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## Linking war, natural resources and public revenues: the case of the War of the Pacific (1879-1883)

Sabate Domingo, Oriol; Peres-Cajías, José

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# STANCE

State-Making and the Origins of Global Order  
in the Long Nineteenth Century and Beyond

Linking war, natural resources and public  
revenues: the case of the War of the Pacific  
(1879-1883)

Oriol Sabaté

José Peres-Cajías

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# Linking war, natural resources and public revenues: the case of the War of the Pacific (1879-1883)<sup>1</sup>

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Oriol Sabaté  
Post Doc in Political Science  
Lund University  
[oriol.sabate\\_domingo@svet.lu.se](mailto:oriol.sabate_domingo@svet.lu.se)

José Peres-Cajías  
Research Fellow in Economic History  
University of Barcelona  
[joalperes@ub.edu](mailto:joalperes@ub.edu)

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## Abstract

We argue that wars over natural resources, even if they are limited in their military scope, can have long-term consequences on the level and composition of public revenues. Military success in a resource war may lead to the annexation of natural resource-rich areas from enemy combatants, which provides the winning coalition with valuable and easy-to-tax sources of income. This, however, might discourage new investments in administrative capacity that jeopardize the possibility to establish complex and politically costly taxes in the long-term. This was the case in Chile after it took over the Bolivian and Peruvian coastal regions during the War of the Pacific (1879-1883). In Peru, by contrast, the loss of its nitrate-rich areas brought its fiscal system to the brink of collapse. The impact of the conflict on the Bolivian fiscal system was milder owing to its initial low level of state capacity to control these coastal regions.

### **Keywords**

Fiscal capacity, warfare, nineteenth century, Latin America, War of the Pacific.

### **JEL Codes**

H11; H20; K34; N46.

# I Introduction

Warfare has been long associated with the growth of stronger fiscal institutions. Even if wars may exert a negative short-term impact on fiscal capacity due to the physical destruction that they cause, many authors have argued that over the long run they promote fiscal innovations that improve the government's capacity to collect taxes (Gennaioli & Voth, 2015; Karaman & Pamuk, 2013; Rasler & Thompson, 1985a; Tilly, 1975, 1985, 1990). Most of the literature, however, has suggested that this positive effect is circumscribed to very intense wars (Centeno, 2002; López-Alves, 2001). Limited wars do not bring about the necessary social, political and economic transformations that spur significant long-term fiscal transformations (Centeno, 2003).

In this paper we look more closely into the fiscal impact of one type of limited military conflict that has received little attention by the previous literature, namely wars over natural resources. We follow Klare (2001, 25) in defining them as “conflicts that revolve, to a significant degree, over the pursuit or possession of critical materials”.<sup>2</sup> Even if the control of resource-rich areas has been considered one of the key determinants of military conflicts throughout history (Acemoglu et al., 2012; Caselli et al., 2015; Le Billon, 2012), not much has been said about how this type of wars affect fiscal capacity.<sup>3</sup> Most of the literature has focused instead on the interplay between natural resources and the frequency and intensity of civil and international conflicts (e.g., Klare, 2001; Le Billon, 2012; Thies, 2010).

We argue that wars over natural resources have the potential of triggering significant long-term fiscal transformations even if they are limited in their military scope. On the one hand, they might alter the preferences of the elites as a result of the threat that these military conflicts pose to the national territory. On the other, states can expand their capacity to extract revenue from their economies by conquering natural resource-rich areas from enemy combatants. The availability of valuable and easily taxable economic resources may translate into higher levels of public revenues in the short-term. However, this might eventually discourage investment in administrative capacity, which in turn imperils the states' ability to penetrate society and to enforce complex tax systems in the future. As a result, the military seizure of new natural resource endowments might significantly shape the fiscal landscape of the belligerent countries in the long-term, but not necessarily in the right direction.

We empirically study this topic by analysing the fiscal impact of the so-called War of the Pacific (1879-1883). This military conflict pitted Chile against Peru and Bolivia

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<sup>2</sup> Even if they generally involve many other grievances that go beyond the mere conflict over natural resources, the concept responds to the prominence that the control of such materials acquires (Le Billon, 2007)

<sup>3</sup> Recent examples of resource conflicts can be found in the recurrent armed clashes in the Middle East and Central Asia or in the Gulf of Guinea.



over the Peruvian and Bolivian nitrate-rich regions of Tarapacá and Antofagasta, and constitute an illustrative example of an international resource war. Even if the war fell short of developing into a mass mobilization conflict, several authors have considered it to be one of the few wars in Latin America that could have been associated with state-making efforts in the last two centuries (Kurtenbach, 2011; Kurtz, 2012). On the one hand, the ruling classes of Peru and Bolivia had good reasons to feel the territorial status quo threatened by the Chilean seizure of their coastal areas (including, in the case of Peru, the invasion of its capital, Lima, in January 1881).<sup>4</sup> The Chilean state, on the other, presented a wide elite consensus behind the war effort that led to the conquest and annexation of rich natural resource endowments (Kurtz, 2012). Crucially, the three countries had the possibility to finance the war through foreign capital curtailed (della Paolera & Taylor, 2013; Reinhart & Rogoff, 2009) and therefore had to rely to a large extent on internal sources of revenues (Queralt, 2019).

To analyse this war, we make use of a variety of primary and secondary sources. Firstly, we draw on and update the most recent series of public revenues for the three countries that participated in the military conflict, focusing not only on the level of revenues but also on their composition. Secondly, we compile several indicators of the states' administrative capacity to collect public revenues. Finally, we provide an original database of tax laws, decrees and other parliamentary acts, passed by the Chilean national parliament during the period 1870-1890, with the aim of capturing the degree of pro-revenue consensus among the elites in this Andean country.

Our results indicate that the War of the Pacific exerted a significant effect on the fiscal systems of the three belligerent countries. The war had a double-edged impact on Chile, allowing the country to increase public revenues during the war period but opening the door for revenue substitution in the long-term. The loss of natural resource endowments imperilled the capacity to collect public revenues in Peru and Bolivia, but it had a milder effect in the latter due to Bolivia's initial low level of state capacity to control its coastal regions.

The paper proceeds as follows. The next section reviews the previous literature on warfare and fiscal capacity in Latin America. Section 3 discusses the main concepts and the analytical framework used in this paper. Section 4 briefly describes the War of the Pacific, while section 5 presents the historical evolution of public revenues in Bolivia, Chile and Peru during the second half of the nineteenth century (up until the first decade of the twentieth century). The next three sections look at the evolution of the economic base during and after the war, the long-term effects of the military conflict on administrative capacity, and the willingness of the elites to collect public revenues. Section 9 concludes.

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<sup>4</sup> Wars of conquest have been, in fact, the type of wars most clearly associated with state-making in early-modern Europe (Spruyt, 2011; Tilly, 1985).

## II Latin America in the bellicist theory

A great deal of literature has considered warfare a fundamental driver of state formation and fiscal development. This argument was first developed to explain the rise of sovereign and centralized states in early-modern Europe amid relentless military conflicts (Dincecco, 2015; Gennaioli & Voth, 2015; Karaman & Pamuk, 2013; Tilly, 1975, 1990). The military revolutions initiated in the fifteenth and sixteenth centuries in the Eurasian continent increased the cost of warfare, compelling European rulers to look for new sources of revenue. New taxes and increasingly centralized fiscal bureaucracies were thus the result of continuous and expensive wars, at least for those states that could keep up with the military pressure.<sup>5</sup>

Different versions of this theory have travelled to the nineteenth and twentieth century.<sup>6</sup> Even if warfare lost the prominence that it once had in the international political arena, military pressures remained important to spur institutional transformations. The two World Wars constitute the most paradigmatic illustration of this phenomenon, with the development of exceptional fiscal innovations that expanded the scope and the nature of the tax systems of belligerent countries (Steinmo, 2003). Governments were not only compelled to meet unparalleled military demands in a context of new technological and industrial capabilities (Rasler & Thompson, 1985b; Sabaté, 2016), but also to make the fiscal system fairer in order to compensate the working class for their efforts in the battlefield (Scheve & Stasavage, 2016).<sup>7</sup>

This theoretical framework has proven to be more elusive when it comes to the historical experiences of non-European countries. Latin America stands as an important landmark in this debate, and many authors have cast reasonable doubts on the positive interplay between warfare and fiscal capacity in the continent. On the one hand, Centeno (2002) and López Alves (2001) argue that Latin American countries did not fight the type of wars that are commonly associated with increasing fiscal capacity in early-modern Europe, namely intense international wars. Most wars were, instead, civil wars or wars limited in their scope and intensity.<sup>8</sup> Civil wars undermined the state-making efforts – and were, to certain extent, a reflection of its very same failure – whereas limited wars were not costly enough to trigger institutional changes that could favour stronger and centralized states.<sup>9</sup> Along the same lines, Thies (2005) argues

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<sup>5</sup> See Abramson (2017) or Sharma (2017) for recent criticisms of the bellicist theory in early-modern Europe.

<sup>6</sup> For an excellent survey of the debate and some of its most recent contributions, see Goenaga & Hagen-Jamar (2018).

<sup>7</sup> Other military conflicts have been also associated with relevant fiscal and institutional transformations, such as the US Civil War (Mehrotra, 2013), the Austro-Prussian War (Pammer, 2010), or the series of military conflicts fought by the state of Piedmont in the run-up to the Italian unification (Dincecco et al., 2011).

<sup>8</sup> Similar arguments have been made for other regions or for developing countries in general. See, for instance, Herbst (2014), Malešević (2012), or Boogaard et al. (2018). Others, however, do not share this scepticism (e.g., Xu & Yang, 2018).

<sup>9</sup> Goenaga, Sabaté, & Teorell (2018) argue that this weak relationship between wars and state-making in the nineteenth century is not unique to Latin America, and identify some of its roots in the nature of nineteenth-century warfare.

that only total wars and long-term interstate rivalries, and not the mere presence of limited wars, enhanced extractive capacity in the continent. Hence, the Latin American limited international wars did not contribute to build up fiscal capacity, rather the opposite.

Not only Latin American countries fought, in Centeno's words, the 'wrong kind of wars', but they also lacked some of the political and economic pre-conditions to make the best of this type of crises when they occurred. Centeno (1997, 2002) identifies the lack of previous institutional and bureaucratic capacity, the geographical and social divisions, and the availability of foreign credit, as major obstacles for institutional development during wartimes. Queralt (2019) has further formalized and tested the link between access to foreign loans and fiscal capacity in a sample of more than 100 countries from 1816 to 1913, arguing that only those wars financed when international capital was not available triggered fiscal expansion. Given that foreign loans were granted to Latin American countries during several episodes of the long-nineteenth century (della Paolera & Taylor, 2013), rulers may have faced fewer incentives to bear the costs of taxation and to engage in complex political negotiations.

As previously stated, the War of the Pacific (1879-1883) has been one of the few conflicts in the continent that the literature has identified with long-term fiscal transformations (Centeno, 2002; Kurtenbach, 2011; Kurtz, 2012). However, with the main exception of the work by Sicotte, Vizcarra, & Wandschneider (2009), no in-depth comparative analyses have been conducted yet. We fill this gap by studying the impact of this military conflict on the size and composition of the tax systems of the three belligerent countries. To do so, we first develop a new analytical framework that takes into account the importance of natural resource endowments in fiscal transformations. We indeed argue that the war had a very relevant effect on the fiscal systems of the belligerent countries owing to the prominent role that natural resources played in the military dispute and the ensuing fiscal reforms.

