Empire-building and Price competition

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Abstract

This paper is among the first to theoretically examine the relevance of price competition in the protection market by focusing on the competition between empires. By distinguishing absolute and differential protection rents, we first define coercive rivalry and price competition among empires and then establish three types of empires: early empires of domination (like Akkadian empire), territorial empires (like Russian empire), and merchant empires (like Venetian empire). Empires are structured on the basis of two types of hierarchies that determine their protection costs: 'top-down' and 'bottom-up.' We systematically study the impact of asymmetrical protection costs on price competition in the light of Bertrand equilibria. We provide an economic rationale for the use of violence throughout history in conformity with the findings of economic historians.

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Introduction

Considerable historical evidence reveals price competition in the protection market, at both national and international levels. Germany during the Thirty Years' War and throughout the nineteenth century is a good example of how several violence-using enterprises can compete in demanding payments for protection in almost the same territory (Lane, [1958] 1979, p. 51). Prussia was the winning competitor: its Junker army was efficient and meagrely paid,[1] but highly respected and saluted by a code of honour (Frevert, 1995).

Economic historians like Lane (1973, 1979), North and Thomas (1973), and North (1981) have stressed the importance of price competition in the protection market[2] as a source of Western ascendancy and empire-building. In contrast, theorists of conflictual

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[1] "During the process of the internal formation of the state, the military had developed into a 'pillar of the monarchistic unitary state'…As a reward for maintaining such close bonds, special privilege was accorded to their concept of honor, which, as contemporaries mockingly observed, replaced two-thirds of their pay, and, for the ruling princes, was an exceptionally inexpensive currency with which to 'replenish their coffers'." (Frevert, 1995, p. 42).

[2] See also all the papers in the volume edited by Tracy (1991) regarding the political economy of merchant empires.

activity have argued against extrapolating this form of competition in the protection market, instead favoring competition through the quantity of conflictual effort. Conflict models are often based on the Cournot-Nash equilibrium,[3] favoring competition over the amount of effort, and postulating the uniformity of protection price. According to these models, "private providers of protection, instead of competing on the price of their service, typically compete with their means of violence over turf" (Konrad and Skaperdas, 2012, p. 418). Coercive rivalry is prevalent in the protection market because the 'buyers' of protection are not mobile and cannot change their 'sellers': "In this setting, peasants have limited options. They are tied to their land and at the mercy of the lords who compete over how to divide them up" (ibid, 2012, p. 418).

Skaperdas (20O3, p. 150) argued that price competition in the protection market can work if: 1) subjects are mobile; and 2) rulers are able to commit to their announced taxes and services. Unlike peasants, merchants trading expensive spices abroad are mobile, and have frequently influenced monarchs' policies in Europe since the sixteenth century. In this sense, under a merchant empire, both conditions are almost satisfied.

[3] The Stackelberg equilibrium has also been extensively used, but it focuses on the quantity of protective/aggressive efforts rather than competition over price. Grossman's model (1995) of price competition between two providers of protection (the state and the mafia) is one exception, but it is also based on the Cournot-Nash equilibrium and focuses on the quantity of services rendered by each competitor. Moreover, according to the Cournot competition, "the tax rate and the extortion rate will be equal to each other" (Celentani, 1995, p. 158).

However, tax competition between merchant empires, or between a merchant and a territorial empire[4], differs from tax competition among democratic states. In the latter case, tax competition among different jurisdictions involves many services including the number of schools, green areas, hospitals, and other public utilities (Tiebout, 1956; Epple and Romer, 1991) – whereas in the former case, 'tax'[5] competition is merely about protection from aggression and violent menace.

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[4] In the first section, we will distinguish three types of empires, namely empire of domination (like Akkadian and Mongol empires), territorial empire (like Roman and Russian empires) (Mann, 1986), and merchant empire (like Venetian, Dutch and British empires) (Tilly, 1990; Mann, 2012). We adopt Mann's definition of empire: « Our modern English word « empire » derives from the Latin *imperium* "the power wielded by a general commanding an army and a magistrate armed with the law"-that is, a combined political and military power. Modern usages add a geographical element-power exercised over peripheral regions by a core power. I define an empire as a centralized, hierarchical system of rule acquired and maintained by coercion through which a core territory dominates peripheral territories, serves as the intermediary for their main interactions, and channels resources from and between peripheries." (Mann, 2012, p. 17).

[5] Here, 'tax' competition does not refer to the modern usage of 'tax' as transfer payment, but to its historical connotation as a protection price against violent menace. Barzel (1999, p. 32) wrote: "Taxes are the rents paid by the former owners of confiscated properties to the confiscator. Another meaning is that taxes constitute

An exploration of price competition in the protection market can: 1) reveal the economic rationale of merchant empires; and 2) clarify the historical transition from absolute monarchy to modern state by focusing on the protection market as one initially dominated only by sellers (providers) of protection (kings, lords, warriors, soldiers, pirates) to a market dominated by a combination of sellers and buyers of protection (merchants, financiers, industrialists). By excluding price competition and focusing only on coercive rivalry in the protection market, we can clarify the 'inner' or 'predatory' layers of the modern state (Konrad and Skaperdas, 2012, p. 436). Price competition à la

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transfer payments-their claimed destination in contemporary taxation theory." Taxation of property or person originated in the West as an exaction on conquered enemies, and "for many centuries such taxes were borne as a badge of disgrace" (Ames and Rapp, 1977, footnote 17, p. 167). In both meanings, taxes are treated as equivalent to the amount of wealth that can be otherwise redistributed through appropriation or transfer payment, although the original appropriative connotation is softened in its contemporary meaning. A third meaning, used in medieval English parliament, treats taxes as investment shares in projects usually initiated by the ruler, and in which subjects wished to join as partners. For example, partners could participate in the conduct of warfare through pecuniary taxes or in-kind contributions. Retribution took the form of war booties. This process could also prevent the monarch from using the triumphant army to acquire despotic powers; as council/parliament grew more powerful, it voted for more taxes. Thus, the nobility and ascending merchants used taxes both to tame the protector/aggressor state and to enhance their looting power.

Tiebout reveals competition among different jurisdictions of a democratic state – but what about the transition from coercive rivalry to price competition?

This paper focuses on the particular combination of coercive rivalry and price competition in the protection market. Price competition was an important aspect of empire-building, particularly in the case of merchant empires. For example, although the Venetian merchant empire used violence, this violence was encapsulated within a system of price competition and protection rent for merchants, bankers, and manufacturers contributing to economic prosperity. In stark contrast, the Portuguese method of empire-building encouraged coercive rivalry and maximized the Crown's tributes, which the court spent on sumptuous consumption and extensive military settlements. Although this unproductive way of expending tributes impeded economic prosperity in the long run, an alternative scenario could easily be imagined.

The Portuguese monarch could have used the tributes to enhance manufacturing and trade, as Colbert did in expanding French industry and commerce in the ex-Dutch colonies of the West Indies (Woolsey Cole, 1939). A military junta or an empire led by a military caste also uses violence to plunder and capture tributes. However, unlike an absolute monarchy, its goal is to maximize the size of the army and its territorial domination, even if it results in losing a large share of tribute. The economic role of violence in these three types of empire-building is thus completely different, and an economics of conflict cannot ignore this difference.

