \frac{\bar{f}S}{SN} = \frac{M + \bar{f}}{N}$$

4. Constant average cost of public good provision and constant average product of private enterprise (i.e., no agglomeration economies):

$$\text{Let } f(K) = \bar{f}K \Leftrightarrow \frac{f(K)}{K} = \bar{f}$$

$$\text{Let } g(K) = \bar{g}$$

$$T^* = W(N) - \frac{N}{S}W(S) \quad \text{From (5)}$$

$$T^* = (N\bar{g} - \bar{f}N) - \frac{N}{S}(S\bar{g} - \bar{f}S) = N\bar{g} - \bar{f}N - N\bar{g} + \bar{f}N = 0$$

$$P^* = \frac{W(S)}{S} \quad \text{From (8)}$$

$$P^* = \frac{S\bar{g} - \bar{f}S}{S} = \bar{g} - \bar{f}$$

$$B^* = P^* + \frac{T^*}{M} \quad \text{From (8)}$$

$$B^* = (\bar{g} - \bar{f}) + 0 = \bar{g} - \bar{f}$$

$$t^* = \frac{g(N) - g(S)}{g(N)} + \frac{f(S)}{Sg(N)} \quad \text{From (3)}$$

$$t^* = \frac{\bar{g} - \bar{g}}{\bar{g}} + \frac{\bar{f}S}{S\bar{g}} = \frac{\bar{f}}{\bar{g}}$$

Proofness conditions

1. Secession-proof condition:

Since players can now use cryptosecession as a means of escaping fiscal exploitation, the secession-proof condition will be changed.

Player 2 payoff if they do not secede is $\Pi^2 = (1 - t_S^*)\alpha g(N) + (1 - t_0(S))\beta g(S)$.

Player 2 payoffs if they do secede are $\Pi^2 = (1 - t_0(S))g(S)$ when they do not also cryptosecede; or $\Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$ when they do cryptosecede.

The first secession-proof condition

$$(1 - t_S^*)\alpha g(N) + (1 - t_0(S))\beta g(S) = (1 - t_0(S))g(S)$$

$$(1 - t_S^*)\alpha g(N) = (1 - t_0(S))\alpha g(S)$$

$$t_S^* g(N) = g(N) - \left(g(S) - \frac{f(S)}{S} \right)$$

$$t_S^* = 1 - \frac{g(S)}{g(N)} - \frac{f(S)}{Sg(N)} = t^*$$

When $\alpha = 1, \beta = 0 \Leftrightarrow t_S^* = t^*$

The second secession-proof condition

$$(1 - t_S^*)\alpha g(N) + (1 - t_0(S))\beta g(S) = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$$

$$(1 - t_S^*)\alpha g(N) = (1 - t_0(S))\alpha g(S) - (1 - t_0(S))\beta g(S) + (1 - t_0(N))\beta g(N)$$

$$(1 - t_S^*)\alpha g(N) = \alpha g(S) - \alpha \frac{f(S)}{S} - \beta g(S) + \beta \frac{f(S)}{S} + \beta g(N) - \beta \frac{f(N)}{N}$$

$$t_S^* = \left(1 - \frac{g(S)}{g(N)} - \frac{f(S)}{Sg(N)}\right) - \frac{\beta}{\alpha} \left(1 - \frac{g(S)}{g(N)} - \frac{f(S)}{Sg(N)}\right) + \frac{\beta}{\alpha} \frac{f(N)}{Ng(N)}$$

$$t_S^* = \frac{\alpha - \beta}{\alpha} t^* + \frac{\beta}{\alpha} t_0(N)$$

When $\alpha = 1, \beta = 0 \Leftrightarrow t_S^* = t^*$, which means the first condition is nested in this expression

The *new* secession-proof condition, given the capability to cryptosecede, is

$$t_S^* = \frac{\alpha - \beta}{\alpha} t^* + \frac{\beta}{\alpha} t_0(N).$$

2. *Cryptosecession-proof condition:*

Player 2 payoffs if they do not cryptosecede are $\Pi^2 = (1 - t_C^*)g(N)$ when they do not also secede; or $\Pi^2 = (1 - t_0(S))g(S)$ when they do secede.

We will use the first of these, since it contains the cryptosecession-proof t_C^* that we are trying to solve for.

Player 2 payoffs if they do cryptosecede are $\Pi^2 = (1 - t_S^*)\alpha g(N) + (1 - t_0(S))\beta g(S)$ when they do not also secede; or $\Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$ when they do secede.

The first cryptosecession-proof condition

$$(1 - t_C^*)g(N) = (1 - t_S^*)\alpha g(N) + (1 - t_0(S))\beta g(S)$$

$$(1 - t_C^*)g(N) = \left(1 - \frac{\alpha - \beta}{\alpha}t^* - \frac{\beta}{\alpha}t_0(N)\right)\alpha g(N) + (1 - t_0(S))\beta g(S)$$

$$(1 - t_C^*)g(N) = (\alpha - (\alpha - \beta)t^* - \beta t_0(N))\alpha g(N) + (1 - t_0(S))\beta g(S)$$

$$(1 - t_C^*)g(N) = \alpha g(N) - \alpha t^* g(N) + \beta t^* g(N) - \beta t_0(N)g(N) + \beta g(S) - \beta t_0(S)g(S)$$

$$t_C^* g(N) = \beta g(N) + \alpha \left(g(N) - g(S) - \frac{f(S)}{S}\right) - \beta \left(g(N) - g(S) - \frac{f(S)}{S}\right) + \beta \frac{f(N)}{N} - \beta g(S) + \beta \frac{f(S)}{S}$$

$$t_C^* g(N) = \alpha g(N) + \alpha g(S) + \alpha \frac{f(S)}{S} + \beta \frac{f(N)}{N}$$

$$t_C^* = \alpha \left(1 - \frac{g(S)}{g(N)} - \frac{f(S)}{Sg(N)}\right) + \beta \frac{f(N)}{N}$$

$$t_C^* = \alpha t^* + \beta t_0(N)$$

The second cryptosecession-proof condition

$$(1 - t_c^*)g(N) = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$$

$$(1 - t_c^*)g(N) = \alpha g(S) - \alpha \frac{f(S)}{S} + \beta g(N) - \beta \frac{f(N)}{N}$$

$$t_c^*g(N) = g(N) - \alpha g(S) + \alpha \frac{f(S)}{S} - \beta g(N) + \beta \frac{f(N)}{N}$$

$$t_c^*g(N) = \alpha g(N) - \alpha g(S) + \alpha \frac{f(S)}{S} + \beta \frac{f(N)}{N}$$

$$t_c^* = \alpha \left(1 - \frac{g(S)}{g(N)} - \frac{f(S)}{Sg(N)} \right) + \beta \frac{f(N)}{N}$$

$$t_c^* = \alpha t^* + \beta t_0(N)$$

The cryptosecession-proof condition is $t_c^* = \alpha t^* + \beta t_0(N)$.

3. Secession-proof tax rate versus cryptosecession-proof tax rate:

Finally, is the cryptosecession-proof or secession-proof tax rate larger?

$$t_S^* - t_C^* = \frac{\alpha - \beta}{\alpha} t^* + \frac{\beta}{\alpha} t_0(N) - \alpha t^* - \beta t_0(N)$$

$$t_S^* - t_C^* = \left(1 - \frac{\beta}{\alpha}\right) t^* + \frac{\beta}{\alpha} t_0(N) - (1 - \beta) t^* - \beta t_0(N)$$

$$t_S^* - t_C^* = \left(\beta - \frac{\beta}{\alpha}\right) t^* + \left(\frac{\beta}{\alpha} - \beta\right) t_0(N)$$

$$t_S^* - t_C^* = \left(\frac{\beta(\alpha - 1)}{\alpha}\right) t^* + \left(\frac{\beta(1 - \alpha)}{\alpha}\right) t_0(N)$$

$$t_S^* - t_C^* = \frac{\beta^2}{\alpha} (t_0(N) - t^*)$$

$$t_S^* - t_C^* = \frac{\beta^2}{\alpha} \left(\frac{f(N)}{Ng(N)} - \left(1 - \frac{g(S)}{g(N)} - \frac{f(S)}{Sg(N)}\right) \right)$$

$$t_S^* - t_C^* = \frac{\beta^2}{\alpha} \frac{1}{g(N)} \left(\left(\frac{f(N)}{Ng} - \frac{f(S)}{S} \right) + (g(S) - g(N)) \right) < 0$$

Since $\frac{f(N)}{N} < \frac{f(S)}{S} \Leftrightarrow \frac{f(N)}{N} - \frac{f(S)}{S} < 0$ and $g(S) < g(N) \Leftrightarrow g(S) - g(N) < 0$

The secession-proof tax rate is lower than the cryptosecession-proof tax rate

Payoffs and solutions to partial internal exit subgames

1. Over-exploitative tax rate t_X and no secession:

Variable	<i>Neither player chooses crypto</i>
α^i and β^i	$\alpha^1 = 1, \beta^1 = 0, \alpha^2 = 1, \beta^2 = 0$
K_ρ	$K_1 = N, K_2 = 0, K_3 = 0$
g_ρ	$g_1 = g(N), g_2 = 0, g_3 = 0$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = 0,$ $K_1^2 = S, K_2^2 = 0, K_3^2 = 0$
g_ρ^i	$g_1^1 = g(N), g_2^1 = 0, g_3^1 = 0,$ $g_1^2 = g(N), g_2^2 = 0, g_3^2 = 0$
g_V^i	$g_V^1 = g(N), g_V^2 = g(N)$
g_H^i	$g_H^1 = 0, g_H^2 = 0$
g^i	$g^1 = g(N), g^2 = g(N)$
f_ρ	$f_1 = f(N), f_2 = 0, f_3 = 0$
T_ρ	$T_1 = t_X N g(N) - f(N), T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_X = \frac{f(N) + T_1}{N g(N)}, t_2 = 0, t_3 = 0$
Π^i	$\Pi^1 = (1 - t_X)g(N) + \frac{t_X N g(N) - f(N)}{M},$ $\Pi^2 = (1 - t_X)g(N)$