### III The fiscal impact of natural resource wars

We begin our theoretical discussion by clarifying some key concepts. Firstly, we define fiscal capacity as the ability to implement and enforce fiscal regulation.<sup>10</sup> In this paper, we focus on the capacity to collect public revenues (from now on we call it "revenue capacity"), and hence leave other relevant aspects of the fiscal system aside (such as public expenditure or debt). Revenue capacity requires, above all, a minimum level of economic surplus to be taxed. A subsistence economy based on a non-monetary agricultural sector, for instance, will not have the same fiscal potential than an urban

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<sup>10</sup> In this definition we follow Lindvall & Teorell (2016, 5), who define state capacity as the ability to "make members of society conform to the state's laws and directives", regardless of how this ability is used.

and industrialized economy. Along this line, Centeno (2002, 131) argues that not even a “thoroughly rapacious state” in the poor Latin American countries in the early-nineteenth century would have been able to extract significant resources from their economies. A sufficient “economic base” needs to be complemented by a capable administrative apparatus (commonly referred to as “administrative capacity”). Without a modicum bureaucratic organization in place, any attempts to penetrate and extract resources from society will be futile.

This capacity will translate into different levels of public revenues depending on the “willingness” to implement and enforce fiscal regulation. This hinges on the relative power of different political groups and their attitudes towards taxation. In democratic regimes, fiscal policies are discussed among different political factions in the context of pluralistic and competitive power-sharing institutions. In authoritarian regimes, by contrast, fiscal policy decisions respond more closely to the preferences of the ruling elites and their ability to form pro-revenue (or anti-revenue) coalitions (Ehrhart, 2012; Timmons, 2010). Non-elites in autocratic settings have limited access to formal political power and thus restricted capacity to influence the policy agenda.

Even in a context of high capacity, negative political attitudes towards taxation might keep public revenues at bay. Indeed, the literature on state formation has shown that political and economic elites do not always perceive a stronger state as beneficial to their interests. Kurtz (2012), for example, emphasizes how local Peruvian elites were reluctant to invest in the formation of national institutions so as to protect their control over coercive assets. Soifer (2015) argues that the *laissez-faire* attitudes of Colombian liberal elites prevented state leaders from expanding the power of public authorities after independence. The lack of a pro-revenue agenda does not only result in low levels of public revenues in the short-term, but also in low levels of investment in administrative capacity, which negatively affects public revenues in the future.

The preferences of the elite, however, are not immutable. Social scientists have well established that warfare is one of the phenomena that can effectively shape previous attitudes and bring about a pro-revenue consensus on the agenda. Serious threats to the status quo in a context of expensive military confrontation might put pressure on the elites to accept higher tax burdens (Besley & Persson, 2009, 2011). Even if the costs of war can be initially met by borrowing money in the national and international credit markets, new taxes (or other non-tax revenue instruments) are generally necessary to sustain intense military conflicts over time.<sup>11</sup> Wars can also bring new coalitions of elites into power and change the governments’ attitudes towards taxation (Levitsky & Way, 2013). Pressures from the lower classes to expand public services, or the acceptance of higher levels of fiscal extraction by the population in exchange for more effective military protection by the state, can also explain the sustained rise in public revenues (Peacock & Wiseman, 1961; Rasler & Thompson, 1985b).

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<sup>11</sup> This is particularly the case when the access to the international credit market is constrained (Queralt, 2019).

These shifts in attitudes have been generally associated with very intense wars. Low-scale conflicts, by contrast, do not entail the levels of mass mobilization that alter the preferences of the population at large, and they rarely threaten the elite's status quo. This is why limited military conflicts do not bring about dramatic shifts in fiscal policies (Centeno, 2002). We argue, however, that resource wars (i.e., conflicts over the control or possession of natural resources) might be an important exception to this rule. Specifically, we identify two mechanisms through which these conflicts can affect the fiscal systems of war participants even if they fall short of being mass conflicts. On the one hand, they might alter the preferences of the elites as a result of the threat that they pose to the national territory and the risk of losing direct access to valuable economic resources. In this way, the war can act as a shock that fosters new pro-revenue consensuses at the highest political level. Secondly, resource wars can directly change the revenue capacity of the states by expanding the economic base of the winning coalition; in other words, winners can seize natural resource endowments of enemy combatants and thus make new and easily taxable sources of income available. Natural resources can bring money into the public coffers in a variety of ways: in the form of sales and production taxes, through export duties or non-tax measures related to the public ownership of property rights (such as the sale of leases), or even by means of direct public participation in the production.<sup>12</sup>

The annexation of new natural resource endowments, however, might be double-edged. As the 'resource curse' literature has long argued, natural resources per se are not necessarily related to higher levels of taxation. On the contrary, the autonomy that natural resources confer to governments might weaken taxation and induce poor governance (Besley & Persson, 2011; Le Billon, 2012; Mehlum et al., 2006; Thornton et al., 2008). Rulers might decide to employ the rents generated by natural resources to repeal or reduce politically costly taxes, such as direct taxes on income or property (Lieberman, 2002; Moore, 2007). Additionally, since a significant share of the domestic natural resources is usually owned by foreigners (particularly in developing countries), natural resources taxes tend to fall disproportionately upon non-nationals (Boadway & Flatters, 1993). As a result, the short-term gains in revenue capacity could lead to disinvestments in administrative capacity, which at turn would imperil public revenues in the long-run.

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<sup>12</sup> The attainment of new natural resource endowments might also have indirect positive effects on the economic base and, therefore, further effects on fiscal capacity. The main ones are related to the multiplicative effects of natural resources in other areas of the economy (e.g., the capacity to raise revenues from new railways lines financed by these resources). Natural resources might also provide access to the international credit market – which we do not specifically analyse in this paper but constitutes an important side effect.

## IV The War of the Pacific

The War of the Pacific (1879-1883) was an international military conflict that opposed Chile, on the one hand, and Bolivia and Peru, on the other, over the nitrate-rich coastal regions. The discovery of guano and nitrates deposits in the Pacific South in the mid-nineteenth century had spurred the arrival of foreign investors (mainly British, US and Chileans) in the Bolivian and Peruvian coast; a significant share of Chilean workers also moved to the Bolivian coastal region. The economic dynamism brought by guano and nitrate trade invigorated the Bolivian isolated coastal province, but at the same time intensified the border disputes between La Paz and Santiago, which became particularly virulent in the early 1860s. The 10-cent tax on nitrate exports enacted by the Bolivian National Assembly in 1878 triggered the opposition of the Chilean government, which considered the tax an infringement of the 1874 Treaty signed between the two governments to settle their territorial disputes. The tension escalated into the Chilean military invasion of the province of Atacama in February 1879.

After a relatively quick military seizure of the Bolivian province, and the subsequent Bolivian declaration of war on Chile, the Chilean government responded by declaring the war on both Bolivia and Peru (which hold a mutual defence alliance since 1874) in April 1879. The first major battles were fought at sea, where the Chilean navy was able to establish dominance over the Peruvian fleet (Bolivia did not have warships) in October 1879. At the end of the year, the Chilean forces already controlled the Peruvian province of Tarapacá, the richest in nitrate deposits, and in May 1880 the Chilean army occupied the Peruvian provinces of Arica and Tacna. After some naval incursions in the Peruvian North during the second semester of the year, the Chilean forces defeated the Peruvian army in a two-day battle in January 1881 and occupied Lima. Thereafter, a guerrilla war unfolded in the Peruvian Mountain Range between Peruvian and Chilean forces, but also between Peruvian forces themselves commanded by different regional leaders. This process lasted until October 1883 when a peace treaty was signed between Chile and Peru. A ceasefire between Chile and Bolivia came into effect in April 1884 (further ratified by the peace treaty of 1904). In both cases, the territorial gains made by Chile were recognized.

Even if the War of the Pacific was one of the few large-scale international conflicts that took place in the last quarter of the nineteenth century (Sater, 2007: 2), it can hardly be considered a total war (Collier & Sater, 2004, 132). First of all, the size of the armies before the war was limited to around 1,600-1,900 men in Bolivia, 2,400 in Chile and 5,557 in Peru (Sater, 2007: 45, 54 59). At the time of the utmost frictions, the army size amounted to 2% of total adult population in Chile and Peru, and barely 1% in Bolivia; this meant that not more than 4,000, 42,000 and 30,000 men were enlisted in the Bolivian, Chilean and Peruvian armies respectively (Sater, 2007: 21-22,

57, 72).<sup>13</sup> War experiences (critical to understand changes in societal attitudes) were also circumscribed to the battle fields. The Peruvian population suffered the most, since the majority of military confrontations took place in the South, North and in the capital of Peru; the impact of far distant battles on the Chilean and Bolivian population, however, was milder.<sup>14</sup>

Despite of being limited in its military scope, the conflict can be undoubtedly considered a milestone in the economic and political history of the three countries. On the one hand, it allowed the territorial expansion of Chile and the exploitation of vast reserves of nitrates that were critical for the economic development of the country from the 1880s to the First World War. On the other hand, it dramatically worsened the economic crisis that Peru had suffered since 1876 (and that lasted until the early 1890s), and it also cut off Bolivian sovereign access to the Ocean Pacific, which may have severely affected its long-term growth potential.

Moreover, this shock came amid severe restrictions in the international financial market. In the case of Bolivia, the government had been foreclosed from access to foreign resources even before the military conflict began. After several failed attempts, the country had been able to obtain a British loan in 1872 (just a few months before the outbreak of the 1873 international crisis), but it went into default less than three years later (in January 1875). The only other loans that the government had been able to raise came from Chilean banks or companies with legal tenure in this country (Huber, 2001: 50-75). Therefore, once the war started, the Bolivian government had to rely entirely on internal sources of financing. The Peruvian government had also defaulted on its large amount of external obligations in January 1876 (Marichal, 1988), and therefore had the access to foreign resources similarly curtailed. The Chilean case was significantly different, but the endpoint resembled that of the two neighbouring countries. This country had not defaulted on its credits after the 1873 crisis and had even been able to negotiate two large loans with London banks in 1873 and 1875 (Marichal, 1988; Sanfuentes, 1987). However, in a context of international economic crisis, the availability of foreign resources was critically limited.

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<sup>13</sup> Notice, however, that estimates vary considerably across sources. For instance, according to Casanova, Díaz & Castillo (2017: 407-408) the number of Bolivian soldiers in Tacna before the Tarapacá battles was around 6,000 men and the size of the Peruvian army reached 9,000-13,000. Sarkees & Wayman (2010) and Sater (2007) also offer diverging estimates on battle deaths, which range from 10.000 men to about 18.000 in Peru and Bolivia combined (the Chilean estimates, on the other hand, remain closer to 3.000 men in both sources). In any case, all estimations point towards a low-intensity war.

<sup>14</sup> Similarly, the duration of military actions was not uniform across the three countries. In the case of Bolivia, military actions started in February 1879 and ended in May 1880; in Chile and Peru, they went from February/April 1879 to October 1883.

