Economic Foundations of the Territorial State System*

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Abstract

The contemporary world is organized into a system of territorial states in which rulers exercise authority inside clearly defined boundaries and recognize the authority of other rulers outside those boundaries. We argue that this system can be rationalized as an economic cartel in which self-interested and forward-looking rulers maintain high tax revenues by reducing competition in the "market for governance." Our theory explains how the major economic and military developments in Europe starting in the 15th century contributed to the development of this system.

1 Introduction

Today's world is organized into a system of territorial states, with most states recognizing the sovereignty of others outside their boundaries. Outside of Antarctica, nearly every square inch of land in the world belongs to a state, and the fraction of this land that was claimed by more than one state in 2000 was only 1.6% (based on Schultz, 2015).

Such mutual recognition of territorial boundaries is remarkable in human history. As recently as the Middle Ages in Europe, and the Qing era in East Asia, political boundaries were not the markers of absolute changes in political authority—in fact, the most powerful rulers claimed authority over the whole world. In the last several centuries, however, the

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world witnessed the gradual formation of a system where borders have come to possess significantly greater political meaning. In the words of Stephen Krasner, "the clearest storyline of the last thousand years is the extruding out of universal alternatives to the sovereign state" (Krasner, 1993, 261).

In this paper, we offer a new theory of the territorial state system based on its development in Modern Europe. One key driver of this development was the economic expansion that began in the Late Middle Ages, and which accelerated during the Industrial Revolution as Europe transformed from a predominantly agrarian economy to one in which monetary exchange, long-distance trade, and eventually industrial production also played important roles. At the same time, military technology and the administrative capabilities of states continued to improve as rulers built standing armies and modern bureaucracies. These developments turned states into fierce competitors in what we refer to as the "market for governance," by which we mean the market for an evolving package of state-provided services that are necessary for supporting increasingly complex decentralized economies. Our central thesis is that the territorial state system emerged as a solution for managing the growth of competition in the governance market.

The economic expansion that took place in Europe since the Late Middle Ages increased the ability (and willingness) of citizens to pay for market-supporting governance, while improvements in military technology and bureaucratic organization made it cheaper for rulers to exercise control over longer distances. These factors together expanded the territory that rulers could profitably govern. Rulers attempted to expand their influence in response to these shifts and became competitive providers of governance in the areas where their influence overlapped. This competition drove down the revenues that each could collect from the overlapping areas. To avoid these losses, rulers developed a self-enforcing cooperative norm under which they divided the market for governance geographically, enabling them to exercise monopoly power within well-defined territorial boundaries. This gave rise, eventually, to the norm of territorial sovereignty, which developed further with increases in economic and political complexity, and spread across the world with Western influence.

We develop our theory through a formal model that rationalizes the norm of sovereignty as a cooperative equilibrium of a repeated game in which self-interested and forward-looking rulers form a cartel to raise revenue by limiting competition in the market for governance. Our theory builds upon the perspective developed by Levi (1989), who argues that rulers are revenue-maximizing. It also builds upon the work of Konrad and Skaperdas (2012) and an earlier literature in comparative politics in which rulers raise

revenue by selling protection and other forms of governance to their subjects. Finally, our model also relates to Keohane's (2005) neoliberal theory of inter-state cooperation in which cooperation is sustained in anarchy by the threat of future punishments for deviating from the cooperative norm (see also Axelrod, 2006).

Our theory is notably distinct from the influential view in international relations, which asserts that the development of the modern state system was the product of an ideational shift that took place with the singing of the treaties of Westphalia (1648). This view, though popular, has been challenged by several recent accounts. Osiander (1994) writes, for example, that the view "that the Peace of Westphalia was a milestone on the road to a states system built around the concept of sovereignty is a popular view, especially with students of international relations—but it is a myth" (78). While he and a few other scholars (e.g. Krasner, 1993, Teschke, 2003) have argued against the Westphalia hypothesis, none to our knowledge fully articulates the precise mechanism behind an alternative account that emphasizes material incentives.

2 The Development of the European State System

Territorial boundaries are as old as civilization itself, and there are numerous examples of such demarcations in Antiquity and the Dark Ages.[1] However, prior to the Modern period in Europe, these demarcations had relatively little practical significance given that both feudal ties and traditional claims of political authority frequently crossed them. As Sahlins (1989) remarks:

> In the eleventh and twelfth centuries, the political boundaries between kingdoms were fundamentally in kind to feudal limits within the kingdom... The word "frontier" dates precisely from the moment when a new insistence on royal territory gave to boundary a political, fiscal and military significance which it had previously lacked. (6)

Sahlins (1989) also notes that even as late as the 18th century,

> The French monarchy continued to envision its sovereignty in terms of its jurisdiction over subjects, not over a delimited territory, relying on the inherited notions of "jurisdiction" and "dependency" instead of basing its administration on firmly delineated territorial circumscriptions. (14)

[1] Examples include the borders delineated by the Partition Treaties of the Carolingian Empire (843, 870) (Pounds, 1951), as well as military frontiers such as the Great Wall of China and the Danube *limes*.

The haziness of medieval political boundaries meant that lords and towns located between larger polities maintained a considerable amount of autonomy, often by playing one side off against the other. The Dukes of Burgundy, for example, built up a large political unit in the 15th century in the borderlands between France and the Holy Roman Empire, in spite (or because) of their status as vassals of both rulers (Vaughan, 1965). Similarly, in the "transitional zone" between England and Scotland, powerful families built up fiefs that, well into the 17th century, enjoyed more independence from royal interference than vassals elsewhere (Fraser, 2008).[2]

The limited political and administrative reach of pre-Modern rulers, however, did not prevent them from claiming "universal empire." Under Roman rule, most of Europe had been organized into a single polity that claimed to rule the "whole world" (Nicolet, 1991, Ch. 2).[3] In the Middle Ages, both the papacy and the Holy Roman Empire used this precedent to make similarly extravagant claims to political precedence. Even after the administrative machinery of the Empire had already become decrepit, the Latin motto of *Austriae est imperare orbi universo* ("all the world is subject to Austria") featured prominently on Hapsburg iconography, and in the *Dictates Papae* (1075), Pope Gregory claimed that he has the power "(12)... to depose emperors," and "(27)... to absolve subjects from their oath of fidelity to wicked rulers" (Ogg, 1907).

While larger polities claimed universal rule, the smaller ones typically claimed a subordinate one. In medieval Europe, this often took the form of a feudal agreement, where a "superior" lord granted land to a vassal in return for military and other services (Bloch, 2014, 145-7). In this arrangement, neither party possessed full sovereignty in the modern sense. The superior lord, while enjoying higher status, did not actually collect taxes or administer justice in the territories he or his ancestors had granted to vassals. The vassal, while often enjoying *de facto* independence, had legal obligations to his superior, and had to provide for the possibility that the ruler could remove him (Bloch, 2014, 219-24). The princes and cities of the Holy Roman Empire, notably, were autonomous for most purposes but still acknowledged (and were on occasion forced to confront) the claimed authority of the Emperor (Wilson, 2011).[4]

[2]A similar fluidity, and emphasis on personal rather than territorial jurisdiction characterized the polities of precolonial Africa (Herbst, 2014, 35-57), and highland Southeast Asia (Scott, 2014).

[3]The Parthian and Persian polities were exceptions to this claim, and for that reason presented problems for Roman official ideology (Dignas and Winter, 2007).

[4]While some of these polities are labeled as "states" by modern scholars, the distinction was far from clear at the time. In practice, the status of highly autonomous "domestic" vassals blurred into that of subordinate "foreign" neighbors.

In these circumstances, what one might call "international relations" were built upon hierarchies, and difficult to separate from internal politics. The relationships between Burgundy, France and the Empire in the 15th century, for example, were conditioned by the fact that the rulers of France and the Empire both considered the rulers of Burgundy to be their vassals, (Holzgrefe, 1989, Vaughan, 1965). Similarly, the war in Normandy between Phillip II of France and John of England (1202-14) was justified by the French aggressors not as a war against a threatening neighbor but as the punishment of a disloyal vassal for disobeying a court judgement, since John's French territories were held "of" Phillip (Bradbury, 2015, 145-55). The Holy Roman Empire was the most extreme development of these trends. It contained hundreds of small polities that both claimed to be sovereign but acknowledged the right of the Emperor and diet to raise taxes and adjudicate some disputes.

Eventually, however, claims to universal empire started to decline in the Late Middle Ages as rulers expanded their influence across geographic distances. The Treaty of Edinburgh-Northampton (1328), for example, recognized Robert Bruce as the sovereign ruler of Scotland, a land "separate in all things from the Kingdom of England, whole, free and undisturbed in perpetuity, without any kind of subjection, service claim or demand." The famous Peace of Westphalia (1648) likewise guaranteed that "the free Towns, and other States of the Empire ... shall, without molestation, keep their Regales, Customs, annual Revenues, Libertys, Privileges to confiscate, to raise Taxes, and other Rights," and guaranteed them "the free exercise of Territorial Right ... that they never can or ought to be molested therein by any whomsoever upon any manner of pretense."

With such developments, rulers began to treat each other as peers and relations between them began a gradual evolution into modern inter-state relations. One important and observable implication of this evolution was the growth of border demarcations, helped by the advent of modern cartographical techniques during the 17th - 19th centuries (Biggs, 1999, Branch, 2011). Original data that we collected from Dumont, de Carlscroon and Picart (1726) provides some systematic evidence on the growth of inter-state borders, and inter-state relations in general. This comprehensive series contains the full text of all recorded European treaties from 1400-1718. In the dataset, we find that the total number of new inter-state treaties signed in Europe increased from 393 in the period 1400-1450 to 628 in the period 1651-1700. We also find that the number of new treaties signed that mention inter-state borders (or any of a variety of French or Latin synonyms) more than doubled, from 29 to 75 over these two periods.

As borders became increasingly formalized over time, so too did diplomatic relations between states. This manifested in the exchange of permanent ambassadors, a practice that began in renaissance Italy (Mattingly, 1955). The development of diplomacy was, nevertheless, slow and gradual, and some older hierarchical notions persisted. For example, in the Early Modern period, diplomats were ranked relative to each other with Empires at the top and republics at the bottom.[5] (In 21st century practice, nearly all ambassadors are formally equal in status—a reflection of the formal equality of states today.) This reminder of the formal inequality of nations lingered into the 19th century, a claim that is supported by data from Bayer (2006). These data show that the proportion of dyads of European countries in which the two countries had some form of diplomatic relations with each other rose from 57% to 78% from 1820-1909, and the proportion of dyads among those with diplomatic relations where each country's representatives were of equal diplomatic rank also grew from 61% to 88% in this period.

Norms of state sovereignty and the formal equality of states emerged in the Early Modern period, but continued to develop in the 19th and 20th centuries. In this later period, international conferences (such as the Congress of Vienna and the Geneva Convention) and organizations (such as the League of Nations and the United Nations) played an important role in this process by developing formalized rules and procedures for behavior by states, and procedures for resolving disputes between them. The Congress of Vienna, for example, acted as a mechanism for mediating a broad range of territorial disputes without resort to violence, and swept away many remnants of medieval politics, while informal cooperation among the great powers in subsequent decades (the "Concert of Europe") defended it settlement (Elrod, 1976). The United Nations goes much further, creating a General Assembly in which all states are formally equal, a Security Council capable of punishing violations of the international order, and developing a variety of alternative procedures for resolving international disputes.[6]

International institutions were important in later periods for solidifying the sovereignty norm, but as we argue below such a norm can, and did, emerge naturally in unstructured

[5]Britain's representative in Washington was not retitled as an ambassador until 1893. And, the United States retitled its last legations as embassies in 1966.

[6]The sovereignty norm required a theory of which polities were states (and thus sovereign) and which were not. This led to a winnowing of Europe's thousands of polities with some claims to autonomous political authority. While some managed to win recognition as states, the vast majority were assimilated into larger neighboring polities, often the same polities they had previously played of against each other. On the southern borderlands of the Holy Roman Empire, for instance, the Duchy of Lorraine, was annexed by France in the 17th century, while many of the small polities of southern Germany were annexed by Bavaria and Prussia.

interaction. In the next section, we explain how such a norm can emerge. Then we apply it to the case of Europe and examine its implications in four cases.

3 A Model of the Territorial State System

At the center of our theory is the concept of *governance*, which refers to the package of centrally provided state services that support a complex decentralized market economy. Charles Tilly (1985) and others in comparative politics have argued that the main service that rulers provided their subjects in the Late Middle Ages was protection, and Konrad and Skaperdas (2012) explain how the threat of expropriation by local bandits or distant robbers gave rise to economic insecurity and created a *market* for protection. According to Konrad and Skaperdas (2012), early states emerged as participants in this market, providing protection in exchange for revenue.[7] This package of services is paid for by taxation, which may be in cash, in in-kind services (such as military service) or in valuable policy concessions (such as ceasing socially destructive activities).

Our concept of governance builds on this literature, recognizing that, over time, states provided a wider array of services than simply protection. With the rise of long distance trade in Late Medieval and Early Modern Europe, the demand for governed economic exchange grew and later rulers began to provide greater market-supporting services such as dispute resolution and economic regulation—services that had previously been provided privately by local institutions (Milgrom, North and Weingast, 1990, Greif, 1993). Responding to the needs of an industrial economy, today's states also provide an even wider array of public services; they also provide public goods, including public infrastructure, education and research. It is this evolving package of state-provided services that we refer to as "governance," and like Konrad and Skaperdas (2012), we view states as the sellers of governance in a market where there is a demand for such a package of services.