Variable	Player 2 chooses crypto, player 1 does not
α^i and β^i	$\alpha^1 = 1, \beta^1 = 0, \alpha^2 = \alpha, \beta^2 = \beta$
K_ρ	$K_1 = N, K_2 = 0, K_3 = S$
g_ρ	$g_1 = g(N), g_2 = 0, g_3 = g(S)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = 0,$ $K_1^2 = S, K_2^2 = 0, K_3^2 = S$
g_ρ^i	$g_1^1 = g(N), g_2^1 = 0, g_3^1 = 0,$ $g_1^2 = g(N), g_2^2 = 0, g_3^2 = g(S)$
g_V^i	$g_V^1 = g(N), g_V^2 = \alpha g(N)$
g_H^i	$g_H^1 = 0, g_H^2 = \beta g(S)$
g^i	$g^1 = g(N), g^2 = \alpha g(N) + \beta g(S)$
f_ρ	$f_1 = f(N), f_2 = 0, f_3 = f(S)$
T_ρ	$T_1 = t_X(M + \alpha S)g(N) - f(N), T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_X = \frac{f(N)+T_1}{(M+\alpha S)g(N)}, t_2 = 0, t_3 = t_0(S) = \frac{f(S)}{\beta S g(S)}$
Π^i	$\Pi^1 = (1 - t_X)g(N) + \frac{t_X(M+\alpha S)g(N)-f(N)}{M},$ $\Pi^2 = (1 - t_X)\alpha g(N) + (1 - t_0(S))\beta g(S)$

Variable	Player 1 chooses crypto, player 2 does not
α^i and β^i	$\alpha^1 = \alpha, \beta^1 = \beta, \alpha^2 = 1, \beta^2 = 0$
K_ρ	$K_1 = N, K_2 = 0, K_3 = M$
g_ρ	$g_1 = g(N), g_2 = 0, g_3 = g(M)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = M,$ $K_1^2 = S, K_2^2 = 0, K_3^2 = 0$
g_ρ^i	$g_1^1 = g(N), g_2^1 = 0, g_3^1 = g(M),$ $g_1^2 = g(N), g_2^2 = 0, g_3^2 = 0$
g_V^i	$g_V^1 = \alpha g(N), g_V^2 = g(N)$
g_H^i	$g_H^1 = \beta g(M), g_H^2 = 0$
g^i	$g^1 = \alpha g(N) + \beta g(M), g^2 = g(N)$
f_ρ	$f_1 = f(N), f_2 = 0, f_3 = f(M)$
T_ρ	$T_1 = t_x(\alpha M + S)g(N) - f(N), T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_x = \frac{f(N)+T_1}{(\alpha M+S)g(N)}, t_2 = 0, t_3 = t_0(M) = \frac{f(M)}{Mg(M)}$
Π^i	$\Pi^1 = (1 - t_x)\alpha g(N) + (1 - t_0(M))\beta g(M) + \frac{t_x(\alpha M+S)g(N)-f(N)}{M},$ $\Pi^2 = (1 - t_x)g(N)$

Variable	<i>Both players choose crypto</i>
α^i and β^i	$\alpha^1 = \alpha, \beta^1 = \beta, \alpha^2 = \alpha, \beta^2 = \beta$
K_ρ	$K_1 = N, K_2 = 0, K_3 = N$
g_ρ	$g_1 = g(N), g_2 = 0, g_3 = g(N)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = M,$ $K_1^2 = S, K_2^2 = 0, K_3^2 = S$
g_ρ^i	$g_1^1 = g(N), g_2^1 = 0, g_3^1 = g(N),$ $g_1^2 = g(N), g_2^2 = 0, g_3^2 = g(N)$
g_V^i	$g_V^1 = \alpha g(N), g_V^2 = \alpha g(N)$
g_H^i	$g_H^1 = \beta g(N), g_H^2 = \beta g(N)$
g^i	$g^1 = g(N), g^2 = g(N)$
f_ρ	$f_1 = f(N), f_2 = 0, f_3 = f(N)$
T_ρ	$T_1 = t_X \alpha N g(N) - f(N), T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_X = \frac{f(N) + T_1}{\alpha N g(N)}, t_2 =, t_3 = t_0(N) = \frac{f(N)}{N g(N)}$
Π^i	$\Pi^1 = (1 - t_X) \alpha g(N) + (1 - t_0(N)) \beta g(N) + \frac{t_X \alpha N g(N) - f(N)}{M},$ $\Pi^2 = (1 - t_X) \alpha g(N) + (1 - t_0(N)) \beta g(N)$

Equilibrium for subgame 1:

Consider the difference between payoffs Π^1 for when sharers cryptosecede versus not, given that non-sharers do not cryptosecede:

$$\Delta\Pi^1 = \left((1 - t_x)\alpha g(N) + (1 - t_0(M))\beta g(M) + \frac{t_x(\alpha M + S)g(N) - f(N)}{M} \right) - \left((1 - t_x)g(N) + \frac{t_x N g(N) - f(N)}{M} \right)$$

$$\Delta\Pi^1 = (1 - t_x)(\alpha - 1)g(N) + (1 - t_0(M))\beta g(M) + \frac{t_x(\alpha M + S - N)g(N)}{M}$$

$$\Delta\Pi^1 = -(1 - t_x)\beta g(N) + (1 - t_0(M))\beta g(M) - t_x\beta g(N)$$

$$\Delta\Pi^1 = \beta \left(g(M) - g(N) - \frac{f(M)}{M} \right) < 0$$

If non-sharers do not cryptosecede, then sharers will not either.

Consider the difference between payoffs Π^1 for when sharers cryptosecede versus not, given that non-sharers do cryptosecede:

$$\Delta\Pi^1 = \left((1 - t_x)\alpha g(N) + (1 - t_0(N))\beta g(N) + \frac{t_x\alpha N g(N) - f(N)}{M} \right) - \left((1 - t_x)g(N) + \frac{t_x(M + \alpha S)g(N) - f(N)}{M} \right)$$

$$\Delta\Pi^1 = (1 - t_x)(\alpha - 1)g(N) + (1 - t_0(N))\beta g(N) + \frac{t_x(\alpha N - M - \alpha S)g(N)}{M}$$

$$\Delta\Pi^1 = -(1 - t_x)\beta g(N) + (1 - t_0(N))\beta g(N) - t_x\beta g(N)$$

$$\Delta\Pi^1 = -t_0(N)\beta g(N) < 0$$

If non-sharers do cryptosecede, then sharers still will not.

Now consider the difference between payoffs Π^2 for when non-sharers cryptosecede versus not, given that sharers *do not* cryptosecede:

$$\Delta\Pi^2 = (1 - t_x)\alpha g(N) + (1 - t_0(S))\beta g(S) - (1 - t_x)g(N)$$

$$\Delta\Pi^2 = (1 - t_x)(\alpha - 1)g(N) + (1 - t_0(S))\beta g(S)$$

$$\Delta\Pi^2 = -(1 - t_x)\beta g(N) + (1 - t_0(S))\beta g(S)$$

$$\Delta\Pi^2 = \beta \left(g(S) - \frac{f(S)}{S} - g(N) + t_x g(N) \right)$$

$$\Delta\Pi^2 = \frac{\beta}{g(N)} \left(\frac{g(S)}{g(N)} - \frac{f(S)}{Sg(N)} - 1 + t_x \right)$$

$$\Delta\Pi^2 = \frac{\beta}{g(N)} \left(t_x - \left(1 - \frac{g(S)}{g(N)} + \frac{f(S)}{Sg(N)} \right) \right)$$

$$\Delta\Pi^2 = \frac{\beta}{g(N)} (t_x - t^*) > 0$$

Since $\beta > 0$, $g(N) > 0$, and $t_x > t^* \Leftrightarrow t_x - t^* > 0$

Thus non-sharers will cryptosecede, given that sharers do not cryptosecede.

Therefore the Nash equilibrium is non-sharers cryptosecede and sharers do not.

2. Over-exploitative tax rate t_x and secession:

Variable	<i>Neither player chooses crypto</i>
α^i and β^i	$\alpha^1 = 1, \beta^1 = 0, \alpha^2 = 1, \beta^2 = 0$
K_ρ	$K_1 = M, K_2 = S, K_3 = 0$
g_ρ	$g_1 = g(M), g_2 = g(S), g_3 = 0$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = 0,$ $K_1^2 = 0, K_2^2 = S, K_3^2 = 0$
g_ρ^i	$g_1^1 = g(M), g_2^1 = 0, g_3^1 = 0,$ $g_1^2 = 0, g_2^2 = g(S), g_3^2 = 0$
g_V^i	$g_V^1 = g(M), g_V^2 = g(S)$
g_H^i	$g_H^1 = 0, g_H^2 = 0$
g^i	$g^1 = g(M), g^2 = g(S)$
f_ρ	$f_1 = f(M), f_2 = f(S), f_3 = 0$
T_ρ	$T_1 = 0, T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_0(M) = \frac{f(M)}{Mg(M)}, t_2 = t_0(S) = \frac{f(S)}{Sg(S)}, t_3 = 0$
Π^i	$\Pi^1 = (1 - t_0(M))g(M),$ $\Pi^2 = (1 - t_0(S))g(S)$

Variable	Player 2 chooses crypto, player 1 does not
α^i and β^i	$\alpha^1 = 1, \beta^1 = 0, \alpha^2 = \alpha, \beta^2 = \beta$
K_ρ	$K_1 = M, K_2 = S, K_3 = S$
g_ρ	$g_1 = g(M), g_2 = g(S), g_3 = g(S)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = 0,$ $K_1^2 = 0, K_2^2 = S, K_3^2 = S$
g_ρ^i	$g_1^1 = g(M), g_2^1 = 0, g_3^1 = 0,$ $g_1^2 = 0, g_2^2 = g(S), g_3^2 = g(S)$
g_V^i	$g_V^1 = g(M), g_V^2 = \alpha g(S)$
g_H^i	$g_H^1 = 0, g_H^2 = \beta g(S)$
g^i	$g^1 = g(M), g^2 = g(S)$
f_ρ	$f_1 = f(M), f_2 = f(S), f_3 = 0$
T_ρ	$T_1 = 0, T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_0(M) = \frac{f(M)}{Mg(M)}, t_2 = t_0(S) = \frac{f(S)}{Sg(S)}, t_3 = t_0(S) = \frac{f(S)}{Sg(S)}$
Π^i	$\Pi^1 = (1 - t_0(M))g(M),$ $\Pi^2 = (1 - 2t_0(S))g(S)$

