



Munich Personal RePEc Archive

Empire-building and price competition

Pietri, Antoine and Tazdaït, Tarik and Vahabi, Mehrdad

University Paris 1, CES, CNRS, EHESS, CIRED, University Paris 8, CES

14 February 2013

Online at <https://mpra.ub.uni-muenchen.de/44368/>

MPRA Paper No. 44368, posted 14 Feb 2013 09:28 UTC

Empire-building and Price competition

Antoine Pietri (University Paris 1, CES): ant.pietri@gmail.com

Tarik Tazdaït (CNRS, EHESS, CIRED): tazdait@centre-cired.fr

Mehrdad Vahabi (University Paris 8, CES): Mehrdad.vahabi@wanadoo.fr

Abstract

While economic historians have stressed the importance of price competition in the protection market, theorists of conflictual activity have argued against the extrapolation of this form of competition in the protection market and favored competition through the quantity of conflictual effort. We purport to show 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, namely early empires of domination, territorial empires and merchant empires. Empires are structured on the basis of two types of hierarchies: “top-down” and “bottom-up” that determine their protection costs. 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.

JEL Classification: D74, H11, H56, L13, P16

Keywords: Absolute and differential protection rents; Bertrand equilibrium; Empires of domination; Merchant empires; Territorial Empires

Acknowledgements. The authors would like to thank Keith Hartley and Stergios Skaperdas as well as participants of the workshop on “Contests: Experiments and Theory” organized by *Max Planck Institute for Tax Law and Public Finance in Munich* on January 9 and 10, 2013 and participants in the research seminar of the University of Neuchâtel in Switzerland on January 17th, 2013 for their insightful remarks on earlier versions of this paper. The usual disclaimers apply.

Empire-building and Price Competition

Antoine Pietri (University Paris 1, CES),
Tarik Tazdaït (CNRS, EHESS, CIRED)
Mehrdad Vahabi (University Paris 8, CES)

Introduction

Historical evidence regarding price competition in the protection market both at national and international levels is abundant¹. Germany during the Thirty Years' War and all throughout the nineteenth century is a salient illustration of several violence-using enterprises competing in demanding payments for protection in almost the same territory (Lane, [1958] 1979, p. 51). Prussia was the winning competitor: its Junker army was both efficient and meagerly paid², but highly respected and saluted by a code of honor (Frevert, 1995).

While economic historians like Lane (1973, 1979), North and Thomas (1973), and North (1981) have stressed the importance of price competition in the protection market³ as a source of Western ascendancy and empire-building, theorists of conflictual activity have argued against the extrapolation of this form of competition in the protection market and favored competition through the quantity of conflictual effort. Conflict models are often based upon Cournot-Nash equilibrium⁴ or favor competition over the amount of effort, postulating the uniformity of protection price. The main line of argument is that "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). In fact, public economics has usually assumed that different jurisdictions attempt to attract mobile subjects through lower taxation or other privileges (Tiebout, 1956; Epple and Romer, 1991). The non-conventional economics of conflict gives the pride of place to competition based on the use of force.

¹ Konrad and Skaperdas correctly remind us that the very assumption of mobile subjects during serfdom is a historical nonsense, since "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." (2012, p. 418) Price competition in the protection market does not need to assume mobile subjects but rather the mobility of providers of protection.

² "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).

³ See also all the papers of the edited volume of Tracy (1991) regarding the political economy of merchant empires.

⁴ Stackelberg equilibrium has also been extensively used, but the focus was on the quantity of protective/ aggressive efforts rather than competition over price. Grossman's model (1995) on price competition between two providers of protection, namely the state and mafia is an exception. But this model is also based on Cournot-Nash equilibrium and focuses on the quantity of services rendered by each competitor. Moreover, in accordance with Cournot competition, "the tax rate and the extortion rate will be equal to each other" (Celentani, 1995, p. 158).

However, this division of labor between the economics of conflict (focusing on coercive rivalry) and conventional public economics (concentrating on tax competition) fails to capture the importance of price competition in empire building particularly in the case of merchant empires. For instance, while the Venetian merchant empire used violence, it encapsulated it within a system of price competition and protection rent for merchants, bankers, and manufacturers contributing to economic prosperity. In dire contrast to the Venetian example, the Portuguese way of empire-building enhanced coercive rivalry and maximized the Crown's tributes that were spent in the court's sumptuous consumption as well as Portuguese 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 use 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, in contrast to an absolute monarchy, it aims at maximizing the size of 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 the economics of conflict cannot ignore this difference.

The profuse literature on tax competition notwithstanding, there is no model that captures the impact of price competition on empire-building. The extensive empirical evidence of economic historians has not yet found 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. Understanding the impact of multiple prices for protection in empire-building requires the application of Bertrand equilibria.

Following the pioneering work of Boulding (1962), numerous studies have been conducted on the economics of nation and empire-building that include 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 follow Findlay's intuition 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 (that henceforth we will name 'absolute protection rents')⁵ and 'differential protection rents' provide the economic rationale of different types of empires and their competition. Our main line of enquiry is to explain how price competition within the context of coercive power derives from this economic rationale. Our model examines the determination of the size of an empire under the assumption of multiple protection prices and a price competition *à la* Bertrand.

⁵ See next section for an explanation on the distinction between 'absolute protection rent' (tributes) and 'differential protection rents'.

