Inequality, Foreign Investment, and Imperialism Prior to World War I

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Abstract

This paper presents empirical evidence for economic (imperialist) theories of the outbreak of World War I, especially the Hobson thesis, which links domestic inequality to surplus of savings, need for foreign investment and imperialist competition. We find that it stands up reasonably well to scrutiny. The belligerent countries were at the historical income and wealth inequality peaks prior to the War; the holdings of net foreign assets expanded absolutely and relatively to GDP; such assets were held almost entirely by the rich; and foreign assets bore higher average returns than similar classes of domestic assets, even adjusting for risk. We also find evidence that countries that owned more foreign assets kept larger armies.

Keywords: Inequality, foreign investment, imperialism, World War I

JEL-Classification: N33, N43, D31, F51, F54

1 Introduction

The number of historical and political books and articles written on the origins of the Great War (later called World War I) in all languages is enormous. Recently, around the centenary of the outbreak of the War, there appeared many new historical books, some of which went on to became international bestsellers. The discussion of the War thus appears endless and shows no signs of abating. But in one area, the discussion of the origins of the war, is strangely absent. This is economics.

The lack of recent economic works on the origin of the war is even stranger because it is economics and not the other social sciences that led the analysis in the past, arguing even before the hostilities of 1914 began, that the war was almost inevitable, and then, during the war, continued with its economically-driven "dissection" of the causes. We have in mind here the seminal under consumptionist work by John Hobson Hobson (1902), *Imperialism: A Study*, that in the next couple of decades led to several influential works within the Marxist tradition that stressed the imperialist origins of the war (Rosa Luxemburg, Vladimir Lenin, Nikolai Bukharin, Rudolf Hilferding). That line of analysis remained very active for a while among Marxist economists (for example, Samir Amin (1974) in *Accumulation on a World Scale*). Paul Bairoch shared the same view.[1] It was recently restated by Branko Milanovic (2016) in *Global Inequality* where, focusing on the role of high inequality before the conflict, he dubbed it an "endogenous" explanation of the war meaning that internal logic of the highly unequal capitalist societies at the turn of the 20th century predisposed them to imperialism[2] which in turn caused the war. However, in the past fifty years, interest in this type of explanation among economists and economic historians has been limited. It is not exaggerated to say that theories of imperialism elicit today mostly an antiquarian interest, and the empirical study of late 19th century international economy is largely subsumed under "globalization", which ignores the geopolitical concerns that loomed large in the early literature.[3] Even

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[1] In his section on the causes of growth of foreign investments before 1914 (Chapter 13 of Volume 2 of his monumental *Victoires et deboires*, p. 320), Bairoch writes: "the increase in income inequality leads to an even faster increase in available funds (*disponibilités*) of the top classes. At that point the possibility emerges that there is a lack of profitable domestic investment opportunities. This is from 1840–50 apparently the case with the United Kingdom, and later with other European countries that have engaged in early industrializaton" (our translation).

[2] Imperialism in our paper will not be confined to direct colonization, but more broadly includes relationships of informal dependence. See Gallagher & Robinson (1953).

[3] The same is not true for historians where imperial pressures as determinants of World War I continue to play an important role (e.g., Fritz Fischer and William Appleman Williams).

Findlay & O'rourke (2009), who are quite attuned to the complementary relationship between force and trade, treat World War I as an exogenous shock to the well-managed globalization of the previous 50 years. Tooze (2015) provides further historiography, highlighting the disconnect between economic history literatures on 19th century globalization (who ignore geopolitics) and political science literatures on international relations (which ignore economics).

Our objective in this paper is to revisit theories of imperialism in order to define them in a more coherent manner, freeing them from reliance on irrelevant details, and to investigate whether the mechanisms adduced by the authors can be empirically substantiated. However, while both the modeling and the empirics are modern, in the sense that neither the tools of the analysis nor the data were available to the authors who wrote a century ago, the main contours of the argument are theirs.