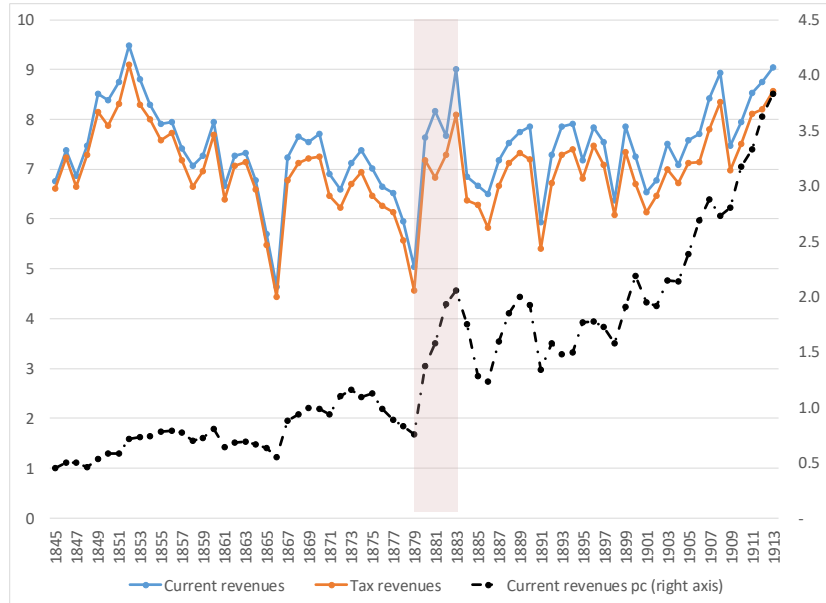
## V Public revenues in Chile, Peru, and Bolivia (1845-1913)

As a result of the aforementioned restrictions in the international credit market, the War of the Pacific required substantial fiscal effort based on internal sources of revenue that created severe economic tensions. In this section we describe the evolution of taxation and public revenues in the three belligerent countries, paying special attention to the long-term changes that emerged from the conflict and the potential displacement effects (i.e., wartime revenue growth that becomes permanent after the military conflict ends). Such comparative approach has been unusual in this field of research, mainly because Bolivia has remained off the radar of previous analysis. To do so we rely on the latest and most comprehensive datasets on public revenues for the three countries, and we complement them with new estimates for Bolivia and Peru (see the list of sources below each figure and table).

Figure 1 shows the evolution of Chilean public revenues and tax revenues as a share of GDP, as well as public revenues per capita, from 1845 to 1913. Public revenue ratios and tax ratios fluctuated considerably throughout the period without any clear long-term pattern, reaching their highest levels in the late 1840s and on the eve of the First World War. The War of the Pacific had a clear short-term impact on the fiscal system, since it reversed a decreasing trend initiated in 1873 (resulting from the economic crisis caused by the collapse of export prices). However, tax ratios (tax revenue/GDP) barely attained the levels reached two decades earlier, and most of the war effort vanished soon thereafter. We do find a significant and permanent change in the level of public revenues per capita after the war, but this additional revenue raised by the government seems to be the result of economic growth rather than the product of higher tax pressure.



Figure 1. Public revenues and tax revenues as a share of GDP (% , left axis) and per capita (sterling pounds, right axis) in Chile, 1845-1913



Sources: Díaz B., Lüders & Wagner (2016).

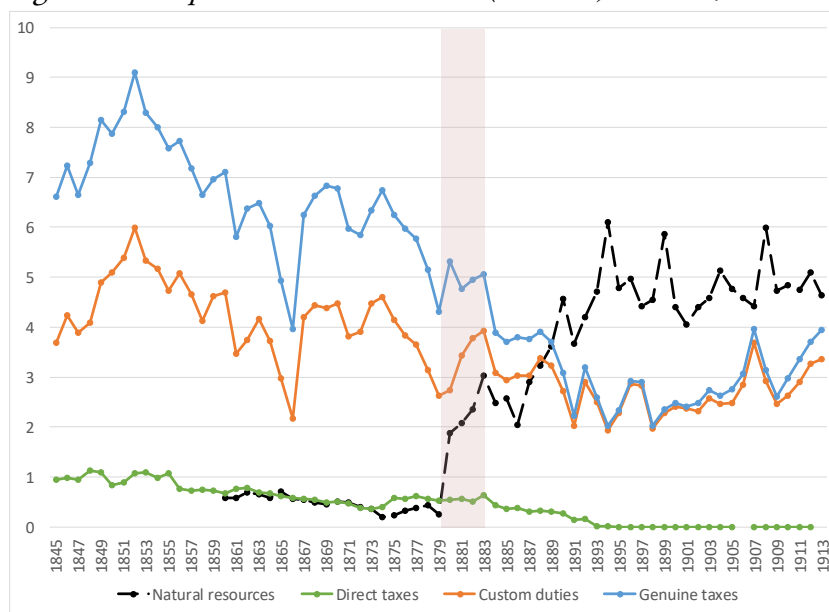
Figure 2 disaggregates tax revenues in four categories, namely taxes and non-tax duties imposed upon natural resources,<sup>15</sup> direct taxes, custom duties, and genuine taxes (total taxes minus taxes on natural resources), as a share of GDP. The war seems to be clearly associated with the growth of taxes on natural resources (which accounts for the increasing levels of public revenues per capita in the post-war period seen in Figure 1) and a parallel decrease in other sources of revenue (which explains the very limited displacement effect). The most important type of taxes before the war (import duties) had been already decreasing since the outburst of the 1873 crisis (despite of the higher tax rates that had been imposed to service the escalating public debt; see Collier & Sater, 2004), but resource revenues did not begin their surge until the outbreak of war.<sup>16</sup> They soon became the most important source of public revenues for decades to come.<sup>17</sup>

<sup>15</sup> We include all taxes and royalties paid by either privately-owned or state-owned *mining* companies, and dividend payments or transfers paid by state-owned firms. Following the literature on the natural resource curse, we exclude government revenues from agriculture production. See Peres-Cajías, Torregrosa-Hetland, & Ducoing (2020).

<sup>16</sup> The war was also financed through inorganic money issued by the free banking system (Sater, 1986)

<sup>17</sup> This overall picture is consistent with Peres-Cajías et al. (2020) estimates, according to which tax collection from natural resources increased from 4% of *the natural resources GDP* during the 1870s to 20%, on average, during the 1880-1919 period. By contrast, tax pressure in the *non-natural resources GDP* diminished from 7% during the 1870s to 4.5% during the 1880-1919 period.

Figure 2. Composition of tax revenues (% GDP) in Chile, 1845-1913

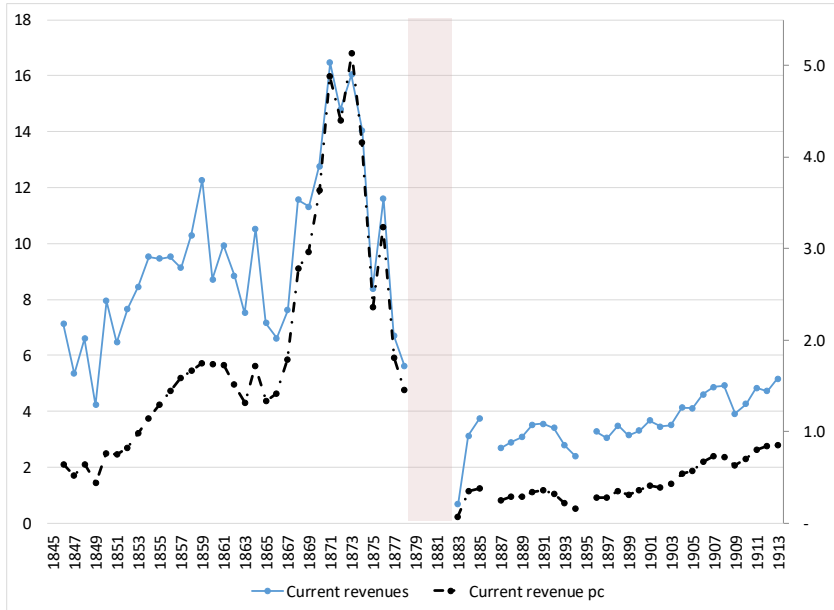


Sources: Díaz B., Lüders & Wagner (2016).

The impact of the War of the Pacific on the Peruvian fiscal system differs drastically from the Chilean experience. Figure 3 shows how public revenues per capita and as a share of GDP soared in the early 1870s and plummeted during the war, to remain at historically low levels in the following decades. At the eve of the First World War, public revenues per capita were three times lower than the corresponding levels in Chile. Figure 4 indicates that most of the fluctuation observed in this period was driven by the evolution of public revenues from natural resources. This source of revenue accounted for around 80% of the total public budget up until the outburst of the War of the Pacific, and became largely irrelevant in the aftermath of the military conflict. Custom duties, on the other hand, remained stagnant at around 2% of GDP before and after the war.

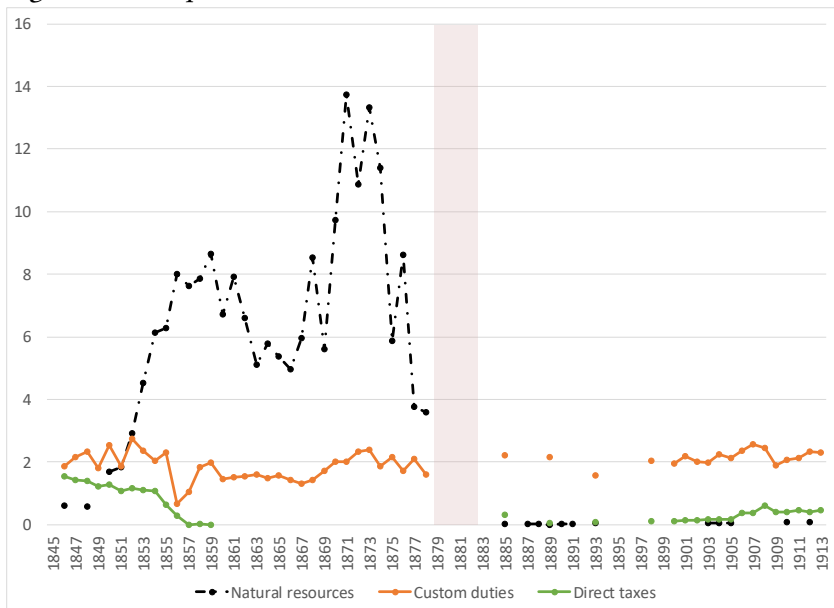
Hence, the government hardly had any available taxes to pay for the war. It had to rely on the so-called *donativos patrióticos*, which ranged from reductions in public employees' wages to raffles organized by Peruvian bourgeoisie women, as well as on loans from the exhausted free banking system and on the suspension of payments on the domestic debt. By the end of 1879, the issuance of inorganic money became the most relevant financial instrument to meet the military needs (Dancuart & Rodríguez, 1916).

Figure 3. Public revenues as a share of GDP (% left axis) and per capita (sterling pounds, right axis) in Peru, 1845-1913



Sources: Contreras (ed) (2011), for 1846-1879; Contreras (1997:260-261), for 1887-1913.

Figure 4. Composition of tax revenues (% GDP) in Peru, 1845-1913

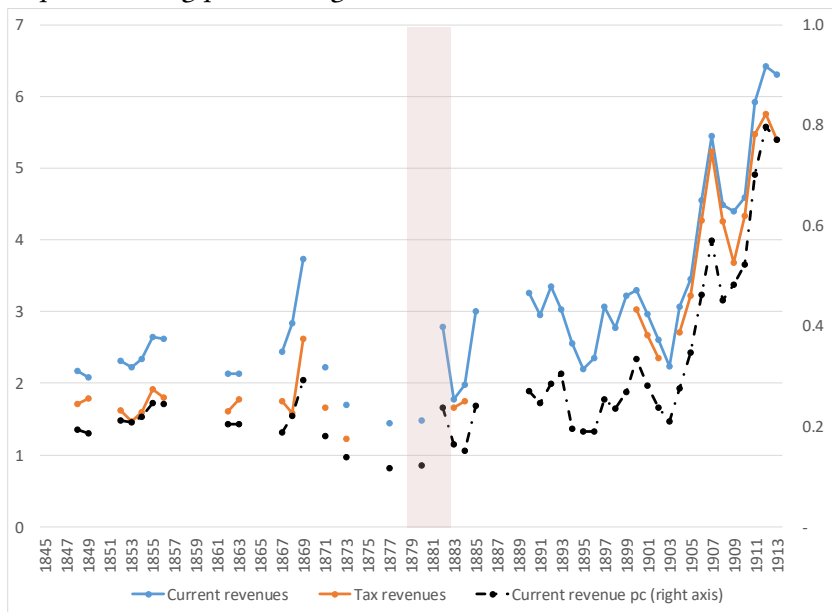


Sources: Contreras (ed) (2011), for 1846-1879; authors' own calculations and Portocarrero S., Beltrán B., & Romero P. (1992) for 1885-1913.