The paper proceeds as follows. The first section underlines 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, namely absolute and differential protection rents to measure this difference. Given asymmetrical costs of protection, three types of empires will be identified according to the way 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 modelise 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 discusses the results and affords both static and historical interpretations of the results. Finally, conclusions highlight the economic significance of violence in a historical perspective.

1. Coercive rivalry and price competition

Why do economic historians insist on the role of price competition 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 can be understood by such a competition that cannot be grasped by competition based on the use of force?

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 focuses on the complementary relationship. The economic advantage of such a symbiosis between 'trade' and 'raid' is *differential protection rent*. Coercive rivalry insists on the role of force as a substitute of 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 by a historical example regarding the importance of protection price in the competition between Portuguese and Venetian empires over the pepper market. Then, we will discuss the difference between protection costs in the Venetian and Portuguese empires according to their different types of hierarchies, namely the 'bottom-up' (in the Venetian case) and 'top-down' (in the Portuguese case) hierarchies.

1.1 Absolute versus differential protection rents

Protection costs were always prominent in determining who should handle the spices which moved from the Indian Ocean to Europe. In the second half of the fifteenth century, most of them were carried by Arab merchants from India to Jeddah in the Red Sea. There they came under the protection of the Egyptian Sultan, who exacted a heavy sum for his protection. Then, at Alexandria the spices were sold to the Venetians and other Europeans. When the Portuguese reached India by circumnavigating Africa, it was feared that they would ruin the Venetians by selling the spices at a lower price than that of the Venetians. The famous Venetian merchant banker, Gerolamo Priuli, had even predicted in his diary that the Portuguese would be able to undersell the Venetians because the spices brought around Africa would not have to pay the high taxes levied on the spices which passed through Egypt. Priuli expected the Cape route to prove cheaper

because of lower protection costs. However, as Lane correctly notes, “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).

What is the difference between Priuli’s conception of competition and that of the Portuguese King? To answer this question, it should be first noted that if the utility of violence is protection, then protection is the *final product* of the State (or any violence-using enterprise⁶), 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 product⁷. The price of protection as a final product for the State (or any violence-using 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’ is 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) prefer ‘extortion’ for the following reason: “A payment for defense or justice contains elements of extortion to the extent that there is a monopoly profit to government”. Both authors are right in underlining 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 good⁸. In this sense,

⁶ 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.”

⁷ Kuznets (1948, p. 156) pioneered the idea that military expenditures should be treated as “intermediate costs”. He averred that “the maintenance of internal peace and external security” is “not a direct service to consumers; it is rather an antecedent and indispensable cost of maintaining society at large and a condition of *economic production rather than an activity yielding final economic goods*” (the emphases are ours).

⁸ The modern usage of ‘tax’ as transfer payment should not blind us about its original meanings. Barzel (1999, p. 32) aptly reminds: “Taxes are the rents paid by the former owners of confiscated properties to the confiscator. Another meaning is that taxes constitute 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 regarded as the equivalent of the amount of wealth that can be otherwise redistributed through appropriation or transfer payment, though in its contemporary meaning the original appropriative connotation is rather softened or camouflaged. A third meaning has been ascribed to the term in the medieval English parliament as investment shares in projects the ruler usually initiated and in which subjects wished to partake as partners. For example, partners could participate in the conduct of warfare through pecuniary taxes or contributions in kind. The retribution was in terms of war booties. Moreover, the king could be eschewed from using the

the terms ‘extortion’ or ‘tribute’ make an appropriate distinction between the usual monopoly profit and this particular type of monopoly based on the use of violence. In fact, a citizen who ‘buys’ protection from a king, a lord, or an armed bandit is not just a consumer, since she cannot easily change her supplier of protection. She owes ‘allegiance’ to the supplier. *The amount of absolute protection rent that the citizen pays to protection-provider defines also 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 attains its maximum.

North (1981) also underlines the monopoly profit derived from the use of violence and names it ‘rent’. North *et al.* (2009, 2012) also uses ‘rent-sharing’, as a way to control violence through elite bargains. From an economic viewpoint, this excess payment is a rent. However, there is not just one type of protection rent. In this paper, we distinguish two different types of protection rent:

- 1) *First type of protection rent:* A protection rent for *sellers* of protection that we call ‘absolute protection rent’. This first type of protection rent is synonymous to ‘tributes’, ‘extortions’ and ‘rent-sharing’ 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) *Second type of protection rent:* A protection rent for *buyers* of protection which we name ‘differential protection rent’. This second type of protection rent which will be discussed below 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 protection-provider. In this case, state provides protection for a low price in order to confer an economic advantage to local merchants. . Once differential protection rent attains its maximum, protection price is minimal and absolute protection rent approaches zero⁹. In this paper, we introduce this distinction for the first time and we shall demonstrate its relevance in price competition between empires.

But initially, the first type of protection rent must be examined. In equation (1), the king¹⁰ *tries to maximize the absolute protection rent, whereas the army aspires maximizing* (c_i). Herein lies the difference between these two types of empires: an empire led by warriors or marcher lords (a military junta) versus an empire led by an absolute monarchy.

triumphant army to acquire despotic powers. In fact, as the council or parliament grew in power, it voted for more taxes. The nobility and ascending merchants resorted to taxes not only to tame the protector/ aggressor state but also to enhance their looting power.

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 All throughout this paper, we refer to ‘King’ as the head of an empire precluding all the subtleties of political jargon regarding the distinctions between ‘King’, ‘Emperor’, ‘Cesar’ or ‘Tsar’.