They are relatively simple. According to Hobson, unequal distribution of income in advanced capitalist countries (more specifically, England) leads to secular underconsumption due to lack of purchasing power of the poorer and middle classes. There is a glut of savings compared to profitable investments that exist nationally.[4] In Lenin's formulation, lower domestic profitability is due to the "tendential" decrease in the domestic rate of profit as postulated by Marx. The owners of financial capital hence need to find more profitable outlets for their investments and they can only find them in overseas territories where the marginal productivity of capital, due to its scarcity, is greater. These investments are of two kinds: lending to foreign government in the form of purchase of their bonds and direct foreign investments. But neither form of investment is safe, once it is made so far away from home and in the countries where property rights are much less secure than in the main capitalist nations.[5] In order to ensure security of their property, capitalists in advanced countries resort to the use of state power, either to control the borrowing government and threaten it by military force if it fails to pay the debt (e.g. Egypt, Turkey, Venezuela, Tunisia), or to conquer the country in order to transform it into a colony where metropole rules (including those regarding the security of property) apply.[6]

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[4]While Hobson did not, for obvious reasons, use the language of domestic financial frictions, his argument is consistent with modern formulations of uninsured idiosyncratic returns, as our model formalizes.

[5]In fact, already Adam Smith (*Wealth of Nations*, Book IV, Chapter 2) had noticed that capitalists prefer to invest close to home, in order to have their assets more easily controlled.

[6]Hobson (1902, p. 54) quotes the Italian economist Achille Loria: "France's attempted conquest of Mexico during the second empire was undertaken solely with the view of guaranteeing the interest of French citizens holding Mexican

In Hobson's view, imperialism is "vent for investments". It is "the endeavor of the great controllers of industry to broaden the channel for the flow of their surplus wealth by seeking foreign markets and foreign investments to take off the goods and capital they cannot sell or use at home" (p.85). And it is far from being class neutral, for the political and military power of the metropole is used to ensure a superior return to the owners of foreign assets who are mostly the rich: "...if I invest either in the public funds or in some private industrial venture in a foreign country for the benefit of my private purse, getting specially favorable terms to cover risks arising from the political insecurity of the country or the deficiencies of its Government, I am entitled to call upon my Government to use its political and military force to secure those very risks which I have already discounted in the terms of my investment. Can anything be more palpably unfair?" (Hobson, ibid, p. 358).

Having a colony (formal or informal) comes with other advantages like a cheap labor force that can be exploited much more than domestic labor (where pro-worker regulations were already in place), preferential access to raw materials (which can be denied to other imperialist competitors), new monopolistic market for the products made or traded by the metropole (British textiles in India or steel in the colonial United States, opium in China). In some cases (the sack of the Summer Palace in Beijing), even outright plunder of the old-fashioned style was not excluded. Now, when several major powers are involved in these actions, the struggle for colonies and for control of the "unallocated" parts of the world rapidly ensues. It is this imperialistic competition that, after several smaller conflicts (Fashoda, the two Moroccan crises) led to the outbreak of the Great War.

Empire was more than colonies, however. The literature has often focused on the difference between colonial and non-colonial holdings, and a robust empirical fact is that colonial assets were small relative to non-colonial assets.[7] But as Saul (1960) shows, empire was a network of offsetting trade balances, where for example British trade surpluses with North America and Continental Europe were used to pay for trade deficits with India and Turkey. [ENTER HOBSBAWM QUOTE

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securities. But more frequently the insufficient guarantee of an international loan gives rise to the appointment of financial commission by the creditor countries in order to protect their rights and guard the fate of their invested capital. The appointment of such a commission...amounts...to a veritable conquest."

[7]See Cain & Hopkins (1980) and Clemens & Williamson (2004), who show that less than 30% of British foreign investment was outside the white settler states.

HERE??] Our argument is not about the returns to colonies specifically, but rather the returns to empire broadly, including maintaining the security and value of trade routes (and future trade routes). The large foreign asset positions held by wealthy citizens of the metropoles could only be redeemed by future flows of income, whose smooth realization would need to be guaranteed by naval power and expeditionary forces, secured strategic routes such as Morocco and the Dardanelles, reliable prospects of future pan-African trade linkages (Fashoda) or Asian markets (Tonkin), and extensive mutual defense treaties to deter aggression.