The profuse literature on tax competition notwithstanding, to date no model has captured the effect of price competition on empire-building. The extensive empirical evidence presented by economic historians has not yet yielded an adequate formal theoretical construction. One of the main objectives of this paper is to address this gap between economic history and conflictual models by establishing a typology of empires and their different forms of competition in the presence of multiple prices and asymmetrical costs of protection. Clarifying the impact of multiple prices for protection in empire-building requires applying Bertrand equilibria.

Following the pioneering work of Boulding (1962), numerous studies have focused on the economics of nation and empire-building: Alesina and Spolaore (1997, 2000, 2003, 2006); Buchanan and Faith (1987); De Long and Shleifer (1993); Findlay (1996); Friedman (1977); Olson (1982, 2000); and Wittman (1991, 2000). Among this abundant literature, we will expand on Findlay's suggestion that the process by which the boundaries of a country "are determined and defined clearly depends on the interplay of economic and military forces, which have, however, generally been regarded as independent factors" (Findlay, 1996, p. 41).

Tributes (henceforth, 'absolute protection rents')[6] and 'differential protection rents' provide an economic rationale for different types of empires and their competition. Our main line of enquiry here is to explore how price competition is derived from this

[6] See the next section for an explanation of the distinction between 'absolute protection rent' (tributes) and 'differential protection rents.'

economic rationale, within the context of coercive power. Our model focuses on the determination of the size of an empire under the assumption of multiple protection prices and a price competition *à la* Bertrand.

The paper proceeds as follows. The first section highlights the economic significance of two different methods of using violence, based on coercive rivalry and price competition. We accordingly distinguish two different types of protection rent to measure this difference: absolute and differential protection rents. Given asymmetrical costs of protection, we will identify three types of empires based on how they try to maximize (absolute or differential) protection rents by economizing or maximizing on protection costs. This typology underpins different types of competition including price competition among empires. In section two, we present a model to explain the competition between three different types of empires using Bertrand equilibria with asymmetrical protection costs. The model includes three types of competition: first, competition between an empire of domination and a territorial empire; second, competition between a territorial empire and a merchant empire; and finally, competition between two merchant empires. Section 3 presents the results and static and historical interpretations of these results. Finally, we present conclusions and explore the economic significance of violence from a historical perspective.

1. Coercive rivalry and price competition

Why do economic historians insist that price competition plays a role in the protection market? Borrowing Olson's terminology (1982, 2000), why is it important to investigate

the consequences of price competition within the context of coercive power? What does this kind of competition reveal that competition involving the use of force cannot?

The difference between the two types of competition boils down to the complementarity or substitutability of market competition and the use of force. Price competition in the protection market involves a complementary relationship. The economic advantage of such a symbiosis between 'trade' and 'raid' is *differential protection rent*. Coercive rivalry requires the use of force as a substitute for price competition. The economic advantage of such an opposition between 'trade' and 'raid' is *absolute protection rent*. In this section, we will first illustrate this difference using a historical example to demonstrate the importance of protection price in competition for the pepper market between Portuguese and Venetian empires. Next, we will discuss the difference between protection costs in the Venetian and Portuguese empires according to their different types of hierarchies: 'bottom-up' (Venetian) and 'top-down' (Portuguese).

1.1 Absolute versus differential protection rents

Protection costs were always determining factors for who should handle the spices that needed to be transported from the Indian Ocean to Europe. In the second half of the fifteenth century, most spices were carried by Arab merchants from India to Jeddah in the Red Sea. These merchants were under the protection of the Egyptian Sultan, who exacted a large protection fee. At Alexandria, the spices were sold to the Venetians and other Europeans. When the Portuguese reached India by circumnavigating Africa, the Venetians worried that they would sell the spices at lower prices, thereby ruining the

Venetian trade. In his diary, the famous Venetian merchant banker, Gerolamo Priuli, predicted that the Portuguese would be able to undersell the Venetians because they would avoid the high taxes in Egypt by bringing the spices around Africa. However, "This is *not* what happened. The Portuguese did *not* set their prices below those common at Venice in the fifteenth century…The Portuguese king attempted to prevent by armed force the passage of any spices from India to the Red Sea or Persian Gulf. He staked his hopes of profit on securing a monopoly…Consequently, the Portuguese king was able to sell for prices higher than those the Venetians had received in the fifteenth century before Vasco da Gama rounded the Cape" (Lane, [1940] 1979, pp. 15–16).

How did the concepts of competition differ between Priuli and the Portuguese king? Before addressing this question, it is important to note that if the utility of violence is protection, then protection is the *final product* of the state (or any violence-using enterprise[7]), but a *factor of production* for any non-violence-using commercial or productive unit without which it could not enforce its property rights on its final product.[8] The price of protection as a final product for the state (or any violence-using

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[7] Violence-using agencies include private security, military corporations and even Mafia-like organizations. As Barzel (2002, p. 263) noted, "Another substitute for the state's third-party enforcement is organized crime."

[8] Kuznets (1948, p. 156) pioneered the idea that military expenditures should be treated as "intermediate costs." He argued that "the maintenance of internal peace and external security" is "not a direct service to consumers; it is rather an antecedent and

enterprise) is a cost of production for a non-violence-using commercial or industrial enterprise.

The citizen pays an absolute protection rent for each unit of protection to the king, *which is the difference between the price of protection (p_i) and the average cost of protection (c_i) of the empire i.*

$$AR_i = p_i - c_i \quad (1)$$

What we call 'absolute protection rent' was broadly defined as 'tribute' by Lane ([1942]1979, p. 27): "By tribute it means payments received for protection, but payments in excess of the cost of producing the protection." Ames and Rapp (1977, p. 167) preferred the term 'extortion' for the following reason: "A payment for defence or justice contains elements of extortion to the extent that there is a monopoly profit to government." Both authors are correct in highlighting the 'extortionate' nature of a payment for protection (against menace). In extreme forms, taxes may be completely extortionate, with the taxpayer receiving no compensatory public good. In this sense, the terms 'extortion' or 'tribute' highlight an appropriate distinction between the usual monopoly profit and this particular type of monopoly, based on the use of violence. A citizen who 'buys' protection from a king, a lord, or an armed bandit is not just a consumer, because she cannot easily change her supplier of protection. She owes

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indispensable cost of maintaining society at large and a condition of *economic production rather than an activity yielding final economic goods*" (emphasis added).

'allegiance' to the supplier. *The amount of absolute protection rent that the citizen pays to protection-provider also defines her degree of allegiance*. The degree of a citizen's freedom to choose her protection-provider is measured by the amount of absolute protection rent. When absolute protection rent approaches zero, her freedom is at its maximum.

North (1981) referred to the monopoly profit derived from the use of violence as 'rent.' North *et al.* (2009, 2012) also argued that 'rent-sharing' is a way to control violence through elite bargains. From an economic viewpoint, this excess payment is a rent. However, there are different kinds of protection rent. Here, we discuss two:

1) 'Absolute protection rent' – a protection rent for *sellers* of protection. This first type of protection rent is synonymous with 'tributes,' 'extortions,' and rent-seeking in the recent economic literature. The 'absolute' protection rent is directly derived from the use of coercive means and has a *purely military-political* character that can be regarded as the cost of allegiance.