[7]The work of Konrad and Skaperdas (2012) differs in this respect from that of Lane (1979) and Tilly (1985), who argued that early states were protection *rackets*. While the Lane-Tilly view may be appropriate for very early states, the view that all states only provide protection only from themselves, as opposed to also supporting law and order in society, enforcing contracts and providing market supporting public goods and services is not warranted by the evidence and existing theory (see, e.g., Acemoglu (2005) and Barro (1999)). Moreover, the Konrad-Skaperdas view is consistent with Levi's (1989) argument that rulers are revenue-maximizing and enjoy what she calls "quasi-voluntary compliance" from their citizens. Citizens are voluntarily willing to pay rulers not just because payment takes place in the shadow of coercion, but also because they expect some valuable services from the state. For this reason, we follow Konrad and Skaperdas (2012) and view states as competitors in the governance market.

Building on this concept of governance, we develop our theory through a model in which the international state system represents an economic cartel created by rulers to keep their revenues high by limiting competition in the market for governance.

3.1 The Market for Governance

Two rulers called A and B are located at the endpoints, 0 and 1, of the unit interval. A continuum of individuals of unit mass are distributed uniformly between them. We identify each individual with his location on the interval, $\ell \in [0, 1]$. These individuals may be thought of as citizens or as chieftains, bishops, local lords and the types of small-scale authorities who exercise power within a discrete area.

Each ruler i offers to sell governance to each individual by setting a location-specific price $p_i(\ell)$. The cost to ruler i from providing governance to a individual at ℓ is $c_i(\ell)$. We assume that $c_A(\ell)$ is a strictly increasing function while $c_B(\ell)$ is a strictly decreasing function, each with at most a finite number of jumps (see Figure 1). The value of governance to each individual is fixed at $v > 0$. Rulers simultaneously offer prices, and after looking at the prices offered, each individual decides whether or not to pay for the service, and if so, from which ruler. We refer to the set of individuals that purchase from a ruler as that ruler's *subjects*. Since no individual accepts a price larger than v, we interpret all offers $p_i(\ell) > v$ as indicating that ruler i chooses to *stay out* of the market for ℓ. Throughout the paper, we study sequentially rational pricing strategies for the two profit-maximizing rulers, and buying decisions for the individuals.

We interpret the environment geographically, and depict it in Figure 1. The figure shows how the costs of providing the good may be discontinuous, reflecting the idea that geographic breaks such as mountains or rivers may cause abrupt changes in a ruler's cost of providing governance. We also maintain the following three assumptions:

(i) $c_A(0) < v$,
(ii) $c_B(1) < v$, and
(iii) $c_B(0) > c_A(0)$ and $c_A(1) > c_B(1)$.

The first assumption implies that the set of individuals for whom ruler A's cost of providing governance does not exceed their willingness to pay, v, is $[0, \ell_A]$ where $\ell_A := \sup\{\ell \leq 1 : c_A(\ell) < v\}$. We refer to the interval $[0, \ell_A]$ as ruler A's *market*. Similarly, the second assumption implies that the analogous market for ruler B is $[\ell_B, 1]$ where $\ell_B := \inf\{\ell \geq 0 : c_B(\ell) < v\}$. The third assumption implies that there is a unique threshold $\ell_* \in (0, 1)$ such that $c_B(\ell) > c_A(\ell)$ for all $\ell < \ell_*$ and $c_B(\ell) < c_A(\ell)$ for all $\ell > \ell_*$. This means that

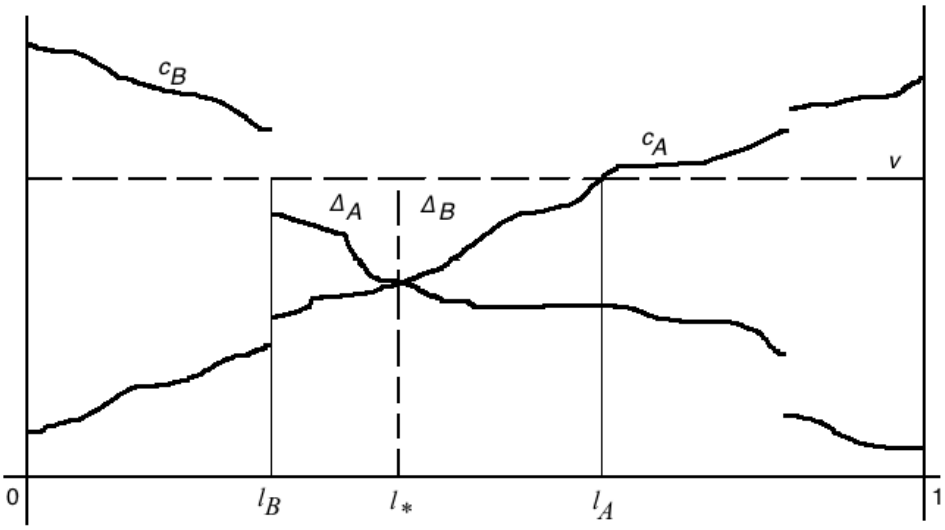

Figure 1. The case of overlapping markets.

A is the lower cost seller to the west of ℓ_* and B is the lower cost seller to the east of ℓ_*. These thresholds are all depicted in Figure 1.

We make two remarks about the basic environment of our model. First, the assumption that the locations of rulers is fixed is not meant to imply that rulers themselves were immobile. It simply captures the idea that all rulers have a point which can be thought of as the core of their existing polity, where they can provide services cheaply, and that their cost of providing governance increases as distance from this area increases. Second, the idea that citizens are also stationary is, as well, a simplifying feature. Our model's conclusions would be largely robust to building in the idea that citizens may be able to escape taxation by moving to "ungoverned territories," (e.g. Scott, 2014), as long as changing one's location is not costless.

3.2 Overlapping and Non-overlapping Markets

We say the rulers' markets *overlap* when $\ell_B < \ell_A$ so that $[0, \ell_A] \cap [\ell_B, 1] \neq \emptyset$. When this is the case, there is an interval $[\ell_B, \ell_A]$ as depicted in Figure 1, where rulers A and B compete to provide governance to individuals that live in the interval. We refer to the interval $[\ell_B, \ell_A]$ as the *overlapping area*. Outside of the overlapping area, only one ruler can profitably sell governance, so the other stays out of the market, making the former a

monopoly provider. When markets overlap, assumptions (i) and (ii) and the monotonicity assumptions on c_A and c_B imply that $\ell_B \leq \ell_* \leq \ell_A$.

Our first result characterizes the subgame perfect equilibrium (SPE) of the static model in the case of non-overlapping and overlapping markets. It compares equilibrium profits to the joint-profit maximizing levels of profit, which are

$$\Pi_A^* = v \min\{\ell_A, \ell_*\} \qquad \text{and} \qquad \Pi_B^* = v \max\{\ell_B, \ell_*\}$$

for rulers A and B, respectively. In the case of overlapping markets, we impose the condition that *no ruler prices below cost*;[8] that is,

$$p_i(\ell) \geq c_i(\ell) \qquad \forall \ell \in [0,1] \text{ and } i = A, B.$$

The main result of this section is:[9]

Proposition 1. *If markets do not overlap, then in equilibrium ruler A sells to individuals in his market* $[0, \ell_A]$ *at price* $p_A(\ell) = v$*, ruler B sells to individuals in her market,* $[\ell_B, 1]$ *at the monopoly price* $p_B(\ell) = v$*, and individuals in* (ℓ_A, ℓ_B) *buy from neither A nor B. Consequently, the rulers maximize joint profit given demand.*

If markets overlap, then in any equilibrium in which no ruler prices below cost, ruler A offers prices $p_A(\ell) = \min\{v, \max\{c_A(\ell), c_B(\ell)\}\}$ *to individuals in* $[0, \ell_A]$ *and sells to individuals in* $[0, \ell_*]$*, while ruler B offers prices* $p_B(\ell) = \min\{v, \max\{c_A(\ell), c_B(\ell)\}\}$ *to individuals in* $[\ell_B, 1]$ *and sells to individuals in* $[\ell_*, 1]$*. Consequently, the profits of rulers A and B fall short of the joint profit maximizing levels of profits by, respectively,*

$$\Delta_A := \int_{\ell_B}^{\ell_*} v - c_B(\ell) d\ell \qquad \textit{and} \qquad \Delta_B := \int_{\ell_*}^{\ell_A} v - c_A(\ell) d\ell. \tag{1}$$

The proof of this result (and all proofs) appear in the appendix.

When markets do not overlap, i.e. when $\ell_A < \ell_B$, the rulers are monopoly sellers in their respective markets, and maximize joint profit. In this case, each ruler's cost of providing governance in the other ruler's market is higher than any individual's willingness to pay for it, so each ruler stays out of the other's market. No ruler can sell profitably to individuals in the interval (ℓ_A, ℓ_B), so we refer to such an interval as *ungoverned space*.

[8] A strategy of pricing below cost on any set of positive measure is weakly dominated by a strategy in which the ruler stays out of the market on that set, but prices the same way outside the set.

[9] To be precise, the results of Proposition 1 hold except on sets of measure zero, but we ignore the measure-theoretic issues and state that a result holds on a set if it holds almost everywhere on that set.

When markets overlap, each ruler can sell at the monopoly price only on the part of his or her market where the other ruler's cost exceeds each individual's willingness to pay. In the overlapping area $[\ell_B, \ell_A]$ the rulers become Bertrand competitors, driving down each of their prices: ruler A sells at a price equal to ruler B's cost to the west of the boundary ℓ_*, while B sells east of ℓ^* at a price equal to A's cost.

The proposition presents some familiar results under price competition with differentiated costs and strategic buyers. First, if one of the sellers has a cost higher than the valuation of a buyer, while the other has a cost lower than this valuation, then the low cost seller becomes a monopolist, extracting the entire consumer surplus. Second, if both sellers have costs below the valuation of each buyer in the market, and neither prices below cost, then the low cost seller serves the market at a price equal to the high cost seller's cost. Consequently, the equilibrium outcome does not necessarily maximize the sum of the rulers' profits given demand, and as the proposition reports, the equilibrium profits of rulers A and B fall short of their joint profit maximizing levels by Δ_A and Δ_B respectively. These quantities are also depicted in Figure 1.

In the discussion of our cases, we will interpret the shortfall in revenue from monopoly profits in our model as being the privileges that peripheral elites and other individuals can win from central governments by playing them of against their neighbors. Elites in an overlapping area will always have fewer taxes and more privileges than those in the core, since they have the option to be governed (e.g. buy protection) from the rival ruler, who is willing and able to provide them with governance.

3.3 The Territorial State System as a "Cartel Equilibrium"

When the rulers' markets overlap, competition on the overlapping area drives down profits in the static game. In a repeated game, however, the rulers can improve their profits by setting up a cooperative agreement in which they divide territory at the partition point ℓ_*. In one such agreement, the rulers divide the overlapping market $[\ell_B, \ell_A]$ at the joint-profit maximizing boundary ℓ_* and stay out of the market for the other's subjects. Territorial sovereignty emerges as a cartel agreement between rulers.

Suppose that the rulers' markets overlap, the static game studied in the previous section is repeated indefinitely, and rulers discount future payoffs with a common discount factor $\delta < 1$. Several possible outcomes may be supported in an SPE. We consider two kinds of paths to be focal. The first is one in which a static game equilibrium of the kind characterized in Proposition 1 is played in every period of the supergame. We refer to this

as a *static game equilibrium path*. The second is one that maximizes the joint profits of the two rulers, which is the infinite repetition of the outcome that maximizes joint profits period-by-period. In such a path, ruler A sells at the monopoly price v to individuals in $[0, \ell_*)$ and B sells at the monopoly price v to individuals in $(\ell_*, 1]$. The rulers thus earn profits Π_A^* and Π_B^* each period. We call this the *joint profit maximizing path*.

The proposition below characterizes a necessary and sufficient condition for the joint profit maximizing path to be supported by an equilibrium strategy profile of the repeated game in which the outcome path is played until and unless a deviation by either ruler has taken place, after which a static game equilibrium path is played forever after.[10]

Proposition 2. *Suppose that markets overlap. The joint profit maximizing path is supported in equilibrium via the threat of reversion to any static game equilibrium path iff*

$$\delta \geq \max\left\{\frac{\Delta_A}{\Delta_A + \Delta_B}, \frac{\Delta_B}{\Delta_A + \Delta_B}\right\} \tag{2}$$

Proposition 2 shows how territorial sovereignty can be rationalized as cooperation in a repeated game, and therefore provides a "neoliberal" rationale for the sovereignty norm. The proposition also suggests that for territorial sovereignty to emerge, the gains from cooperation must be relatively even. Inequality (2) is more easily satisfied when the right hand side is low. The lowest value that this side can take is 1/2, which occurs when $\Delta_A = \Delta_B$. This means that regardless of the *magnitudes* of the gains that the rulers can achieve from recognizing each's sovereignty, this recognition is most likely to emerge when the gains from cooperation are almost even.