In the case of an empire led by warriors, the main objective of the empire is to maximize the size of its army in order to permit territorial expansion¹¹. The maximization of 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) dub a 'fragile limited access society'¹², anarchy and plunder dominate. Viking or Mongol raids provide salient historical illustrations. Mann (1986) depicted these empires as 'early empires of domination' which were based on the pure military striking force of marcher lords. While the military caste was vigilant not to have empty coffers, its main concern was *to maximize the costs of protection* (c_p) so that officers and soldiers could be satisfied. This implies that 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 is the description of one type of agent, namely warrior-king in the context of an "empire of domination".

In the case of an empire led by an Absolute Monarchy, the monarch becomes the owner of the army and its relationship with the officers is more or less like the relationships between owners (shareholders) and managers of an enterprise. The warrior-king transforms into an entrepreneur-king. The king's objective is to maximize the absolute protection rent. This rent belongs to the king and its 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 an entrepreneur-king who would "use inexpensive wives, at least as inexpensive devices as possible, to affirm his legitimacy, to maintain domestic order, and to distract neighboring 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).

Furthermore, the king could reduce the protection costs if he acquired legitimacy, either through custom and length of reign or through ceremonial religious rites or any other form of support provided by public opinion. The legitimacy of the king was a prominent source of political stability and economizing on the cost of policing. This type of empire-building corresponds to what North *et al.* (2009, 2012) coin a 'basic limited access order', and Mann (1986) named 'territorial empires' which did 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 dominate necessarily. Although absolute monarchs could spend their protection rent on sumptuous consumption and military expenditures (like the Portuguese

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

¹² North *et al.* (2012, p. 3) define 'limited access order' (LAO) as an order that limits "violence through the manipulation of economic interests by the political system in order to create rents so that powerful groups and individuals find it in their interest to refrain from using violence." They distinguish three variants of LAO, namely '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 to a fragile LAO. In the 'mature' LAO, the dominant coalition supports a large variety of organizations both outside and inside the government (Ibid., pp. 10-15). But it is still different from 'Open Access Orders' that are sustained by institutions that support 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).

empire), they could also use it for enhancing their industry and commerce (like the French empire at the time of Colbert). An empire led by an entrepreneur-king represents the second type of empire developed in our model, namely the “territorial empire”

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

One of the major competitive advantages of the Venetian merchants was that 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 instance, if there are two countries, with two different protection prices p_1 and p_2 , then differential protection rent for each unit of protection would be:

$$DR_i = p_1 - p_2 \quad (2)^{13}$$

The 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) though the absolute protection rent (AR_i) might exist. Introducing (DR_i) clarifies the institutional identity of the beneficiaries of protection and helps distinguishing price competition from coercive rivalry.

The 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 market, then (AR_i) approaches zero, and (DR_i) reaches its maximum. Conversely, if the protection market is a seller market, then (AR_i) attains its maximum.. The Venetian republic with its “wise government”, composed of the Council of Doges, is closer to a buyers’ market¹⁴. It is not surprising then that 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 channeling of trade through Venice rather than the creation of a territorial empire.” (Tilly, 1990, p. 145).

Such a state waged as little war as possible, but launched 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 the historical formation of the modern state, the Venetian council of doges might be an exception. The Venetian

¹³ 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.

¹⁴ 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.

merchant empire can be described as a collective body of elite merchants. Borrowing North *et al.*'s (2009, 2012) terminology, the Venetian empire comes within the scope of 'mature LAO'. While it was not yet an OAO (Open Access Order), the doorstep conditions were shaping, particularly the Venetian elites were inclined to develop institutional arrangements that could enable impersonal exchange among them. This behavior characterizes the third kind of empire designed in our model, namely a "merchant empire".

By contrast, the situation under the Portuguese Monarchy was closer to a sellers' market, since the Portuguese King was only concerned about the privileges of Court and high military officials. The Portuguese government might be labeled 'Leviathans' or a *predatory* government according to Alesina and Spolaore (2003)¹⁵. Here, decisions are taken 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 company was a royal one. The difference between the two methods of competition or two methods of using violence was either maximizing the royal (AR_i) or maximizing the (DR_i) for merchants. In the Venetian case, 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 case, however, violence was used for the prestige and privileges of the King; and hence there was no price competition over supplying protection.

Excluding price competition in analyzing empires' rivalry suffers from two shortcomings: 1) (DR_i) is dismissed and only (AR_i) comes under scrutiny. 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 market to a buyer market is overlooked.

Exploring the sources of (DR_i), we need to examine the differences in protection costs between a merchant empire like Venice and an absolute Monarchy such as the Portuguese empire.

1.2 Protection costs and two types of hierarchies

Protection costs of an empire depend on the type of hierarchy that prevails in the empire. Empire-building requires different types of hierarchies. We owe the distinction between two sets of hierarchies to William Skinner: the first, constructed largely from the bottom-up, which emerged from exchange; the second, imposed mainly from the top-down, as a result of imperial control (Skinner, 1977, pp. 275-352; see also Wakeman, 1985; Whitney, 1970). Skinner's study was based 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 which centered on highly populated town and cities. The nested units of the top-down imperial

¹⁵ In their analysis of the size of nations, Alesina and Spolaore (2003) distinguished 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 *predatory* state or Leviathans.