2) 'Differential protection rent' – a protection rent for *buyers* of protection. This second type of protection rent is almost completely ignored in the literature. It originates from a peculiar *combination of raid (military power) and trade (economic power)*. This type of rent is not related to 'allegiance' but to the economic advantage of the protection-provider. In this case, the state provides protection for a low price in order to confer an economic advantage to local merchants. Once differential protection rent reaches its maximum, protection

price is minimal and absolute protection rent approaches zero.[9] This paper introduces this distinction for the first time and demonstrates its relevance to price competition between empires.

We will begin by examining the first type of protection rent. In equation (1), the king[10] *tries to maximize the absolute protection rent, whereas the army aspires to maximize* (c_i). Herein lies the difference between these two types of empires: one is led by warriors or marcher lords (a military junta) and the other is led by an absolute monarch.

In an empire led by warriors, the main objective is to maximize the size of the army to permit territorial expansion.[11] Maximizing the absolute rent matters only to the extent that the army's size and revenue are maximized. In this type of empire, which corresponds to what North *et al.* (2009, 2012) dubbed a 'fragile limited access society,'[12]

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[9] Given that absolute protection rent measures the benefit to territorial expansion, an empire would try to extend this frontier only if $AR \geq 0$. Thus, protection price-cutting is possible as long as absolute rent is positive or nil.

[10] Throughout this paper, we refer to 'King' as the head of an empire, ignoring all the subtleties of political jargon (or gender) regarding the distinctions between 'King' (or 'Queen'), 'Emperor', 'Caesar,' or 'Tsar.'

[11] Protection cost is assimilated to the logic of expenditures. Thus, the warrior-king maximizes military expenditures, i.e., the costs of protection.

[12] North *et al.* (2012, p. 3) defined "limited access order" (LAO) as an order that limits "violence through the manipulation of economic interests by the political system in

anarchy and plunder dominate. Akkadian and Mongol empires are good examples. Mann (1986, chapter 5) described Akkadian empire as an 'early empire of domination' based on the pure military might of marcher lords. While the military caste worked to ensure the coffers were full, the main concern was *to maximize the costs of protection* (c_i) and thereby satisfy officers and soldiers. Thus, the empire constantly increased the price of protection to keep up with the increasing costs of protection and relied on coercive subscription or allegiance of the 'protected' population. This describes one type of agent: the warrior-king in the context of an 'empire of domination.'

In an empire led by an absolute monarch, the monarch owns the army and has a relationship with officers similar to that between the owners (shareholders) of an organization and the managers of the organization. Here, the warrior-king is an entrepreneur-king, with the objective of maximizing the absolute protection rent. The

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order to create rents so that powerful groups and individuals find it in their interest to refrain from using violence." They distinguished three variants of LAO: 'fragile,' 'basic,' and 'mature,' There is a progression between these three variants. In the 'fragile' LAO, most organizations are closely identified with the personality of their leadership. In the 'basic' LAO, the government is well-established compared with a fragile LAO. In the 'mature' LAO, the dominant coalition supports a large variety of organizations outside and inside the government (ibid., pp. 10–15), but it differs from 'Open Access Orders' that are sustained by institutions supporting open access and competition: "political competition to maintain open access in the economy and economic competition to maintain open access in the polity" (ibid., p. 16).

rent belongs to the king and the court, and the king might even reduce the costs of protection while maintaining the price of protection. Henry VII of England and Louis XI of France are excellent historical examples of entrepreneur-kings who would "use inexpensive wiles, at least as inexpensive devices as possible, to affirm his legitimacy, to maintain domestic order, and to distract neighbouring princes so that his own military expenses could be low. From lowered costs, or from the increased exactions made possible by the firmness of his monopoly, or from the combination, he accumulated a surplus the kind of monopolistic profit which I am calling tribute" (Lane, [1958]1979, p. 54).

A king could reduce protection costs if he acquired legitimacy, either through custom and length of reign or through ceremonial religious rites or any other form of public support. The legitimacy of the king was an important aspect of political stability and economized on the cost of policing. This type of empire-building corresponds to what North *et al.* (2009, 2012) called a 'basic limited access order' and Mann (1986) called 'territorial empires'[13] – these do not solely depend on a country's military striking force but also on its economic, administrative, and ideological/moral integrative capacities. In this type of empire, anarchy and plunder do not necessarily dominate. Although absolute monarchs could spend their protection rent on sumptuous consumption and military expenditures (as in the Portuguese empire), they could also use it to enhance industry and commerce (as in the French empire at the time of Colbert). An empire led

[13] Mann (1986, chapter 9) cites the Roman empire as an illustration of "territorial empire".

by an entrepreneur-king represents the second type of empire developed in our model: the 'territorial empire.'

To this point, we have only explored equation (1) from the viewpoint of *sellers* of protection. But what are the interests of *buyers* in the protection market? Any non-violence-using commercial, industrial, or financial enterprise is interested in minimizing the absolute protection rent (p_i) so that it can sell its product cheaper than its rivals.

The Venetian merchants had a major competitive advantage: they paid a lower protection price. They enjoyed a *differential protection rent* (DR_i) compared to other merchants paying a higher protection price. *A differential protection rent is the difference between protection prices*. For example, given two countries with two different protection prices p_1 and p_2, the differential protection rent for each unit of protection would be:

$$DR_i = p_1 - p_2 \qquad (2)^{14}$$

A merchant who incurs less protection costs takes advantage of a higher differential protection rent (DR_i). If the protection price is assumed to be unique, there will be no (DR_i), although the absolute protection rent (AR_i) might exist. Introducing (DR_i) clarifies the institutional identity of the beneficiaries of protection and helps distinguish price competition from coercive rivalry.

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[14] The total amount of differential rents for $p_1 > p_2$ would be: $(p_1 - p_2)N_1$ where N_1 stands for the total population of the first country.

Merchants, bankers, and producers are the *buyers* of protection, while the state or other violence-using enterprises are the *sellers* of protection. If the protection market is a buyer's market, then (AR_i) approaches zero and (DR_i) reaches its maximum. Conversely, if the protection market is a seller's market, then (AR_i) attains its maximum. The Venetian republic, with its 'wise government' composed of the Council of Doges, most resembled a buyer's market.[15] Unsurprisingly, it contributed to the accumulation of wealth in the hands of the Venetian merchants: "Through all the conquest, Venetian commercial interests reigned supreme. The city's leading families were merchants and bankers, the city's governing council represented the leading families, the doge came from that same patriciate, the city's military forces drew on its own population, and its military and diplomatic policies promoted the establishment of commercial monopolies, protection for its merchants, and channelling of trade through Venice rather than the creation of a territorial empire" (Tilly, 1990, p. 145).

This kind of state tends to wage as little war as possible, but to launch that war ruthlessly. Although Marx's and Engels' formulation of the state as "executive committee of the bourgeoisie" (Marx and Engels [1848] 1998, p. 37) is hardly applicable to historical formations of the modern state, the Venetian Council of Doges might be an exception. The Venetian merchant empire can be described as a collective body of elite

[15] The protection market in Venice can be depicted as a seller/buyer market, since the merchants were both 'buyers' and 'sellers' of protection due to their influential role in the council of doges.

merchants. Borrowing North *et al.'s* (2009, 2012) terminology, the Venetian empire falls within the scope of 'mature LAO.' While it was not yet an Open Access Order (OAO), the doorstep conditions were shaping, particularly as the Venetian elites were inclined to develop institutional arrangements that could enable impersonal exchange. This behaviour characterizes the third kind of empire designed in our model: the 'merchant empire.'