Although our main contribution is to develop a new model of the territorial state system, the fact that Proposition 2 pins down the territorial boundary as being ℓ_* relates (and contrasts) our work existing models of inter-state borders. For example, Alesina and Spolaore (1997) study a model of state-formation in which borders emerge endogenously, but borders in their model are the outcome of majoritarian voting—an assumption that runs counter to what we know about the historical development of states, which preceded democracy. Friedman (1977) develops a theory of borders based on rulers wishing to maximize tax revenue net of collection costs. As in our model, territory is allocated to maximize joint profit; however, unlike our model, this outcome is not based on cooperation between rulers in a cartel.

[10]This is a "trigger strategy" profile. In such strategy profiles, we assume that individuals optimize statically (i.e., myopically) and that deviations by them are ignored by the rulers and other players.

Finally, it is also worth noting that because the cost functions may be discontinuous at geographic breaks such as rivers and mountains, the territorial boundary ℓ_* is likely to occur at such a point of such discontinuity. Therefore, the model provides a rationale for why many of the world's border demarcations correspond to such geographic barriers.

3.4 Extensions

This section provides nontechnical summaries of five extensions to the baseline model of this paper. These extensions are fully developed in a supplemental appendix.

Dynamic Extension. Our baseline model studies the static cases of cooperation and no-cooperation separately. We extend the model to show how these two cases can be embedded in a unified setting that captures the change in rulers' incentives across the transition from non-cooperation to cooperation. Such a dynamic extension of our model enables us to characterize the earliest date at which (full-scale) cooperation between the rulers becomes self-enforcing.

Independent vs. Interdependent Cooperation. We studied a bilateral relationship between two rulers competing for subjects, but the territorial state system of today represents a multilateral relationship involving many rulers. We extend the model to study a trilateral relationship where rulers A, B and C are located at 0, 1 and -1 respectively and a continuum of individuals are spread evenly between them. Here, it becomes possible to support a territorial state system through multilateral cooperation (or, "interdependent cooperation") even when independent bilateral cooperation is not self-enforcing. Ruler A has strategic relationships with B and C to the east and west, respectively. Even when cooperation between A and B cannot be made self-enforcing in an independent bilateral relationship, cooperation between the two rulers may be self-enforcing in an interdependent relationship. The idea is that if A fails to cooperate with B, then A's relationship with C may collapse as well, which could be very costly to A. This extension also helps account for the survival of small states in the international system.

Entry Deterrence. The stability of the territorial state system may be challenged not just by rulers, but also opportunist subjects who may like to establish themselves as new rulers by entering the market for governance. As in other cartel models, existing providers have an incentive to deter such entry because it threatens their profits. The large fixed costs to starting a new state enables existing states to suppress entry by new potential rulers. We consider the three-ruler model described above. Rulers B and C can keep a lord, A (who is aspiring to start his own state in the middle), out of the

governance market by contributing to suppressing entry by A. If it is not profitable for any one ruler to suppress entry unilaterally, but the rulers can profitably suppress entry by making joint contributions, then entry deterrence is a *coordination problem* between existing rulers. International organizations, such as the United Nations, influence the parameters of this coordination problem by establishing the procedures by which states receive recognition in the international system.

Border Persistence and Border Changes. The boundary ℓ_* in Proposition 2 is the point at which the cost functions c_A and c_B cross each other. But what happens if costs change, and how do we reconcile our model with the stability of borders over time? (Governance costs were indeed changing over time with improvements in military technology, bureaucratic organization and other state institutions.)

We consider a simple extension in which c_A can remain high or shift down at a specific moment in time, and any potential shift is publicly observed. This results in the joint profit maximizing boundary ℓ_* potentially shifting to the east. Now, the rulers have two options: (i) move the old boundary east to the new joint profit maximizing boundary, which would entail B ceding some territory to A, or (ii) maintain cooperation with the historical boundary. We show in this extension that it is ambiguous as to whether the conditions needed to make cooperation self-enforcing are stronger under the new joint-profit maximizing boundary or the old, since the shift in the costs can make the gains from cooperation more or less even.

Nevertheless, since it is common for historical boundaries to persist, the extension suggests that is possible that historical boundaries are more focal than the changing joint profit maximizing ones. This view receives some support in work by Abramson and Carter (2016), who show that inter-state territorial disputes often have precedents in historical borders. If this is the case, then it could be that many of today's boundaries were once joint-profit maximizing but are no longer joint-profit maximizing today.

Conflict. Our model predicts stable borders and cooperation. However, history is replete with violent international conflict. Does this conflict not undermine the potential for cooperation? When we embed a standard model of conflict into our framework, we find that, in equilibrium, cooperation can be re-established after periods of conflict. We consider an extension that is similar to the one on border persistence and change above, but with the key difference that now, any change in a ruler's cost is private information, and territorial redistributions occur only after violent conflict. Conflict is a mechanism by which a ruler credibly reveals any changes in his cost of providing governance when movements in this cost are private information.

4 Applying the Model to Post-Medieval Europe

Returning to the model, it is straightforward to verify that ℓ_A is weakly increasing in v while ℓ_B is weakly decreasing in it. If we say that for two functions, f and g, $f \geq g$ when $f(x) \geq g(x)$ for all x then ℓ_A is decreasing in c_A and ℓ_B is decreasing in c_B.

The main implications of these comparative statics is that the rulers' markets are likely to overlap—and hence the impetus to develop a state system can only be present—when the value of governance, v, is large and when the costs of providing governance c_A and c_B are small. In light of this, we argue below that both "demand-side" and "supply-side" changes that took place in post-Medieval Europe resulted in shifts from the situation of non-overlapping markets to that of overlapping markets. On the demand side, increases in economic productivity led to increases in the value of governance v. On the supply side, improvements in military and administrative technology lowered the costs c_A and c_B of governing distant areas. These changes resulted in increasingly overlapping markets, and made rulers competitive providers of governance in these markets, also providing them with the impetus to coordinate on the cartel equilibrium described above.

4.1 Economic Development

Historians of European economic development often focus their attention on the acceleration in economic growth that Europe experienced during the period of industrialization, but Early Modern Europe also experienced a major expansion in economic activity that some scholars describe as the "Commercial Revolution."[11]

These developments had a major impact on the European economy. For example, commenting on the structural transformations that took place during this period, Walt Rostow writes that "the widening of the market—both within Europe and overseas—brought not only trade, but increased specialization of production, increased inter-regional and international dependence, enlarged institutions of finance, and increased market incentives to create new production functions" (Rostow, 1959, 4). Estimates by Maddison (2007) and others confirm the importance of this period after the 15th century. In Maddison's data, GDP per capita in Western Europe as a whole grew in the period 1500-1820 by 55%, slower than the growth of 182% in the period 1820-2000, but significantly faster than the overall growth of only 38% between years 1 and 1500.

[11] Others use this term more narrowly to describe the improved business and financial techniques that developed during this period (Lopez, 1976, Beniger, 2009).

These developments brought new challenges and opportunities to the rulers of European states. To capitalize on them (and to grow the merchant economy in particular) Europeans required the support of services that territorial states had a natural advantage in providing. In the early days, such services included roads and rural police forces that protected goods and travelers from predatory bandits. As productivity rose, the traditional government service of protection from expropriation became even more valuable to producers and traders, but the demand for new services also grew. By the time of industrialization, market-supporting government services included a wide bundle of public sector projects, including public education, transport and infrastructure. Over the several hundred years after the end of the Middle Ages, the demand for services that the state had a natural advantage in providing grew steadily.

With this, European rulers saw an opportunity to increase their revenues from their citizens—not just to finance these projects, but also to fill their coffers. Correspondingly, shares of state revenue increased dramatically as states continued to provide more governance over time. In the period 1600-1780, for instance, real French and English state revenues increased by factors of 10.5 and 46.3, and in the period 1833-1990 these revenues increased by factors of 40.2 and 16.1, respectively (Bonney, 1999).

Our theory links these developments to the development of the European territorial state system, and provides a new explanation of this system that is grounded in the political economy of European growth. We are not aware of any prior arguments that have explicitly made such a link, detailing the precise mechanism for how economic forces shaped international organization, though both Stephen Krasner and Andreas Osiander (2001) have alluded to the centrality of these forces. Krasner (1993) simply asserts that the states system "can be explained primarily by material, not ideational, factors," (235) and that "the development of long distance trade ... advantaged larger units" (261). Osiander too is vague, and focuses on a later period, writing that "the most significant transition occurred with the French Revolution and the onset of industrialization, not with the Peace of Westphalia..." (281). These conjectures nevertheless support the idea that economic developments and material interests shaped the modern state system.

4.2 Military and Administrative Developments

The period of state building in Europe was also one of considerable changes in the cost and sophistication of military technology and organization, a process which some authors, contentiously, call the "military revolution" (Parker, 1996). Accompanying these devel-

opments was also the significant improvement in bureaucratic capacity to support these organizations (Brewer, 1990). Certain changes, like the development of artillery, created economies of scale in coercion (Bean, 1973). In this situation, where "new weaponry began to favor larger states and more powerful monarchs" (McNeill, 1989, 80), smaller lordships were often absorbed into larger ones. Louis IX of France, who was fortunate to retain the services of the Bureau brothers as artillerists, was able to conquer 60 Norman castles in two years, reducing in months a province that had taken the English thirty four years to conquer using traditional methods (Oman, 1968, Vol. 2, 226).

Even more striking than the improved capabilities of armies was their improved ability to project force over long distances. Part of this reflected changes in the means of recruiting and controlling troops. According to Oman (1968, Vol. 2, 64-7), the English were unable to conquer northern Wales until they ceased using feudal armies (whose service obligation was only 40 days a year) and began to employ mercenaries who could be kept in the principality all year round. Similarly, the development of standardized and disciplined forms of military organization (such and the Spanish *tercios* and the French *compagnies d'ordonnance*) allowed control of remote forces superior to what was possible in feudal armies. Finally, early modern bureaucracies were increasingly capable of paying and feeding such armies outside their home territories. The result was that early modern armies ranged much farther than their medieval predecessors had. The Spain of Phillip II, for instance, was able to support armies as far apart as Italy, Belgium, Catalonia and North Africa, all despite numerous bankruptcies and several mutinies (Parker, 2000).

We are not the first authors to link this military expansion to the political changes of the early modern period. Several authors, of whom Tilly (1992) is perhaps the best known, have traced the institutional development of European states to the demands of war (see also Brewer, 1990, Bates, 2001, Besley and Persson, 2010, Gennaioli and Voth, 2015). We differ from these authors in linking conflict to *sovereignty*—where states *stop* governing, rather than their institutional strength where they do govern. Among the authors in this tradition, the one whose arguments most directly concern the development of the state *system* is Spruyt (1996), and we contrast our theory with his perspective in Section 6.3.

5 Illustrative Cases

We now discuss several cases that illustrate the main observable implication of our theory, which is that the creation of norms of territorial sovereignty should be followed by greater

state presence and expanded revenue collection in border areas. There is considerable evidence to support the claim that during the Early Modern period, rulers started to restrict the authority, autonomy and privileges of lords and towns (see, e.g., Dincecco, 2015). We tie some of this evidence to the development of the state system.

5.1 England and Scotland

The development of the Anglo-Scottish border exhibits many of the patterns predicted by our model. In the late Middle Ages the border was fluid and contested, and the elites of the region took advantage of this fluidity to make favorable arrangements with both English and Scottish rulers. In the 16th century, the border was fixed by mutual agreement between the two states, leading to the end of the special status that the local population had previously enjoyed and an increase in royal control.

During the early Middle Ages, the English kings had claimed feudal superiority over all of Scotland, and the demarcation between the two kingdoms was either nonexistent or highly fluid, with many lords holding land in both kingdoms. Even after the Scots won full recognition of their independence in 1328, the boundary was not precisely demarcated and, instead, the Treaty of Edinburgh-Northhampton enigmatically defined Scotland's boundaries as "its own proper marches as they were held and maintained in the time of King Alexander" (as quoted in Maxwell, 1912, 170).

Administratively, the border was a weak area for both states into the 17th century, with powerful local families (the Percys and Nevilles on the English side, the Douglasses and Homes on the Scottish) building up fiefs that enjoyed considerably more independence from royal interference than vassals elsewhere (see, e.g., Fraser, 2008). At the same time, they used the bodies armed men that the government allowed them to play kingmakers in English and Scottish politics (see, e.g., Hicks, 2008). These families, in their capacities as "Wardens of the Marches," administered a legal system know as "March Law," separate to, and sometimes in competition with, royal common law (Neville, 1988).

Other border families pressed their advantages even further, particularly those based in the "debatable lands," a belt of territory on the western border claimed by both England and Scotland. The Armstrongs, for example, maintained an armed force of 3,000 men in 1528, and used them to raid cattle on both sides of the border, with the looted cattle being sold on the opposite side, reducing the wealth of the tax-paying residents of both kingdoms (Maxwell, 1896, 161).

The lawlessness of this region prompted one of Europe's first formal processes of border demarcation, a process especially remarkable because it took place between polities with a strong tradition of mutual hostility. In 1552, the two states appointed a five man commission to draw a border, with each party appointing two members and the French ambassador serving as a neutral arbiter. A mutually agreeable line was surveyed through the area, giving the Scots more territory but the English control of the main road. The new border was marked by the "Scot's dike," an earthen mound with a ditch on either side (MacKenzie, 1951).