Finally, Figure 5 shows that both the ratio of public revenues to GDP and public revenues per capita in Bolivia remained stagnant from the late 1840s to the early 1870s and decreased slightly before the war (owing to the decentralization law of 1872). The war does not seem to be associated with any positive displacement effect nor any downfall equivalent to the Peruvian one. Even if tax ratios increased in the early 1880s,

the empirical evidence that we have been able to gather suggests that they remained below the levels attained in the previous decades.<sup>18</sup> Instead, the war effort was partially financed from two internal loans (issued with limited success) and borrowing directly from the only existing Bolivian bank (Querejazu-Calvo, 1979: 592-597). The seizure of Chilean citizens' shares in mining companies and the central government's control over departmental and municipal treasuries also contributed to cover the costs of the military conflict (Finance Minister Yearbook of 1880). Overall, Bolivian public revenues were the lowest of the three countries before the War of the Pacific, and only matched the Peruvian ones in the aftermath of the military conflict (as a result of the Peruvian collapse). A pattern of steady growth did not begin until 1904, when tin exports consolidated and the new political elites initiated a centralization process.

*Figure 5. Public revenues as a share of GDP (% , left axis) and per capita (sterling pounds, right axis) in Bolivia, 1848-1913*



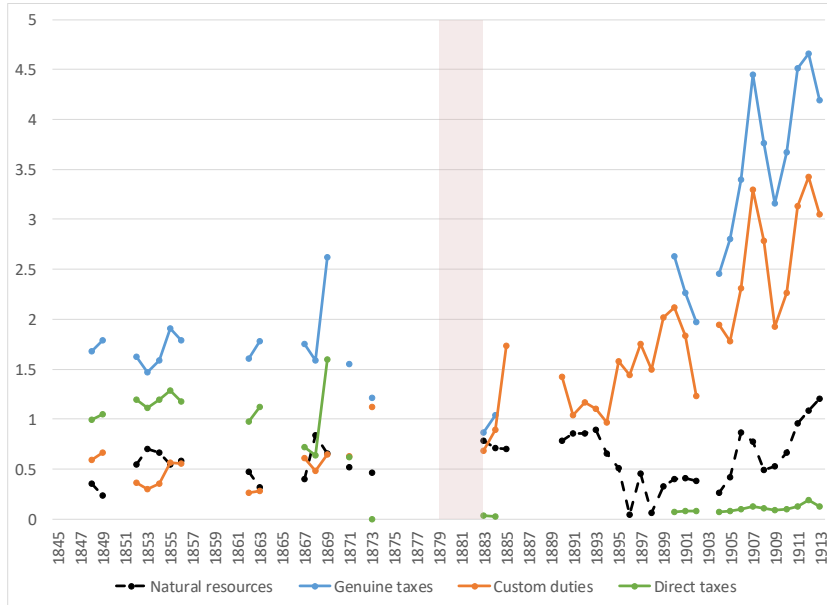
Sources: Authors' own calculations for 1848-1880; Peres-Cajías (2014), for 1882-1913.

Figure 6, on the other hand, suggests that the composition of Bolivian public revenues changed significantly before and after the military conflict. Soon after Independence and up to the early 1870s the indigenous capitation tax remained the most important source of revenue (which explains, together with other ancient regime taxes – such as the tithe – the prevalence of direct taxes during the third quarter of the nineteenth century). In 1872, the indigenous capitation tax was transferred to the regional authorities (departmental treasuries) and natural resources revenues (above all, a tax on

<sup>18</sup> The revenue series as a share of GDP prior to 1890 are based on rough and imprecise GDP estimates and therefore need to be taken with a grain of salt. They are nevertheless shown in the figure for comparative purposes.

silver exports and concessions on guano exploitation) took the lead.<sup>19</sup> After the war, natural resources revenues stagnated while custom duties increased, becoming the most important source of revenue.

Figure 6. Composition of tax revenues (% GDP) in Bolivia, 1848-1913



Sources: See Figure 5.

All in all, the War of the Pacific seems to be associated with a moderate positive displacement effect in Chile (but only in terms of public revenues per capita) and a negative one in Peru, both of them largely driven by public revenues from natural resources. As for Bolivia, the war does not seem to exert any clear impact on the total amount of public revenues, but it affected their composition. In the following two sections we explore the distinct impact of the war on the capacity to collect public revenues by looking at the levels of economic and administrative capacity in the three countries.

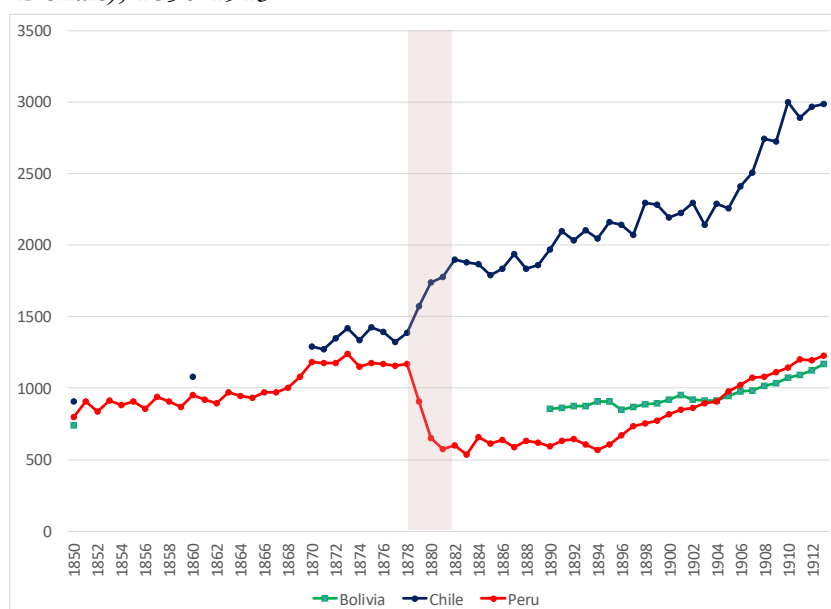
## VI Exploring the mechanisms (1): the evolution of the economic base

According to our analytical framework, the capacity to collect public revenues depends to a large extent on the economic resources available in the economy. The evolution of

<sup>19</sup> Custom duties from 1848 to 1857 include data from foreign trade and “internal trade”. Anecdotic evidence suggests that the relative importance of both revenue sources was similar during these years. Also, the 1873 figure on custom duties includes data on silver and copper export taxes.

GDP per capita provide some insights on this topic. As shown in Figure 7, the differences in GDP per capita across countries appear to be relatively small in the mid-nineteenth century, but increased drastically during and after the War of the Pacific. In the Peruvian case, the economy stagnated already in the early 1870s, but the huge downturn began during the War of the Pacific. The impact of this crisis was so severe that the pre-war GDPpc levels were not fully recovered until thirty years later. The Chilean economy also stagnated in the early 1870s, but sustained economic growth took off during the war. Despite the lack of continuous data (and therefore the inability to account for economic cycles), the Bolivian divergence seems to be driven by a persistent low dynamism during the nineteenth century.<sup>20</sup>

*Figure 7. GDPpc of Bolivia, Chile and Peru (1990 Geary Khamis Int. Dollars), 1850-1913*



Sources: Díaz B., Lüders & Wagner (2016), Herranz-Loncán & Peres-Cajías (2016) and Seminario (2016). In the Bolivian case, 1850 refers to 1846 data.

The structure of the economy also diverged during this period. As shown in Table 1, urbanization rates remained around 10% in Bolivia and 20% in Peru during the second half of the nineteenth century, but increased from 29% to 44% in Chile. This process of urbanization took place at the same time as the Chilean total population grew at higher rates than in its neighbouring countries. Consequently, the number of Chilean cities with a population higher than 10,000 inhabitants increased persistently in size and number. For instance, the population in Santiago and Valparaíso increased by a factor of 5 and 3 respectively, whereas the number of cities tripled between 1854 and

<sup>20</sup> We do not present continuous series for Bolivia before 1890 given that, as mentioned above, we do not count with precise and high-quality GDP data. Similarly, Díaz et al (2016) do not present continuous series for Chile before 1870 and just those benchmarks whose methodological quality allows for international comparisons.

1907. Knowing that the total population in Metropolitan Lima remained below 160,000 until 1897 (Seminario, 2016), we can safely conclude that the total population in Santiago was lower than in Metropolitan Lima before the War of the Pacific, but higher thereafter.

The lower levels of GDPpc in Bolivia and Peru after the War of the Pacific and the rural nature of their economies made taxation in the two Andean countries harder than in Chile. Indeed, economic stagnation and rural predominance have been identified as determinants of the relevance of the indigenous head tax in the Bolivian and Peruvian treasuries right after Independence (Centeno, 1997), which hinged on the political negotiation with indigenous communities.<sup>21</sup>

*Table 1. Total and urban population in Bolivia, Chile and Peru, c. 1850-1913*

Census Year	Total population	Urban population	% Urban Population	Cities>10K
<i>Bolivia</i>				
1846	1,478,896	167,967	11.4	5
1900	1,766,451	183,000	10.4	6
<i>Chile</i>				
1854	1,516,387	n.d.	n.d.	5
1865	1,819,223	520,663	28.6	8
1875	2,075,971	725,545	34.9	8
1885	2,492,000	1,041,765	41.8	8
1895	2,790,000	1,223,407	43.8	9
1907	3,213,000	1,392,026	43.3	16
<i>Peru</i>				
1850	2,033,554	433,632	21.3	...
1862	2,481,936	483,283	19.5	...
1876	2,699,106	450,654	16.7	6

Sources: Díaz, J.; Lüders, R. y Wagner, G. (2016), Peres-Cajías (2019), Seminario (2016) and Peruvian National Census of 1876.

Natural resources played a relevant role in these economic trends and, ultimately, in the evolution of public revenues described in the previous section. During the first half of the nineteenth century, the Chilean economy had been based on minerals exports, above all silver and cooper, with wheat exports becoming important by the mid-nineteenth century (see Table 2). The severe collapse of export prices initiated in 1873, however, left the country in a dim economic situation and dragged public revenues down during the second half of the 1870s (see Figure 1). In this economic context, the

<sup>21</sup> This fiscal equilibrium is interpreted by the Bolivian historiography as a reinstatement of the colonial fiscal pact, according to which indigenous communities agreed on paying a capitation tax in exchange for political autonomy in their territories (Platt, 1982).

military invasion of the Bolivian and Peruvian coast during the War of the Pacific allowed the Chilean government to raise revenues from nitrates, which had become one of the most important fertilizers worldwide since the early 1870s (Gallo, 2008). It first granted exploitation rights to the private companies that were already extracting and exporting sodium nitrates, while it additionally established a duty on nitrate exports during the military conflict (Cariola and Sunkel, 1982).