In contrast, the Portuguese monarchy was closer to a sellers' market, because the Portuguese king was only concerned with the privileges of court and high-ranking military officials: Alesina and Spolaore (2003) might call the Portuguese government 'Leviathans' or a *predatory* government.[16] In this system, decisions are made by rent-maximizing governments who care more about their own welfare, and that of their close associates, rather than the welfare of their citizens. In Portugal, private merchants were not influential and the pepper trade was managed by a royal company. The difference between the two methods of competition, or of using violence, lay in either maximizing the royal (AR_i) or maximizing the (DR_i) for merchants. In the Venetian

[16] In their analysis of the size of nations, Alesina and Spolaore (2003) distinguished between three different types of government. The first is a *benevolent* government that maximizes a collective utility function. Here, politicians are assumed to be ideal social planners who maximize social welfare. The second is a *democratic* government, which can be described as a government of free citizens who can vote for government policies and political borders. In economic jargon, public policies are determined by the utility function of the median elector. The third type is a *predatory* state or 'Leviathans.'

context, violence was used as a means of accumulating mercantile profit; price competition on the protection market was thus a commercial way to maximize(DR_i). In the Portuguese context, violence was used for the prestige and privileges of the king, so there was no price competition over supplying protection.

The exclusion of price competition from analyses of empires' rivalry results in two main shortcomings: 1) (DR_i) is dismissed and only (AR_i) comes under scrutiny; and 2) the beneficiaries of violence are reduced to its direct suppliers, while its beneficiaries on the demand side are ignored. Consequently, the evolution of the protection market from a seller's market to a buyer's market is overlooked.

To explore the sources of (DR_i), it is important to clarify the differences in protection costs between a merchant empire like Venice and an absolute monarchy like the Portuguese empire.

1.2 Protection costs and two types of hierarchies

The protection costs of an empire depend on the type of hierarchy that prevails in the empire. Empire-building requires different types of hierarchies. William Skinner distinguished between two sets of hierarchies: one largely constructed from the bottom-up, as a result of exchange and one largely constructed from the top-down, as a result of imperial control (Skinner, 1977, pp. 275–352; see also Wakeman, 1985; Whitney, 1970). Skinner focused on the social geography of late imperial China as the intersection of two sets of central-place hierarchies. The overlapping units of the

bottom-up hierarchy consisted of large market areas, generally centred in highly populated town and cities. The nested units of the top-down imperial control comprised a hierarchy of administrative jurisdictions. Down to the county level, every city had a place in both the commercial and the administrative hierarchy.

Skinner's typology has been adopted in research about the formation of hierarchies and state-building in Europe. Tilly (1990, chapter 5, pp. 127–160) used a 'Skinnerian' scheme and opposed 'coercive-intensive path' versus 'capital-intensive path' in European state-building as follows:

1) *'Coercion-intensive path' characterized by top-down imperial control*

The Russian empire is a good example of the top-bottom hierarchy: "From top to bottom, the emerging structure of social relations depended on coercion" (Tilly, 1990, p. 141). Other historical examples include the Polish, Hungarian, Serbian, and Brandenburg states. This system involves forced labour, landlord relationships, and the development of the government's armed force. Conversely, trade routes tend to be thin and to lack capital. This type of hierarchy is tailored to maximize (AR_i). The 'forced subscription' of subjects or their allegiance to the absolute monarch (or tsar) is the cornerstone of this imperial hierarchy.

2) *'Capital-intensive path' marked by bottom-up exchange relationships and weak, fragmented concentrations of coercion*

The Venetian merchant empire is a classic example: it extended to Cyprus until 1573 and to Crete until 1669. The city's forces launched wars to maintain access to

commercial opportunities, and to challenge rivals such as Genoa. However, "more than anything else, its rulers gained reputations from the ability to wage canny and successful sea wars *at relatively low cost to the city's merchants, bankers, and manufacturers*" (Tilly, 1990, p. 147, emphasis added). Venice did not produce bureaucracy: elected committees and officials' personal retainers did the bulk of governmental work. This path was based on the profound influence of merchants over any attempt to create autonomous coercive power: the emergence of a "sleek, efficient, rapacious, protection-oriented seafaring state" (Tilly, 1990, p. 144). The goal of this merchant empire was to maximize (DR_i)[17].

Of these two opposite systems, the first incurs the highest cost of protection because it requires a large military and bureaucratic state apparatus. The second minimizes protection costs, because it economizes on the costs of state bureaucracy and develops a dense and vast network of commercial ties, routes, and infrastructures.

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[17] Tilly (1990) also introduced a third system: a *'capitalized coercion path' situated between the capitalist (mercantile) and coercive extremes*. This system embraces both types of hierarchies, although the combination varies among different European countries. The emblematic figure was the English (then British) state built on a conjunction of capital and coercion; since its inception, it afforded immense means of warmaking for any monarch, but only at the price of large concessions to the country's merchants and bankers. Our model does not consider this 'intermediary case.'

The Venetian empire involved the lowest cost of protection, and the Portuguese empire required a high cost of protection, because it was closer to the first system. The Portuguese crown received a major share of its income from customs duties on goods provided by its colonies: it could only prosper when gold and goods flowed freely from the colonies. Its imperial control transformed most of its colonies into military settlements. Unlike the Dutch, English, and Venetians, Portuguese rulers did not license merchants to organize colonial domination. Unlike the Spanish, they did not tolerate the creation of great autonomous domains in their overseas territories. Portugal may have been caught in a 'territorial trap' – the conquest of so much dependent territory relative to its means of extraction meant that administrative costs swallowed its gains from imperial control (Thompson and Zuk, 1986).

Although the Portuguese empire incurred higher protection costs, these were still less than the costs of early empires of domination ('fragile limited access order') in which the costs of a top-down hierarchy were inflated with costs of anarchical rivalry among warlords. Hence, three levels of protection costs can be distinguished:

1) Early empires of domination (*fragile LAO*) like the Akkadian and Mongol empires. These empires incur the highest costs of protection due to a fragile top-down hierarchy and anarchical rivalry among warlords.
2) Territorial empires (*basic LAO* or absolute monarchy) like the Russian or Portuguese empires. These empires have the next-highest costs of protection due to a top-down hierarchy, but with more political stability (maximizing AR_i).

3) Merchant empires like the Venetian empire (*mature LAO*). These empires incur the lowest costs of protection due to a bottom-up hierarchy (maximizing DR_i and approaching a nil AR_i).

Accordingly, we can identify three types of competition among empires, which will be modelled in the next section:

1) *Coercive competition* between an empire of domination with a fragile top-down hierarchy and a territorial empire with a stable top-down hierarchy for extracting(AR_i).
2) A *mixture of coercive and price competition* between a territorial empire with a stable top-down hierarchy and a merchant empire with bottom-up hierarchy for maximizing (DR_i) and (AR_i).
3) *Price competition* between two merchant empires with a bottom-up hierarchy for maximizing(DR_i).