Variable	Player 1 chooses crypto, player 2 does not
α^i and β^i	$\alpha^1 = \alpha, \beta^1 = \beta, \alpha^2 = 1, \beta^2 = 0$
K_ρ	$K_1 = M, K_2 = S, K_3 = M$
g_ρ	$g_1 = g(M), g_2 = g(S), g_3 = g(M)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = M,$ $K_1^2 = 0, K_2^2 = S, K_3^2 = 0$
g_ρ^i	$g_1^1 = g(M), g_2^1 = 0, g_3^1 = g(M),$ $g_1^2 = 0, g_2^2 = g(S), g_3^2 = 0$
g_V^i	$g_V^1 = \alpha g(M), g_V^2 = g(S)$
g_H^i	$g_H^1 = \beta g(M), g_H^2 = 0$
g^i	$g^1 = g(M), g^2 = g(S)$
f_ρ	$f_1 = f(M), f_2 = f(S), f_3 = f(M)$
T_ρ	$T_1 = 0, T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_0(M) = \frac{f(M)}{Mg(M)}, t_2 = t_0(S) = \frac{f(S)}{Sg(S)}, t_3 = t_0(M) = \frac{f(M)}{Mg(M)}$
Π^i	$\Pi^1 = (1 - 2t_0(M))g(M),$ $\Pi^2 = (1 - t_0(S))g(S)$

Variable	<i>Both players choose crypto</i>
α^i and β^i	$\alpha^1 = \alpha, \beta^1 = \beta, \alpha^2 = \alpha, \beta^2 = \beta$
K_ρ	$K_1 = M, K_2 = S, K_3 = N$
g_ρ	$g_1 = g(M), g_2 = g(S), g_3 = g(N)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = M,$ $K_1^2 = 0, K_2^2 = S, K_3^2 = S$
g_ρ^i	$g_1^1 = g(M), g_2^1 = 0, g_3^1 = g(N),$ $g_1^2 = g(M), g_2^2 = 0, g_3^2 = g(N)$
g_V^i	$g_V^1 = \alpha g(M), g_V^2 = \alpha g(S)$
g_H^i	$g_H^1 = \beta g(N), g_H^2 = \beta g(N)$
g^i	$g^1 = \alpha g(M) + \beta g(N), g^2 = \alpha g(S) + \beta g(N)$
f_ρ	$f_1 = f(M), f_2 = f(S), f_3 = f(N)$
T_ρ	$T_1 = 0, T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_0(M) = \frac{f(M)}{Mg(M)}, t_2 = t_0(S) = \frac{f(S)}{Sg(S)}, t_3 = t_0(N) = \frac{f(N)}{Ng(N)}$
Π^i	$\Pi^1 = (1 - t_0(M))\alpha g(M) + (1 - t_0(N))\beta g(N),$ $\Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$

Equilibrium for subgame 2:

Consider the difference between payoffs Π^1 for when sharers cryptosecede versus not, given that non-sharers do not cryptosecede:

$$\Delta\Pi^1 = (1 - 2t_0(M))g(M) - (1 - t_0(M))g(M)$$

$$\Delta\Pi^1 = -t_0(M)gM < 0$$

If non-sharers do not cryptosecede, then sharers will not either

Consider the difference between payoffs Π^1 for when sharers cryptosecede versus not, given that non-sharers do cryptosecede:

$$\Delta\Pi^1 = (1 - t_0(M))\alpha g(M) + (1 - t_0(N))\beta g(N) - (1 - t_0(M))g(M)$$

$$\Delta\Pi^1 = (1 - t_0(N))\beta g(N) - (1 - t_0(M))\beta g(M) > 0$$

However, if non-sharers do cryptosecede, then sharers will also

Now consider the difference between payoffs Π^2 for when non-sharers cryptosecede versus not, given that sharers do not cryptosecede:

$$\Delta\Pi^2 = (1 - 2t_0(S))g(S) - (1 - t_0(S))g(S)$$

$$\Delta\Pi^2 = -t_0(S)g(S) < 0$$

If sharers do not cryptosecede, then non-sharers will not either

Consider the difference between payoffs Π^2 for when non-sharers cryptosecede versus not, given that sharers do cryptosecede:

$$\Delta\Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N) - (1 - t_0(S))g(S)$$

$$\Delta\Pi^2 = (1 - t_0(N))\beta g(N) - (1 - t_0(S))\beta g(S) > 0$$

However, if sharers do cryptosecede, then non-sharers will also

There are therefore two Nash equilibriums: (1) both players do not cryptosecede, and (2) both players do cryptosecede.

3. Cryptosecession-proof tax rate t_c^* and no secession:

Variable	<i>Neither player chooses crypto</i>
α^i and β^i	$\alpha^1 = 1, \beta^1 = 0, \alpha^2 = 1, \beta^2 = 0$
K_ρ	$K_1 = N, K_2 = 0, K_3 = 0$
g_ρ	$g_1 = g(N), g_2 = 0, g_3 = 0$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = 0,$ $K_1^2 = S, K_2^2 = 0, K_3^2 = 0$
g_ρ^i	$g_1^1 = g(N), g_2^1 = 0, g_3^1 = 0,$ $g_1^2 = g(N), g_2^2 = 0, g_3^2 = 0$
g_V^i	$g_V^1 = g(N), g_V^2 = g(N)$
g_H^i	$g_H^1 = 0, g_H^2 = 0$
g^i	$g^1 = g(N), g^2 = g(N)$
f_ρ	$f_1 = f(N), f_2 = 0, f_3 = 0$
T_ρ	$T_1 = t_c^* N g(N) - f(N), T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_c^* = \frac{f(N) + T_1}{N g(N)}, t_2 = 0, t_3 = 0$
Π^i	$\Pi^1 = (1 - t_c^*) g(N) + \frac{t_c^* N g(N) - f(N)}{M},$ $\Pi^2 = (1 - t_c^*) g(N)$

Variable	Player 2 chooses crypto, player 1 does not
α^i and β^i	$\alpha^1 = 1, \beta^1 = 0, \alpha^2 = \alpha, \beta^2 = \beta$
K_ρ	$K_1 = N, K_2 = 0, K_3 = S$
g_ρ	$g_1 = g(N), g_2 = 0, g_3 = g(S)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = 0,$ $K_1^2 = S, K_2^2 = 0, K_3^2 = S$
g_ρ^i	$g_1^1 = g(N), g_2^1 = 0, g_3^1 = 0,$ $g_1^2 = g(N), g_2^2 = 0, g_3^2 = g(S)$
g_V^i	$g_V^1 = g(N), g_V^2 = \alpha g(N)$
g_H^i	$g_H^1 = 0, g_H^2 = \beta g(S)$
g^i	$g^1 = g(N), g^2 = \alpha g(N) + \beta g(S)$
f_ρ	$f_1 = f(N), f_2 = 0, f_3 = f(S)$
T_ρ	$T_1 = t_C^*(M + \alpha S)g(N) - f(N), T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_C^* = \frac{f(N)+T_1}{(M+\alpha S)g(N)}, t_2 = 0, t_3 = t_0(S) = \frac{f(S)}{\beta S g(S)}$
Π^i	$\Pi^1 = (1 - t_C^*)g(N) + \frac{t_C^*(M+\alpha S)g(N)-f(N)}{M},$ $\Pi^2 = (1 - t_C^*)\alpha g(N) + (1 - t_0(S))\beta g(S)$

Variable	Player 1 chooses crypto, player 2 does not
α^i and β^i	$\alpha^1 = \alpha, \beta^1 = \beta, \alpha^2 = 1, \beta^2 = 0$
K_ρ	$K_1 = N, K_2 = 0, K_3 = M$
g_ρ	$g_1 = g(N), g_2 = 0, g_3 = g(M)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = M,$ $K_1^2 = S, K_2^2 = 0, K_3^2 = 0$
g_ρ^i	$g_1^1 = g(N), g_2^1 = 0, g_3^1 = g(M),$ $g_1^2 = g(N), g_2^2 = 0, g_3^2 = 0$
g_V^i	$g_V^1 = \alpha g(N), g_V^2 = g(N)$
g_H^i	$g_H^1 = \beta g(M), g_H^2 = 0$
g^i	$g^1 = \alpha g(N) + \beta g(M), g^2 = g(N)$
f_ρ	$f_1 = f(N), f_2 = 0, f_3 = f(M)$
T_ρ	$T_1 = t_c^*(\alpha M + S)g(N) - f(N), T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_c^* = \frac{f(N)+T_1}{(\alpha M+S)g(N)}, t_2 = 0, t_3 = t_0(M) = \frac{f(M)}{Mg(M)}$
Π^i	$\Pi^1 = (1 - t_c^*)\alpha g(N) + (1 - t_0(M))\beta g(M) + \frac{t_c^*(\alpha M+S)g(N)-f(N)}{M},$ $\Pi^2 = (1 - t_c^*)g(N)$

Variable	<i>Both players choose crypto</i>
α^i and β^i	$\alpha^1 = \alpha, \beta^1 = \beta, \alpha^2 = \alpha, \beta^2 = \beta$
K_ρ	$K_1 = N, K_2 = 0, K_3 = N$
g_ρ	$g_1 = g(N), g_2 = 0, g_3 = g(N)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = M,$ $K_1^2 = S, K_2^2 = 0, K_3^2 = S$
g_ρ^i	$g_1^1 = g(N), g_2^1 = 0, g_3^1 = g(N),$ $g_1^2 = g(N), g_2^2 = 0, g_3^2 = g(N)$
g_V^i	$g_V^1 = \alpha g(N), g_V^2 = \alpha g(N)$
g_H^i	$g_H^1 = \beta g(N), g_H^2 = \beta g(N)$
g^i	$g^1 = g(N), g^2 = g(N)$
f_ρ	$f_1 = f(N), f_2 = 0, f_3 = f(N)$
T_ρ	$T_1 = t_C^* \alpha N g(N) - f(N), T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_C^* = \frac{f(N) + T_1}{\alpha N g(N)}, t_2 =, t_3 = t_0(N) = \frac{f(N)}{N g(N)}$
Π^i	$\Pi^1 = (1 - t_C^*) \alpha g(N) + (1 - t_0(N)) \beta g(N) + \frac{t_C^* \alpha N g(N) - f(N)}{M},$ $\Pi^2 = (1 - t_C^*) \alpha g(N) + (1 - t_0(N)) \beta g(N)$

Equilibrium for subgame 3:

Consider the difference between payoffs Π^1 for when sharers cryptosecede versus not, given that non-sharers do not cryptosecede:

$$\Delta\Pi^1 = \left((1 - t_c^*)\alpha g(N) + (1 - t_0(M))\beta g(M) + \frac{t_c^*(\alpha M + S)g(N) - f(N)}{M} \right) - \left((1 - t_c^*)g(N) + \frac{t_c^*Ng(N) - f(N)}{M} \right)$$

$$\Delta\Pi^1 = (1 - t_c^*)(\alpha - 1)g(N) + (1 - t_0(M))\beta g(M) + \frac{t_c^*(\alpha M + S - N)g(N)}{M}$$

$$\Delta\Pi^1 = -(1 - t_c^*)\beta g(N) + (1 - t_0(M))\beta g(M) - t_c^*\beta g(N)$$

$$\Delta\Pi^1 = \beta \left(g(M) - g(N) - \frac{f(M)}{M} \right) < 0$$

If non-sharers do not cryptosecede, then sharers will not either

Consider the difference between payoffs Π^1 for when sharers cryptosecede versus not, given that non-sharers do cryptosecede:

$$\Delta\Pi^1 = \left((1 - t_c^*)\alpha g(N) + (1 - t_0(N))\beta g(N) + \frac{t_c^*\alpha Ng(N) - f(N)}{M} \right) - \left((1 - t_c^*)g(N) + \frac{t_c^*(M + \alpha S)g(N) - f(N)}{M} \right)$$

$$\Delta\Pi^1 = (1 - t_c^*)(\alpha - 1)g(N) + (1 - t_0(N))\beta g(N) + \frac{t_c^*(\alpha N - M - \alpha S)g(N)}{M}$$

$$\Delta\Pi^1 = -(1 - t_c^*)\beta g(N) + (1 - t_0(N))\beta g(N) - t_c^*\beta g(N)$$

$$\Delta\Pi^1 = -t_0(N)\beta g(N) < 0$$

If non-sharers do cryptosecede, then sharers still will not.

Now consider the difference between payoffs Π^2 for when non-sharers cryptosecede versus not, given that sharers do not cryptosecede:

$$\Delta\Pi^2 = (1 - t_c^*)\alpha g(N) + (1 - t_0(S))\beta g(S) - (1 - t_c^*)g(N)$$

$$\Delta\Pi^2 = (1 - t_c^*)(\alpha - 1)g(N) + (1 - t_0(S))\beta g(S)$$

$$\Delta\Pi^2 = -(1 - t_c^*)\beta g(N) + (1 - t_0(S))\beta g(S)$$

$$\Delta\Pi^2 = \beta((1 - t_0(S))g(S) - (1 - t_c^*)g(N))$$

$$\Delta\Pi^2 = \beta\left(\left(g(S) - \frac{f(S)}{S}\right) - (g(N) - \alpha t^* g(N) - \beta t_0(N)g(N))\right)$$

$$\Delta\Pi^2 = \beta\left(\left(g(S) - \frac{f(S)}{S}\right) - \left(g(N) - \alpha\left(g(N) - g(S) + \frac{f(S)}{S}\right) - \beta\frac{f(N)}{N}\right)\right)$$

$$\Delta\Pi^2 = \beta\left(\beta g(S) - \beta g(N) + \beta\frac{f(N)}{N} - \beta\frac{f(S)}{S}\right)$$

$$\Delta\Pi^2 = \beta^2\left(\left(g(S) - g(N)\right) + \left(\frac{f(N)}{N} - \frac{f(S)}{S}\right)\right) < 0$$

If sharers do not cryptosecede, then non-sharers will not either

Now consider the difference between payoffs Π^2 for when non-sharers cryptosecede versus not, given that sharers do cryptosecede:

$$\Delta\Pi^2 = (1 - t_c^*)\alpha g(N) + (1 - t_0(N))\beta g(N) - (1 - t_c^*)g(N)$$

$$\Delta\Pi^2 = (1 - t_c^*)(\alpha - 1)g(N) + (1 - t_0(N))\beta g(N)$$

$$\Delta\Pi^2 = -(1 - t_c^*)\beta g(N) + (1 - t_0(N))\beta g(N)$$

$$\Delta\Pi^2 = \beta(t_c^* - t_0(N))g(N)$$

$$\Delta\Pi^2 = \beta(\alpha t^* + \beta t_0(N) - t_0(N))g(N)$$

$$\Delta\Pi^2 = \alpha\beta(t^* - t_0(N))g(N)$$

$$\Delta\Pi^2 = \alpha\beta \left(1 - \frac{g(S)}{g(S)} + \frac{f(S)}{Sg(N)} - \frac{f(N)}{Ng(N)} \right) g(N)$$

$$\Delta\Pi^2 = \alpha\beta \left((g(N) - g(S)) + \left(\frac{f(S)}{S} - \frac{f(N)}{N} \right) \right) > 0$$

However, if sharers do cryptosecede, then non-sharers will also

Therefore the Nash equilibrium is both players do not cryptosecede.

4. Cryptosecession-proof tax rate t_c^* and secession:

Variable	<i>Neither player chooses crypto</i>
α^i and β^i	$\alpha^1 = 1, \beta^1 = 0, \alpha^2 = 1, \beta^2 = 0$
K_ρ	$K_1 = M, K_2 = S, K_3 = 0$
g_ρ	$g_1 = g(M), g_2 = g(S), g_3 = 0$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = 0,$ $K_1^2 = 0, K_2^2 = S, K_3^2 = 0$
g_ρ^i	$g_1^1 = g(M), g_2^1 = 0, g_3^1 = 0,$ $g_1^2 = 0, g_2^2 = g(S), g_3^2 = 0$
g_V^i	$g_V^1 = g(M), g_V^2 = g(S)$
g_H^i	$g_H^1 = 0, g_H^2 = 0$
g^i	$g^1 = g(M), g^2 = g(S)$
f_ρ	$f_1 = f(M), f_2 = f(S), f_3 = 0$
T_ρ	$T_1 = 0, T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_0(M) = \frac{f(M)}{Mg(M)}, t_2 = t_0(S) = \frac{f(S)}{Sg(S)}, t_3 = 0$
Π^i	$\Pi^1 = (1 - t_0(M))g(M),$ $\Pi^2 = (1 - t_0(S))g(S)$

Variable	Player 2 chooses crypto, player 1 does not
α^i and β^i	$\alpha^1 = 1, \beta^1 = 0, \alpha^2 = \alpha, \beta^2 = \beta$
K_ρ	$K_1 = M, K_2 = S, K_3 = S$
g_ρ	$g_1 = g(M), g_2 = g(S), g_3 = g(S)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = 0,$ $K_1^2 = 0, K_2^2 = S, K_3^2 = S$
g_ρ^i	$g_1^1 = g(M), g_2^1 = 0, g_3^1 = 0,$ $g_1^2 = 0, g_2^2 = g(S), g_3^2 = g(S)$
g_V^i	$g_V^1 = g(M), g_V^2 = \alpha g(S)$
g_H^i	$g_H^1 = 0, g_H^2 = \beta g(S)$
g^i	$g^1 = g(M), g^2 = g(S)$
f_ρ	$f_1 = f(M), f_2 = f(S), f_3 = 0$
T_ρ	$T_1 = 0, T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_0(M) = \frac{f(M)}{Mg(M)}, t_2 = t_0(S) = \frac{f(S)}{Sg(S)}, t_3 = t_0(S) = \frac{f(S)}{Sg(S)}$
Π^i	$\Pi^1 = (1 - t_0(M))g(M),$ $\Pi^2 = (1 - 2t_0(S))g(S)$

Variable	Player 1 chooses crypto, player 2 does not
α^i and β^i	$\alpha^1 = \alpha, \beta^1 = \beta, \alpha^2 = 1, \beta^2 = 0$
K_ρ	$K_1 = M, K_2 = S, K_3 = M$
g_ρ	$g_1 = g(M), g_2 = g(S), g_3 = g(M)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = M,$ $K_1^2 = 0, K_2^2 = S, K_3^2 = 0$
g_ρ^i	$g_1^1 = g(M), g_2^1 = 0, g_3^1 = g(M),$ $g_1^2 = 0, g_2^2 = g(S), g_3^2 = 0$
g_V^i	$g_V^1 = \alpha g(M), g_V^2 = g(S)$
g_H^i	$g_H^1 = \beta g(M), g_H^2 = 0$
g^i	$g^1 = g(M), g^2 = g(S)$
f_ρ	$f_1 = f(M), f_2 = f(S), f_3 = f(M)$
T_ρ	$T_1 = 0, T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_0(M) = \frac{f(M)}{Mg(M)}, t_2 = t_0(S) = \frac{f(S)}{Sg(S)}, t_3 = t_0(M) = \frac{f(M)}{Mg(M)}$
Π^i	$\Pi^1 = (1 - 2t_0(M))g(M),$ $\Pi^2 = (1 - t_0(S))g(S)$

Variable	<i>Both players choose crypto</i>
α^i and β^i	$\alpha^1 = \alpha, \beta^1 = \beta, \alpha^2 = \alpha, \beta^2 = \beta$
K_ρ	$K_1 = M, K_2 = S, K_3 = N$
g_ρ	$g_1 = g(M), g_2 = g(S), g_3 = g(N)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = M,$ $K_1^2 = 0, K_2^2 = S, K_3^2 = S$
g_ρ^i	$g_1^1 = g(M), g_2^1 = 0, g_3^1 = g(N),$ $g_1^2 = g(M), g_2^2 = 0, g_3^2 = g(N)$
g_V^i	$g_V^1 = \alpha g(M), g_V^2 = \alpha g(S)$
g_H^i	$g_H^1 = \beta g(N), g_H^2 = \beta g(N)$
g^i	$g^1 = \alpha g(M) + \beta g(N), g^2 = \alpha g(S) + \beta g(N)$
f_ρ	$f_1 = f(M), f_2 = f(S), f_3 = f(N)$
T_ρ	$T_1 = 0, T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_0(M) = \frac{f(M)}{Mg(M)}, t_2 = t_0(S) = \frac{f(S)}{Sg(S)}, t_3 = t_0(N) = \frac{f(N)}{Ng(N)}$
Π^i	$\Pi^1 = (1 - t_0(M))\alpha g(M) + (1 - t_0(N))\beta g(N),$ $\Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$