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 exploring the formation of hierarchies and state-building in Europe. Tilly (1990, chapter 5, pp. 127-160) follows a 'Skinnerian' scheme and opposes 'coercive-intensive path' versus 'capital-intensive path' in European state-building as follows:

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

The Russian empire is a typical illustration. Russian empire was constructed around the top-bottom hierarchy: "From top to bottom, the emerging structure of social relations depended on coercion" (Tilly, 1990, p. 141). Other historical examples are Polish, Hungarian, Serbian, and Brandenburg states. This path was based on forced labor, landlord relationships, and the development of the government's armed force. Conversely, trade routes were thin and lacking in capital. This type of hierarchy was tailored to maximize (AR_i). The "forced subscription" of subjects or their allegiance to the absolute monarch (or tsar) was the cornerstone of this imperial hierarchy.

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

The Venetian merchant empire provides a classical case. It extended, for example, to Cyprus until 1573 and to Crete until 1669. The city's forces launched wars to maintain access to commercial opportunities, and to chase 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, emphases are ours). 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)¹⁶.

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

While the Venetian path offers the lowest cost of protection, the Portuguese empire warranted the highest cost of protection since it was closer to the first path. The Portuguese crown received a major share of its income from customs duties on goods

¹⁶ Tilly (1990) also introduces a third path, namely *'Capitalized coercion path' situated between the capitalist (mercantile) and coercive extremes*. This trajectory embraces both types of hierarchies, though the combination varies among different European countries. The emblematic figure was the English (then British) state built on a conjunction of capital and coercion that since its inception afforded immense means of warmaking for any monarch, but only at the price of large concessions to the country's merchants and bankers. In our model, we do not consider this 'intermediary case'.

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, the English, and the 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 also have caught itself in the “territorial trap”, i.e. the conquest of so much dependent territory relative to its means of extraction that administrative costs swallowed its gains from imperial control (Thompson and Zuk, 1986).

Although the Portuguese empire incurred the highest costs of protection in the aforementioned model, its protection costs were less than the costs of the 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 should be distinguished:

- 1) Early empires of domination (*fragile LAO*) like Viking and Mongol empires: These empires incur the highest costs of protection due to a fragile top-down hierarchy perturbed by anarchical rivalry among warlords.
- 2) Territorial empires (*basic LAO* or absolute monarchy) like the Russian or Portuguese empires: These empires bear next to the highest costs of protection due to a top-down hierarchy, but with more political stability (maximizing AR_i).
- 3) Merchant empires of Venetian type (*mature LAO*): These empires incur the lowest costs of protection due to a bottom-up hierarchy (maximizing DR_i and approaching to a nil AR_i).

Accordingly, we identify three types of competition among empires that will be modeled 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, the use of 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 a competition for maximizing the absolute protection rent (AR_i), whereas price competition is defined as competition for maximizing the differential protection rent (DR_i). Bertrand equilibrium can be used to modelise both coercive rivalry (Maximizing AR_i) and price competition (Maximizing DR_i). But why should we use Bertrand equilibrium?

There are three reasons for mobilizing 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 on the protection market. Cournot equilibrium cannot capture this multiplicity of prices.
- 2) Asymmetrical Bertrand equilibrium can provide a unified framework to deal with different types of competition in the presence of multiple prices.
- 3) Finally, Bertrand equilibrium is necessary to model the differential protection rents.

In other words, while the application of Bertrand equilibrium is not synonymous of price competition in the economics of conflict, modeling price competition warrants Bertrand equilibrium.

Moreover, protection is assumed to be a *homogenous* good. Lane (1973, 1975) and North and Thomas (1973) have assumed that there is a *homogenous* public good called protection, the supplier of which are called governments. Ames and Rapp (1977, pp. 166-167) rejected this assumption and advocated a *heterogeneous* nature for protection. They argued that although protection is always against a threat, two types of threat and protection must be differentiated: “a threat by foreigners creates a demand for *defense*; a threat by one group of the population against another creates a demand for *justice*.” (Ibid., p. 167). In our model, we follow Lane, North and Thomas, since our present study does not focus on the distinction between internal and external threats. In fact, 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 defined¹⁷. 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 that will be modeled in the next section.

¹⁷ We shall explore the impact of heterogeneity in the protection market under symmetrical costs of protection 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	Mongol empire	Seller market	Fragile Top-down hierarchy	Intermediary	Absent	Maximum	Coercive rivalry
Territorial empires, basic LAO	Russian empire	Seller market	Stable Top-down hierarchy	Maximum	Intermediary	Intermediary	Coercive rivalry
Merchant empire, mature LAO	Venetian empire	Transition from seller to buyer market	Bottom-up hierarchy	Low (or absent)	Maximum	Low	Coercive rivalry and price competition

2. Bertrand equilibria of the protection market

In the model that we develop in this section, the frontiers of an empire are determined by the protection market. The effective territory of an empire is regarded as the geographical space over which its authority is respected. Accordingly, the size of an empire corresponds to the zone that is controlled by the empire, i.e. the territory which is protected by the empire. The study of protection market is thus an intuitive manner to grasp 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 empire¹⁸. Competition on this market is actually a competition à la Bertrand, in which two empires try to attract the biggest share of demand. More precisely, we 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 the population's need to protect itself from any aggression, and to establish a higher authority capable of enforcing property rights. The population size is represented below by parameter a . Let the market demand for protection be:

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

N is the total number of people protected by an empire. It is noteworthy that in our 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. Moreover, the whole territory like the total population is normalized to a .