During the course of the 16th century the English and Scottish monarchies also asserted their authority along their now mutual border. The most prominent casualties of this process were the nobles that had previously dominated this area. The Percys and the Nevilles put aside their differences to lead a revolt against the court in 1569, but were defeated and their lands seized for the crown. On the Scottish side, The Armstrongs were severely weakened by executions and putative land redistributions. Administrative powers gradually passed from these lords to bureaucratic entities such as the specially constituted Council of the North (reestablished in 1537). The process of administrative centralization accelerated after a single monarch took power in both Kingdoms (James I of England, VI of Scotland) in 1603, but the evidence we have presented shows that the process had started even before then. Eventually, the border areas were renamed the "Middle Shires," border law was abolished, and a joint commission was established to enforce law and order in the region, executing hundreds of bandits and issuing a series of restrictions on armament and fortification (Fraser, 2008, 361-9).

5.2 Sweden

In the Swedish province of Livland, similar developments occurred following a period of explosive economic growth. Border demarcation and inter-state agreements were followed within a decade by moves that transferred large sums from the previously favored local nobility to the central government.

In 1660, the Swedish monarch ruled a multi-national empire that included modern Finland and Estonia, and large portions of modern Latvia and Germany. As in many other such assemblages, the nobility of the peripheral regions enjoyed a set of privileges, of which the most important were the right to exploit the peasantry. In Livland (modern Northern Latvia and Southern Estonia) successive Swedish and Polish kings had granted 84% of the land to the nobility as gifts, while retaining only 1.25% for themselves (Upton,

1998, 191). By contrast, in Uppland (part of Sweden proper), at most 59% of the land had been donated to the nobility and the crown retained a sizable 10% (Upton, 1998, 67). The crown's greater generosity in Livland reflected the desire to retain the loyalty of the nobility in a region subject to constant border disputes with Russia and Poland. Between the 1620 and 1660, both Sweden and Poland formally claimed Livland, and fought two major wars over its possession.

In 1660, however, the Treaty of Oliva finally ceded Livland to Sweden permanently, while Russia, guaranteed its border with Sweden at Cardis (1661). After Charles XI of Sweden came of age in 1672, he set out, through his Uniformity Policy, to eliminate all political peculiarities among regions under the slogan of "one king, one law, one people." The most important policy consequence for Livland was the *reduktion*, in which the king confiscated all noble property that had previously been given by the crown, sometimes then leasing it back to its previous owners. Despite feverish protests from the local nobility (who cited earlier royal guarantees made at the time of annexation) the process was successfully completed by the 1690s. The *reduktion* was a financial windfall for the crown, recovering revenues of 5.5 million silver dalers from Livland, and making the province (previously a financial drain) self-sustaining and allowing it to pay a subsidy worth 10% of the central budget (Upton, 1998, 197).

Previously, we noted that in some cases expansions of local economic activity (and thus the potential returns to providing governance) should provide an incentive to demarcate borders. Livland provides some suggestive evidence for this pattern, since the century before the implementation of the uniformity policy was one of notable economic expansion. This expansion was based on a commodity export boom: The export of grain, principally to the Netherlands, a trade encouraged by the rapid urbanization of these provinces as well as improvements in bulk shipping technology. The Dutch referred to it as the "mother of all trades," and Livland and Poland were the major producing areas (Van Tielhof, 2002, Bogucka, 1973).[12] The local nobility made sure that that the returns from this trade passed into their own hands, both by squeezing the peasantry through the expansion of serfdom and by negotiating directly with foreign merchants for the most favorable prices (Małowist, 1958, 187).

Notably, the areas of the Swedish empire where the uniformity policy was carried out with the least success were its German provinces, where the residual structure of the Holy

[12]Van Tielhof (2002) notes that "Because of the expansion of this trade, its relative steadiness and the enormous volumes involved, the late 16th century and the first half of the 17th century are generally considered to have been the heyday of the Baltic grain trade" (50).

Roman Empire muddied the absoluteness of the Swedish king's authority. In Pomerania, for example, the king only recovered a paltry 66,500 silver dalers from the *reduktion*. As Upton (1998) writes,

> The need to respect imperial law limited the possibilities ... For example, some recipients of the donations had taken the precaution of getting them confirmed by the emperor, and the king accepted that it would be impolitic to challenge them, just as he was careful not to pursue his argument with the estates to the point where they might appeal for imperial intervention. (185)

5.3 Spain

Spain was another case where the fiscal pressure on peripheral regions increased as norms of sovereignty developed. In the 17th century, Spain was a "composite state" including both Castile and the peripheral provinces of Aragon, Valencia and Catalonia (the "crown of Aragon"). These provinces were not subject to Castilian taxation, and enjoyed a set of *fueros* [privileges] that allowed the local nobility to control most posts within the kingdoms, and the right to consent to taxation. Though the lack of a developed central accounting system makes quantification difficult, contemporaries and modern historians are in agreement that Catalonia and Aragon had much lower levels of taxation than Castile in the 17th century (Storrs, 2006, Ch. 5). Anderson (1979) writes that

> Nothing is more striking in this respect than the utter lack of any proportionate contribution to the Spanish war effort in Europe during the later 16th and 17th centuries from Aragon, or even Italy. Castile was to bear the burden of interminable military campaigns virtually alone. (71)

Particularly in the case of Catalonia (the richest of the peripheral provinces), the reluctance to pressure the local elite came from a fear that they would use their location on the border to call in French troops as allies against Castile. In fact, between 1640 and 1652 the Catalan parliament, the General Estates, had done precisely this, after revolting against a royal attempt to create a "Union of Arms" that would equalize military contributions. Louis XIII of France was declared first Protector of the Catalan Republic and Count of Barcelona, while a Franco-Catalan Army fought the Castilians. According to Storrs (2006), throughout the later 17th century, the royal bureaucracy "were constantly aware—and fearful—of the danger of a repeat of the events of 1640-52" (195), which led them to be cautious in their negotiations with the Catalan elite over taxation.

During the War of the Spanish Succession (1701-1715), the Catalans sided with the losing (Austrian) candidate against the winning (French) candidate to the Spanish throne, and were defeated. Now that Catalonia was situated between two friendly states with an agreed-upon border, the victors were less inclined to be generous than they had been in 1652—the possibility of playing the two states against each other was remote. The Spanish Nueva Planta decrees of 1707 (only implemented after the end of the war) abolished the *fueros* of the crown of Aragon, and the administration was reformed to conform to the centralized Castilian model (Lynch, 1989, 64-66). One of the first acts of the reformers was to established new taxes designed to equalize the fiscal burden between Castile and the Aragonese kingdoms, with the Valencian version being explicitly called the *equivalente*. Similar (though less effective) changes in the same period reduced the autonomy of the Basque provinces at the other end of the frontier.

5.4 France

Perhaps the most well-known story of state centralization is that of the French state under Richelieu, Mazarin, and Louis XIV. Faced with a powerful nobility, these rulers worked to undermine feudal privileges and traditional institutions while concentrating authority in centrally appointed *intendents* (Beik, 1985, Anderson, 1979). These efforts occurred in all parts of France, but their effects were especially pronounced in border areas where previous rulers had been generous to the nobility to compel or entice them to accept French rule. Burgundy and French Flanders, for instance, had formerly been part of the Burgundian state, and were claimed by the Hapsburgs into the early 16th century. Many of these areas retained representative institutions abolished in interior France, the autonomy of which was an early target of the *intendents*.

This consolidation led to large financial profits for the French state. Quantitative evidence on the fiscal consequences of the incorporation of border regions in Europe (as opposed to the institutional ones) is difficult to come by, but 17th century France is an exception. Data collected by Mallet (1789) and made available by Bonney (1999) show how French state revenues increased over time for three types of French provinces: those that did not border another kingdom during the 17th century, those that did, and those that did border another kingdom in 1600 but not in 1695, due to Louis XIV's annexations. Due to the lack of annual measures of provincial population or economic activity, it is impossible to compute measures of the absolute tax burden. Nevertheless, from these data, we calculated that between 1600 and 1695, nominal state revenue increased by a

factor of only 3.81 in non-border provinces, a factor of 6.20 in regions that were border provinces in 1600 but not in 1695, and a factor of 12.05 in border areas, with the fastest rises coming in the middle of the century.[13]

This relatively more precipitous increase in border areas does not necessarily mean that the they were more heavily taxed than the center—in fact, there is evidence that the opposite was true (Behrens, 1963)—but that the relative fiscal advantage of the border areas decreased. In addition, these calculations do not reflect institutional differences that might be expected to have led to lower taxation in border provinces.[14] Instead, the 17th century, and especially the middle decades where the steepest rises in revenue occurred, was a period of the development in norms of territoriality between France its neighbors, which in effect gave greater power to the central French state in exercising control over its border regions. Notably, the Treaty of the Pyrenees (1659) ended twenty four years of war between Spain and France and ended Spanish claims to French occupied territory on both the southwestern and northeastern borders. The south-western border, along the Pyrenees, has remained stable since 1659. On the eastern border, the Peace of Westphalia not only granted new territory to France, but made explicit that several French territories annexed in the previous century, such as the "three bishoprics" of Metz, Verdun and Toul, were not part of the Holy Roman Empire, giving the "chief Dominion, Right of Sovereignty, and all other Rights" to the French King (see Articles 71-74).

6 Alternative Theories

6.1 Ideational Theories

Was the development of the territorial state system in Modern Europe the result of an encounter with new ideas that resulted in a change in norms and ideology?[15]

Perhaps the most influential ideational theory for the development of the modern state system is the idea that the Peace of Westphalia (1648) engendered the norm of territorial

[13]These calculations are based on data in the file MALM031.

[14]On the contrary, in *ancien regime* France, the peripheral provinces were generally ruled as *Pays d'état*, which meant that the could not be taxed without their own consent. A few provinces annexed in the 17th century were annexed as *Pay d'imposition*, which gave them a reduced level of fiscal autonomy. The core provinces, on the other hand, were usually ruled as *Pays d'election*, which allowed the king to raise taxes at will. While Louis XIV was somewhat successful in eroding the autonomy of the *Pays d'état*, these institutional difference remained until the French revolution.

[15]This is perhaps the most widely held view in international relations theory, supported in some form by numerous scholars(see, e.g., Ruggie, 1993, Philpott, 2001, Nexon, 2009, among many others)

sovereignty, and therefore marked a critical juncture in the development of the modern state system. This view dates back to an article by Leo Gross (1948), and reflected in the works of numerous scholars of international relations from diverse camps.[16] Supporters of this view point mainly to three articles in the the Treaties of Onasbruk and Muenster that comprise the Peace. These are Article 64, which states the rights of princes to choose the official religion of their principalities, 65, which states that they may conduct their own foreign policy, and 67, which states that they can set domestic policy.

However, as Osiander (2001) and Krasner (1993) have argued, these articles neither granted the princes rights that they did not already have, nor did they materially change the way the princes conducted their affairs within the Empire. These and other skeptics challenge the Westphalia hypothesis on three grounds. First, the provision to allow the states to adopt their own religion had already been stated in the Treaty of Augsburg (1555). Moreover, religious conflicts persisted well after 1648. Second, the constituent states of the Empire had the ability to set domestic and foreign policy even prior to the end of the Thirty Years War, as per the *landeshoheit* system practiced at least since 1519. At the same time, it was not until the 19th century, after the Napoleonic wars abolished the Empire, that the princes became fully sovereign. Third, and perhaps most compelling, is the observation that there is no evidence that any historian, diplomat, emissary, or ruler prior to Leo Gross cited the Peace of Westphalia as a source for the norm of territorial sovereignty, rather than a legal precedent affecting particular territories.

We refer to both Osiander (2001) and Krasner (1993) for critiques of the power of ideational theories to explain the emergence of the sovereignty norm. Krasner (1993) writes the following about these ideational theories:

> Initially, the ideas [of sovereignty] were just hooks to justify actions that were motivated by considerations of wealth and power, not by visions of justice and truth. European leaders were fortunate in having many hooks because of the diversity and richness of European intellectual traditions. (257)

6.2 Nations and Nationalism

Another potential explanation for the development of the territorial state system is the development of national identities. According to this view, as individuals formed strong ethnic, linguistic, and religious attachments to particular states, the variation in costs to

[16] According to Osiander (2001) the list of scholars who support this view includes David Boucher, Seyom Brown, Hedley Bull, Kal Holsti, Hans Morgenthau and Mark Zacher, among many others.

rulers of governing these individuals dictated the location of borders and bolstered the development of the state system by making it costly to annex territories inhabited by populations loyal to other rulers.