In all cases, we assume *multiple protection prices* and mobilize Bertrand equilibria with asymmetric costs to tackle price competition. In industrial economics, Bertrand competition describes price competition. However, in the economics of conflict, use of the Bertrand equilibrium does not automatically imply price competition. How do we define 'coercive rivalry' and 'price competition' in the economics of conflict? By 'coercive rivalry,' we mean competition for maximizing the absolute protection rent (AR_i), whereas 'price competition' is defined as competition for maximizing the

differential protection rent (DR_i). The Bertrand equilibrium can be used to model both coercive rivalry (maximizing AR_i) and price competition (maximizing DR_i).

There are three reasons for mobilizing the Bertrand equilibrium:

1) We assume different prices for protection, although the multiplicity of prices does not mean that price differences will always be actively used to compete in the protection market. The Cournot equilibrium cannot capture this multiplicity of prices.
2) An asymmetrical Bertrand equilibrium can provide a unified framework to deal with different types of competition in the presence of multiple prices.
3) Finally, the Bertrand equilibrium is necessary to model the differential protection rents.

In other words, while the application of the Bertrand equilibrium is not synonymous with price competition in the economics of conflict, modelling price competition requires using the Bertrand equilibrium.

Moreover, protection is assumed to be a *homogenous* good. Lane (1973, 1975) and North and Thomas (1973) assumed that there is a *homogenous* public good called 'protection,' the suppliers of which are called 'governments.' Ames and Rapp (1977, pp. 166-167) rejected this assumption and argued that protection has a *heterogeneous*

nature: although protection is always against a threat, two types of threat and protection must be differentiated: "a threat by foreigners creates a demand for *defence*; a threat by one group of the population against another creates a demand *for justice*" (ibid., p. 167). Our model builds on the work done by Lane, North, and Thomas, because we are not focusing on the distinction between internal and external threats. During the process of empire-building, the distinction between internal/external is still blurred. This demarcation becomes particularly relevant once the respective territories of victorious and defeated empires are defined.[18] Furthermore, we assume that protection is *indivisible* in the sense that one cannot be partially protected: one is either protected or not. Before presenting our model, we summarize the typology of empires and compare their distinctive features in a recapitulative table (Table 1). This table highlights the main stylized facts of competition between empires, which will be modelled in the next section.

[18] We will explore the impact of heterogeneity in the protection market under symmetrical protection costs in another paper.

Table 1. A comparative representation of different types of empires

Type of empire	Examples	Type of protection market	Type of hierarchy	Absolute protection rent (AR_i)	Differential protection rent (DR_i)	Costs of protection (C_i)	Type of competition
Early empires of domination, fragile LAO	**Akkadian empire**	Seller's market	Fragile top-down hierarchy	Intermediary	Absent	Maximum	Coercive rivalry
Territorial empires, basic LAO	**Russian empire**	Seller's market	Stable top-down hierarchy	Maximum	Intermediary	Intermediary	Coercive rivalry
Merchant empire, mature LAO	**Venetian empire**	Transition from seller's to buyer's market	Bottom-up hierarchy	Low (or absent)	Maximum	Low	Coercive rivalry and price competition

2. Bertrand equilibria of the protection market

In the model developed in this section, the frontiers of an empire are determined by the protection market. The effective territory of an empire is equivalent to the geographical space over which its authority is respected. In other words, the size of an empire corresponds to the zone that is controlled by the empire: the territory that is protected by the empire. Thus, the protection market can be used as an intuitive way to determine the formation of an empire's size.

2.1 The protection market

The protection market is characterized by the confrontation of a demand and a supply that determines the territorial size of an empire.[19] Competition in this market is actually a competition à la Bertrand: two empires try to attract the largest share of demand. More precisely, we can consider bilateral interactions between two empires with different types of hierarchy that coexist together. Thus, protection, market is designed as a duopoly.

The *demand for protection* is represented by a population's need to protect itself from any aggression, and to establish a higher authority capable of enforcing

[19] In our model, the 'size' of an empire is assumed to be proportional to the number of people protected by the empire.

property rights. The population size is represented below by parameter a. Let the market demand for protection be:

$$N = a - p \qquad (3)$$

N is the total number of people protected by an empire. In this model, the size of an empire is assimilated to its population. We assume that the population is uniformly distributed. Thus, total population corresponds with total territory. Additionally, the whole territory, like the total population, is normalized to a.

The supply of protection is dependent upon the empire's protection capacity. We assume that empires are hierarchical structures: despite their differences, the hierarchies all have the capacity to guarantee physical and legal protection of their territories. In other words, we assume that in the Hobbesian state of nature (marked by 'war of all against all') there is a Leviathan (here, an 'empire') that is capable of protecting individuals. The more people are protected, the larger the empire's territory will be.

Our theoretical model assumes a protection market where two empires (or two 'Leviathans') compete to attract the largest share of protection demand. It also incorporates the Bertrand equilibrium, meaning that the variable used by empires to compete is the price of protection.

The following sections will explore three different cases of competition between empires. Subsection (2.2) analyses a case of *coercive competition* between an empire of domination and a territorial empire. Subsection (2.3) examines a

combination of coercive and price competition between a territorial and a merchant empire. Finally, subsection 2.4 analyses competition between two identical merchant empires contesting the protection market; this involves *price competition* as defined above.[20]

In all of these cases, the two competing empires try to attract protection demand to realize their objectives. However, territorial expansion cannot be infinite: an empire's size is constrained by *organizational* difficulties (particularly when the empire is composed of heterogeneous cultural groups) as well as *protection* problems (because borders are strategic elements that should also be defended against external aggressions). Here, there exists a threshold k,[21] beyond which an empire cannot extend. Assuming the impossibility of a unique empire, ($k < 1$) entails the coexistence of two potentially antagonistic empires. This

[20] We selected three cases of competition to explore how different types of hierarchies affect the type of competition among empires. We excluded other possible types of competition, e.g., competition between two territorial empires, two empires of domination, or an empire of domination and a merchant empire; these cases would not add further relevant information.

[21] k is assumed to be the same for all empires. This hypothesis implies that the type of hierarchy has no influence on the maximal size of an empire. Although this assumption is bold, it allows us to focus on how the hierarchical structure of empires and their costs of protection affect the equilibrium of the protection market. The results may be explored further by assuming different capacity limits.

exogenous variable is strongly linked with both technological progress (particularly military, communication and transportation sectors) and improvement in the bureaucracy. Thus, the more developed these characteristics are, the more an empire is able to extend its territory.

This is a typical case of Bertrand-Edgeworth duopoly, with competition over control of a given territory. This competition is carried out through prices: the empire that offers the lowest price will draw the larger part of the market, leaving a residual demand to its rival. Our model applies the rule of *efficient rationing*: individuals who desire to be protected the most are the 'first served.'[22]

Hence, generally speaking, the protection market is a duopoly in which the demand for protection by an empire i is defined by:

$$N_i = \begin{cases} Min\{a - p_i, k\} & ,if\ p_i < p_j \\ Min\left\{\dfrac{(a - p_i)}{2}, k\right\} & ,if\ p_i = p_j \\ Min\{N - N_j - p_i, k\} & ,if\ p_i > p_j \end{cases} \quad (4)$$

In satisfying this demand for protection, empire i should support a function of protection costs denoted by $C_i(N_i)$. These costs are strongly dependent on the nature of the empire, but can be assumed to have the following general form:

$$C_i(N_i) = c_i . N_i \quad (5)$$

[22] For a discussion of efficient and proportional rationing, see Davidson and Deneckere (1986) and Tirole (1988).

where $c_i \in]0; a[$ represents a parameter of the cost function, which is determined by the nature of the given empire.