We do not take a position on the validity of either the maldistribution-cum-underconsumption hypothesis or the "tendential decrease in the rate of profit" hypothesis. We instead posit domestic financial frictions, so that investors face heterogeneous domestic rates of returns, creating an upward sloping supply curve for foreign investment. Our argument is therefore simpler but also less restrictive. We argue that the increase in income and wealth inequality in major countries has produced an increasing demand for financial assets, which are not all met by domestic investments due to credit market imperfections. The rich tended to invest overwhelmingly in foreign assets because they were, adjusted for risk, more profitable than available domestic opportunities. To protect such foreign assets, whether portfolio or direct, the countries, partially at the instigation of investors in foreign assets, increased military investments (naval dreadnoughts as well as territorial armies) and complemented it with geopolitical strategies, including both colonial conquests as well as extensive treaties.

The paper is organized exactly to follow the line of argumentation sketched above. In Section 2 we present a simple model of supply and demand of foreign investments, where foreign investments provide a surplus (rent above the compensation for asset riskiness) and where military force is used to ensure that the rent is safeguarded. In Section 3 we look at income and wealth inequalities in the main capitalist nations on the eve of the conflict. In Sections 4-7, we study the importance of foreign assets in the overall portfolio of the rich countries, look at whether foreign assets were overwhelmingly owned by the rich, and whether their yield (adjusting for risk) was higher than that of domestic assets. Finally, in Section 8 we assemble the empirical evidence to obtain estimates of the relationships between the key variables (cross-country correlations between inequality, foreign assets, and military capacity in the advanced countries prior to 1914). Section 9 presents our

conclusion. Online appendices give information on the data we use and additional graphical and historical support.

2 Theories of Imperialism: A Modern Restatement

Imperialist countries invested in a variety of geopolitical strategies to defend the rents from foreign assets. Here we show a partial equilibrium model that generates the total surplus from empire in terms of a simple supply and demand diagram that includes the colonial (foreign) and domestic rates of return, as well as the domestic income distribution and economic structure (monopolistic or not). This model deliberately simplifies, but builds on ideas from recent models in macroeconomics with incomplete markets and idiosyncratic rates of return to capital, as surveyed in Brunnermeier et al. (2018) (see also Benhabib et al. (2015)). Evidence on capital market imperfections in the late 19th century is not hard to find, with perhaps the most comprehensive evidence being the lack of arbitrage between volatility-adjusted housing and equity rates of return documented in Jordà et al. (2019).

While seemingly disparate, three economic forces that wove through the classic works on imperialism were inequality of domestic incomes and wealth, underconsumption, and monopoly. These were all linked in different ways by different authors. But upon closer inspection, all of the extant classic stories have in common an outward shift in the supply of foreign investment, driven by an increased stock of savings and depressed domestic returns.

Inequality generated a large pool of savings as well as low domestic demand for products, and in Hilferding's account these savings turned into domestic monopolization via the financial sector, and this monopolization together with the low domestic product demand lowered the domestic demand for capital and hence led to lower domestic rates of return. Low domestic demand, or underconsumption as a reason for low domestic returns is quite possible in models with credit constraints and 0 lower bounds on real interest rates. In our view microfounding this in our model is unnecessary; what is needed is a mechanism that makes some domestic investors get a substantial surplus from foreign investment. To do this, we choose to use domestic financial frictions.[8]

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[8]Joan Robinson's preface to an edition of Luxemburg's book also made the point that underconsumptionism was

Diverse interpretations exist as to what exactly generates the rate of return on foreign invest-ments. In Rosa Luxemburg (2002, Originally published in 1913) and Rudolf Hilferding (1912) view, it is extractive institutions in the non-capitalist periphery that provide the higher rate of return by securing cheaper input materials (e.g. colonial military force used to compel forced labor of primary commodity producers).

Another source of higher rates of return abroad is access to large foreign output markets, so that the quest for new markets for output sales is what colonial powers gained from empire. For example, this view was also held by Luxemburg. This is, in our view, a less compelling explanation: given the generally low relative incomes of most foreign countries relative to Europe it is unlikely that there were sizeable foreign markets motivating imperialist adventures.