These sources of revenue did nothing but to increase in the aftermath of the war: the Treaty of Ancón signed between Chile and Peru in 1883 and the subsequent consolidation of the annexation of the Antofagasta and Tarapacá provinces gave Chile a virtual monopoly in the production and export of this mineral (Badia-Miró & Ducoing, 2015). As can be seen in Table 2, nitrate exports skyrocketed in the aftermath of the conflict, increasing by a factor of 3 from the mid-1870s to the end of the century. The sale of leases and the war tax on nitrate exports were made permanent and brought natural resources taxes above 5% of GDP in the early 1890s (see Figure 2).

*Table 2. Natural resources exports in Bolivia, Chile and Peru (5-year averages), 1850-1913*

	Bolivia		Chile				Peru		
	Silver	Tin	Copper	Saltpetre	Silver	Wheat	Guano	Nitrates	Silver
	Kg	Kg	Ton	Ton	Kg	Kg (000)	Ton	Ton	Kg
1850-1854	44,627	62,762	13,894		n.d.	n.d.	292,327	30,762	66,546
1855-1859	47,994	81,422	23,815		n.d.	n.d.	396,047	51,154	58,931
1860-1864	78,421	98,985	35,865	64	44,229	249,360	375,081	63,408	55,698
1865-1869	80,019	100,000	42,279	101	55,311	324,048	502,753	105,179	59,032
1870-1874	218,390	260,400	44,564	219	55,155	385,454	428,875	206,993	72,243
1875-1878	208,010	315,000	48,039	398	48,128	332,395	498,629	306,990	66,058
1879-1883	287,300	372,600	42,138	343,537	71,075	429,238	34,351	28,676	49,521
1884-1889	232,344	764,833	35,158	643,417	146,122	322,160	7,168	0	58,212
1890-1894	415,081	2,526,600	22,848	948,823	130,099	339,644	0	0	62,683
1895-1899	346,569	4,797,600	23,843	1,238,263	140,983	387,062	0	0	119,526
1900-1904	244,778	11,677,800	29,177	1,443,062	51,560	357,379	0	0	140,136
1905-1913	125,601	20,628,444	36,319	2,205,474	27,644	498,301	0	0	205,866

Sources: Díaz B., Lüders & Wagner (2016), Herranz-Loncán and Peres-Cajías (2016), and Zegarra (2018).  
Notes: Data refers to production in Chile.

The Peruvian case shows the other side of the same coin. Guano had replaced silver as the main Peruvian commodity in the early 1850s and accounted, on average, for about 60% of total Peruvian exports from the late 1850s to the late 1860s (Zegarra, 2018).<sup>22</sup> This export boom and the fiscal rents that it generated offered a way out of the fiscal system that had been in place since the early 1820s. It allowed the Peruvian

<sup>22</sup> This natural manure had been found to be an exceptional fertilizer due to its high concentration of phosphorus and nitrogen, which increased its value in the international markets.



governments to abolish the Indian head tax in 1854 and the “personal contribution” that was supposed to replace it, leaving direct taxes almost irrelevant by the end of the 1850s (see Figure 4). It even made possible to start serving the debt issued in 1822 and 1825 and suspended since thereafter (Salinas, 2011). However, the fiscal system became highly dependent on natural resource revenues. For instance, the share of guano in the total public revenue increased from 27% in 1852 to a historical maximum of 76% in 1871 (Deustua, 2011; Salinas, 2011).

Fiscal revenues from guano also opened the door to foreign loans, which increased significantly the amount of resources available to the government but left the country highly indebted (accruing the largest foreign debt in Latin America by the mid-1870s). In this context of a mounting debt that was draining public funds at an unsustainable rate, the vast deposits of sodium nitrate stored in the Tarapacá province became an exceptional alternative source of revenue. Indeed, during the 1870s, the relative importance of guano exports remained around 50% and that of nitrates increased from 14% to 25% (Zegarra, 2018). The state intervention in the nitrogen market started with a new tax on exports in 1868, just a few months before the guano monopoly was granted to Dreyfus in exchange for yet another multimillion-pound loan. Subsequently, the government established a government-granted monopoly (estanco) in 1873 run by a confederation of Peruvian banks, to be finally expropriated in 1875 with the aim of increasing public revenues (Deustua, 2011).

The fiscal relevance of guano and nitrates is reflected in the predominance of natural resources revenues as a share of total public revenues, which reached 80% in the late-1850s and early-1870s (see Figure 4). Yet, this source of revenue could not prevent the government from suspending its foreign debt service in 1876, which led to a severe reorganization of the government’s spending priorities (among them, calling a halt to public investments). The War of the Pacific, thus, came in a moment of fiscal contraction, accentuated afterwards by the Chilean occupation and the subsequent loss of the valuable nitrate deposits (see Table 2). The Peruvian government saw its economic base deteriorate as a result of the military defeat, which severely depressed its capacity to collect public revenues.

Natural resources were also essential in Bolivia, but the impact of the war fell short of the Peruvian mishap. The initial stagnation of Bolivian public revenues observed in Figure 5 can be explained by the lack of economic dynamism. One of the most important mining centres during colonial times, Potosi, suffered a profound crisis at the beginning of the nineteenth century that was worsened by the direct and indirect costs of the wars of independence (Barragán, Lema, Mendieta, & Peres-Cajías, 2015). This crisis in the mining sector was accompanied by de-urbanization and the persistence of a subsistence agrarian sector (as shown in Table 1). Given this economic scenario and the opposition to a profound fiscal reform, the Bolivian government had no option but to rely on the colonial fiscal system, leaving the indigenous capitation tax as the most important source of revenue.

This fiscal system gradually changed during the mid-nineteenth century. In the early 1850s, the traditional silver mining centres in the Andes started to recover thanks to investments made by a new group of Bolivian capitalists (Klein, 2011). A new export tax on silver was enacted in the early 1870s, and trade taxes became the most important source of public revenues.<sup>23</sup> At the same time, foreign capital and workers arrived in the guano and nitrate-rich coastal province of Antofagasta to exploit the opportunities that these fertilizers offered in the international market. The Bolivian government, however, had its capacity to extract resources from this lucrative trade hindered by its precarious sovereignty in the region (Pérez, 1994; Peres-Cajías, 2017). For this reason, the effects of the war on the Bolivian economic capacity were not directly related to the loss of nitrate reserves (as it was the case in Peru), but with the loss of access to its main ports, which affected Bolivian trade costs and, as a consequence, indirectly undermined the country's silver exports). In effect, the reduction of natural resources taxes that took place during the last decade of the nineteenth century (Figure 6) was driven by the fall of the international price of silver and the ensuing reduction of tax rates on this commodity by the Bolivian government (Peres-Cajías, 2015).<sup>24</sup>

All in all, the War of the Pacific had a profound impact on the economic base of the three belligerent countries. On the one hand, Peru lost the access to its nitrate deposits, which seriously reduced their capacity to extract resources from the economy. On the other hand, Bolivia lost access to its main ports, which affected its connection with global markets and thus hindered the dynamism of its international trade. Furthermore, the lower levels of GDPpc in Bolivia and Peru and the rural nature of their economies in the aftermath of the military conflict made taxation in these two countries difficult. By contrast, the state's capacity to collect public revenues increased in Chile as a result of the annexation of the nitrate-rich Antofagasta and Tarapacá provinces.

## VII Exploring the mechanisms (2): the administrative capacity

The aforementioned changes in the economic base reflect an important aspect of the state capacity to collect public revenues (namely, the existence of economic surplus from where to extract resources) but it needs to be complemented by the level of administrative capacity to do so effectively. The number of central government employees provides a general overview on this issue. As can be seen in Table 5, the

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<sup>23</sup> The availability of alternative sources of revenues also brought about a new relationship between the government and the indigenous communities, based on the privatization of their land and the consequent fall in the capitation tax.

<sup>24</sup> Likewise, the increasing prominence of custom duties was the result of a national customs system implemented before the war that continued in place during the following two decades (Peres-Cajías, 2017).

number of public employees per 1,000 inhabitants in Bolivia and Chile prior to the War of the Pacific compared unfavourably to that of Peru, and also of other more advanced economies.<sup>25</sup> However, the military defeat and the loss of the nitrate deposits in Peru resulted in an erosion of its administrative capacity: the number of total employees per 1,000 inhabitants in 1889 was half the number of 1873. Therefore, the war did not only affect the economic base of the country, but also depressed the administrative apparatus of the Peruvian state. The consequence of this daunting scenario could be hardly any other than a severe slump in public revenues.

The war had also a short-term negative effect in Bolivia, with fewer public employees in 1883 than a decade ago. At the end of the century, however, the ratio of public employees per 1,000 inhabitants increased twofold in relation to the early 1880s (although it remained much smaller than in advanced and neighbouring economies). This mild impact and the subsequent recovery reflect the lack of state capacity in these coastal regions. Even if Bolivia lost a larger chunk of its territory than Peru, these areas hosted a small number of state representatives and did not provide significant amount of revenue that could be employed to strengthen the administrative apparatus. In other words, the precarious control that the government exercised over this region mitigated the negative effect that the outcome of the war had on both the level of state capacity and public revenues (Figure 5).

*Table 5. Central government employees in Bolivia, Chile and Peru, 1850-1900*

	Bolivia			Chile			Peru		
	Total	Per 1,000 inhabitants	Finance	Total	Per 1,000 inhabitants	Finance	Total	Per 1,000 inhabitants	Finance
1850s	1,051	0.7		2,211	1.5	435			
1860s	2,943	1.9		2,525	1.5	<u>579/601</u>			
1870s	1,916	1.2	<u>225</u>			<u>684</u>	11,911	4.5	1221
1880s	1,859	1.1		3,048	1.3	729	6,317	2	525
1890s						<u>1600</u>			
1900s	<u>3,892</u>	2.2	<u>242</u>	13,119	4.4	1564/ <u>1599</u>			

Sources: The data for Chile refers to 1850, 1860, 1870, 1880, 1890 and 1900; for Peru to the Biannual Budget of 1973/74 and 1889; and for Bolivia to 1851, 1860, 1874, 1883 and 1903. Sources: a) public employees: for Chile, Humud (1969) and authors' own estimations (see underlined figures) based on Chilean budgetary laws (several volumes); for Peru, Dancuart & Rodríguez (1916: 88); Contreras (2012: 406-408); and for Bolivia, Barragán (2006) and authors' own estimations (see underlined figures) based on Bolivian budgetary laws (several volumes); b) total population: see Figure 7.

By contrast, the conflict is associated with a substantial increase in the number of public employees in Chile. At the end of the century the ratio of central government

<sup>25</sup> For instance, the number of central government employees in Great Britain was around 2.5 per 1,000 inhabitants in the 1850s and 4.1 in France. In the 1870s, the number of central government employees in Prussia and France was 5.5 and 6.1 per 1,000 respectively (Mann, 2012)

employees per 1,000 inhabitants even surpassed that of Great Britain, which reached 4 per 1,000 inhabitants.<sup>26</sup> This sharp increase could be expected given the stunning expansion of its economic base, but it is somehow at odds with our theoretical expectations outlined in section 3: the war-driven expansion of natural resources endowments and the consequent substitution of this new source of revenue for other politically costlier taxes should lead to a reduction – not an increase – in the administrative capacity in the long-term. What we observe, however, points towards the opposite direction.