As for the supply of protection, the latter hinges upon the empires' protection capacity. In fact, we assume that empires are hierarchical structures. Despite their differences, these 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 (in our case an 'empire') that is capable of protecting individuals. The higher the number of protected people is, the greater the territory of an empire will be.

In our theoretical setup we assume a protection market where two empires (or two "Leviathans") compete in order to attract the largest share of protection demand. We use a model "à la Bertrand", which implies that the variable used by empires to compete is the price of protection.

¹⁸ In our model, the 'size' of an empire is assumed to be proportional to the number of people protected by the empire.

We will successively explore three different cases of competition between empires in the subsequent sections. In subsection (2.2), we first analyze the case of a *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, we will end our investigation by analyzing competition between two identical merchant empires contesting the protection market (2.4). This last confrontation takes the form of a *price competition* as we define here above.¹⁹

In all these cases, the two contending empires try to attract the largest share of protection demand in order to increase the size of their territory. However, the territorial expansion cannot be infinite and the empire's size is constrained by *organizational* difficulties (particularly when the empire is composed of heterogeneous cultural groups) as well as *protection* problems (since borders are strategic elements that should also be defended against external aggressions). In our case, there exists a threshold k ²⁰, beyond which an empire cannot extend. Assuming the impossibility of a unique empire, ($k < 1$) entails the coexistence of two potentially antagonist empires. We are in the typical case of Bertrand duopoly, with competition over controlling 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. The *efficient rationing* is the rule of rationing that is adopted in our model. This implies that individuals who desire to be protected the most are the 'first-served'²¹.

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

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

In satisfying this demand for protection, an empire i should support a function of protection costs denoted by $C_i(N_i)$. The costs are strongly dependent on the nature of the empire. But we assume that their general form is as follows.

¹⁹ We have selected three cases of competition in order to identify the impact of different types of hierarchies on the type of competition among empires. Accordingly, we excluded other possible types of competition, i.e. a competition between two territorial empires, two empires of domination, or an empire of domination and a merchant empire. These cases do not add further relevant information.

²⁰ k is assumed to be the same for all empires. In particular, this hypothesis implies that the type of hierarchy doesn't influence the maximal size of an empire. Although our assumption might be strong, it allows us to focus on the impact of hierarchical structure of empires and their costs of protection on the equilibrium of protection market. The results of the present paper can be explored further by assuming different capacity limits.

²¹ For a discussion of efficient and proportional rationing, see Davidson and Deneckere (1986) and Tirole (1988).

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

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

Thus, we are in the presence of empires that are confronted with linear cost functions: protection costs increase proportionally to the territorial size. Beyond a certain threshold, k , this cost will become infinite since we will be restrained by the protection capacity limit.

The objective of an empire varies according to its nature. As we indicated 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 aspires maximizing its differential protection rent (DR_i).

An empire will act rationally regardless of its objective and tries to maximize its objective if it allows the empire to enrich itself or at least not to impoverish it. To put it differently, 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 disappear.

In the three following subsections, we will represent the protection market in three different situations thanks to 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 . They 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 rent²². According to our definition, their competition comes within the scope of ‘coercive rivalry’.

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

The question of the costs borne by an empire is closely related to its governance structure. As we noted in the previous section, an empire of domination governed by warriors incurs significant costs of protection, since the army holds senior command positions in such type of empire and the satisfaction of its interests is regarded as an absolute priority. By contrast, in a territorial empire, the king acts as the ‘owner’ of the army and as an entrepreneur-king, he endeavors to reduce the costs of protection (including the army’s costs). Hence,

²² We previously underlined that the main objective of the empire of domination is to maximize the size of its army, and military expenditures. This step cannot be illustrated by our model since costs are assumed to be known. However, in order to maintain the maximum cost assumption, we postulate that the protection costs have already been maximized prior to the model.

we have $\forall n \in [0, N], C_D(n) = d \cdot n$ and $C_T(n) = t \cdot n$. $C_D(n)$ represents 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. The parameters d, t are two real positive real numbers such as: $a > d > t$.

In Bertrand duopolistic competition, each empire has an interest to propose a lower price than its competitor to capture a bigger share of the market. This pertains to the dynamic of price war which was eloquently depicted by Bertrand in 1883.

Here, a territorial empire has an advantage over an empire of domination in terms of protection costs. This advantage allows the territorial empire to dominate the protection market, since 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 taken into account in defining the equilibrium values of the protection market. In fact, the value of k has an impact on the equilibrium when the competition is organized à la Bertrand (see Levitan and Shubik, 1972).

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

The capacity constraint restrains the territorial empire to sell less protection compared with the 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 the maximization of the empires' absolute protection rents²³.

The equilibrium values are $N_T^* = k, N_D^* = \max\left\{k, \frac{a-2d+t}{3}\right\}$ and $p^* = p_T^* = p_D^* = a - k - N_D^*$.

Table 2 indicates the principal results. We note that if empires are subject to strong constraints, there will be two small empires, each of them enjoying a positive absolute protection rent. However, because of the uniformity of protection price, none of them can take advantage of differential protection rents.

²³ See Annex 1 for details of the calculation.