These empires are thus confronted with linear cost functions: protection costs increase proportionally to territorial size. Beyond a certain threshold, k, this cost will become infinite because it will be restrained by the protection capacity limit.

An empire's objective varies according to its nature. As discussed in the previous section, an empire organized by a 'top-down' hierarchy tries to maximize its absolute protection rent (AR_i). Conversely, an empire with a 'bottom-up' hierarchy tries to maximize its differential protection rent (DR_i).

An empire will act rationally regardless of its objective: it will try to maximize its objective if it allows the empire to enrich itself or at least does not impoverish it. In other words, an empire i exists if the revenues of its protective activity are superior or equal to its costs, *i.e.* $AR_i \geq 0$. Otherwise, the empire i cannot provide protection, and will dissolve.

The following three subsections focus on the protection market in three different situations, using a non-cooperative static game in which players act simultaneously with perfect information. We further assume that the protection good is homogenous.

2.2. Empire of domination (D) versus territorial empire (T)

Let be two empires indexed by D and T. These respectively represent an 'empire of domination' characterized by a marcher lord (a warrior-king) and a 'territorial empire' governed by an absolute monarch (an entrepreneur-king). Both types of empire try to maximize their absolute protection rent.[23] According to our definition, their competition falls within the scope of 'coercive rivalry.'

$$Max\ AR_i = (p_i - c_i)N_i \qquad \forall\ i\ \in \{D, T\} \tag{6}$$

The costs borne by an empire are closely related to its governance structure. As discussed in the previous section, an empire of domination governed by warriors incurs significant protection costs, because the army holds senior command positions and its satisfaction is considered an absolute priority. In contrast, in a territorial empire, the king acts as the 'owner' of the army; as an entrepreneur-king, he endeavours to reduce the costs of protection (including army costs). Hence, we have: $\forall\ n\ \in [0, N]$, $C_D(n) = d.n$ and $C_T(n) = t.n$

[23] We previously noted that the main objective of an empire of domination is to maximize the size of its army, and military expenditures. Our model cannot describe this step because it assumes that the costs are known. To maintain the maximum cost assumption, we postulate that protection costs were already maximized prior to the model.

where $C_D(n)$ is the total protection costs of n individuals by an empire of domination, and $C_T(n)$ is the total protection costs borne by a territorial empire. Parameters d, t are two real positive real numbers, such as: $a > d > t$.

In a Bertrand duopolistic competition, each empire is motivated to propose a lower price than its competitor to capture a larger market share. This is related to the dynamic of price war, which was eloquently depicted by Bertrand in 1883.

In this case, a territorial empire has an advantage over an empire of domination in terms of protection costs. This allows the territorial empire to dominate the protection market, because it will be in a stronger position than the empire of domination, which is subject to higher costs of protection. Accordingly, the territorial empire will capture the larger share of demand by offering a price that forces its rival to limit itself to the residual demand (see Ledvina and Sircar, 2011).

The protection capacity constraint should be considered when defining the equilibrium values of the protection market. The value of k affects the equilibrium when the competition is organized à la Bertrand (see Levitan and Shubik, 1972).

- **Case 1: Strong constraints with $k \leq \frac{a-2t+d}{3}$**

The capacity constraint forces the territorial empire to sell less protection, depending on Cournot's equilibrium quantity. If the protection capacities are inferior or equal to the Cournot's equilibrium quantity, "the price and quantity of non-cooperative equilibria are the same" (Levitan and Shubik, 1972, p. 116). The equilibrium values are obtained by maximizing the empire's absolute protection rent as follows:[24] $N_T^* = k, N_D^* = max\left\{k, \frac{a-2d+t}{3}\right\}$, and $p^* = p_i^* = p_j^* = a - k - N_D^*$.

Table 2 lists the principal results. If empires are subject to strong constraints, there will be two small empires, each with a positive absolute protection rent. However, because of the uniformity of protection price, neither of these can take advantage of differential protection rents

Table 2. Principal characteristics of empires if $k < \frac{a-2t+d}{3}$

	Empire of Domination	**Territorial Empire**
N_i	$N_D^* \leq N_T^*$	
AR_i	$\left(max\left\{k, \frac{a-2d+t}{3}\right\}\right)(p^* - d) > 0$	$k(p^* - t) > 0$
	$AR_D < AR_T$	
DR_i	0	0

[24] See Annex 1 for details of the calculation.

- **Case 2: Average constraints with $\boldsymbol{k} \in]\frac{\boldsymbol{a-2t+d}}{\boldsymbol{3}} ; \boldsymbol{a-d}[$**

The territorial empire will always be the victor in this price war, because it can fix prices so low that the absolute protection rent of the empire of domination becomes negative. In other words, an empire governed by an entrepreneur-king can offer a price so low that the empire of domination will be forced to limit itself to the residual demand. This means that $p_T^* < p_D^{min}$

where p_T^* represents the optimal price of the territorial empire, and p_D^{min} denotes the threshold price below which the empire of domination cannot claim the larger share of demand. Thus:[25]

$$p_D^{min} = \{p_D | p_D N_D - C_D(N_D) = 0\} \qquad (7)$$

Given equation (6), we can determine that $p_D^{min} = d$.

[25] More rigorously, $p_T^* = Min\{p_D^{min} - \varepsilon, p_T^{mo}\}$, where p_T^{mo} stands for the price offered by the territorial empire if it is in a monopoly situation, i.e., the price that maximizes its absolute protection rent in the absence of any competition. For the sake of clarity, we assume that the following inequality is respected: $p_D^{min} - \varepsilon < p_T^{mo}$. This means that the values of the parameters of cost functions of empires are subject to the following constraint: $d < \frac{a-t}{2}$.

Hence, when $k \in]\frac{a-2t+d}{3} ; a-d[$, it results in an equilibrium: the territorial empire will be characterized by $p_T^* = d - \varepsilon$ and $N_T^* = k$, where ε stands for a very small positive real number.

Accordingly, the empire of domination will have a monopoly over the residual demand defined by equation (4). This monopoly results in the following equilibrium values: $p_D^* = \frac{a-k+d}{2}$ and $N_D^* = \frac{a-k-d}{2}$.

Table 3. Principal characteristics of empires if $k \in]\frac{a-2t+d}{3} ; a-d[$

	Empire of Domination	**Territorial Empire**
N_i	$N_D^* \leq N_T^*$	
AR_i	$\left(\frac{a-k-d}{2}\right)^2 > 0$	$k(d-t-\varepsilon) > 0$
	$AR_D < AR_T$ [26]	
DR_i	$\left(p_D^{min} - p_D^*\right)N_D^* < 0$	$\left(\frac{a-k-}{2} + \varepsilon\right)k > 0$

As shown in Table 3, the territorial empire has an advantage in its use of *coercive rivalry*: its lower protection costs allow it to capture more territory and more absolute protection rent while benefiting from a non-zero differential protection rent.

[26] See Annex 2.