To further explore these results, Table 5 also shows the number of civil servants working at the Ministry of Finance during the same period in the three countries. This indicator provides a more accurate picture of the administrative capacity specifically devoted to implement and enforce tax regulations. The data confirms the negative impact of the war in Peru: the number of public employees in the Ministry of Finance was in 1889 less than half that of 1873. It also suggests that the expansion of the Bolivian bureaucracy in the last decades of the nineteenth century was not driven by the Ministry of Finance, since its manpower barely increased between 1874 and 1903 (while its relative importance in terms of the total number of civil servants decreased from 12% to 6%). As for the Chilean case, the number of public employees in the Ministry of Finance increased twofold between 1880 and 1890 and stagnated thereafter. It still depicts a growing pattern in the aftermath of the military conflict, but the increase is more moderate than that of total number of civil servants.

Table 6 looks more in depth into the Chilean case by disaggregating the number of civil servants in the Ministry of Finance into different categories. The data suggest that the 1880s expansion was mainly driven by customs, which absorbed 75% of the total number of employees at the Ministry of Finance in 1890. The growth of the bureaucracy, therefore, was concentrated in a sector (imports and exports) most likely related to the new trade dynamism brought about by the annexation of the nitrates-rich areas (natural resources revenues were, as mentioned above, mainly collected through export taxes).<sup>27</sup> On top of that, an office exclusively dedicated to resolve issues related to nitrates was created in the 1880s. There was also a fourfold expansion in the number of public employees working at the central offices in Santiago and at the fiscal treasuries outside Santiago. The relative importance of the latter, however, remained marginal throughout the period: 3% in 1880 and 6% in 1890.<sup>28</sup> The number of public employees and the relative importance of each subcategory remained stable during the decade of 1890. All in all, the growth of administrative capacity was essentially linked

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<sup>26</sup> It remained though clearly below France, with 11 bureaucrats per 1.000 inhabitants. See Mann (2012).

<sup>27</sup> Notice that 24% of all custom agents in 1890 were located in the previously occupied Bolivian and Peruvian coastal regions (accounting for 44% of the new workforce recruited between 1870 and 1890).

<sup>28</sup> As mentioned in the notes of Table 6, the original source does not differentiate between several fiscal treasuries outside Santiago and custom agencies in 1870. If the personnel recorded under these joint budgetary items were reported under “Rest of Fiscal Treasuries” instead of “Customs”, the former would account for almost 14% of total central government employees. This would signal a reduction in the importance of fiscal treasuries during the 1870s and the 1880s rather than the mild increase mentioned above.

to international trade and natural resources rather than to a widespread network of fiscal agents capable of implementing complex direct taxes throughout the territory.

*Table 6. Central government employees in the Ministry of Finance of Chile, 1870-1900*

	1870	1890	1900	1890 (1870=1)	1900 (1890=1)
<b>Central Offices</b>	56	226	226	4.04	1.00
<b>Mint</b>	24	32	32	1.33	1.00
<b>Fiscal Treasury of Santiago</b>	21	22	27	1.05	1.23
<b>Rest of Fiscal Treasuries<sup>a</sup></b>	23	98	98	4.26	1.00
<b>Customs<sup>a</sup></b>	554	1,199	1,187	2.16	0.99
<b>Diverse</b>	6	9		1.50	
<b>Saltpetre Services</b>		14	29		2.07
<b>Total</b>	<b>684</b>	<b>1,600</b>	<b>1,599</b>	<b>2.34</b>	<b>1.00</b>

Sources: Authors' own calculations based on Chilean budgetary laws (several volumes). a) Several fiscal treasuries in 1870 functioned alongside custom agencies, and their personnel are reported under "Customs". If we were to report these personnel under "Rest of Fiscal Treasuries" instead of "Customs", the former would reach 93 employees and the latter 461.

These results align closely with the evolution of public revenues described in Section 5. Chilean public revenues per capita increased in the aftermath of the War of the Pacific, as the number of civil servants did during this same period. However, this increase was mainly driven by the growth in natural resources exports rather than by an intensified fiscal pressure in other areas of the economy. As a result, tax ratios (taxes/GDP) went back to their pre-war levels right after the military conflict ended, and administrative strength continued to be mostly confined to custom agencies. This pattern is also consistent with our analytical framework: the annexation of natural resource endowments was not employed to strengthen the fiscal pressure but to substitute the new easily taxable sources of income for more politically costly taxes.

## VIII Exploring the mechanisms (3): the willingness to collect public revenues

We have already mentioned that the Chilean governments did not use their additional economic base and wartime fiscal expansion to implement a more ambitious fiscal agenda in the long-term. Tax ratios did not experience a significant displacement effect during the military conflict, and the strength of the tax administration was mostly concentrated on customs agencies. In this last section we turn to examine the historical evolution of tax legislation as an indicator of the political resolve to expand the tax

system. This aspect remains critical to understand the lack of a positive long-term impact of the War of the Pacific on the Chilean public finances.

The importance of the elites' willingness to collect public revenues has been long acknowledged by the literature. Research on post-independence Latin America (1810s-1830s), for instance, emphasizes that state leaders do not invariably pursue a state-making agenda (Hernández Rodríguez, 2015). On the contrary, the new political elites in the continent (as well as many of the pro-independence revolutionaries) saw the process of independence as an opportunity to reduce taxation and oppose the colonial fiscal burden (Barragán et al., 2015; Centeno, 1997). Public revenues were merely devoted to cover the costs of defence and internal order, with the goal of ensuring the survival of the new political authorities (Coastworth, 1993).

To formally assess the extent to which the war affected the elites' attitudes towards public revenues in Chile, and how this affected the materialization of the latent revenue capacity, we have compiled the list of laws, decrees, and other parliamentary acts on taxation (and non-tax revenue related exclusively to natural resources) passed by the national parliament or by the Ministry of Finance from 1870 to 1890.<sup>29</sup> These legislative decisions capture the degree of consensus among policy-makers to implement new tax reforms. Crucially, parliamentary activity does not hinge on state capacity; even if there are certain costs associated to the legislative process, they are largely negligible. State capacity is tested during the process of implementation and enforcement of new legislation rather than during its parliamentary approval. Hence, we consider legislative decisions to be appropriate indicators of the political resolve – rather than the capacity – to implement tax reforms.<sup>30</sup>

In a historical period when formal political participation was restricted to the upper classes, we can confidently assume that parliamentary activity mainly reflects the preferences of the elites. Even if Chilean politics enjoyed a considerable degree of stability compared to its Andean neighbours, the parliamentary system at the time of the War of the Pacific was nonetheless dominated by oligarchic elites. A restricted suffrage and widely spread vote buying remained in place well into the first decades of the twentieth century, hindering the political participation of middle and working classes (Kurtz, 2012). In spite of an electoral reform in 1874 that extended the suffrage to all literate males (and despite the fact that property requirements were in many cases sidestepped), no more than 7% of the population actually registered to vote during the nineteenth century (being this the century's peak reached in 1878) and less than 5% actually voted (Sagredo & Barragán, 2008; Valenzuela, 1996).

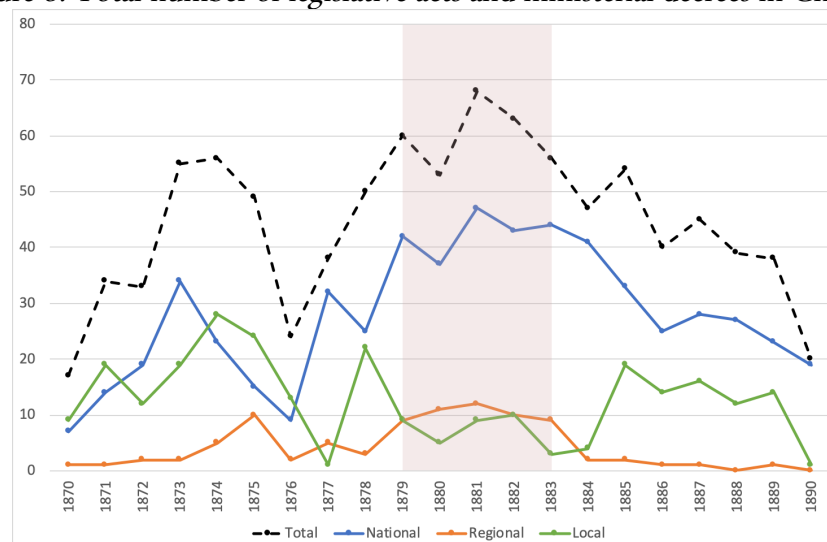
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<sup>29</sup> We include non-tax revenue related to non-renewable natural resources (mining in the case of Chile) not to miss an important facet of the fiscal management of natural resources (as the natural resource curse literature has noticed). More information about the coding process can be found in the codebook (see appendix).

<sup>30</sup> Even if the lack of state capacity does not directly restrict parliamentary activity, it can certainly prevent the legislator from enacting tax reforms that are widely perceived as unenforceable. Parliamentary activity should not thus be interpreted as a mere reflection of the willingness of policy-makers to increase (or diminish) public revenues but as the result of their preferences towards taxation and their ability to form pro-revenue coalitions.

Figure 8 displays the total number of legislative acts and ministerial decrees related to taxation during the period 1870-1890. The war corresponds with the peak in the legislative attention to taxes. The number of acts more than doubled during the late 1870s and early 1880s. They reached similar levels than in the mid-1870s (during the outbreak of the pre-war economic crises), but with a critical difference: this time, most of the legislative and ministerial activity was related to taxes that were implemented at the national level (i.e., affecting the entire national territory), whereas in the mid-1870s the number of acts circumscribed to the local level (i.e., related to municipal taxes) was as important. Hence, the war brought about a centralized effort to meet the military needs. This increase, however, faded away soon after the war ended. The level of national and regional acts returned to their pre-war average levels in 1885, decreasing even further in the late 1880s. Only acts related to local taxation increased in the second half of the decade.

Figure 8. Total number of legislative acts and ministerial decrees in Chile, 1870-1890



Sources: The data comes from the yearbooks *Boletines de Leyes y Decretos del Gobierno* (volumes from 1870 to 1890)

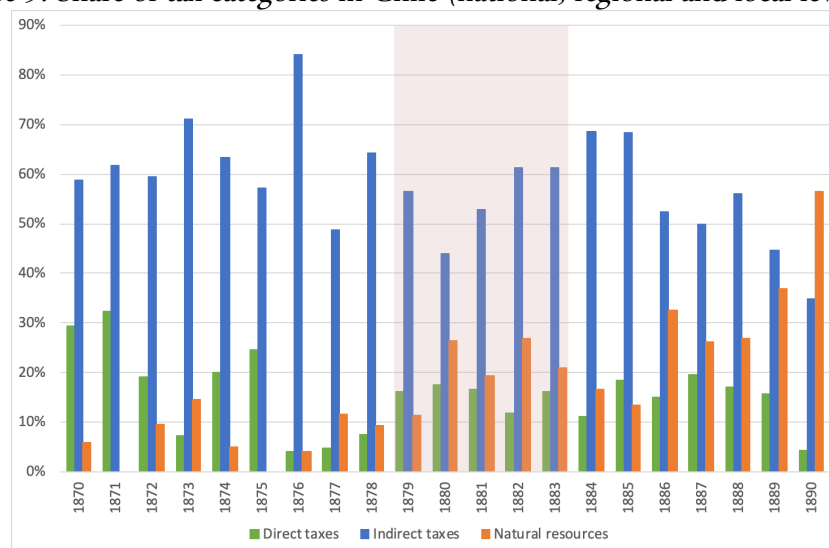
Notes: The figure includes laws, decrees and other parliamentary decisions (such as resolutions and regulations). The line “Total” refers to all parliamentary decisions passed by the Chilean national parliament and ministerial decrees, whereas the lines “National”, “Regional” and “Local” account for parliamentary decisions and decrees related to national, regional and local tax regulation respectively.