5. Secession-proof tax rate t_S^* and no secession:

Variable	<i>Neither player chooses crypto</i>
α^i and β^i	$\alpha^1 = 1, \beta^1 = 0, \alpha^2 = 1, \beta^2 = 0$
K_ρ	$K_1 = N, K_2 = 0, K_3 = 0$
g_ρ	$g_1 = g(N), g_2 = 0, g_3 = 0$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = 0,$ $K_1^2 = S, K_2^2 = 0, K_3^2 = 0$
g_ρ^i	$g_1^1 = g(N), g_2^1 = 0, g_3^1 = 0,$ $g_1^2 = g(N), g_2^2 = 0, g_3^2 = 0$
g_V^i	$g_V^1 = g(N), g_V^2 = g(N)$
g_H^i	$g_H^1 = 0, g_H^2 = 0$
g^i	$g^1 = g(N), g^2 = g(N)$
f_ρ	$f_1 = f(N), f_2 = 0, f_3 = 0$
T_ρ	$T_1 = t_S^* N g(N) - f(N), T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_S^* = \frac{f(N) + T_1}{N g(N)}, t_2 = 0, t_3 = 0$
Π^i	$\Pi^1 = (1 - t_S^*) g(N) + \frac{t_S^* N g(N) - f(N)}{M},$ $\Pi^2 = (1 - t_S^*) g(N)$

Variable	Player 2 chooses crypto, player 1 does not
α^i and β^i	$\alpha^1 = 1, \beta^1 = 0, \alpha^2 = \alpha, \beta^2 = \beta$
K_ρ	$K_1 = N, K_2 = 0, K_3 = S$
g_ρ	$g_1 = g(N), g_2 = 0, g_3 = g(S)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = 0,$ $K_1^2 = S, K_2^2 = 0, K_3^2 = S$
g_ρ^i	$g_1^1 = g(N), g_2^1 = 0, g_3^1 = 0,$ $g_1^2 = g(N), g_2^2 = 0, g_3^2 = g(S)$
g_V^i	$g_V^1 = g(N), g_V^2 = \alpha g(N)$
g_H^i	$g_H^1 = 0, g_H^2 = \beta g(S)$
g^i	$g^1 = g(N), g^2 = \alpha g(N) + \beta g(S)$
f_ρ	$f_1 = f(N), f_2 = 0, f_3 = f(S)$
T_ρ	$T_1 = t_S^*(M + \alpha S)g(N) - f(N), T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_S^* = \frac{f(N)+T_1}{(M+\alpha S)g(N)}, t_2 = 0, t_3 = t_0(S) = \frac{f(S)}{\beta S g(S)}$
Π^i	$\Pi^1 = (1 - t_S^*)g(N) + \frac{t_S^*(M+\alpha S)g(N)-f(N)}{M},$ $\Pi^2 = (1 - t_S^*)\alpha g(N) + (1 - t_0(S))\beta g(S)$

Variable	Player 1 chooses crypto, player 2 does not
α^i and β^i	$\alpha^1 = \alpha, \beta^1 = \beta, \alpha^2 = 1, \beta^2 = 0$
K_ρ	$K_1 = N, K_2 = 0, K_3 = M$
g_ρ	$g_1 = g(N), g_2 = 0, g_3 = g(M)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = M,$ $K_1^2 = S, K_2^2 = 0, K_3^2 = 0$
g_ρ^i	$g_1^1 = g(N), g_2^1 = 0, g_3^1 = g(M),$ $g_1^2 = g(N), g_2^2 = 0, g_3^2 = 0$
g_V^i	$g_V^1 = \alpha g(N), g_V^2 = g(N)$
g_H^i	$g_H^1 = \beta g(M), g_H^2 = 0$
g^i	$g^1 = \alpha g(N) + \beta g(M), g^2 = g(N)$
f_ρ	$f_1 = f(N), f_2 = 0, f_3 = f(M)$
T_ρ	$T_1 = t_S^*(\alpha M + S)g(N) - f(N), T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_S^* = \frac{f(N)+T_1}{(\alpha M+S)g(N)}, t_2 = 0, t_3 = t_0(M) = \frac{f(M)}{Mg(M)}$
Π^i	$\Pi^1 = (1 - t_S^*)\alpha g(N) + (1 - t_0(M))\beta g(M) + \frac{t_S^*(\alpha M+S)g(N)-f(N)}{M},$ $\Pi^2 = (1 - t_S^*)g(N)$

Variable	<i>Both players choose crypto</i>
α^i and β^i	$\alpha^1 = \alpha, \beta^1 = \beta, \alpha^2 = \alpha, \beta^2 = \beta$
K_ρ	$K_1 = N, K_2 = 0, K_3 = N$
g_ρ	$g_1 = g(N), g_2 = 0, g_3 = g(N)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = M,$ $K_1^2 = S, K_2^2 = 0, K_3^2 = S$
g_ρ^i	$g_1^1 = g(N), g_2^1 = 0, g_3^1 = g(N),$ $g_1^2 = g(N), g_2^2 = 0, g_3^2 = g(N)$
g_V^i	$g_V^1 = \alpha g(N), g_V^2 = \alpha g(N)$
g_H^i	$g_H^1 = \beta g(N), g_H^2 = \beta g(N)$
g^i	$g^1 = g(N), g^2 = g(N)$
f_ρ	$f_1 = f(N), f_2 = 0, f_3 = f(N)$
T_ρ	$T_1 = t_S^* \alpha N g(N) - f(N), T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_S^* = \frac{f(N) + T_1}{\alpha N g(N)}, t_2 =, t_3 = t_0(N) = \frac{f(N)}{N g(N)}$
Π^i	$\Pi^1 = (1 - t_S^*) \alpha g(N) + (1 - t_0(N)) \beta g(N) + \frac{t_S^* \alpha N g(N) - f(N)}{M},$ $\Pi^2 = (1 - t_S^*) \alpha g(N) + (1 - t_0(N)) \beta g(N)$

Equilibrium for subgame 5:

Consider the difference between payoffs Π^1 for when sharers cryptosecede versus not, given that non-sharers do not cryptosecede:

$$\Delta\Pi^1 = \left((1 - t_S^*)\alpha g(N) + (1 - t_0(M))\beta g(M) + \frac{t_S^*(\alpha M + S)g(N) - f(N)}{M} \right) - \left((1 - t_S^*)g(N) + \frac{t_S^*Ng(N) - f(N)}{M} \right)$$

$$\Delta\Pi^1 = (1 - t_S^*)(\alpha - 1)g(N) + (1 - t_0(M))\beta g(M) + \frac{t_S^*(\alpha M + S - N)g(N)}{M}$$

$$\Delta\Pi^1 = -(1 - t_S^*)\beta g(N) + (1 - t_0(M))\beta g(M) - t_S^*\beta g(N)$$

$$\Delta\Pi^1 = \beta \left(g(M) - g(N) - \frac{f(M)}{M} \right) < 0$$

If non-sharers do not cryptosecede, then sharers will not either

Consider the difference between payoffs Π^1 for when sharers cryptosecede versus not, given that non-sharers do cryptosecede:

$$\Delta\Pi^1 = \left((1 - t_S^*)\alpha g(N) + (1 - t_0(N))\beta g(N) + \frac{t_S^*\alpha Ng(N) - f(N)}{M} \right) - \left((1 - t_S^*)g(N) + \frac{t_S^*(M + \alpha S)g(N) - f(N)}{M} \right)$$

$$\Delta\Pi^1 = (1 - t_S^*)(\alpha - 1)g(N) + (1 - t_0(N))\beta g(N) + \frac{t_S^*(\alpha N - M - \alpha S)g(N)}{M}$$

$$\Delta\Pi^1 = -(1 - t_S^*)\beta g(N) + (1 - t_0(N))\beta g(N) - t_S^*\beta g(N)$$

$$\Delta\Pi^1 = -t_0(N)\beta g(N) < 0$$

If non-sharers do cryptosecede, then sharers still will not.

Now consider the difference between payoffs Π^2 for when non-sharers cryptosecede versus not, given that sharers do not cryptosecede:

$$\Delta\Pi^2 = (1 - t_s^*)\alpha g(N) + (1 - t_0(S))\beta g(S) - (1 - t_s^*)g(N)$$

$$\Delta\Pi^2 = -(1 - t_s^*)\beta g(N) + (1 - t_0(S))\beta g(S)$$

$$\Delta\Pi^2 = -\left(1 - \frac{\alpha - \beta}{\alpha}t^* - \frac{\beta}{\alpha}t_0(N)\right)\beta g(N) + (1 - t_0(S))\beta g(S)$$

$$\Delta\Pi^2 = -\left(1 - \frac{\alpha - \beta}{\alpha}\left(1 - \frac{g(S)}{g(N)} + \frac{f(S)}{Sg(N)}\right) - \frac{\beta}{\alpha}\frac{f(N)}{Ng(N)}\right)\beta g(N) + \left(1 - \frac{f(S)}{Sg(S)}\right)\beta g(S)$$

$$\Delta\Pi^2 = \beta\left(\left(-1 + \frac{\alpha - \beta}{\alpha}\right)g(N) + \left(-\frac{\alpha - \beta}{\alpha} + 1\right)g(S) + \left(\frac{\alpha - \beta}{\alpha} - 1\right)\frac{f(S)}{S} + \frac{\beta}{\alpha}\frac{f(N)}{N}\right)$$

$$\Delta\Pi^2 = \beta\left(-\frac{\beta}{\alpha}g(N) + \frac{\beta}{\alpha}g(S) - \frac{\beta}{\alpha}\frac{f(S)}{S} + \frac{\beta}{\alpha}\frac{f(N)}{N}\right)$$

$$\Delta\Pi^2 = \frac{\beta^2}{\alpha}\left((g(S) - g(N)) + \left(\frac{f(N)}{N} - \frac{f(S)}{S}\right)\right) < 0$$

If sharers do not cryptosecede, then non-sharers will not either

Consider the difference between payoffs Π^2 for when non-sharers cryptosecede versus not, given that sharers do cryptosecede:

$$\Delta\Pi^2 = (1 - t_s^*)\alpha g(N) + (1 - t_0(N))\beta g(N) - (1 - t_s^*)g(N)$$

$$\Delta\Pi^2 = -(1 - t_s^*)\beta g(N) + (1 - t_0(N))\beta g(N)$$

$$\Delta\Pi^2 = (t_s^* - t_0(N))\beta g(N) > 0$$

However, if sharers do cryptosecede, then non-sharers will also

Therefore the Nash equilibrium is both players do not cryptosecede.