- **Case 3: Weak constraints with $k > a - d$**

In this case, the territorial empire is not constrained by k and the game outcomes will be the same as in a homogenous Bertrand competition with asymmetrical costs of protection for empires. As shown in Table 4, the equilibrium values result in the dissolution of the empire of domination.[27] The size and the protection price of the territorial empire are as follows: $N_T^* = a - d + \varepsilon$ and $p_T^* = p_D^{min} - \varepsilon = d - \varepsilon$.

Table 4. Principal characteristics of empires if $k > a - d$

	Empire of Domination	**Territorial Empire**
N_i	0	$a - d + \varepsilon$
AR_i	0	$(a - d + \varepsilon)(d - t - \varepsilon) > 0$
DR_i	0	0

This subsection focused on competition between two empires organized on the basis of a 'top-down' hierarchy. A territorial empire has an advantage in terms of protection costs and will benefit from this through coercive rivalry. The weaker the constraint on the maximal size of empire (i.e., higher values of k), the stronger the supremacy of the territorial empire over the empire of domination.

[27] For a more detailed analysis of the resolution of a homogenous Bertrand competition, see Ledvina and Sircar (2011, pp. 15–16).

This translates into a pure and simple withdrawal of the empire of domination from the protection market when $k > a - d$.

2.3. Territorial empire (T) versus merchant empire (M)

We can now focus on a case where a merchant empire, marked by a 'bottom-top' hierarchy, competes with a territorial empire. This situation is radically different from the preceding one, because the two empires do not share the same objectives.

As discussed in section 1, a merchant empire tries to maximize the interests of merchants who constitute the government, in terms of differential protection rent:

$$Max\ DR_M = (p_T - p_M)N_M \qquad (8)$$

The protection costs of empires are defined by: $C_M(n) = m.n$ and $C_T(n) = t.n$, $\forall\ n\ \in [0, N]$. Where m, t denote two positive real numbers such as $a > t > m$, $C_M(n)$ stands for the total protection costs of n individuals under a merchant empire, and $C_T(n)$ represents the protection costs borne by a territorial empire.

Given the advantageous position of the merchant empire in terms of protection costs, it has the power to fix prices to maximize DR_M by seizing the largest share of demand. The choice of a protection price hinges on two factors. First, a merchant empire has an incentive to offer a low price to maximize its differential

protection rent $(p_T - p_M)$. Second, a lower protection price p_M, will result in a greater demand for protection.

Consequently, the merchant empire will choose the minimum price that it can offer, i.e., p_M^{min} defined by:

$$p_M^* = p_M^{min} = \{p_M | AR_M = 0\} = m \qquad (9)$$

With regard to determining the equilibria of the protection market and the characteristics of the empires, it is important to distinguish between two cases with different values of protection constraint k.

- **Case 1 : $\boldsymbol{k < a - t}$**

In this case, the merchant empire is subject to the size constraint and cannot extend in an optimal way. Nonetheless, this constraint does not influence its choice to offer the lowest possible protection price maximizing DR_M. Therefore, $p_M^* = m$ and $N_M^* = k$.

Alternatively, the territorial empire may follow a different objective, and try to maximize the absolute protection rent. Accordingly, its optimal behaviour will be to play $p_T^* = \frac{a-k+t}{2}$ over the residual demand function and capture a territory of the size: $N_T^* = \frac{a-k-t}{2}$.

Table 5. Principal characteristics of empires if $k < a - t$

	Merchant Empire	**Territorial Empire**
N_i	$N_D^* \geq N_T^*$	
AR_i	0	$\left(\frac{a-k-t}{2}\right)^2 > 0$
DR_i	$\left(\frac{a-k+t}{2} - m\right)k < 0$	$(m - p_T^*)N_D^* < 0$ [28]

This situation demonstrates that the very logic of the two empires leads to a mixed competition. A merchant empire seeks above all to maximize its (DR), so it follows price competition as defined in section 1. Conversely, a territorial empire trying to maximize its (AR) behaves within the logic of coercive rivalry.

This particular mixture of price competition and coercive rivalry results in a dominant merchant empire at a territorial level. This domination increases proportionally with the softening of the constraint on the protection capacity (i.e., when k increases).

[28] This yields $p_T^* = \frac{a-k+t}{2} > t > m$.

- **Case 2 : $k \geq a - t$**

In this case, the protection constraint of the merchant empire is sufficiently softened to allow its extension to the point that the territorial empire would dissolve entirely. This is a prolongation of the preceding case: beyond a certain threshold, the territorial empire would operate on a residual demand that is so small that it would not yield any positive absolute protection rent.

The equilibrium is thus characterized by the survival of a merchant empire that affords a price $p_M^* = m$ and detains a territory defined by $N_M^* = \min\{k, a - m\}$. Under these circumstances, the territorial empire dissolves.

Table 6. Principal characteristics of empires if $k \geq a - t$

	Merchant Empire	**Territorial Empire**
N_i	$\min\{k, a - m\}$	0
AR_i	0	0
DR_i	0	0

Hence, our model describes the competition between a merchant empire and a territorial empire as a mixture of coercive rivalry and price competition. This combined competition results in the dissolution of the territorial empire with increased values of protection capacity k.

2.4. Merchant empire versus merchant empire

Finally, we can focus on a case where two merchant empires compete with each other. This is a Bertrand competition with two symmetric empires: $C_{M1}(n) = C_{M2}(n) = m.n\ , \forall\ n\ \in [0, N]$. Where $C_{M1}(n)$ represents the total protection costs of the first merchant empire for n individuals, and $C_{M2}(n)$ stands for the total protection costs borne by the second merchant empire.

This results in a situation known as the 'Bertrand Paradox.' While the market is comprised of only two suppliers, the dynamic of price war results in a situation where absolute and differential protection rents are nil (Table 7). Here, the game's equilibrium values are characterized by $p^*_{M1} = p^*_{M2} = m$ and $N^*_{M1} = N^*_{M2} = \min\left\{k, \frac{a-m}{2}\right\}$.

Table 7: Competition between two merchant empires, $\forall\ k$

	Merchant Empire 1	**Merchant Empire 2**
N_i	$\min\left\{k, \frac{a-m}{2}\right\}$	$\min\left\{k, \frac{a-m}{2}\right\}$
AR_i	0	0
DR_i	0	0

When two merchant empires compete with each other, they are in pure price competition: they compete on the basis of price differential because their objective is to maximize their differential protection rents. This situation leads to

the coexistence of two vast empires that share a specific feature in common: their protection price is equal to their marginal cost of protection.

3. Interpretation of results

This section presents *static* and *historical* interpretations of the results from section 2.

At a static level, we can assess our results on the basis of our theoretical framework. As discussed above, traditional conflict models assume uniformity in protection price and systematically focus on quantity competition. Consequently, they overlook the distinction between absolute and differential protection rents and cannot incorporate differential protection rents. Competition on the protection market is accordingly limited to coercive rivalry. These models suffer from a major shortcoming: they cannot incorporate the logic of territorial expansion by merchant empires. For example, they are unable to provide a theoretical explanation for the Venetian merchant empire, with its particular combination of *raid* and *trade*.

One aspect of a protection market in the absence of a monopoly of violence is the coexistence of *multiple* protection prices. Although conflict models assume price uniformity, they focus on situations in which different powerful magnates are involved in warfare against each other and there is no monopoly of violence. Bertrand competition provides a broader theoretical framework to deal with the territorial expansion of an empire in the presence of multiple prices. As

discussed in subsection 2.2, in some situations both empires try to maximize absolute protection rents. Here, coercive rivalry can be handled in a similar way to Cournot's equilibrium.