In Figure 9 we disaggregate the number of legislative acts and ministerial decrees in three distinct categories, namely direct taxes, indirect taxes (including indirect internal taxes and import and export duties on non-mining exports) and natural resource taxes (mainly direct taxes and export duties, but also non-tax revenues).<sup>31</sup> We exclude from the graph the residual category “others”, which accounts for legislative acts that did not

<sup>31</sup> This last category was particularly relevant in the second half of the 1870s, and lost most of its importance since 1882. The original dataset is based on fourteen sub-categories of taxes, which have been re-coded into the four broader categories mentioned in the text.

clearly stipulate the specific type of tax category they referred to, or that mentioned other type of taxes such as state-granted monopolies of mass consumption products. Since each legislative act may make reference to several categories of taxes, Figure 9 displays the number of times that each category was mentioned in the legislation over the total number of mentions.<sup>32</sup>

*Figure 9. Share of tax categories in Chile (national, regional and local levels), 1870-1890*



Sources: See Figure 8.

The results reflect the transformation that the Chilean fiscal system experienced during and after the War of the Pacific and are consistent with our previous account. Firstly, indirect taxes dominated the legislative arena until the late 1880s, when natural resources took the lead. The latter increased from around 7% on average in the pre-war period (1870-1878) to more than 26% in the post-war (1884-1890). Even if an important proportion of these post-war regulations consisted of monthly updates of export rates on nitrates and iodine, this increase reflects nonetheless the attention that these new sources of revenue gained in the Chilean parliament after the annexation of the Peruvian and Bolivian coastal regions.

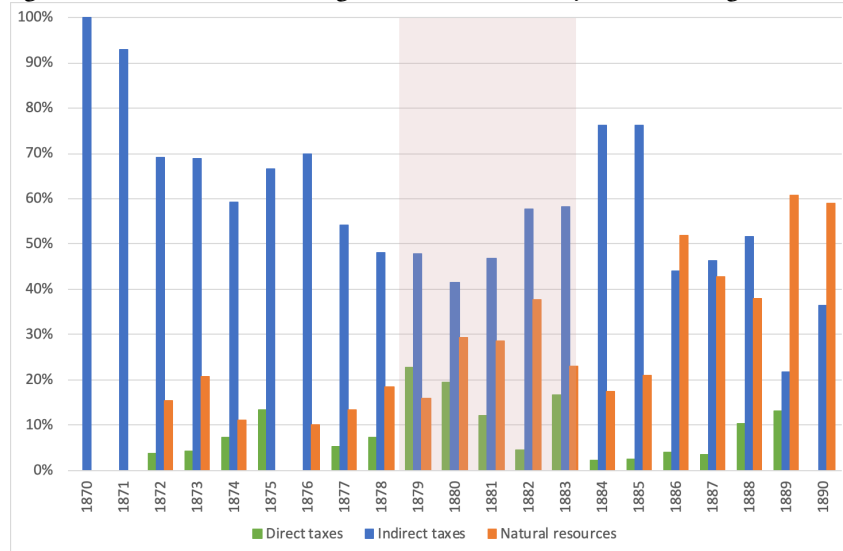
Legislation on direct taxes, on the other hand, increased in waves, but they were for the most part related to local taxes. If we look only at national legislation, the share of legislative attention to direct taxes diminishes significantly in the pre-war and post-war periods (see Figure 10). It increased vigorously during the first years of the military conflict (particularly in relation to income taxes and the agrarian tax), but lost its momentum soon after natural resources boosted. Some of these direct taxes were eventually transferred to the local governments, particularly after the 1891 civil war

<sup>32</sup> In order to reduce the work burden of the coding process, we coded up to four sub-categories of taxes per each legislative act and ministerial decree. When the act affected all or a very large number of sub-categories, we used the sub-category “unspecified/generic” (not included in Figure 9, since it belongs to the broader residual category “others”).



(such as succession and donation taxes, professional and commercial patents, or the agrarian tax), while some internal taxes were abolished all at once (such as the “alcabala” in 1884). Regulation on natural resources revenues, on the other hand, accounted for 37% of all national legislative acts, an increase compared to the 13% in the pre-war period. The result of this fiscal policy was the near disappearance of direct taxes from the central government’s accounts (see Figure 2).

*Figure 10. Share of tax categories in Chile (only national legislation), 1870-1890*



Sources: See Figure 8.

Notes: The figure only includes legislative acts and ministerial decrees that affected the entire national territory. For sources see Figure 8.

Finally, it is important to notice that not all these acts were meant to expand taxation. Table 7 disaggregates the aforementioned categories based on their expected impact on tax revenue: increase tax revenue, decrease tax revenue, and neutral or unspecified impact (such as administrative reforms without a clearly stated policy goal).<sup>33</sup> We also add a residual category (“unknown”) that accounts for all acts (generally regulations) that might have an impact on tax revenue, but the direction of which remains unknown and would require an in-depth fiscal analysis that goes beyond the scope of our paper. The results are telling: during wartimes the parliament approved more decisions to increase revenue than to reduce it in all our categories except for “others”, whereas in the post-war period only natural resources acts were still predominantly pro-taxes. In the case of direct and indirect taxes, most parliamentary and ministerial regulation after the war was aimed at reducing taxation. Furthermore, several of these acts were ad hoc decrees that exempted certain individuals or companies from paying custom duties. Indeed, the percentage of such “personal decrees” (which stand in contrast to impersonal rules) increased from 7% in the pre-war period to 17% in the

<sup>33</sup> We only include legislation concerning the national level, since it is more directly related to the war effort.

aftermath of the conflict, which reflects the extent to which the post-war fiscal system shifted towards a more personalistic regime.<sup>34</sup>

*Table 7. Policy position by type of tax category (only national legislation), 1870-1890*

		Direct taxes		Indirect taxes		Natural resources		Others	
		%	Num.	%	Num.	%	Num.	%	Num.
<b>Pre-war period (1870-1878)</b>	<b>Increase</b>	27%	3	5%	7	7%	2	0%	0
	<b>Neutral</b>	55%	6	18%	25	25%	7	69%	24
	<b>Decrease</b>	0%	0	64%	87	57%	16	17%	6
	<b>Unknown</b>	18%	2	13%	18	11%	3	14%	5
	<b>Total</b>	100%	11	100%	137	100%	28	100%	35
<b>Wartime (1879-1883)</b>	<b>Increase</b>	29%	10	50%	57	36%	22	6%	1
	<b>Neutral</b>	43%	15	22%	25	31%	19	70%	11
	<b>Decrease</b>	14%	5	16%	19	8%	5	12%	2
	<b>Unknown</b>	14%	5	12%	14	25%	15	12%	2
	<b>Total</b>	100%	35	100%	115	100%	61	100%	16
<b>Post-war period (1884-1890)</b>	<b>Increase</b>	0%	0	22%	25	77%	61	0%	0
	<b>Neutral</b>	10%	1	14%	16	8%	6	83%	5
	<b>Decrease</b>	20%	2	48%	56	4%	3	17%	1
	<b>Unknown</b>	70%	7	16%	19	11%	9	0%	0
	<b>Total</b>	100%	10	100%	116	100%	79	100%	6

Notes: The column "Num." shows the total number of "increase", "decrease", "neutral" and "unknown" positions for each category of taxes. The column "%" reflects the percentage of each one of these policy position within each category of taxes. For sources, see Figure 8.

In a nutshell, the empirical evidence presented in this section indicates that parliamentary attention to taxation in Chile increased significantly during the war (giving place to a substantial increase in public revenues from 1879 to 1883) but decreased soon thereafter and shifted to a large extent to natural resources revenues. This supports the idea that the declining fiscal pressure (revenue/GDP) observed in the aftermath of the military conflict was driven by the lack of political resolve to implement expansive fiscal reforms beyond the natural resources sector. The elites represented in the national parliament opted for tax cuts and decentralization on direct and indirect taxes, and for tax increases in the nitrates industry. In other words, the enhanced revenue capacity was not used to improve the fiscal output but to reallocate the burden of taxation across economic sectors. This also implied a reallocation of the tax burden across economic agents, since no less than 50% of saltpetre production was in hands of foreign capitalists in the last decades of the nineteenth century.

<sup>34</sup> The percentage of personal rules reached its minimum level during the war, with only 9 decrees in total (or 3% of the total number of acts). This also reflects the political resolve during wartimes to expand taxation.

## IX Conclusions

In this paper we analyse the fiscal impact of the War of the Pacific (1879-1883) in Bolivia, Chile and Peru. To do so, the paper proposes an analytical framework that differentiates the capacity to tax from the willingness to implement and enforce tax regulation. We argue that wars fought over natural resources (such as the War of the Pacific) can have significant fiscal effects even if they fall short of being mass military conflicts. Resource wars can reshape the capacity to collect public revenues by expanding the economic base of the winning coalition (through the seizure of natural resource endowments of enemy combatants). The annexation of natural resources, however, can be double-edged. Along the lines of the resource curse literature, we expect the availability of easily taxable economic resources to discourage investments in administrative capacity in the long-term, which would hinder the capacity to collect more complex and political costlier taxes in the future.

Our empirical evidence suggests that the War of the Pacific did exert a significant impact on the fiscal systems of the three countries, even if we do not observe a clear displacement effect in any of them. First of all, the capacity to raise public revenues increased significantly in Chile due to the annexation of the Bolivian and Peruvian nitrate-rich coastal regions. This has been highlighted by previous research (Sicotte, Vizcarra, & Wandschneider, 2009). However, we also show that despite of this new source of wealth (which made natural resources revenues soar) and the relatively advanced bureaucratic system in place at that time, the post-war public revenue ratios (public revenues/GDP) in Chile remained at a similar level than those of the pre-war period. Instead of using this new capacity to expand the fiscal system, the Chilean elites opted for the abolition or the decentralization of direct taxes and, to a lesser extent, indirect taxes not related to natural resources.

By contrast, Peruvian revenues plummeted as a result of the loss of its natural resource endowments, which before the war represented their most important sources of public revenue by a large margin. The erosion the Peruvian economic base went along with the loss of administrative capacity and a long-lasting economic crisis. Finally, the limited fiscal relevance of the Bolivian coast before the war (which can be explained by the low levels of administrative capacity in this area) and the government's efforts to find alternative sources of revenue in the aftermath of the military conflict prevented a major fiscal collapse in the country despite of the loss of its nitrate-rich coastal region.

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# APPENDIX: LEGISLATIVE CODEBOOK

## “LINKING WAR, NATURAL RESOURCES AND PUBLIC REVENUES: THE CASE OF THE WAR OF THE PACIFIC (1879-1883)”

### Introduction

This codebook presents the guidelines used in this paper to code legislative activity and ministerial decrees on taxation and natural resources revenues in Chile from 1870 to 1890. The dataset keeps track of laws, resolutions, regulations and other legislative acts passed by the Chilean national parliament, as well as decrees approved by the Chilean government. For the purpose of this codebook we restrict the definition of natural resources to non-renewable and inorganic natural materials that are exploited for economic purposes (namely, hydrocarbons and minerals extracted from mines or from the surface).

Overall, the dataset includes 939 pieces of legislation. Each one of them is coded as an individual event, and it therefore corresponds to one single line in the dataset. For each legislative act we code information regarding the date of approval, the type and title of the act, the tax categories mentioned in the text, the policy orientation of the reform, the level of incidence (national, regional or local), and whether it refers to personal or impersonal legislation. Since multiple categories of taxes or natural resources revenues can be mentioned in each legislative act, we code up to four categories of taxes for each one of them.