6. Secession-proof tax rate t_ξ^* and secession:

Variable	<i>Neither player chooses crypto</i>
α^i and β^i	$\alpha^1 = 1, \beta^1 = 0, \alpha^2 = 1, \beta^2 = 0$
K_ρ	$K_1 = M, K_2 = S, K_3 = 0$
g_ρ	$g_1 = g(M), g_2 = g(S), g_3 = 0$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = 0,$ $K_1^2 = 0, K_2^2 = S, K_3^2 = 0$
g_ρ^i	$g_1^1 = g(M), g_2^1 = 0, g_3^1 = 0,$ $g_1^2 = 0, g_2^2 = g(S), g_3^2 = 0$
g_V^i	$g_V^1 = g(M), g_V^2 = g(S)$
g_H^i	$g_H^1 = 0, g_H^2 = 0$
g^i	$g^1 = g(M), g^2 = g(S)$
f_ρ	$f_1 = f(M), f_2 = f(S), f_3 = 0$
T_ρ	$T_1 = 0, T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_0(M) = \frac{f(M)}{Mg(M)}, t_2 = t_0(S) = \frac{f(S)}{Sg(S)}, t_3 = 0$
Π^i	$\Pi^1 = (1 - t_0(M))g(M),$ $\Pi^2 = (1 - t_0(S))g(S)$

Variable	Player 2 chooses crypto, player 1 does not
α^i and β^i	$\alpha^1 = 1, \beta^1 = 0, \alpha^2 = \alpha, \beta^2 = \beta$
K_ρ	$K_1 = M, K_2 = S, K_3 = S$
g_ρ	$g_1 = g(M), g_2 = g(S), g_3 = g(S)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = 0,$ $K_1^2 = 0, K_2^2 = S, K_3^2 = S$
g_ρ^i	$g_1^1 = g(M), g_2^1 = 0, g_3^1 = 0,$ $g_1^2 = 0, g_2^2 = g(S), g_3^2 = g(S)$
g_V^i	$g_V^1 = g(M), g_V^2 = \alpha g(S)$
g_H^i	$g_H^1 = 0, g_H^2 = \beta g(S)$
g^i	$g^1 = g(M), g^2 = g(S)$
f_ρ	$f_1 = f(M), f_2 = f(S), f_3 = 0$
T_ρ	$T_1 = 0, T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_0(M) = \frac{f(M)}{Mg(M)}, t_2 = t_0(S) = \frac{f(S)}{Sg(S)}, t_3 = t_0(S) = \frac{f(S)}{Sg(S)}$
Π^i	$\Pi^1 = (1 - t_0(M))g(M),$ $\Pi^2 = (1 - 2t_0(S))g(S)$

Variable	Player 1 chooses crypto, player 2 does not
α^i and β^i	$\alpha^1 = \alpha, \beta^1 = \beta, \alpha^2 = 1, \beta^2 = 0$
K_ρ	$K_1 = M, K_2 = S, K_3 = M$
g_ρ	$g_1 = g(M), g_2 = g(S), g_3 = g(M)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = M,$ $K_1^2 = 0, K_2^2 = S, K_3^2 = 0$
g_ρ^i	$g_1^1 = g(M), g_2^1 = 0, g_3^1 = g(M),$ $g_1^2 = 0, g_2^2 = g(S), g_3^2 = 0$
g_V^i	$g_V^1 = \alpha g(M), g_V^2 = g(S)$
g_H^i	$g_H^1 = \beta g(M), g_H^2 = 0$
g^i	$g^1 = g(M), g^2 = g(S)$
f_ρ	$f_1 = f(M), f_2 = f(S), f_3 = f(M)$
T_ρ	$T_1 = 0, T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_0(M) = \frac{f(M)}{Mg(M)}, t_2 = t_0(S) = \frac{f(S)}{Sg(S)}, t_3 = t_0(M) = \frac{f(M)}{Mg(M)}$
Π^i	$\Pi^1 = (1 - 2t_0(M))g(M),$ $\Pi^2 = (1 - t_0(S))g(S)$

Variable	<i>Both players choose crypto</i>
α^i and β^i	$\alpha^1 = \alpha, \beta^1 = \beta, \alpha^2 = \alpha, \beta^2 = \beta$
K_ρ	$K_1 = M, K_2 = S, K_3 = N$
g_ρ	$g_1 = g(M), g_2 = g(S), g_3 = g(N)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = M,$ $K_1^2 = 0, K_2^2 = S, K_3^2 = S$
g_ρ^i	$g_1^1 = g(M), g_2^1 = 0, g_3^1 = g(N),$ $g_1^2 = g(M), g_2^2 = 0, g_3^2 = g(N)$
g_V^i	$g_V^1 = \alpha g(M), g_V^2 = \alpha g(S)$
g_H^i	$g_H^1 = \beta g(N), g_H^2 = \beta g(N)$
g^i	$g^1 = \alpha g(M) + \beta g(N), g^2 = \alpha g(S) + \beta g(N)$
f_ρ	$f_1 = f(M), f_2 = f(S), f_3 = f(N)$
T_ρ	$T_1 = 0, T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_0(M) = \frac{f(M)}{Mg(M)}, t_2 = t_0(S) = \frac{f(S)}{Sg(S)}, t_3 = t_0(N) = \frac{f(N)}{Ng(N)}$
Π^i	$\Pi^1 = (1 - t_0(M))\alpha g(M) + (1 - t_0(N))\beta g(N),$ $\Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$

7. Non-exploitative tax rate t_0 and no secession:

Variable	<i>Neither player chooses crypto</i>
α^i and β^i	$\alpha^1 = 1, \beta^1 = 0, \alpha^2 = 1, \beta^2 = 0$
K_ρ	$K_1 = N, K_2 = 0, K_3 = 0$
g_ρ	$g_1 = g(N), g_2 = 0, g_3 = 0$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = 0,$ $K_1^2 = S, K_2^2 = 0, K_3^2 = 0$
g_ρ^i	$g_1^1 = g(N), g_2^1 = 0, g_3^1 = 0,$ $g_1^2 = g(N), g_2^2 = 0, g_3^2 = 0$
g_V^i	$g_V^1 = g(N), g_V^2 = g(N)$
g_H^i	$g_H^1 = 0, g_H^2 = 0$
g^i	$g^1 = g(N), g^2 = g(N)$
f_ρ	$f_1 = f(N), f_2 = 0, f_3 = 0$
T_ρ	$T_1 = 0, T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_0(N) = \frac{f(N)}{Ng(N)}, t_2 = 0, t_3 = 0$
Π^i	$\Pi^1 = (1 - t_0(N))g(N),$ $\Pi^2 = (1 - t_0(N))g(N)$

Variable	Player 2 chooses crypto, player 1 does not
α^i and β^i	$\alpha^1 = 1, \beta^1 = 0, \alpha^2 = \alpha, \beta^2 = \beta$
K_ρ	$K_1 = N, K_2 = 0, K_3 = S$
g_ρ	$g_1 = g(N), g_2 = 0, g_3 = g(S)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = 0,$ $K_1^2 = S, K_2^2 = 0, K_3^2 = S$
g_ρ^i	$g_1^1 = g(N), g_2^1 = 0, g_3^1 = 0,$ $g_1^2 = g(N), g_2^2 = 0, g_3^2 = g(S)$
g_V^i	$g_V^1 = g(N), g_V^2 = \alpha g(N)$
g_H^i	$g_H^1 = 0, g_H^2 = \beta g(S)$
g^i	$g^1 = g(N), g^2 = \alpha g(N) + \beta g(S)$
f_ρ	$f_1 = f(N), f_2 = 0, f_3 = f(S)$
T_ρ	$T_1 = 0, T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_0(N) = \frac{f(N)}{(M+\alpha S)g(N)}, t_2 = 0, t_3 = t_0(S) = \frac{f(S)}{\beta S g(S)}$
Π^i	$\Pi^1 = (1 - t_0(N))g(N),$ $\Pi^2 = (1 - t_0(N))\alpha g(N) + (1 - t_0(S))\beta g(S)$

Variable	Player 1 chooses crypto, player 2 does not
α^i and β^i	$\alpha^1 = \alpha, \beta^1 = \beta, \alpha^2 = 1, \beta^2 = 0$
K_ρ	$K_1 = N, K_2 = 0, K_3 = M$
g_ρ	$g_1 = g(N), g_2 = 0, g_3 = g(M)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = M,$ $K_1^2 = S, K_2^2 = 0, K_3^2 = 0$
g_ρ^i	$g_1^1 = g(N), g_2^1 = 0, g_3^1 = g(M),$ $g_1^2 = g(N), g_2^2 = 0, g_3^2 = 0$
g_V^i	$g_V^1 = \alpha g(N), g_V^2 = g(N)$
g_H^i	$g_H^1 = \beta g(M), g_H^2 = 0$
g^i	$g^1 = \alpha g(N) + \beta g(M), g^2 = g(N)$
f_ρ	$f_1 = f(N), f_2 = 0, f_3 = f(M)$
T_ρ	$T_1 = 0, T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_0(N) = \frac{f(N)}{(\alpha M + S)g(N)}, t_2 = 0, t_3 = t_0(M) = \frac{f(M)}{Mg(M)}$
Π^i	$\Pi^1 = (1 - t_0(N))\alpha g(N) + (1 - t_0(M))\beta g(M)$ $\Pi^2 = (1 - t_0(N))g(N)$

Variable	<i>Both players choose crypto</i>
α^i and β^i	$\alpha^1 = \alpha, \beta^1 = \beta, \alpha^2 = \alpha, \beta^2 = \beta$
K_ρ	$K_1 = N, K_2 = 0, K_3 = N$
g_ρ	$g_1 = g(N), g_2 = 0, g_3 = g(N)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = M,$ $K_1^2 = S, K_2^2 = 0, K_3^2 = S$
g_ρ^i	$g_1^1 = g(N), g_2^1 = 0, g_3^1 = g(N),$ $g_1^2 = g(N), g_2^2 = 0, g_3^2 = g(N)$
g_V^i	$g_V^1 = \alpha g(N), g_V^2 = \alpha g(N)$
g_H^i	$g_H^1 = \beta g(N), g_H^2 = \beta g(N)$
g^i	$g^1 = g(N), g^2 = g(N)$
f_ρ	$f_1 = f(N), f_2 = 0, f_3 = f(N)$
T_ρ	$T_1 = 0, T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_0(N) = \frac{f(N)}{\alpha N g(N)}, t_2 = 0, t_3 = t_0(N) = \frac{f(N)}{N g(N)}$
Π^i	$\Pi^1 = (1 - t_0(N))g(N),$ $\Pi^2 = (1 - t_0(N))g(N)$

Equilibrium for subgame 7:

Consider the difference between payoffs Π^1 for when sharers cryptosecede versus not, given that non-sharers do not cryptosecede:

$$\Delta\Pi^1 = (1 - t_0(N))\alpha g(N) + (1 - t_0(M))\beta g(N) - (1 - t_0(N))g(N)$$

$$\Delta\Pi^1 = -(1 - t_0(N))\beta g(N) + (1 - t_0(M))\beta g(M) < 0$$

If non-sharers do not cryptosecede, then sharers will not either

Consider the difference between payoffs Π^1 for when sharers cryptosecede versus not, given that non-sharers do cryptosecede:

$$\Delta\Pi^1 = (1 - t_0(N))g(N) - (1 - t_0(N))g(N) = 0$$

If non-sharers do cryptosecede, then sharers will be indifferent between cryptoseceding or not

Now consider the difference between payoffs Π^2 for when non-sharers cryptosecede versus not, given that sharers do not cryptosecede:

$$\Delta\Pi^2 = (1 - t_0(N))\alpha g(N) + (1 - t_0(S))\beta g(S) - (1 - t_0(N))g(N)$$

$$\Delta\Pi^2 = -(1 - t_0(N))\beta g(N) + (1 - t_0(S))\beta g(S) < 0$$

If sharers do not cryptosecede, then non-sharers will not either

Consider the difference between payoffs Π^2 for when non-sharers cryptosecede versus not, given that sharers do cryptosecede:

$$\Delta\Pi^2 = (1 - t_0(N))g(N) - (1 - t_0(N))g(N) = 0$$

If sharers do cryptosecede, then non-sharers will be indifferent between cryptoseceding or not

There are therefore two Nash equilibriums: (1) both players do not cryptosecede, and (2) both players do cryptosecede.