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

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

The 'victorious' side of this price war is necessarily the territorial empire, since it can fix a price so low that the absolute protection rent of the empire of domination becomes negative. More clearly, the empire governed by the entrepreneur king will 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^* stands for 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. We have thus²⁴ :

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

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

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

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

²⁴ More rigorously, $p_T^* = \text{Min}\{p_D^{min} - \varepsilon, p_T^{mo}\}$, where p_T^{mo} stands for the price which the territorial empire will offer if it were in a monopoly situation, i.e. the price which 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 signifies that the values of the parameters of cost functions of empires are subject to the following constraint: $d < \frac{a-t}{2}$.

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	$\left(\frac{a-k-d}{2}\right)^2 > 0$	$k(d-t-\varepsilon) > 0$
	$AR_D < AR_T$ ²⁵	
DR_i	$(p_D^{min} - p_D^*)N_D^* < 0$	$\left(\frac{a-k-d}{2} + \varepsilon\right)k > 0$

As noted in Table 3, the territorial empire has an advantage in using *coercive rivalry*, since by virtue of its lower protection costs, it can capture more territories and a more significant amount of absolute protection rents while benefiting from a non-zero differential protection rent.

- **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 a homogenous Bertrand competition with asymmetrical costs of protection for empires. As is highlighted in Table 4, the equilibrium values result in the disappearance of the empire of domination²⁶. The size and the protection price of the territorial empire are $N_T^* = a - d + \varepsilon$ 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

In this subsection, we explored competition between two empires that are organized on the basis of a « top-down » hierarchy. The territorial empire has an advantage in terms of protection costs and will benefit from it through coercive rivalry. The weaker the constraint on the maximal size of empire (*i.e.* higher level of k), the stronger the supremacy of the territorial empire over the empire of domination will be. This translates into a pure and simple withdrawal of the empire of domination from the protection market when $k > a - d$.

²⁵ See Annex 2.

²⁶ For a more detailed analysis of the resolution of a homogenous Bertrand competition, see Ledvina and Sircar (2011, pp. 15-16).

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

We now study the case where a merchant empire, marked by a « bottom-top » hierarchy, competes with a territorial empire. The situation is radically different from the preceding one, since the two empires do not share the same objectives.

As previously underlined in section 1, the merchant empire tries to maximize the interests of merchants who constitute the government, namely the differential protection rent.

$$\text{Max } DR_M = (p_T - p_M)N_M \quad (8)$$

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 the price that maximizes DR_M by seizing the largest share of demand. The choice of a protection price hinges upon 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, the lower the protection price p_M , the larger the demand for protection will be.

Consequently, the merchant empire will choose the minimum price that it can offer, *i.e.* p_M^{min} defined by: $p_M^* = p_M^{\text{min}} = \{p_M | AR_M = 0\} = m$.

In determining the equilibria of the protection market and the characteristics of the empires, two cases should be distinguished with regard to the values of protection constraint k .

- **Case 1 : $k < a - t$**

We are confronted with the case in which 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 . Hence, we have $p_M^* = m$ and $N_M^* = k$.

Alternatively, the territorial empire follows a different objective: it tries to maximize the absolute protection rent. Accordingly, its optimal behavior is 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	$\left(\frac{a - k + t}{2} - m\right)k < 0$	$(m - p_T^*)N_D^* < 0$ ²⁷

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

The outcome of this particular mixture of price competition and coercive rivalry is the emergence of 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 augments).

- **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 vanish entirely. It is the prolongation of the preceding case: beyond a certain threshold, the territorial empire would operate on a residual demand which is so small that it does 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 disappears.

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 and a territorial empire as a mixture of coercive rivalry and price competition. This

²⁷ We have $p_T^* = \frac{a - k + t}{2} > t > m$.

combined competition leads to the disappearance of the territorial empire with the increase in the level of protection capacity k .

2.4. Merchant empire versus merchant empire

In this third situation of competition, we study the case where two merchant empires compete with each other. Thus, we have a Bertrand competition with two symmetric empires: $C_{M1}(n) = C_{M2}(n) = m.n, \forall n \in [0, N]$. $C_{M1}(n)$ 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.

Here we are confronted with 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). In fact, the game's equilibrium values will be 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, we can speak of pure price competition: they compete on the basis of price differential since their objective is to maximize their differential protection rents. The 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 is devoted to *static* and *historical* interpretations of results in section 2. We commence by static interpretation.

At a static level, it is possible to assess our results on the basis of our theoretical framework. As we previously argued, the traditional conflict models assume the uniformity of protection price and systematically focus on quantity competition. Consequently, these models overlook the distinction between absolute and differential protection rents and are oblivious to differential protection rents. Competition on the protection market is accordingly limited to coercive rivalry. However, this line of modelisation suffers from a major shortcoming: it does not grapple the logic of territorial expansion by merchant empires. For example, the

classical case of Venetian merchant empire, with its particular combination of *raid* and *trade* cannot be grasped theoretically.

One of the stylized historical facts of protection market in the absence of monopoly of violence is the coexistence of *multiple* protection prices. The paradox of conflict models is that while they assume price uniformity, they describe a situation 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 we indicated in subsection 2.2, it is also possible to tackle a situation in which both empires try to maximize absolute protection rents. In this case, coercive rivalry is treated in a similar way to Cournot equilibrium.