One of the major advantages of our model is that its unified general framework can handle both coercive rivalry and price competition, and specifically elucidates price competition as a particular case (see subsection 2.4). Accordingly, the expansion rationale of merchant empires can be addressed in the context of Bertrand competition. We demonstrated that competition between two merchant empires generates price wars. This leads to the Bertrand Paradox, but our model is capable of disentangling a mixed situation (see subsection 2.3) in which an empire organized around a top-down hierarchy competes with a merchant empire. We found that a merchant empire's advantage in terms of protection costs gives rise to its domination in the protection market, particularly when the size constraint is softened.

In summary, Bertrand competition seems to be a powerful analytical tool to capture the diverse logics of empires' territorial expansion.

So far, we have focused on a static interpretation of the three games that we constructed on the basis of the Bertrand equilibrium. However, our model allows us to move beyond this static analysis and capture the evolution of empires throughout history. We can now introduce a historical interpretation of our results.

The examples we explored were largely dependent on the value of k, reflecting the protection capacity of an empire. Larger k values made it more likely that an empire of domination would dissolve when confronted with a territorial empire(2.3). Similarly, the domination of a merchant empire over a territorial empire increased with an increase in the maximum size of an empire. Therefore, we can conclude that *there is a gradual progression from an empire of domination to a territorial empire and then to a merchant empire with the increasing level of parameter k*.

This parameter hinges strongly upon a combination of factors that enhances military, economic, and cultural integration. All forms of integration require significant progress in transportation and communications, so the maximum size of an empire is greatly affected by the extent of geographical connection and decreased transportation costs. For example, maritime transport permitted the territorial expansion of empires, and the combination of maritime and land routes economized on transport costs and encouraged the formation of territorial empires. Military integration depends on the striking zone of military weapons, and a military revolution in defensive and offensive technologies motivates an empire to extend its territory and increase k.

While the early empires of domination were based on military integration, territorial and merchant empires required a combination of military, economic, and cultural integration (Vahabi, 2004). Territorial empires were less dependent on economic integration through exchange, trade, and market relationships; this type of integration was particularly developed under merchant empires.

Conclusions

Price competition in the protection market operates at both national and international levels. Germany during the Thirty Years' War is a good example of price competition at a national level. In an economy consisting of urban and peasant commoners, nobility, and a king, protection may be supplied in various ways. "In a "competitive solution," nobility and king will engage in *price competition*. In the absence of returns to scale in the supply of protection, one predicts a "German solution," with local rule and a figurehead king" (Ames and Rapp, 1977, p. 173, emphasis added). Along with the significance of price competition at a national level, we demonstrated the relevance of price competition in empire-building at an international level.

By distinguishing between absolute and differential protection rents, we defined three types of empire and systematically studied their competition in the context of Bertrand equilibria. Static and historical interpretation of our results helps clarify the economic significance of violence throughout history.

Specifically, the progression from an empire of domination to a territorial empire and then to a merchant empire involves three main phases in the economic role of violence throughout history.

The first phase, which corresponds to the early empires of domination ('fragile LAO' or warrior-king) is marked by *maximum protection costs* (C_i). While this

type of empire seeks to maximize its absolute protection rents (AR), it does not pursue such an objective by economizing on the army's size or expenditures. In this phase, violence is used for plunder and has a *welfare-degrading* effect.

The second phase, which corresponds to territorial empires ('basic LAO' or absolute monarchy), is characterized by the maximization of absolute protection rents. This implies an important effort to economize on the costs of protection. While (AR) is determined by the entrepreneur-king, the economic significance of violence depends on how the monarch uses his/her wealth. Two broad alternatives are possible: either the monarch employs (AR) to enhance industry and trade, or he/she spends it on conspicuous consumption and military expenditures. In the former case, violence has a *welfare-enhancing* effect, whereas in the latter case, it has rather a *welfare-degrading* effect.

The third phase corresponds to merchant empires ('mature LAO') with a ruling group composed of merchants (like Venice) or merchants in an influential position within the parliament (like the Dutch and British empires). In this case, the use of violence becomes more *welfare-enhancing*, because it is intended to maximize (DR) by minimizing protection costs. In this case, (AR) will shrink to zero.

In the first and second phases, the protection market is a seller's market and coercive rivalry is the principal form of competition. In contrast, the third phase is marked by a transition from a seller's to a buyer's market, where price competition prevails.

The historical evidence is concurrent with our theoretical finding in the sense that according to Mann (2012, pp. 28-29), the British and Dutch merchant empires, were probably the only European empires to have increased the wealth of the mother country empires, whereas the other empires were costly, and not profitable. "Whom did it benefit? It obviously brought profit to the merchants, manufacturers, investors, and settlers who survived the adventure-and many did not." (Ibid., p. 28).

Our findings have two main limitations that should be noted.

First, we studied protection markets under the assumption of a *homogenous* protection good. However, competition between empires is usually decided by their difference in terms of internal and external stability, which might make them more vulnerable (aggressive) according to their position in the market. The difference between 'protection against external threats' (foreign invasions) versus 'protection against internal threats' (for instance, due to cultural heterogeneity) highlights the need to analyse price competition under the assumption of a *heterogeneous* protection good. We will study this issue in another paper.

Second, the Bertrand equilibrium is not a sufficient tool to analyse strategic interactions between two merchant empires. Other types of strategies should also be investigated. For example, empires may try to reduce their protection costs or to increase the protection costs of their rivals to win the competition.

Clarifying this difference in competitive strategies requires distinguishing between ‘defensive’ and ‘offensive’ protection costs. We will also explore this issue in future research.

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Annex 1: Cournot's equilibrium with an empire of domination and a territorial empire

Both empires seek to maximize their absolute protection rents:

$$Max\ AR_i = p.N_i - C_i(N_i) \qquad \forall\ i\ \in \{D, T\}$$

According to Cournot, the protection price is uniform in both empires, and the maximization of the tribute of each empire yields its reaction function:

$$\begin{cases} N_T = \dfrac{a - N_D - t}{2} \\ N_D = \dfrac{a - N_T - d}{2} \end{cases}$$

By solving the system, we obtain the following equilibrium values:

$$N_T^* = \frac{a - 2t + d}{3}\ , N_D^* = \frac{a + t - 2d}{3}\ , p = p_T^* = p_D^* = \frac{a + t + d}{3}$$

By assumption, we have $d > t$, which allows us to assert that $N_T^* > N_D^*$.

Annex 2: AR_D and AR_T if $k \in]\frac{a-2t+d}{3}\ ;\ a - d[$

We have $AR_D = \left(\frac{a-k-d}{2}\right)^2$ due to the given interval of k, and we know that:

$$AR_D < \left(\frac{a - \left(\frac{a - 2t + d}{3} \right) - d}{2} \right)^2 = \left(\frac{a + t - 2d}{2} \right)^2$$

This maximum value can be obtained for $k = \left(\frac{a-2t+d}{3} \right)$.

By assumption, we have $d < \frac{a-t}{2}$, which implies that $\left(\frac{a-2t+d}{3} \right) < d - t - \epsilon$, and consequently, we have $AR_D < AR_T$.