8. Non-exploitative tax rate t_0 and secession:

Variable	<i>Neither player chooses crypto</i>
α^i and β^i	$\alpha^1 = 1, \beta^1 = 0, \alpha^2 = 1, \beta^2 = 0$
K_ρ	$K_1 = M, K_2 = S, K_3 = 0$
g_ρ	$g_1 = g(M), g_2 = g(S), g_3 = 0$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = 0,$ $K_1^2 = 0, K_2^2 = S, K_3^2 = 0$
g_ρ^i	$g_1^1 = g(M), g_2^1 = 0, g_3^1 = 0,$ $g_1^2 = 0, g_2^2 = g(S), g_3^2 = 0$
g_V^i	$g_V^1 = g(M), g_V^2 = g(S)$
g_H^i	$g_H^1 = 0, g_H^2 = 0$
g^i	$g^1 = g(M), g^2 = g(S)$
f_ρ	$f_1 = f(M), f_2 = f(S), f_3 = 0$
T_ρ	$T_1 = 0, T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_0(M) = \frac{f(M)}{Mg(M)}, t_2 = t_0(S) = \frac{f(S)}{Sg(S)}, t_3 = 0$
Π^i	$\Pi^1 = (1 - t_0(M))g(M),$ $\Pi^2 = (1 - t_0(S))g(S)$

Variable	Player 2 chooses crypto, player 1 does not
α^i and β^i	$\alpha^1 = 1, \beta^1 = 0, \alpha^2 = \alpha, \beta^2 = \beta$
K_ρ	$K_1 = M, K_2 = S, K_3 = S$
g_ρ	$g_1 = g(M), g_2 = g(S), g_3 = g(S)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = 0,$ $K_1^2 = 0, K_2^2 = S, K_3^2 = S$
g_ρ^i	$g_1^1 = g(M), g_2^1 = 0, g_3^1 = 0,$ $g_1^2 = 0, g_2^2 = g(S), g_3^2 = g(S)$
g_V^i	$g_V^1 = g(M), g_V^2 = \alpha g(S)$
g_H^i	$g_H^1 = 0, g_H^2 = \beta g(S)$
g^i	$g^1 = g(M), g^2 = g(S)$
f_ρ	$f_1 = f(M), f_2 = f(S), f_3 = 0$
T_ρ	$T_1 = 0, T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_0(M) = \frac{f(M)}{Mg(M)}, t_2 = t_0(S) = \frac{f(S)}{Sg(S)}, t_3 = t_0(S) = \frac{f(S)}{Sg(S)}$
Π^i	$\Pi^1 = (1 - t_0(M))g(M),$ $\Pi^2 = (1 - 2t_0(S))g(S)$

Variable	Player 1 chooses crypto, player 2 does not
α^i and β^i	$\alpha^1 = \alpha, \beta^1 = \beta, \alpha^2 = 1, \beta^2 = 0$
K_ρ	$K_1 = M, K_2 = S, K_3 = M$
g_ρ	$g_1 = g(M), g_2 = g(S), g_3 = g(M)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = M,$ $K_1^2 = 0, K_2^2 = S, K_3^2 = 0$
g_ρ^i	$g_1^1 = g(M), g_2^1 = 0, g_3^1 = g(M),$ $g_1^2 = 0, g_2^2 = g(S), g_3^2 = 0$
g_V^i	$g_V^1 = \alpha g(M), g_V^2 = g(S)$
g_H^i	$g_H^1 = \beta g(M), g_H^2 = 0$
g^i	$g^1 = g(M), g^2 = g(S)$
f_ρ	$f_1 = f(M), f_2 = f(S), f_3 = f(M)$
T_ρ	$T_1 = 0, T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_0(M) = \frac{f(M)}{Mg(M)}, t_2 = t_0(S) = \frac{f(S)}{Sg(S)}, t_3 = t_0(M) = \frac{f(M)}{Mg(M)}$
Π^i	$\Pi^1 = (1 - 2t_0(M))g(M),$ $\Pi^2 = (1 - t_0(S))g(S)$

Variable	<i>Both players choose crypto</i>
α^i and β^i	$\alpha^1 = \alpha, \beta^1 = \beta, \alpha^2 = \alpha, \beta^2 = \beta$
K_ρ	$K_1 = M, K_2 = S, K_3 = N$
g_ρ	$g_1 = g(M), g_2 = g(S), g_3 = g(N)$
K_ρ^i	$K_1^1 = M, K_2^1 = 0, K_3^1 = M,$ $K_1^2 = 0, K_2^2 = S, K_3^2 = S$
g_ρ^i	$g_1^1 = g(M), g_2^1 = 0, g_3^1 = g(N),$ $g_1^2 = g(M), g_2^2 = 0, g_3^2 = g(N)$
g_V^i	$g_V^1 = \alpha g(M), g_V^2 = \alpha g(S)$
g_H^i	$g_H^1 = \beta g(N), g_H^2 = \beta g(N)$
g^i	$g^1 = \alpha g(M) + \beta g(N), g^2 = \alpha g(S) + \beta g(N)$
f_ρ	$f_1 = f(M), f_2 = f(S), f_3 = f(N)$
T_ρ	$T_1 = 0, T_2 = 0, T_3 = 0$
t_ρ	$t_1 = t_0(M) = \frac{f(M)}{Mg(M)}, t_2 = t_0(S) = \frac{f(S)}{Sg(S)}, t_3 = t_0(N) = \frac{f(N)}{Ng(N)}$
Π^i	$\Pi^1 = (1 - t_0(M))\alpha g(M) + (1 - t_0(N))\beta g(N),$ $\Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$

Backward induction solution to cryptosecession game

1. *Decision by player 2 (non-sharers) to secede or not:*

Consider the difference between payoffs Π^2 in the first branch of the decision tree (where player 1 has chosen the over-exploitative tax rate t_X):

$$\text{No secession } \Pi^2 = (1 - t_X)\alpha g(N) + (1 - t_0(S))\beta g(S)$$

$$\text{Secession } \Pi^2 = (1 - t_0(S))g(S) \text{ or } \Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$$

$$\Delta\Pi^2 = (1 - t_0(S))g(S) - ((1 - t_X)\alpha g(N) + (1 - t_0(S))\beta g(S))$$

$$\Delta\Pi^2 = (1 - t_0(S))(1 - \beta)g(S) - (1 - t_X)\alpha g(N)$$

$$\Delta\Pi^2 = (1 - t_0(S))\alpha g(S) - (1 - t_X)\alpha g(N)$$

$$\Delta\Pi^2 = \alpha \left(g(S) - \frac{f(S)}{S} - g(N) + t_X g(N) \right)$$

$$\Delta\Pi^2 = \alpha g(N) \left(\frac{g(S)}{g(N)} - \frac{f(S)}{Sg(N)} - 1 + t_X \right)$$

$$\Delta\Pi^2 = \alpha g(N) \left(t_X - \left(1 - \frac{g(S)}{g(N)} + \frac{f(S)}{Sg(N)} \right) \right)$$

$$\Delta\Pi^2 = \alpha g(N)(t_X - t^*) > 0$$

Since $\alpha > 0$, $g(N) > 0$, and $t_X > t^* \Leftrightarrow (t_X - t^*) > 0$

Since the smaller of the payoffs from seceding is more than the payoff from not seceding, player 2 will decide to secede.

Consider the difference between payoffs Π^2 in the second branch of the decision tree (where player 1 has chosen the cryptosecession-proof tax rate t_C^*):

$$\text{No secession } \Pi^2 = (1 - t_C^*)g(N), \text{ where } t_C^* = \alpha t^* + \beta t_0(N) = t^*$$

$$\text{Secession } \Pi^2 = (1 - t_0(S))g(S) \text{ or } \Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$$

$$\Delta \Pi^2 = (1 - t_C^*)g(N) - ((1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N))$$

$$\Delta \Pi^2 = (1 - t^*)g(N) - ((1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N))$$

$$\Delta \Pi^2 = \left(g(S) - \frac{f(S)}{S}\right) - \alpha \left(g(S) - \frac{f(S)}{S}\right) - \beta \left(g(N) - \frac{f(N)}{N}\right)$$

$$\Delta \Pi^2 = \beta \left((g(N) - g(S)) + \left(\frac{f(N)}{N} - \frac{f(S)}{S}\right) \right) < 0$$

Since the larger of the payoffs from seceding is more than the payoff from not seceding (and the smaller payoff from seceding is equal to the payoff from not seceding), player 2 will decide to secede.