While nationalism did coevolve with norms of sovereignty in the modern world, we follow a long tradition of scholars in arguing that territorial divisions reified national identities rather than the other way around. Mayall (1999) writes, for instance, that "sovereignty is a much older principle in international politics than self-determination" (476). In addition, the concept of sovereignty is typically thought of as originating in the Early Modern period (if not before), but the classic accounts of nationalism describe its rise as taking place largely in the 19th century with the growth of conscription and primary schooling (Weber, 1976, Gellner, 1983, Anderson, 2006). Weber (1976) in fact makes the sequencing explicit, explaining how the French annexation process that took place during the 16th century "had [already] produced a political entity called France..., an entity formed by conquest..." but that "the modern view of the nation as a body of people united according to their own will and having certain attributes in common (not least history) was at best dubiously applicable to the France of 1870" (485). Similarly, Tilly (1995) holds that for 19th century states, "central control emphatically included cultural control, the singling out or creation of a single linguistic, historical, artistic and practical tradition from all those present within the national territory" (197). For these reasons, we are skeptical that the rise of nationalism was a significant driver of the development of the territorial state system in the early days of its development.

In fact, it is possible to explain the emergence of nationalism in a way that reinforces our argument. States might agree on borders, and then work hard to ensure that citizens on their side of the boundary identify with their institutions and not those of their neighbors (Laitin, Solé and Kalyvas, 1994). Over time, this would increase the costs for the neighboring state of governing a disloyal population in the border region. The rise of national attachments could provide an explanation for why long established borders remain stable over time, even as the military capacities of the two states shift.

6.3 Military Technology and the Size of States

The period of state-building was a period of rapid change in the military and institutional capabilities of states (Gennaioli and Voth, 2015). Among scholars who have investigated the political consequences of these developments, Spruyt (1996) comes closest to explicitly linking the improvements in military technology in this period to the development and

expansion of the sovereignty norm. Unlike our theory, however, his focuses on competition and selection among states rather than cooperation. Spruyt holds that changes in the internal structure of states changed the state system overall, as "sovereign states selected out and delegitimized actors who did not fit a system of territorially demarcated and internally hierarchical authorities" (28). For Spruyt, the sovereign, territorial state had "institutionally superior arrangements" (32) relative to city leagues and large empires, particularly in their ability to wage war. Moreover, the organization of territorial states was incompatible with other forms of political organization and authority, whose claims they did not respect.

A change in the economics of coercion was, however, far from certain to lead to the development of the sovereignty norm. In fact there is some reason to expect that the opposite might be the case, and that improvements in military technology are compatible with both claims of universal empire and the practice of mixed sovereignty. This claim receives support from the fact that outside of Europe, the introduction of Early Modern military innovations such as gunpowder was not accompanied by the development of sovereignty norm. In fact, the so-called "gunpowder empires" of the Ottomans, Safavids, Mughals, and Qing used the new technology to repress local rulers and build large polities that explicitly claimed universal dominion (McNeill, 1989, Goldstone, 1991). Spruyt's theory, unlike ours, does not account for why the territorial sovereignty norm did not emerge (naturally) outside of Europe despite other parts of the world experiencing the corresponding developments in military technology. According to our theory, what these empires lacked that Europe also experienced alongside the development of military technology, was the major economic expansion due to the Commercial and Industrial revolutions.[17]

7 Conclusion

The modern territorial state system is a remarkable institutional construction that did not always exist. The Canadian and American governments do not collect taxes (sales, income, or corporate) from the residents of cities and towns just across their common

[17]In addition, while Spruyt's technological or institutional selection argument provides a plausible explanation for why some polities (like France) succeeded while others (like the Hanseatic League) failed, it also does not explain why the successful, institutionally superior states subsequently recognized each other's claims rather than continuing the process of "selecting out" the weaker states. On the contrary, many states eventually ceased to claim all the territory that they could potentially have administered, or to which they might have laid claims—consider, e.g., that Cardinal Richelieu's conception of the "natural frontiers" of France included modern Belgium, Luxembourg, and Western Germany (Sahlins, 1990).

border. While borders are certainly contested in some regions of the world today, they are stable and meaningful political demarcations in most of the modern world. This is a fact that requires explanation.

We have offered a new explanation for this fact built upon the economics of competition between states. States in our model are natural competitors in the market for governance, and their competition drives down the revenues that each can collect from providing governance to their citizens. Like many modern cartels, they divide the market to limit competition and keep revenues high. Occasional shocks may lead to conflicts over parts of the governance market, but the system of geographically-defined states has, by and large, been stable.

In an alternative world where competition in the governance market is allowed, the residents of Neche, North Dakota, could presumably decide whether to pay taxes to the American government or to the Canadian government (or neither) for public goods and services. They may even decide which services to buy from which government, for example public education from the United States and healthcare from Canada. The same could be true for the residents of Gretna, Manitoba, just two miles north of Neche. This, however, is not the reality we live in, and our theory provides an explanation for why states have made sure that it isn't.

Our theory raises new questions about the development of the territorial state system. For example, it leaves open for further examination the exact mechanisms by which co-operation was achieved, the role of technological improvements such as the development of maps, and institutional developments such as the exchange of ambassadors. Further work is also needed on the exact ways in which changes in international norms impacted local-level state behavior, and how the territorial state system spread first to the edges of Europe and later to the rest of the world.

Finally, our assertion that the territorial sovereignty norm is supported by rulers' interests in keeping their revenues high (and consequently the welfare of their citizens low) raises the question of how long such a low citizen-welfare equilibrium can persist, especially in light of the institutional developments of the 19th and 20th centuries—in particular, the advent of democracy and the rise of globalization. Research on these questions will help us further understand the changes in how political authority was organized over the last millennium, and may even provide some clues as to how it may evolve in the future.

Appendix

A Proofs

A.1 Proof of Proposition 1

Suppose markets do not overlap. Ruler A's cost of providing governance is higher than each individual's willingness to pay, v, on the interval $(\ell_A, 1]$. This means that in equilibrium every individual in the interval $(\ell_A, 1]$ must not be buying from A. Analogously, almost every individual in the interval $[0, \ell_B)$ must not be buying from ruler B. Since $\ell_B \geq \ell_A$, ruler A must be selling at the monopoly price v to almost every individual on the interval $[0, \ell_A]$. To see why, suppose that A sets a price lower than v on a positive measure subset of this interval. Then he could profitably deviate by slightly raising the price on this subset, since all individuals in the subset would still have to buy. On the other hand, A cannot be staying out the market for a positive measure set of individuals in this interval, since in this case he could profitably deviate by setting a price slightly lower than v, compelling all individuals in this subset to buy. Finally, it cannot be that a positive measure of individuals in $[0, \ell_A]$ reject to purchase from A at the price v, since the ruler could profitably deviate by slightly lowering his price to these individuals. Therefore, A must be selling at the monopoly price v to almost every individual on the interval $[0, \ell_A]$. Analogously, B must be selling at the monopoly price v to almost every individual in $[\ell_B, 1]$. Finally, almost every individual in (ℓ_A, ℓ_B) must choose not to buy from either ruler, since their willingness to pay, v, is lower than either of the two rulers' costs. Under these conclusions, the rulers maximize the sum of their profits, given demand.

Suppose now that markets overlap. First note that there is no equilibrium in which a set of positive measure of individuals in $[0, \ell_*]$ do not buy from either ruler, since A could profitably deviate by charging a price slightly lower than v to every individual in this set and get them to buy.

Second, it is straightforward to verify that A must sell at the monopoly price $p_A(\ell) = v$ to almost every individual in $[0, \ell_B)$. To see why, note that B must stay out of the market for almost every individual in this set, since no ruler prices below cost and because $c_B(\ell) > v$ for all $\ell \in [0, \ell_B)$. From this it follows that A must be charging a price $p_A(\ell) \leq v$ to almost every $\ell \in [0, \ell_B)$. A cannot be charging a price $p_A(\ell) < v$ to a positive measure set of individuals in $[0, \ell_B)$ given that B stays out of the market for these individuals,

since A could profitably deviate by charging slightly higher to every individual in this set. This establishes that A sells at the monopoly price $p_A(\ell) = v$ to almost every individual in this set. (This argument is analogous to the one used in the case of non-overlapping markets, where A sells at the monopoly price to every individual in $[0, \ell_A)$ since A's cost is lower than v on this set but B's cost is higher than v.)

Finally, A and B both offer a price equal to B's cost to almost every individual in the set $[\ell_B, \ell_*]$, and almost every individual in this set buys from A. Suppose, for the sake of contradiction, there were an equilibrium in which B sold to a positive measure subset S of individuals in $[\ell_B, \ell_*]$. Then, for every individual $\ell \in S$,

$$c_B(\ell) \leq p_B(\ell) \leq p_A(\ell)$$

where the first inequality follows from the refinement that no ruler prices below cost, and the second from the fact that the individuals are strategic buyers. Now note that S cannot have a subset S' of positive measure in which either of the two inequalities above is strict. If the first is strict, then A can profitably deviate by slightly undercutting B's price for every individual in S' and capturing the entire market of individuals in this set. If the second is strict, then B can profitably deviate by slightly raising his price for every individual in S' and still retaining its market. Therefore, $c_B(\ell) = p_B(\ell) = p_A(\ell)$ for almost every individual $\ell \in S$. But under the hypothesis that every individual in S buys from B, ruler A can profitably deviate by slightly lowering his price for every individual in S and capturing the market for almost every individual in this set. This establishes the contradiction.

Therefore, in equilibrium almost every individual in $[\ell_B, \ell_*]$ buys from A. This means that $p_A(\ell) \leq p_B(\ell)$ for almost every $\ell \in [\ell_B, \ell_*]$. In addition, we cannot have $p_A(\ell) < c_B(\ell)$ for a positive measure set of individuals in $[\ell_B, \ell_*]$, because on such a set we would have $p_A(\ell) < c_B(\ell) \leq p_B(\ell)$ by the condition that no ruler prices below cost, implying that A could profitably deviate by raising his price slightly to each individual in this set. Nor can we have $p_A(\ell) > c_B(\ell)$ on a positive measure subset of $[\ell_B, \ell_*]$ since B could profitably deviate by slightly undercutting A's price to each individual in such a set. Therefore, we must have $p_A(\ell) = c_B(\ell)$ almost everywhere on the set $[\ell_B, \ell_*]$. Finally, we cannot have $c_B(\ell) < p_B(\ell)$ on a positive measure subset of $[\ell_B, \ell_*]$, otherwise A could profitably deviate by slightly raising his price for every individual in this set. Since no ruler prices below cost, we must therefore have $p_B(\ell) = c_B(\ell)$ almost everywhere on $[\ell_B, \ell_*]$ as well.

A similar argument establishes analogous results to the east of the threshold ℓ_*. In equilibrium, almost every individual in $(\ell^A, 1]$ buys from B at the monopoly price of v while A stays out of the market for a full measure set of these individuals. Rulers A and B each offer a price equal to A's cost to almost every individual in $(\ell_*, \ell^A]$ and almost every individual in this interval buys from B. Together, these results pin down equilibrium profits, and the shortfalls in these profits from the joint profit maximizing levels. □

A.2 Proof of Proposition 2

Indefinite play of a static game equilibrium path is clearly an SPE. Along the joint profit maximizing outcome path, ruler A's flow profit is $\Pi_A^* = v\ell_*$. In an SPE that supports this payoff via the threat of reversion to a static game equilibrium path, ruler A has no profitable deviation after a history in which no deviation has yet occurred if and only if

$$\Pi_A^* \geq (1-\delta)\left(\Pi_A^* + \Delta_B\right) + \delta\widehat{\Pi}_A$$

where $\widehat{\Pi}_A = \Pi_A^* - \Delta_A$ is A's equilibrium profit. This follows because the supremum one-period payoff that ruler A can get from a one-stage deviation from the path of play is $\Pi_A^* + \Delta_B$. This payoff is nearly obtained by deviating to enter the market for individuals in $(\ell_*, \ell_A]$ at prices slightly below v. After such a deviation, A earns a flow payoff of $\widehat{\Pi}_A$ in each subsequent period. Substituting $\Pi_A^* = \widehat{\Pi}_A + \Delta_A$ into the centered inequality above and rearranging gives $\delta \geq \Delta_B/(\Delta_A + \Delta_B)$. An analogous argument establishes that B has no profitable deviation if and only if $\delta \geq \Delta_A/(\Delta_A + \Delta_B)$. Therefore, the trigger strategy profile is an equilibrium if and only if the inequality stated in the proposition holds. □

B Extensions

B.1 The Emergence of the Territorial State System

In each period $t = 0, 1, 2, ..., \infty$, the players take actions as in the static game described in Section 3.1 with $v = v_t$, where $\{v_t\}_{t=0}^{\infty}$ is an increasing sequence. All other parameters besides v are constant over time. This means that ℓ_* is constant over time, while ℓ_A weakly increases and ℓ_B weakly decreases as v increases. We index these changing thresholds using the time subscript, denoting them by $\ell_{A,t}$ and $\ell_{B,t}$ respectively. Since $\{v_t\}$ is an increasing sequence, we assume that there is some period $\underline{t} > 0$ such that $\ell_{B,t} \geq \ell_{A,t}$ for all $t < \underline{t}$ and $\ell_{B,t} < \ell_{A,t}$ for all $t \geq \underline{t}$. That is, the rulers' markets do not overlap for all $t < \underline{t}$ but

they do overlap for all $t \geq \underline{t}$. Again, the rulers discount future payoffs with the common discount factor δ.