The dataset has been coded based on official annual compilations of legislative acts and ministerial decrees. The relevant pieces of legislation have been identified by looking at the compilations' indices. When necessary, we have also examined the compilations page by page. We are confident that the most important pieces of legislation have been properly identified, but we cannot rule out the possibility that some minor acts have been missed. We thus recommend the reader to treat this dataset as a comprehensive and exhaustive – but not necessarily all-inclusive – compilation of parliamentary acts and ministerial decrees on taxation and natural resources revenues.

The following two sections describe the general coding rules and the variables of interest. These guidelines are not specific to our case study, and hence could be employed to code other countries or time periods (so as to ensure comparability with our series). The fourth section describes more in detail some of the variables of interest and the specific coding decisions regarding the Chilean case, while the last section presents the sources.

### General coding rules

As mentioned above, this dataset focuses on tax legislation. In line with the IMF guidelines (IMF, 2014, 84), we consider tax revenues to be “compulsory, unrequited amounts receivable by government units from institutional units”. The dataset therefore excludes legislation on non-tax revenues, which mainly comprise the sale of public goods and services, fines and penalties, and

donations.<sup>35</sup> However, we make room for an exception to this general rule: we include all type of public revenues from natural resources, including non-tax revenues. In the case of Chile, these non-tax natural resources revenues comprise exploitation rights granted to private companies to exploit guano and nitrate deposits.

The dataset includes legislation on a variety of issues related to taxation, such as regulatory changes, administrative reforms (for instance, in the process of tax collection or in accounting), the implementation and abolition of taxes, as well as legislative acts aimed at clarifying previous reforms or at providing information about the regulatory framework in place or the level of revenue collection. Since our interest is in public revenues, we exclude legislation dealing exclusively with public expenditure, public debt, or private tariffs.

We follow two basic rules of thumb to decide when a piece of legislation can be considered relevant to be coded. Firstly, we code legislative acts that *reform or inform about tax revenues or natural resources revenues*. In other words, taxation or natural resources revenues must be the object of interest (or at least one of the objects of interest). For instance, electoral laws in which taxation is merely mentioned to determine the level of suffrage are not coded (since taxes are part of the discussion but not the object of deliberation). Similarly, decisions regarding land property rights that merely mention taxes with the goal of resolving ownership disputes are excluded.

Secondly, we only code legislative acts that *explicitly allude to tax revenues or natural resources revenues*. With this we intend to make sure that regulatory changes related to administrative bodies in charge of taxes are only coded when they affect taxation or natural resources revenues. For instance, legislative decisions on customs agencies that do not mention public revenues (such as import or export duties) could be related to non-tax issues (for instance, trade regulation). To ensure that we do not include such pieces of legislation, tax revenues or natural resources revenues need to be mentioned. Similarly, legislation dealing with ports is only included if the act alludes to custom duties or other taxes (hence, legislation that refers only to public works on private ports is not coded).

## Variables

The dataset presents information on the following variables:

- Country: name of the country. Values:
  - 1- Chile
- ID: the identification number assigned to each legislative act.
- ID\_Archive: the identification number assigned to each legislative act in the original source (if any).
- Day: day in which the legislative act was published in the official bulletin. In its absence, day in which the legislative act was passed by parliament or was enacted by the corresponding ministry.
- Month: month in which the legislative act was published in the official bulletin. In its absence, month in which the legislative act was passed by parliament or was enacted by the corresponding ministry.

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<sup>35</sup> As a result, legislative acts about post offices' and railway companies' revenue, as well as on sales or leasing of public properties, are excluded. In line with our public revenues series, public monopolies for mass consumption products (such as salt or tobacco) are considered indirect internal taxes and thus coded.

- Year: year in which the legislative act was published in the official bulletin. In its absence, year in which the legislative act was passed by parliament or was enacted by the corresponding ministry.

- Type\_act: we differentiate 10 types of act. The last of them (“unknown”) accounts for those cases in which the source does not specify the type of act. Values:

- 1- Law
- 2- Decree
- 3- Regulation (corresponding to the Spanish “regulación” and “reglamento”)
- 4- Code
- 5- Treaty
- 6- Ordinance
- 7- Tariff/rate
- 8- Agreement/protocol
- 9- Other
- 10- Unknown

- Source: name of the source used to code the legislative act

- Link: online link used to access the source (if any)

- Title\_act: title of the legislative act in the original source

- Level: level of incidence of the legislative act. It differentiates between acts that regulate taxes or non-tax revenues at the national level, regional level (including provinces and departments), and those that are restricted to the local level (municipalities). If a piece of legislation affects both the local level and the national level at the same time, it is coded as national. In other words, the broader category prevails. Legislation affecting one specific custom agency is generally considered to be “national” or “regional” (depending on the type of tax involved). On the other hand, legislation related to several municipalities is coded as “local” as long as the incidence of the tax is at the local level. If it affects all municipalities in the country, it is coded as “national”. Values:

- 1- National
- 2- Regional
- 3- Local

- Impersonal: variable capturing whether the legislative act affects only a very small number of individuals or companies (personal legislation), or a large segment of the population (impersonal legislation). Values:

- 1- Impersonal
- 2- Personal

- Type\_revenue\_1: general category of public revenue. Values:

- 1- Tax revenue
- 2- Non-tax revenue (only related to natural resources; as mentioned above, other non-tax revenues are excluded)

- Category\_revenue\_1: specific category of public revenue (a list of taxes that belong to each of the following categories is provided below). Values:

- 1- Direct taxes
- 2- Import duties
- 3- Natural resources direct taxes
- 4- Natural resources indirect internal taxes
- 5- Natural resources exports taxes
- 6- Natural resources non-tax

- 7- Indirect internal taxes
  - 8- Export duties (non-natural resources)
  - 9- Others
  - 10- Unspecified/generic
  - 11- Natural resources unspecified
  - 12- Estanco (natural resources)
  - 13- Estanco (non-natural resources/unspecified)
  - 14- Unspecified (customs)
- Policy\_1: policy orientation of the reform (see below for a description on how the variable is coded). Values:
- 1- Increase revenue
  - 2- Neutral/unspecified
  - 3- Decrease revenue
  - 4- Unknown

There are up to four public revenue sources that can be coded for each legislative act. Hence, the variables “Type\_revenue\_1”, “Category\_revenue\_1” and “Policy\_1” could be replicated up to three other times in the same row with the headings ended in “\_2”, “\_3” and “\_4” respectively. They are left blank if not needed (i.e., in case the legislative act does not mention four different categories of public revenues).

The variable “Policy” identifies whether the legislative act aims at increasing or decreasing public revenue. The variable is coded based on the following rules of thumb: firstly, the implementation of new taxes has been always coded as aimed at increasing public revenue, whereas the abolition of taxes has been coded as a reduction in revenue. When a piece of legislation seeks to reform – but not to create or abolish – an existing tax, the variable is coded as “increase revenue” if the explanatory memorandum (when available) or the body of the text explicitly points towards this direction (the same applies to “decrease revenue”). When we do not count on this information, the variable is coded either as “neutral/unspecified” (e.g., administrative reforms that are not associated with any evident policy orientation) or “unknown” (for those cases in which we expect a positive or negative impact on public revenues, but the direction of which requires an in-depth fiscal analysis that goes beyond the goal of our paper). When a piece of legislation implies both a neutral change and revenue growth, the latter prevails (so that it is coded as “increase revenue” rather than “neutral”). The same rationale applies to cases with neutral and negative changes in revenue.

### **Specific coding decision regarding the Chilean case (1870-1890)**

We list below several coding decisions that are specific to our case of study (Chile, 1870-1890) or that clarify some of the previous general guidelines:

- All legislative acts related to the so-called “estancos” have been coded, even when they do not explicitly allude to taxation, since we consider these agencies to be an intrinsic part of the tax administration. We only exclude these acts when 1) they are exclusively focused on the process of production of the so-called “bienes estancados” (regulated goods), 2) when they refer only to the running costs of the agencies, and 3) when they refer only to private

activities related to the “bienes estancados” (e.g., fees imposed on private businesses that do not abide by the rules).

- Several decrees in Chile during this period were related to payments imposed upon the use of public slaughterhouses (all of them at the local level). They have not been coded since we consider them to be equivalent to a fee that citizens have to pay in exchange for the provision of a service (hence, a type of non-tax revenue). However, we do include the so-called “derechos de pontazgo” (payment imposed on those who cross a bridge). In this case, even when the collection is in the hands of a private individual, the revenue obligation is a consequence of the state’s prerogative to impose taxes on the movement of goods or people across its territory.
- The opening of new customs agencies and ports in the occupied Bolivian and Peruvian areas during the War of the Pacific is coded as a pro-revenue growth policy (“increase revenue” in the variable “Policy”) even when this is not explicitly mentioned in the document.
- There are several decrees aimed at exonerating individuals from paying certain type of taxes (generally, import and export duties). These decrees are generally part of what is known as “privilegios exclusivos”, which grant certain exclusive privileges to individuals or companies (for instance, exclusive production rights). We only code these privileges when they explicitly mention the exoneration of taxes.
- Legislation regarding taxes (or non-tax duties) imposed upon mining companies operating in mining areas is coded as “national” legislation as long as the tax in question does not discriminate between regions. Instead, it is coded as “regional” when it establishes a particular tax that affects only one specific mining centre.
- We do not code the establishment of new private companies even if the act specifies that they will abide by the fiscal rules in place. These pieces of legislation, quite common in Chile during our period of study, do mention taxation but add nothing to the current fiscal regulatory framework.

The list of taxes that have been coded under different headings is provided below (variable “Category\_revenue”). The list is in Spanish (some of the taxes are very specific to our case study and difficult to translate) and contains the most common type of taxes encountered during the coding process:

- Direct taxes: *impuesto agrícola, contribución de serenos, contribución de alumbrado, contribución de seguridad, impuesto para el sostenimiento de la policía rural, derechos por catastro, impuesto sobre herencias y donaciones, contribución sobre haberes, contribución mobiliaria, arbitrio municipal, contribución de patentes, patentes fiscales, patentes industriales, patentes de establecimientos.*
- Indirect taxes: *impuesto de plazas y tendales o puestos sueltos, derechos de pasaje, derechos de recova, alcabala, derechos de peaje, derechos de pontazgo, contribución de abastos, contribución de paseantes a caballo, contribución de papel sellado, derecho de lanchas, derechos parroquiales, contribución de hospital, contribución de patentes de carruajes,*

*carros o carretas, contribución de depósito, contribución por lanchada de lastre, flete de maderas, derecho de estadías.*

- Import duties: *derechos de internación, derechos de importación, derechos de almacenaje, derechos de muelle y bodega, derechos de recargo y muellaje.*
- Natural resources indirect taxes: *patente minera, contribución sobre los yacimientos de bórax.*
- Natural resources non-tax duties: *explotación de guano y de salitre, venta de guano, beneficios de guano, concesiones de explotación de salitre, utilidades líquidas del guano, pago al Gobierno por la venta de guano, pago por cada quintal métrico de salitre, derecho de regalía de los cargamentos de guano.*
- Export taxes (both for natural resources and non-natural resources): *derechos de exportación.*

## Sources

Our main sources have been the printed volumes of the yearly official bulletins on laws and governmental decrees published in a yearly basis (*Boletín de las Leyes y Decretos del Gobierno*). The bulletins have been consulted in the library of the Chilean congress (*Biblioteca del Congreso Nacional de Chile*) and in the Chilean National Library (*Biblioteca Nacional de Chile*). Some information has been also collected from the digital archives of the library of the Chilean congress (<https://www.leychile.cl/Consulta/>), which provides a selection of some of the most important laws and decrees during our period of study.