Consider the difference between payoffs Π^2 in the third branch of the decision tree (where player 1 has chosen the secession-proof tax rate t_S^*):

$$\text{No secession } \Pi^2 = (1 - t_S^*)g(N)$$

$$\text{Secession } \Pi^2 = (1 - t_0(S))g(S) \text{ or } \Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$$

$$\Delta \Pi^2 = (1 - t_S^*)g(N) - ((1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N))$$

$$\Delta \Pi^2 = \left(1 - \frac{\alpha - \beta}{\alpha} t^* - \frac{\beta}{\alpha} t_0(N)\right) g(N) - (1 - t_0(S))\alpha g(S) - (1 - t_0(N))\beta g(N)$$

$$\Delta \Pi^2 = g(N) - \frac{\alpha - \beta}{\alpha} \left(1 - \frac{g(S)}{g(N)} + \frac{f(S)}{Sg(N)}\right) - \frac{\beta}{\alpha} \left(\frac{f(N)}{N}\right) - \alpha \left(g(S) - \frac{f(S)}{S}\right) - \beta \left(g(N) - \frac{f(N)}{N}\right)$$

$$\Delta\Pi^2 = \left(1 - \frac{\alpha - \beta}{\alpha} - \beta\right)g(N) + \left(\frac{\alpha - \beta}{\alpha} - \alpha\right)g(S) + \left(-\frac{\alpha - \beta}{\alpha} + \alpha\right)\frac{f(S)}{S} + \left(-\frac{\beta}{\alpha} + \beta\right)\frac{f(N)}{N}$$

$$\Delta\Pi^2 = \frac{\beta^2}{\alpha} \left((g(N) - g(S)) + \left(\frac{f(S)}{S} - \frac{f(N)}{N} \right) \right) > 0$$

$$\text{Since } \alpha > 0, g(N) > g(S) \Leftrightarrow g(N) - g(S) > 0 \text{ and } \frac{f(S)}{S} > \frac{f(N)}{N} \Leftrightarrow \frac{f(S)}{S} - \frac{f(N)}{N} > 0$$

Since the larger of the payoffs from seceding is less than the payoff from not seceding, player 2 will decide not to secede.

Consider the difference between payoffs Π^2 in the fourth branch of the decision tree (where player 1 has chosen the non-exploitative tax rate $t_0(N)$):

$$\text{No secession } \Pi^2 = (1 - t_0(N))g(N)$$

$$\text{Secession } \Pi^2 = (1 - t_0(S))g(S) \text{ or } \Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N)$$

$$\Delta\Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))\beta g(N) - (1 - t_0(N))g(N)$$

$$\Delta\Pi^2 = (1 - t_0(S))\alpha g(S) + (1 - t_0(N))(\beta - 1)g(N)$$

$$\Delta\Pi^2 = \alpha \left((1 - t_0(S))g(S) - (1 - t_0(N))g(N) \right)$$

$$\Delta\Pi^2 = \alpha \left((1 - t_0(S))g(S) - (1 - t_0(N))g(N) \right)$$

$$\Delta\Pi^2 = \alpha \left(\left(g(S) - \frac{f(S)}{S} \right) - \left(g(N) - \frac{f(N)}{N} \right) \right)$$

$$\Delta\Pi^2 = \alpha \left((g(S) - g(N)) + \left(\frac{f(N)}{N} - \frac{f(S)}{S} \right) \right) < 0$$

$$\text{Since } \alpha > 0, g(S) < g(N) \Leftrightarrow g(S) - g(N) < 0 \text{ and } \frac{f(N)}{N} < \frac{f(S)}{S} \Leftrightarrow \frac{f(N)}{N} - \frac{f(S)}{S} < 0$$

Since the largest payoff from seceding (both cryptosecede) is less than the payoff from not seceding, then player 2 will decide not to secede.

2. Decision by player 1 (sharers) to set tax rate in original polity:

Consider the difference between payoffs Π^1 cryptosecession-proof tax rate t_C^* and over-exploitative tax rate t_X :

$$\Delta\Pi^1 = (1 - t_C^*)g(N) + \frac{t_C^*Ng(N) - f(N)}{M} - \left((1 - t_0(M))\alpha g(M) + (1 - t_0(N))\beta g(N) \right)$$

$$\Delta\Pi^1 = g(N) + \frac{S}{M}t_C^*g(N) - \frac{f(N)}{M} - (1 - t_0(M))\alpha g(M) - (1 - t_0(N))\beta g(N)$$

$$\Delta\Pi^1 = g(N) + \frac{S}{M}(\alpha t^* + \beta t_0(N))g(N) - \frac{f(N)}{M} - (1 - t_0(M))\alpha g(M) - (1 - t_0(N))\beta g(N)$$

$$\Delta\Pi^1 = g(N) + \frac{S}{M}\alpha t^*g(N) + \frac{N}{M}t_0(N)g(N) - \frac{f(N)}{M} - (1 - t_0(M))\alpha g(M) - \beta g(N)$$

$$\Delta\Pi^1 = \alpha g(N) + \frac{S}{M}\alpha t^*g(N) - \frac{N}{M}\alpha t_0(N)g(N) + \frac{N}{M}t_0(N)g(N) - \frac{f(N)}{M} - (1 - t_0(M))\alpha g(M)$$

$$\Delta\Pi^1 = \alpha \left(g(N) + \frac{S}{M}t^*g(N) - \frac{N}{M}t_0(N)g(N) - (1 - t_0(M))g(M) \right) + \frac{N}{M}t_0(N)g(N) - \frac{f(N)}{M}$$

$$\Delta\Pi^1 = \alpha \left(g(N) + \frac{S}{M} \left(g(N) - g(S) + \frac{f(S)}{S} \right) - \frac{N}{M} \left(\frac{f(N)}{N} \right) - \left(g(M) - \frac{f(M)}{M} \right) \right) + \frac{N}{M} \left(\frac{f(N)}{N} \right) - \frac{f(N)}{M}$$

$$\Delta\Pi^1 = \alpha \left(\frac{N}{M}g(N) - \frac{S}{M}g(S) + \frac{f(S)}{M} - \frac{f(N)}{M} - g(M) + \frac{f(M)}{M} \right)$$

$$\Delta\Pi^1 = \frac{\alpha}{M} \left((Ng(N) - Mg(M) - Sg(S)) + (f(M) + f(S) - f(N)) \right) > 0$$

Since $\alpha > 0, M > 0, g(N) > g(S), g(M) \Leftrightarrow Ng(N) - Sg(S) - Mg(M) > 0$

and $\frac{f(N)}{N} < \frac{f(S)}{S}, \frac{f(M)}{M} \Leftrightarrow f(S) + f(M) - f(N) > 0$

Player 1 will prefer to set the cryptosecession-proof tax rate t_C^* over the over-exploitative tax rate t_X .

Consider the difference between payoffs Π^1 for cryptosecession-proof tax rate t_C^* and secession-proof tax rate t_S^* :

$$\Delta\Pi^1 = (1 - t_0(M))\alpha g(M) + (1 - t_0(N))\beta g(N) - \left((1 - t_S^*)g(N) + \frac{t_S^*Ng(N) - f(N)}{M} \right)$$

$$\Delta\Pi^1 = (1 - t_0(M))\alpha g(M) + (1 - t_0(N))\beta g(N) - \left((1 - t^*)g(N) + \frac{t^*Ng(N) - f(N)}{M} \right)$$

$$\Delta\Pi^1 = \alpha g(M) - \alpha \frac{f(M)}{M} + \beta g(N) - \beta \frac{f(N)}{N} - g(N) + t^*g(N) - \frac{N}{M}t^*g(N) + \frac{f(N)}{M}$$

$$\Delta\Pi^1 = \alpha g(M) + \beta \frac{f(M)}{M} - \frac{f(M)}{M} + g(N) - \alpha g(N) - \beta \frac{f(N)}{N} - g(N) - \frac{S}{M}t^*g(N) + \frac{f(N)}{M}$$

$$\Delta\Pi^1 = \alpha(g(M) - g(N)) + \beta \left(\frac{f(M)}{M} - \frac{f(N)}{N} \right) - \frac{S}{M} \left(g(N) - g(S) + \frac{f(S)}{S} \right) + \frac{f(N)}{M} - \frac{f(M)}{M}$$

$$\Delta\Pi^1 = (g(M) - g(N)) - \beta(g(M) - g(N)) + \beta \left(\frac{f(M)}{M} - \frac{f(N)}{N} \right) + \frac{S}{M}(g(S) - g(N)) + \left(\frac{f(N)}{M} - \frac{f(M)}{M} - \frac{f(S)}{M} \right)$$

$$\Delta\Pi^1 = (g(M) - g(N)) + \beta \left(\frac{f(M)}{M} - g(M) \right) + \beta \left(\frac{f(N)}{N} - g(N) \right) + \frac{S}{M}(g(S) - g(N)) + \left(\frac{f(N)}{M} - \frac{f(M)}{M} - \frac{f(S)}{M} \right) < 0$$

Since $g(N) > g(S)$, $g(M) \Leftrightarrow g(M) - g(N) < 0$, $g(S) - g(N) < 0$

and $\frac{f(N)}{N} < \frac{f(S)}{S}$, $\frac{f(M)}{M} \Leftrightarrow \frac{f(N)}{M} - \frac{f(M)}{M} - \frac{f(S)}{M} < 0$

and $Kg(K) - f(K) \geq 0 \Leftrightarrow \frac{f(K)}{K} - g(K) \leq 0$

Player 1 will prefer to set the secession-proof tax rate t_S^* over the cryptosecession-proof tax rate t_C^* .

Consider the difference between payoffs Π^1 for secession-proof tax rate t_S^* and non-exploitative tax rate $t_0(N)$:

$$\Delta\Pi^1 = (1 - t_S^*)g(N) + \frac{t_S^*Ng(N) - f(N)}{M} - (1 - t_0(N))g(N)$$

$$\Delta\Pi^1 = (t_0(N) - t_S^*)g(N) + \frac{t_S^*Ng(N) - f(N)}{M}$$

$$\Delta\Pi^1 = \left(t_0(N) + \frac{S}{M}t_S^*\right)g(N) - \frac{f(N)}{M} > 0$$

When $\alpha = 1, \beta = 0 \Leftrightarrow t_S^* = t_0(N) \Leftrightarrow \Delta\Pi^1 = 0$

And as $\alpha \rightarrow 0, \beta \rightarrow 1 \Leftrightarrow t_S^* \rightarrow t^* \Leftrightarrow \Delta\Pi^1 > 0$ (transfers increase)

Therefore since $\alpha < 1, \beta > 0 \Leftrightarrow t_S^* > t_0(N) \Leftrightarrow \Delta\Pi^1 > 0$

Player 1 will prefer to set the cryptosecession-proof tax rate t_C^* over the non-exploitative tax rate $t_0(N)$.

Therefore player 1 will decide to set the cryptosecession-proof tax rate t_C^* .

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