In this dynamic game, it is an equilibrium for the players to play a static game equilibrium strategy profile, as characterized in Proposition 1, in each period independent of history. We again refer to the outcome this generates as a static game equilibrium path. Along such a path, there is no shortfall in equilibrium profits in periods $t < \underline{t}$, but in periods $t \geq \underline{t}$ there are shortfalls equal to $\Delta_{A,t} = \int_{\ell_{B,t}}^{\ell_*} v_t - c_B(\ell)d\ell$ and $\Delta_{B,t} = \int_{\ell_*}^{\ell_{A,t}} v_t - c_A(\ell)d\ell$ for rulers A and B respectively. We assume that $\{\Delta_{A,t}\}$ and $\{\Delta_{B,t}\}$ converge to Δ_A^* and Δ_B^* respectively. This is guaranteed if $\{v_t\}$ converges to some $v^* > \max\{c_A(1), c_B(0)\}$, since in this case, the convergence of the integrands is uniform.[18]

Along a path in which the rulers maximize joint profit given demand, ruler A sells at the monopoly price of v_t to almost every individual in $[0, \min\{\ell_*, \ell_{A,t}\}]$ and B sells at the same monopoly price to almost every individual in $[\max\{\ell_*, \ell_{B,t}\}, 1]$, in each period t. This generates the joint profit maximizing outcome. We say that an outcome path is *eventually joint profit maximizing* if there is some period $\bar{t}$ such that the players play the joint profit maximizing outcome from time $\bar{t}$ onwards. We say that an outcome path that is eventually joint profit maximizing is *maximal* among a set of eventually joint profit maximizing outcome paths if it has the lowest value of $\bar{t}$ among all such outcome paths.

Proposition B.1. *Consider the set of eventually joint profit maximizing outcome paths that can be supported in equilibrium via the threat of reversion to any static game equilibrium path. A maximal such outcome path exists if and only if*

$$\delta > \max\left\{\frac{\Delta_A^*}{\Delta_A^* + \Delta_B^*}, \frac{\Delta_B^*}{\Delta_A^* + \Delta_B^*}\right\} \tag{3}$$

Proof: A maximal path in the set of joint profit maximizing outcome paths that are supported in equilibrium via the threat of reversion to any static game equilibrium path exists if and only if this set is nonempty. A set of necessary conditions for this set to be nonempty is that there exists some period $\bar{t}$ such that

$$\sum_{t'=t}^{\infty} \delta^{t'-t}(\Pi_{i,t} + \Delta_{i,t}) \geq (\Delta_{i,t} + \Delta_{-i,t}) + \sum_{t'=t}^{\infty} \delta^{t'-t}\Pi_{i,t}, \qquad \forall t \geq \bar{t},\ i = A, B \tag{4}$$

[18]The assumption that $\Delta_{A,t}$ and $\Delta_{B,t}$ converge is not necessary for our results, but if they diverge they must grow sufficiently slowly relative to δ for payoffs to be well-defined.

which says that each ruler's payoff from the join profit maximizing outcome path is at least as large as the supremum payoff to deviating once any period $t \geq \bar{t}$ and triggering play of the static game equilibrium path. Canceling terms that are common to both sides of each inequality and rearranging gives

$$\delta \geq 1 - \frac{(1-\delta)\sum_{t'=t}^{\infty} \delta^{t'-t} \Delta_{i,t}}{\Delta_{A,t} + \Delta_{B,t}}, \qquad \forall t \geq \bar{t},\ i = A, B \tag{5}$$

Since $\Delta_{A,t}$ and $\Delta_{B,t}$ converge from below to Δ_A^* and Δ_B^* respectively, $(1-\delta)\sum_{t'=t}^{\infty} \delta^{t'-t} \Delta_{i,t}$ converges from below to Δ_i^* for each $i = A, B$. Therefore, the set of necessary conditions characterized above imply that

$$\delta > \frac{\Delta_{-i}^*}{\Delta_A^* + \Delta_B^*}, \qquad i = A, B \tag{6}$$

By continuity, this pair of inequalities is also sufficient to establish the existence of a time $\bar{t}$ such that (4) holds, which means that neither ruler has a profitable one-stage deviation from playing the joint profit maximizing outcome path when deviations trigger the play of a static game equilibrium path. Therefore, an equilibrium that supports a joint profit maximizing outcome paths via the threat of reversion to a static game equilibrium path exists if and only if (6) holds. □

The proposition above characterizes the emergence of territorial cooperation in the following sense. Consider a maximal joint profit maximizing outcome path that is supported in equilibrium via the threat of reversion to any static game equilibrium path, and denote the value of $\bar{t}$ after which the rulers maximize joint profit in this outcome path by $\bar{t}_{\min}$. Up to period $\underline{t}$, markets do not overlap and the rulers maximize joint profit by playing the static game equilibrium outcome. Therefore, if $\bar{t}_{\min} \leq \underline{t}$ then $\bar{t}_{\min} = 0$. When this is the case, the rulers maximize joint profit given demand in every period, so the territorial state system emerges in period $\underline{t}$ right when cooperation begins. If, on the other hand, $\bar{t}_{\min} > \underline{t}$ then there is at least one period $t \in \{\underline{t}, ..., \bar{t}_{\min}\}$ after markets begin to overlap in which the rulers competitively drive down each others' revenues. The state system emerges in a persistent (i.e., consolidated) way, only after time $\bar{t}_{\min}$.

It is worth mentioning that the predictions of this extension are consistent with the finding reported in Section 5.4 of the main text that revenue collection in the border regions of France increased more rapidly than in non-border regions. In the model, revenues from the non-border areas (close to the points 0 and 1) are increasing steadily with

increases in v. Revenues in the border regions close to ℓ_* are also increasing steadily for the same reason. But in period $\bar{t}_{\min}$ there is a sharp increase in revenues collected by each ruler in border areas close to ℓ_* since revenues increase abruptly from their static game levels to the monopoly level, v, in this period. This suggests that the rate of growth in revenues from periods before $\bar{t}_{\min}$ to periods after should be higher in border areas than elsewhere.

Finally, our assumption that the only time-varying parameter is v not only simplifies the dynamic extension, but is also a first order approximation that is substantively grounded in the discussions of Section 4 in the main text, where we emphasized the relatively more important role of the increase in the value of governance due to economic development rather than the changes in military technology and organization that took place in large effect in the Late Middle Ages. Nevertheless, since military technology and organization continued to improve over time, it is natural to think that the costs c_A and c_B were also declining. Our model can account for this, though in this case the joint profit maximizing boundary ℓ_* would also be changing over time. Since borders eventually became relatively stable, this raises the question of how to interpret boundary changes along the joint-profit maximizing path. In other words, how did territorial redistributions occur? We address this question in Sections B.4 and B.5 below.

B.2 Independent vs. Interdependent Cooperation

We augment the model of Section 3 of the main text by adding a ruler called C located at -1 and a continuum of individuals spread uniformly between -1 and 0. Like individuals located to the east of 0, each individual located to the west of 0 values governance at v. Ruler A's cost of providing governance to each individual located at $\ell \in [-1, 1]$ is now a function $c_A(\ell)$ that is strictly decreasing on $[-1, 0]$ and strictly increasing on $[0, 1]$ and continuous at 0. Ruler B's cost of providing governance is a strictly decreasing function $c_B(\ell)$ and ruler C's cost of providing governance is a strictly increasing function $c_C(\ell)$. Again, all of these cost functions have at most a finite number of discontinuities. Our assumptions are now (i) $\max\{c_A(0), c_B(1), c_C(-1)\} < v < \min\{c_B(0), c_C(0)\}$, (ii) $c_A(1) > c_B(1)$ and (iii) $c_A(-1) > c_C(-1)$. Note that we have more than simply generalized our previous assumptions, since we have added the assumption that B's cost of providing governance to the west of 0 and C's cost of providing governance to the east of 0 are

greater than any individual's willingness to pay.[19] Ruler A's market is now $[\ell_A^w, \ell_A^e]$ where $\ell_A^w := \inf\{\ell \geq -1 : c_A(\ell) < v\}$ and $\ell_A^e := \sup\{\ell \leq 1 : c_B(\ell) < v\}$. Ruler B's market is still $[\ell_B, 1]$ where $\ell_B := \inf\{\ell \geq 0 : c_B(\ell) < v\}$ and ruler C's market is $[-1, \ell_C]$ where $\ell_C := \sup\{\ell \leq 0 : c_C(\ell) < v\}$. The two other relevant thresholds are $\ell_*^e \in (0,1)$, where c_A crosses over c_B and $\ell_*^w \in (-1,0)$ where c_C crosses over c_A. We will assume that markets overlap both at the east and west of 0, so that $\ell_A^w < \ell_C \leq 0 \leq \ell_B < \ell_A^e$, and $\ell_A^w \leq \ell_*^w \leq \ell_C$ and $\ell_B \leq \ell_*^e \leq \ell_A^e$. This implies that in an equilibrium in which no ruler prices below cost, equilibrium profits fall short of their joint profit maximizing levels for A by $\Delta_A^e + \Delta_A^w$, where $\Delta_A^e := \int_{\ell_B}^{\ell_*^e} v - c_B(\ell)d\ell$ and $\Delta_A^w := \int_{\ell_*^w}^{\ell_C} v - c_C(\ell)d\ell$; for B by $\Delta_B := \int_{\ell_*^e}^{\ell_A^e} v - c_A(\ell)d\ell$; and for C by $\Delta_C := \int_{\ell_A^w}^{\ell_*^w} v - c_A(\ell)d\ell$.

However, when the game is infinitely repeated, and all three rulers discount future payoffs by δ, the rulers may be able to achieve higher profits. We consider two modes of cooperation to be focal. Under *independent cooperation*, rulers A and B maximize joint profit to the east of 0 and B stays out of the market for individuals to the west of 0, until and unless a deviation by either of them, after which they revert to their static game equilibrium pricing strategies to the east of 0 and keep their strategies to the west of 0. Rulers A and C behave analogously to the west of 0. Thus, ruler A's relationship with B is independent of his relationship with C and vice versa. Under *interdependent cooperation*, all rulers maximize joint profit unless and until *any* deviation by any of them takes place, after which all revert to the indefinite play of their static game equilibrium strategies. In both cases, the individuals (i.e. buyers) optimize statically, and all deviations by them are ignored. This completes the description of two different strategy profiles.

Proposition B.2. *Independent cooperation is an equilibrium if and only if*

$$\delta \geq \overline{\delta}_{\text{indep}} := \max\left\{\frac{\Delta_A^e}{\Delta_A^e + \Delta_B}, \frac{\Delta_B}{\Delta_A^e + \Delta_B}, \frac{\Delta_A^w}{\Delta_A^w + \Delta_C}, \frac{\Delta_C}{\Delta_A^w + \Delta_C}\right\} \tag{7}$$

Interdependent cooperation is an equilibrium if and only if

$$\delta \geq \overline{\delta}_{\text{inter}} := \max\left\{\frac{\Delta_A^e}{\Delta_A^e + \Delta_B}, \frac{\Delta_A^w}{\Delta_A^w + \Delta_C}, \frac{\Delta_B + \Delta_C}{\Delta_A^e + \Delta_A^w + \Delta_B + \Delta_C}\right\} \tag{8}$$

Proof: Under both independent and interdependent cooperation, rulers B and C do not have profitable one-stage deviations in all histories prior to the trigger of static game equilibrium play between each of them and ruler A if and only if $\widehat{\Pi}_B + \Delta_B \geq (1-\delta)(\widehat{\Pi}_B +$

[19] This assumption is not necessary for our results but simplifies the analysis, enabling us to make our main points without additional analytical cost.

$\Delta_B + \Delta_A^e) + \delta\widehat{\Pi}_A$ and $\widehat{\Pi}_C + \Delta_C \geq (1-\delta)(\widehat{\Pi}_C + \Delta_C + \Delta_A^w) + \delta\widehat{\Pi}_C$, where $\widehat{\Pi}_B$ and $\widehat{\Pi}_C$ are the static game equilibrium payoffs to B and C respectively in an equilibrium where no ruler prices below cost. These inequalities rearrange to $\delta \geq \Delta_A^e/(\Delta_A^e + \Delta_B)$ and $\delta \geq \Delta_A^w/(\Delta_A^w + \Delta_C)$.

For ruler A to not have a profitable one-stage deviation in histories prior to a deviation by any ruler, under independent cooperation, we need

$$\widehat{\Pi}_A + \Delta_A^e + \Delta_A^w \geq (1-\delta)(\widehat{\Pi}_A + \Delta_A^e + \Delta_A^w + \Delta_B) + \delta(\widehat{\Pi}_A + \Delta_A^w) \tag{9}$$

$$\widehat{\Pi}_A + \Delta_A^e + \Delta_A^w \geq (1-\delta)(\widehat{\Pi}_A + \Delta_A^e + \Delta_A^w + \Delta_C) + \delta(\widehat{\Pi}_A + \Delta_A^e) \tag{10}$$

where (9) says that A cannot profit by breaking his relationship with B alone (10) says that A cannot profit by breaking his relationship with C alone. We also need

$$\widehat{\Pi}_A + \Delta_A^e + \Delta_A^w \geq (1-\delta)(\widehat{\Pi}_A + \Delta_A^e + \Delta_A^w + \Delta_B + \Delta_C) + \delta\widehat{\Pi}_A \tag{11}$$

which says that A cannot profit by simultaneously breaking his relationship with both B and C. But this condition is implied by (9) and (10) since these simplify to $\Delta_A^e \geq (1-\delta)(\Delta_A^e + \Delta_B)$ and $\Delta_A^w \geq (1-\delta)(\Delta_A^w + \Delta_C)$ respectively; and if we add these two inequalities we get $\Delta_A^e + \Delta_A^w \geq (1-\delta)(\Delta_A^e + \Delta_A^w + \Delta_B + \Delta_C)$, which implies (11). Then, (9) and (10) rearrange to $\delta \geq \Delta_B/(\Delta_A^e + \Delta_B)$ and $\delta \geq \Delta_C/(\Delta_A^w + \Delta_C)$. After all other histories, players are repeatedly playing static game equilibrium on the relevant side of 0, so there are no profitable one-stage deviations. Therefore, (7) and (8) are both necessary and sufficient for independent cooperation to be an equilibrium strategy profile.