One of the major advantages of our line of modelisation is that it affords a unified general framework that deals with both coercive rivalry and price competition and specifically elucidates price competition as one of its particular cases (2.4). Accordingly, the expansion rationale of merchant empires can be comprehended in the light of Bertrand competition. We demonstrated that competition between two merchant empires generates price wars that lead to the classical situation of Bertrand Paradox. However, our model is capable of disentangling a mixed situation (2.3) in which an empire organized around a top-down hierarchy competes with a merchant empire. We noted 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.

To sum up, Bertrand competition seems to be a powerful analytical tool to apprehend the diverse logic of empires' territorial expansion.

Until now, we concentrated on the static interpretation of the three games that we constructed on the basis of Bertrand equilibrium. However, our model allows us to go beyond this static analysis and illustrates the evolution of empires throughout history. We now introduce a historical interpretation of our results.

We observe that the situations largely depend on the value of k reflecting the protection capacity of an empire. The bigger k is, the more probable the disappearance of an empire of domination will be when it confronts a territorial empire(2.3). Similarly, we argue that the domination of a merchant empire over a territorial empire augments with the 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 a significant progress in transport and communication means. That is why the maximum size of an empire is largely conditioned by the extent of geographical connection and the decrease in costs of transport. For instance, maritime transport opened the horizons of territorial expansion of empires and the

combination of maritime and land routes economized on transport costs and enhanced the formation of territorial empires. The military integration depends on the striking zone of military weapons. The military revolution in defensive and offensive technologies incentivizes an empire to extend its territory and increase k .

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

Conclusion

Price competition in the protection market operates both at a national and at an international level. German unification provides a salient historical example of price competition at a national level. In an economy consisting of urban and peasant commoners, nobility and a king, protection may be variously supplied. "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 is ours). The significance of price competition at a national level notwithstanding, we purported to show the relevance of price competition in empire-building at an international level in this paper.

By distinguishing absolute and differential protection rents, we defined three types of empire and systematically studied their competition in the light of Bertrand equilibria. The static and historical interpretation of our results leads to a better understanding of the economic significance of violence throughout history.

In fact, the progression from an empire of domination to territorial empire and then to a merchant empire embraces three moments 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 the *maximum protection costs* (G_i). While this type of empire comes within the scope of empires that seek to maximize their 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 it 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 captured by the entrepreneur-king, the economic significance of violence depends on how the monarch uses his wealth. Two broad alternatives are conceivable: either he employs (AR) to enhance industry and trade or he 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* impact.

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

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

Finally, we should underline two limits of our present discussion.

First, in this paper, we studied protection market under the assumption of a *homogenous* protection good. But competition between empires is usually decided by their difference in terms of internal and external stability that 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) brings us to analyze price competition under the assumption of a *heterogeneous* protection good. We will study this issue in another paper.

Second, Bertrand equilibrium is not a sufficient tool to analyze the strategic interactions between two merchant empires. Other types of strategies should be examined. For example, empires can try to either reduce their protection costs or increase protection costs of their rivals to win the competition. Understanding this difference in competitive strategies requires a distinction between 'defensive' and 'offensive' protection costs. This issue will also be discussed in our future research papers.

Bibliography

Alesina Alberto and Spolaore Enrico, 1997, "On the Number and Size of Nations", *Quarterly Journal of Economics*, 112, pp. 1027-56.

Alesina Alberto and Spolaore Enrico, 2000, "Conflict, Defense Spending, and the Number of Nations", Mimeo, Harvard University and Brown University.

Alesina Alberto and Spolaore Enrico, 2003, *The Size of Nations*, Cambridge, MIT Press.

Alesina Alberto and Spolaore Enrico, 2006, "Conflict, Defense Spending, and the Number of Nations", *European Economic Review*, 50, pp. 91-120.

Ames Edward and Rapp Richard, 1977, "The Birth and Death of Taxes: A Hypothesis", *Journal of Economic History*, Vol. 37, No. 1, pp. 161-178.

Barzel Yoram, 1999, *Property Rights and the Evolution of the State*, Working Paper, University of Washington, June.

Barzel, Yoram, 2002, *A theory of the state, economic rights, legal rights, and the scope of the state*, Cambridge, Cambridge University Press.

Bertrand Joseph, 1883, "Théorie Mathématique de la Richesse Sociale », *Journal des Savants*, cahier de septembre, pp. 499-508. ; reprinted in Cournot, Augustin A.[1838] 2001, *Recherches sur les Principes Mathématiques de la Théorie des Richesse*, Paris, Dunod, pp. 133-141.

Boulding Kenneth E, 1962, *Conflict and Defense: A General Theory*, New York, Harper & Bros.

Buchanan James, and Faith Roger L., 1987, "Secessions and the Limits of Taxation: Towards a Theory of Internal Exit", *American Economic Review*, Vol. 77, pp. 1023-31.

Celentani Marco, 1995, "Discussion", in Fiorentini, Gianluca and Peltzman, Sam (eds.), *The Economics of Organized Crime*, Cambridge, Cambridge University Press, pp. 156-160.

Davidson Carl and Deneckere Raymond, 1986, "Long-run competition in capacity, short-run competition in price, and the Cournot model", *Rand Journal of Economics*, Vol. 17, pp. 404-415.

De Long Bradford J. and Shleifer Andrei, 1993, "Prices and Merchants: European City Growth Before the Industrial Revolution", *Journal of Law and Economics*, 36, pp. 671-702.

Epple Denis and Romer Thomas, 1991, "Mobility and Redistribution", *Journal of Political Economy*, Vol. 99, No. 4, pp. 828-858.