Under interdependent cooperation, for ruler A to not have a profitable one stage-deviation in histories prior to any deviation by any ruler, we need only (11) to hold. This rearranges to $\delta \geq (\Delta_B + \Delta_C)/(\Delta_A^e + \Delta_A^w + \Delta_B + \Delta_C)$. After all other histories, players are repeatedly playing the static game equilibrium path, so (8) is both necessary and sufficient for interdependent cooperation to be an equilibrium strategy profile. □

Since (9) and (10) imply (11) in the proof above, it must be that $\overline{\delta}_{\text{indep}} \geq \overline{\delta}_{\text{inter}}$. Moreover, the inequality may be strict, which happens when three conditions are met: (i) one of A's no profitable deviation conditions from the path of play under independent cooperation defines $\overline{\delta}_{\text{indep}}$, meaning that $\overline{\delta}_{\text{indep}}$ is the solution to either (9) or (10) when they hold with equality; (ii) both of B and C's no profitable deviation conditions from the path of play hold with strict inequality when $\delta = \overline{\delta}_{\text{indep}}$; and (iii) the pair of A's no profitable deviation conditions from the path of play under independent cooperation together imply that A's

no profitable deviation condition from the path of play under interdependent cooperation holds with strict inequality, meaning that (9) and (10) imply (11) holds strictly. Condition (iii) holds generically since it does not hold only if $\Delta_B/\Delta_C = \Delta_A^e/\Delta_A^w$.

The basic point is that if A can profitably deviate under interdependent cooperation, then he can profitably deviate under independent cooperation. A may be tempted to break his cooperative relationship with B under independent cooperation, but under interdependent cooperation, breaking the relationship with B results in his relationship with C collapsing as well, which may be too costly. This suggests that it may be possible to support a territorial state system through multilateral, or interdependent, cooperation, even when cooperation cannot be supported independently in each bilateral relationship.

That said, in cases where neither independent nor interdependent cooperation are an equilibrium, it may still be possible to support bilateral cooperation between two rulers. For example, supporting cooperation between A and B requires only that δ be weakly larger than $\overline{\delta}_{AB} := \max\{\Delta_A^e/(\Delta_A^e + \Delta_B), \Delta^B/(\Delta_A^e + \Delta_B)\}$ and it may be the case that $\overline{\delta}_{AB} < \overline{\delta}_{\text{inter}}$ so that if $\delta \in (\overline{\delta}_{AB}, \overline{\delta}_{\text{inter}})$, then cooperation between A and B can be self-enforcing even though interdependent cooperation cannot.

Finally, even when both interdependent and independent cooperation are self-enforcing, interdependent may still be the more attractive way to support the overall stability of the territorial state system. It works whenever independent cooperation does: the incentive to not misbehave is at least as large under interdependent cooperation as it is under independent cooperation, and may be strictly larger. Moreover, interdependent cooperation is simple in the sense that it makes it unnecessary for rulers to calculate, for each of possibly many cooperative bilateral relationship they are in, whether it may be profitable to break the relationship. Since all cooperation collapses if any one relationship is broken, a ruler must simply appreciate that the sum total value of all of his cooperative relationships is greater than the maximum that he can obtain from misbehaving.

B.3 Entry Deterrence

Consider the environment described in Appendix B.2 but with the difference that there is no ruler located at 0, or equivalently that ruler A has stayed out of the market for all individuals to the east and west of 0 in all (unmodeled) periods prior to period 0. In this sense, A is simply an individual located at 0. B and C are active rulers. At the start of the game, B and C each simultaneously decide how much to pay to deter entry by A. Let d_B and d_C denote the amounts the contribute respectively. If $d_B + d_C \geq d$ where d

is a parameter, then A cannot enter the market, but if $d_B + d_C < d$ then A enters the market for governance. If A enters, he becomes an active ruler, and his cost of providing governance is c_A, as in the previous environment. We maintain all of the assumptions of the previous section. The game then proceeds as in the previous section. In this case, if A were to enter the market and the rulers played an equilibrium that maximized joint profit in the subgame after A enters, the profits of rulers B and C would fall short of their profits in the joint profit maximizing outcome path for the subgame after A chooses to not enter by Δ_A^e and Δ_A^w, respectively.

Proposition B.3. *Consider the class of equilibria in which all active rulers maximize joint profit in all subgames after B and C make their contribution decisions, and suppose that this class is nonempty. (i) If $(1-\delta)d < \max\{\Delta_A^w, \Delta_A^e\}$ then in all equilibria in this class, A does not enter. (ii) If $\Delta_A^w + \Delta_A^e < (1-\delta)d$ then in all equilibria in this class, A enters. (iii) If $\max\{\Delta_A^w, \Delta_A^e\} < (1-\delta)d$ and $(1-\delta)d < \Delta_A^w + \Delta_A^e$ then there are equilibria in this class where A enters and where A does not enter.*

Proof: (i) In this case, there is an equilibrium in this class in which B contributes $d_B = d$, C contributes $d_C = 0$ and A does not enter. If there were an equilibrium in which A entered, then $d_B + d_C < d$ but B could profitably deviate by raising d_B so that $d_B + d_C = d < \Delta^e/(1-\delta)$ in which case entry by A would be deterred. The analogous argument holds if $\Delta_A^w > (1-\delta)d$ but with the roles of B and C reversed.

(ii) In this case there is an equilibrium in this class where $d_B = d_C = 0$. If A did not enter, then either B would be making a contribution larger than $\Delta_A^e/(1-\delta)$ or C would be making a contribution larger than $\Delta^w/(1-\delta)$. One of them could thus profitably deviate by lowering their contribution to 0.

(iii) In this case, there are equilibria in this class where $d_B = d_C = 0$ and A enters. Neither B nor C can profitably deter A by unilaterally raising his contribution. There are also equilibria where $d_B < \Delta_A^e/(1-\delta)$ and $d_C < \Delta_A^w/(1-\delta)$ and $d_B + d_C = d$. □

Lastly, we note that the above analysis is conducted under the assumption inherited from the environment of Appendix B.2 that B's cost of providing governance to the west of 0 and C's cost of providing governance to the east of 0 are greater than an individual's willingness to pay, v. This means that the markets of B and C do not overlap. In the case where their markets do overlap, the situations where the rulers can deter entry by A would differ. However, the main feature of this extension—that entry deterrence by new rulers is, in some situations (e.g. case (iii) of the proposition above), a coordination problem between existing rulers would still carry over.

B.4 Border Persistence and Border Changes

Suppose that the setup of Section 3 in the main text describes a stage game that is played repeatedly by rulers A and B who discount future payoffs at rate $\delta < 1$, but that prior to the start of play, the players learn whether ruler A's cost is $c_A = \overline{c}_A$ or $\underline{c}_A$, where $\overline{c}_A(\ell) \geq \underline{c}_A(\ell)$ for all ℓ. The joint profit maximizing boundary under $\overline{c}_A$ is $\ell_* = \overline{\ell}_*$, and under $\underline{c}_A(\ell)$ is $\ell_* = \underline{\ell}_*$. Note that $\underline{\ell}_* \geq \overline{\ell}_*$ and $\underline{\ell}_A \geq \overline{\ell}_A$. Ruler A's market is $[0, \ell_A] = [0, \overline{\ell}_A]$ under $\overline{c}_A$ and $[0, \ell_A] = [0, \underline{\ell}_A]$ under $\underline{c}_A$. Ruler B's market is $[\ell_B, 1]$ regardless of A's cost. The idea is that in unmodeled periods prior to the start of the first period, ruler A's cost was $\overline{c}$, and in the first period of the game it remains $\overline{c}$ with some probability and drops to $\underline{c}$ with complementary probability.[20]

In light of this interpretation, we consider $\overline{\ell}_*$ to be a historically focal boundary, and we consider two possible outcome paths. The first is the *joint profit maximizing path* in which the rulers maximize joint profit each period. This requires the rulers to set the boundary according to the realization of A's cost in the first period: if ruler A's cost is $\overline{c}$, then he sells at the monopoly price, v, to almost all individuals to the west of $\overline{\ell}_*$ while B sells at the monopoly price to almost all individuals to the east of $\overline{\ell}_*$; and if A's cost drops to $\underline{c}$ then he sells at the monopoly price, to almost all individuals to the west of $\underline{\ell}_*$ while B sells at the monopoly price to almost all individuals to the east of $\underline{\ell}_*$. The second outcome path is one that we call the *historically focal boundary outcome path*. In this path, ruler A sells at the monopoly price to almost all individuals to the west of $\overline{\ell}_*$ and B sells at the monopoly price to almost all individuals to the east of $\overline{\ell}_*$ regardless of the realization of A's cost. If the realization is $\overline{c}_A$ then the the historically focal boundary outcome path maximizes joint profit, but if the realization is $\underline{c}_A$ then it does not.

The static game equilibrium shortfalls from the joint profit maximizing levels of profit for A and B respectively are $\overline{\Delta}_A := \int_{\ell_B}^{\overline{\ell}_*} v - c_B(\ell)d\ell$ and $\overline{\Delta}_B := \int_{\overline{\ell}_*}^{\ell_A} v - \overline{c}_A(\ell)d\ell$ when $c_A = \overline{c}_A$, and $\underline{\Delta}_A := \int_{\ell_B}^{\underline{\ell}_*} v - c_B(\ell)d\ell$ and $\underline{\Delta}_B := \int_{\underline{\ell}_*}^{\ell_A} v - \underline{c}_A(\ell)d\ell$ when $c_A = \underline{c}_A$. If the rulers play the joint profit maximizing path (and thus shift the boundary from $\overline{\ell}_*$ to $\underline{\ell}_*$) after they learn that A's cost is $\underline{c}_A$, then A's payoff is greater by

$$G := \int_{\overline{\ell}_*}^{\underline{\ell}_*} v - \underline{c}_A(\ell)d\ell \tag{12}$$

[20] All equilibrium conditions that we derive will be necessary equilibrium conditions had we included these prior periods in the model.

than his payoff in the case where they play the historically focal boundary outcome path—and therefore maintain the boundary $\overline{\ell}_*$—despite learning that A's cost is $\underline{c}_A$.

Proposition B.4. *The joint profit maximizing path can be supported in equilibrium via the threat of reversion to any static game equilibrium path if and only if*

$$\delta \geq \overline{\delta}_{\text{shift}} := \max\left\{\frac{\overline{\Delta}_A}{\overline{\Delta}_A+\overline{\Delta}_B}, \frac{\overline{\Delta}_B}{\overline{\Delta}_A+\overline{\Delta}_B}, \frac{\underline{\Delta}_A}{\underline{\Delta}_A+\underline{\Delta}_B}, \frac{\underline{\Delta}_B}{\underline{\Delta}_A+\underline{\Delta}_B}\right\} \tag{13}$$

The historically focal boundary outcome path can be supported in equilibrium via the threat of reversion to any static game equilibrium path if and only if

$$\delta \geq \overline{\delta}_{\text{stay}} := \max\left\{\frac{\overline{\Delta}_A}{\overline{\Delta}_A+\overline{\Delta}_B}, \frac{\overline{\Delta}_B}{\overline{\Delta}_A+\overline{\Delta}_B}, \frac{\underline{\Delta}_B+G}{\underline{\Delta}_A+\underline{\Delta}_B}\right\} \tag{14}$$

Proof: Separately adopting the analysis of Proposition 2 to the two sets of histories that come after the two realizations of costs establishes that the joint profit maximizing path is supported in equilibrium via the threat of reverting to any static game equilibrium path if and only if (13) holds.

For the historically focal boundary outcome path to be supported in equilibrium via the same threat, we need δ to be weakly greater than both $\overline{\Delta}_A/(\overline{\Delta}_A+\overline{\Delta}_B)$ and $\overline{\Delta}_B/(\overline{\Delta}_A+\overline{\Delta}_B)$ so that the rulers have no profitable deviations at all histories after they learn that ruler A's cost is $\overline{c}_A$. This also follows from adopting the analysis of Proposition 2 to the set of histories that follow after the rulers learn that A's cost is $\overline{c}_A$. At histories after the rulers learn that A's cost is $\underline{c}_A$, ruler A has no profitable deviation from the historically focal boundary outcome path under the threat of reversion to the static game equilibrium path if and only if

$$\underline{\Pi}_A + \overline{\Delta}_A - R \geq (1-\delta)(\underline{\Pi}_A + \underline{\Delta}_A + \underline{\Delta}_B) + \delta\underline{\Pi}_A \tag{15}$$

where $R := \int_{\overline{\ell}_*}^{\ell_*} c_B(\ell) - \underline{c}_A(\ell)d\ell$ and $\underline{\Pi}_A = \int_0^{\ell_B} v - \underline{c}_A(\ell)d\ell + \int_{\ell_B}^{\ell_*} c_B(\ell) - \underline{c}_A(\ell)d\ell$ is A's payoff from the static game equilibrium path after learning that his cost is $c_A = \underline{c}_A$; and therefore $\underline{\Pi}_A + \overline{\Delta}_A - R = \int_0^{\ell_*} v - \underline{c}_A(\ell)d\ell$ is A's payoff from staying on the historically focal boundary outcome path. Simplifying and rearranging (15) we get

$$\delta \geq \frac{\underline{\Delta}_A - \overline{\Delta}_A + R + \underline{\Delta}_B}{\underline{\Delta}_A + \underline{\Delta}_B} \tag{16}$$

Then, noting that

$$\begin{aligned}\underline{\Delta}_A - \overline{\Delta}_A + R &= \int_{\ell_B}^{\underline{\ell}_*} v - c_B(\ell)d\ell - \int_{\ell_B}^{\overline{\ell}_*} v - c_B(\ell)d\ell + \int_{\overline{\ell}_*}^{\underline{\ell}_*} c_B(\ell) - \underline{c}_A(\ell)d\ell \\ &= \int_{\overline{\ell}_*}^{\underline{\ell}_*} v - c_B(\ell)d\ell + \int_{\overline{\ell}_*}^{\underline{\ell}_*} c_B(\ell) - \underline{c}_A(\ell)d\ell = \int_{\overline{\ell}_*}^{\underline{\ell}_*} v - c_A(\ell)d\ell = G \quad (17)\end{aligned}$$

inequality (16) says that δ is at least $(\underline{\Delta}_B + G)/(\underline{\Delta}_A + \underline{\Delta}_B)$. Finally, at histories after the rulers learn that A's cost is $\underline{c}_A$, ruler B has no profitable deviation from the historically focal boundary outcome path under the threat of reversion to the static game equilibrium path if and only if

$$\underline{\Pi}_B + \underline{\Delta}_B + L \geq (1-\delta)(\underline{\Pi}_B + \underline{\Delta}_B + L + \overline{\Delta}_A) + \delta\underline{\Pi}_B \quad (18)$$

where

$$L := \int_{\overline{\ell}_*}^{\underline{\ell}_*} v - \underline{c}_B(\ell)d\ell \quad (19)$$

Rearranging (18) gives us $\delta \geq \overline{\Delta}_A/(\overline{\Delta}_A + \underline{\Delta}_B + L)$. Then note that we have

$$\begin{aligned}\underline{\Delta}_B + L &= \int_{\overline{\ell}_*}^{\underline{\ell}_*} v - c_B(\ell)d\ell + \int_{\underline{\ell}_*}^{\underline{\ell}_A} v - \underline{c}_A(\ell)d\ell \\ &\geq \int_{\overline{\ell}_*}^{\underline{\ell}_*} v - \overline{c}_A(\ell)d\ell + \int_{\underline{\ell}_*}^{\underline{\ell}_A} \max\{0, v - \overline{c}_A(\ell)\}d\ell \geq \int_{\overline{\ell}_*}^{\overline{\ell}_A} v - \overline{c}_A(\ell)d\ell = \overline{\Delta}_B \quad (20)\end{aligned}$$

The first inequality follows because $\overline{c}_A(\ell) \leq c_B(\ell)$ for all $\ell \geq \overline{\ell}_*$, $v - \underline{c}_A(\ell) \geq 0$ on $[\underline{\ell}_*, \underline{\ell}_A]$, and $v - \underline{c}_A(\ell) \geq v - \overline{c}_A(\ell)$ for all ℓ. The second inequality follows because $\overline{\ell}_A \leq \underline{\ell}_A$ and $v - \overline{c}_A(\ell) \geq 0$ for all $\ell \leq \overline{\ell}_A$. Therefore, as a result of (20), if $\delta \geq \overline{\Delta}_A/(\overline{\Delta}_A + \overline{\Delta}_B)$ then $\delta \geq \overline{\Delta}_A/(\overline{\Delta}_A + \underline{\Delta}_B + L)$. Together, these results imply that the historically focal boundary outcome path is supported in equilibrium via the threat of reverting to any static game equilibrium path if and only if (14) holds. □

Under the joint profit maximizing path, peaceful territorial redistributions take place as costs change. While such redistributions have occurred in history, they are rare.[21] It

[21]For example, the Soviet takeover of Bessarabia from Romania in 1940 did not last long. Austria-Hungary's territorial concessions to Italy during World War I, though initially accepted were eventually rejected as being insufficient. And, Nazi Germany's extortion of sizeable territories from Austria, Czechoslovakia and Lithuania in the 1930's were in the context of a nascent World War which ended with these territories being returned to their original states.

is more common for historical boundaries to persist, which suggests that the historically focal boundary outcome path may be more focal than the joint profit maximizing path. This is also supported in recent work by Abramson and Carter (2016), who find that interstate territorial disputes often have precedents in historical borders. If the historically focal boundary outcome path is more focal than the joint profit maximizing path, then our model says that today's boundaries may have once been joint-profit maximizing, but they no longer are.

In the next section, we explore the idea that when there is a genuine change in governance costs that lead rulers to seek more territory, territorial redistributions, if they occur, are the consequence of violent conflict rather than a peaceful transfers.

B.5 Conflict

Consider the extension of Section B.4 but assume that the realization of c_A is unobserved by ruler B. B's prior is that c_A equals $\underline{c}_A$ with probability γ and $\overline{c}_A$ with probability $1-\gamma$. Thus, the shift in A's cost is unobserved by B, who thinks that the cost has remained the same with probability $1-\gamma$ and dropped with probability γ. The game has two "phases." In the first phase, rulers A and B make a sequence of decisions. After they are done, the second phase begins in which they play the game described in Section B.4 as a continuation game, with discount factor δ. The game starts in the first phase with ruler A deciding whether to seek moving the boundary to $\underline{\ell}_*$ or leaving it at $\overline{\ell}_*$. If A does not seek to move the boundary then the second phase begins. If A does seek to move the boundary then B must choose to either agree or disagree. In both cases, the second phase begins but if B disagrees then the rulers engage in conflict, which costs each a flow payoff of $w > 0$. After they each pay this cost, ruler A's true cost is revealed.

We focus on a perfect Bayesian equilibrium with the following properties. If A did not seek to move the boundary in the first phase, then in the second phase the players play the historically focal boundary outcome path of the previous section. If A tried to move the boundary and B agreed, then in each period of the second phase A sells at the monopoly price to almost all individuals to the west of $\underline{\ell}_*$ for whom $v < c_A(\ell)$ while B sells at the same monopoly price to almost all individuals to the east of $\underline{\ell}_*$. If A tried to move the boundary and B disagreed, then the players play the joint profit maximizing path in the second phase. Under an equilibrium with these properties, equilibrium play in the second phase is based on the agreement of the rulers in the first phase, so we refer to an equilibrium with these properties as an *agreement-based equilibrium*. Since payoffs in every

continuation equilibrium of the second phase are higher than the individually rational payoffs for each ruler of the continuation game, an equilibrium with such properties exists when δ is high enough.

We characterize behavior under an agreement based equilibrium in the first phase of the game under the assumption that *the cost of war is low enough* in comparison to the gains and losses in value of territory for both rulers; in particular, we assume

$$(1-\delta)w < \min\{G, L\}$$

where G is the quantity defined in (12) and L is the quantity defined in (19). This assumption says specifically that the cost of war is smaller than the gain territorial value to the low cost type of A from shifting the boundary to $\underline{\ell}_*$ as well as the loss in territorial value to B from making this shift. Under this assumption, both the low cost type of A and B could be willing to use war as a mechanism to reveal costs.

Proposition B.5. *An agreement-based equilibrium exists if δ is high enough. If the war cost is low enough, then in an agreement-based equilibrium:*

1. *If $(1-\gamma)L < (1-\delta)w$, A always seek to shift the boundary and B agrees.*
2. *If $(1-\gamma)L > (1-\delta)w$, then A seeks to shift the boundary when his cost drops, and seeks to shift the boundary with probability*

$$\frac{\gamma}{1-\gamma}\frac{(1-\delta)w}{L-(1-\delta)w}$$

when his cost does not drop; and B agrees with probability

$$\frac{(1-\delta)w}{g+(1-\delta)w}, \text{ where } g = \int_{\overline{\ell}_*}^{\min\{\underline{\ell}_*, \overline{\ell}_A\}} v - \overline{c}_A(\ell)d\ell.$$

Proof: Since $(1-\delta)w < G$ by the assumption that the war cost is low enough, the low cost type of A seeks to move the boundary.

If B agrees then A would want to move the boundary even when his cost is high. In this situation, B would strictly prefer to agree if

$$\overline{\Pi}_B^* - L > \gamma\left[\overline{\Pi}_B^* - L - (1-\delta)w\right] + (1-\gamma)\left[\overline{\Pi}_B^* - (1-\delta)w\right]$$

where $\overline{\Pi}_B^* = \int_{\overline{\ell}_*}^1 v - c_B d\ell$ is the monopoly profit for B under boundary $\overline{\ell}_*$. This inequality then rearranges to $(1-\gamma)L > (1-\delta)w$.

If B disagrees, then the high cost type of A does not seek to move the boundary. B then infers that if A seeks to move the boundary, his cost is low. In this case, B has a profitable deviation since she would prefer to agree.

Finally, if B mixes between agreeing and disagreeing, she must be indifferent between her two options. This indifference condition is

$$\overline{\Pi}_B^* - L = \left(\frac{\gamma}{\gamma + (1-\gamma)\alpha}\right)\left[\overline{\Pi}_B^* - L - (1-\delta)w\right] + \left(\frac{(1-\gamma)\alpha}{\gamma + (1-\gamma)\alpha}\right)\left[\overline{\Pi}_B^* - (1-\delta)w\right]$$

where α is the probability with which the high cost type of A seeks to move the boundary. From this, we find that $\alpha = \gamma(1-\delta)w/(1-\gamma)[L-(1-\delta)w]$, and note $\alpha < 1$ if and only if $(1-\gamma)L > (1-\delta)w$. Finally, if $\alpha < 1$ then the high cost type of A must be indifferent between seeking and not seeking to move the boundary. The indifference condition is

$$\overline{\Pi}_A^* = \beta\left[\overline{\Pi}_A^* + g\right] + (1-\beta)\left[\overline{\Pi}_A^* - (1-\delta)w\right]$$

where β is the probability with which B agrees and $\overline{\Pi}_A^* = \int_{\overline{\ell}_*}^1 v - \overline{c}_A(\ell)d\ell$ is the monopoly profit for the high cost type of A under boundary $\overline{\ell}_*$. g, the quantity defined in the statement of the proposition, is the gain to the high cost type of A from moving the boundary to $\underline{\ell}_*$. Solving this indifference condition gives $\beta = (1-\delta)w/[g + (1-\delta)w]$. Finally, note that if $(1-\gamma)L = (1-\delta)w$ then $\alpha = 1$ and B is indifferent between agreeing and disagreeing. In this case, there is a continuum of equilibria in which B agrees with sufficiently high probability and both types of A seek to move the boundary. □

The proposition reproduces, in our setting, the well-known result in crisis bargaining theory that if the cost of war is sufficiently small in comparison to the value of the disputed territory, then the weak fully pools with the tough (here, low cost) type in challenging the disputed territory when the prior sufficiently favors the tough type, and partially pools with the tough type in challenging the disputed territory when the prior sufficiently favors the weak type. The tough and weak types correspond, in our setting, to the low and high cost types respectively, and the disputed territory corresponds to the interval $\left[\overline{\ell}_*, \underline{\ell}_*\right]$.

The extension above shows that while tempting to interpret violent redistributions of territory as challenges to the territorial state system, it is possible for them to occur within the framework of the modern state system without disrupting its overall stability. After

conflict is resolved, the rulers in our model continue to cooperate to keep profits high. This is exactly the kind of "organized hypocrisy" that Krasner (1999) uses to describe the concept of modern territorial sovereignty. He writes:

> Westphalian and international legal sovereignty are best understood as examples of organized hypocrisy. At times rulers adhere to conventional norms or rules because it provides them with resources and support (both material and ideational). At other times, rulers have violated the norms, and for the same reasons. (p. 24)

Thus, even when rulers in our model contest territory, this occurs within an equilibrium of long term cooperation.

In fact, this extension also clarifies a key premise of theory—that there is a system of international cooperation in place that is based on the territorial sovereignty norm. Despite his skepticism of the durability of this norm, the premise is consistent with Krasner's (1993) view that "the clearest storyline of the last thousand years is the extruding out of universal alternatives to the sovereign state" (p. 261). While he argues in his 1999 book that challenges to the scope of sovereignty have always existed, and leaders have experimented with other models of international organization, he nevertheless accepts the "dominance of the sovereign state as an organizational form" (Krasner, 1993, p. 261).

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