Findlay Ronald, 1996, "Towards A Model of Territorial Expansion and the Limits of Empire", in Garfinkel Michelle and Skaperdas, Stergios, (eds.), *The Political Economy of Conflict and Appropriation*, Cambridge, Cambridge University Press.

Frevort Ute, 1995, *Men of Honour, A Social and Cultural History of the Duel*, translated by Anthony Williams, Cambridge, Polity Press.

Friedman, David, 1977, "A Theory of the Size and Shape of Nations", *Journal of Political Economy*, 85, pp. 59-77.

Grossman Herschel I., 1995, "Rival kleptocrats: the mafia versus the state", in Fiorentini, Gianluca and Peltzman, Sam (eds.), *The Economics of Organized Crime*, Cambridge, Cambridge University Press, pp. 143-156.

Konrad, Kai and Skaperdas, Stergios. 2012. "The Market for protection and the Origins of the State", *Economic Theory*, 50, pp. 417-443.

Kuznets Simon, 1948, "National Income: A New Version", *The Review of Economics and Statistics*, Vol. 30, No. 3, pp. 151-179.

Lane Frederic C., 1973, *Venice, A Maritime Republic*, Baltimore and London, John Hopkins University Press.

Lane Frederic C., [1940] 1979, "National Wealth and Protection Costs", in *Profit from Power*, New York, State University of New York, pp. 12-21.

Lane Frederic C., [1958] 1979, "Economic Consequences of Organized Violence", in *Profit from Power*, New York, State University of New York, pp. 50-65.

Lane Frederic, 1975, "The Role of Government in Economic Growth in Early Modern Times", *Journal of Economic History*, Vol. 35, March, pp. 8-17.

Ledvina Andrew Fabian and Sircar Ronnie, 2011, "Bertrand and Cournot Competition under Asymmetric Costs: Number of Active Firms in equilibrium", Working Paper, Princeton University, February 18.

Levitan R. and Shubik M, 1972, "Price Duopoly and Capacity Constraints", *International Economic Review*, Vol. 13, pp. 111-122.

Mann, Michael, 1986, *The Sources of Social Power*, vol. 1, *A History of Power from the Beginning to A.D. 1760*, Cambridge, Cambridge University Press.

Marx Karl and Engels Frederick [1848] 1998, *The Communist Manifesto*, A Modern edition, with an introduction by Eric Hobsbawm, London and New York, Verso.

North Douglass and Thomas Robert P., 1973, *The Rise of the Western World, A New Economic History*, Cambridge, Cambridge University Press.

North Douglass, 1981. *Structure and Change in Economic History*, New York, Norton.

North Douglass, Wallis John J, and Weingast Barry. 2009. *Violence and social orders: A conceptual framework for interpreting recorded human history*, New York, Cambridge University Press.

North Douglass, Wallis John J, Webb Steven, and Weingast Barry (eds.), 2012, *In the Shadow of Violence, Politics, Economics, and the Problems of Development*, Cambridge, Cambridge University Press.

Olson Mancur, 1982, *The Rise and Decline of Nations: Economic growth, Stagflation, and Social Rigidities*. New Haven, Yale University Press.

Olson Mancur, 2000, *Power and Prosperity, Outgrowing Communist and Capitalist Dictatorships*. New York, Basic Books.

Skinner William (ed.), 1977, *The City in Late Imperial China*, Stanford, Stanford University Press.

Thompson William and Zuk Gary, 1986, "World Power and the Strategic Trap of Territorial Commitments", *International Studies Quarterly*, Vol. 30, pp. 249-267.

Tiebout Charles, 1956, "A Pure Theory of Local Expenditures", *Journal of Political Economy*, Vol. 64, No. 5, pp. 416-424.

Tilly Charles, 1990, *Coercion, Capital and European States, AD 990-1990*, Cambridge MA., Blackwell.

Tirole Jean, 1988, *The Theory of Industrial Organization*, Cambridge, Mass., MIT Press.

Tracy James (ed.), 1991, *The Political Economy of Merchant Empires, State Power and World Trade*, New York, Cambridge University Press.

Vahabi Mehrdad, 2004, *The Political Economy of Destructive Power*, Cheltenham, Edward Elgar.

Wakeman Frederic, 1985, *The Great Enterprise. The Manchu Reconstruction of Imperial Order in Seventeenth-Century China*, Two volumes, Berkeley, University of California Press.

Whitney Joseph, 1970, *China: area, Administration, and Nation Building*, Chicago, University of Chicago, Department of Geography, Research paper 123.

Wittman, Donald, 1991, "Nations and States: Mergers and Acquisitions; Dissolutions and Divorce", *American Economic Review papers and Proceedings*, 81, pp. 126-128.

Wittman, Donald, 2000, "The Size and Wealth of Nations", *Journal of Conflict Resolution*, 44, pp. 868-84.

Wolsey Cole Charles, 1939, *Colbert and A Century of French Mercantilism*, 2 volumes, New York, Columbia University Press.

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

Both empires seek to maximize their absolute protection rents:

$$\text{Max } AR_i = p \cdot N_i - C_i(N_i) \quad \forall i \in \{D, T\}$$

In a Cournot's conjecture, the protection price is uniform in both empires, and the maximization of the tribute of each empire gives us its reaction function:

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

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

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

By assumption, we have $d > t$, this 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 , 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 is obtained for $k = \left(\frac{a-2t+d}{3}\right)$.

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