One could also believe that the returns from empire were not greatly commodified: simple extraction via taxation at gunpoint could generate returns for foreign investors, particularly bond-holders. We take no stand on this in the model, simply allowing there to be a higher return from foreign investments.

Our model is as follows. There exists one metropole, with unit measure of metropolitan citizens, with a foreign asset (subject to aggregate risk only) yielding a risk-adjusted rate of return $r^* = R - \rho$, where R is the "observed" rate of return and ρ captures the risk of foreign investments, which can be affected by state action: property rights, credit risk, transactions and transportation costs. Importantly, suppose the demand for investment from abroad is perfectly elastic.

Suppose there is also some fraction $\delta < 1$ of capitalists, who control a share $\alpha > \frac{1}{2}$ of the average income y, so that inequality is parameterized by $\frac{\alpha}{\delta}$. Also, suppose capitalists save $\overline{s}$ of their income while non capitalists save nothing, so that the economy-wide savings rate is $s \equiv \overline{s}\alpha$. Citizens get idiosyncratic domestic rates of return which are distributed according to $F(r)$, which for simplicity we suppose is uniform, supported on $[r_{choke}, r_{choke} + \phi]$. The supply curve of foreign investment is $K_f(r^*) = syF(r^*)$. The choke price r_{choke} is the lowest domestic return anyone can get, and positive, while ϕ measures the dispersion in domestic interest rates (a reduced form measure of financial frictions). The cumulative distribution function of domestic rates of return is thus given

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an unnecessary component of the theory of imperialism.
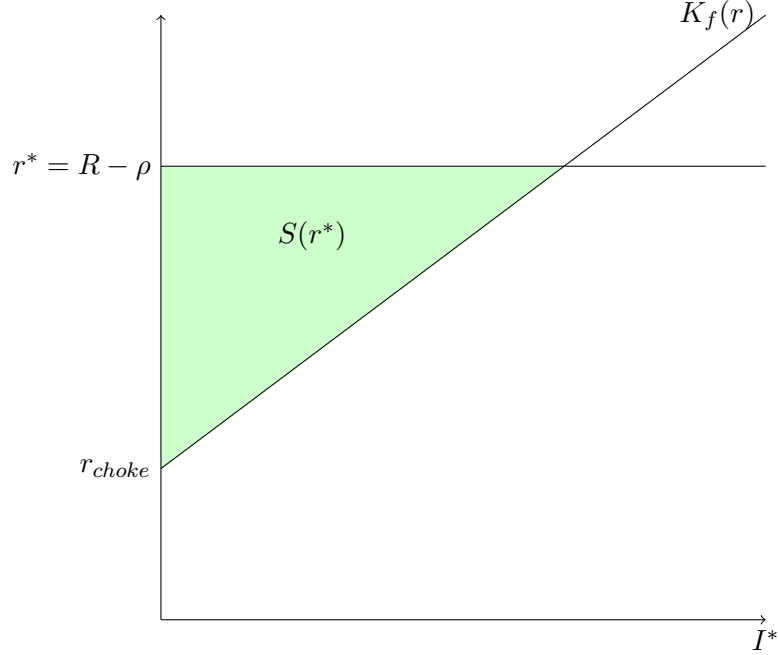
Figure 1: Foreign investment supply and income surplus from imperialism.

by $F(r) = \frac{r - r_{choke}}{\phi}$.[9]

Figure 1 shows the simplest version of this diagram. We define the surplus yielded by empire as

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\begin{aligned}
S(r^*) &= \int_{-\infty}^{r^*} K_f(r)dr = \int_{r_{choke}}^{R-\rho} \frac{sy(r - r_{choke})}{\phi}dr \\
&= \frac{\bar{s}\alpha y}{2\phi}(R - \rho - 2r_{choke})
\end{aligned}
\tag{1}
$$

Equation 1 is the total surplus from foreign investment. It is not only the rate of return on foreign investments, nor the quantity of foreign investment, but also depends also on the choke price and slope of the capital supply curve (in this case ϕ. Both of these reflect the structure of financial markets and the degree of financial frictions. As the choke price approaches the foreign rate of return, so that there is less of a gap between the lowest domestic rate of return and the foreign rate of return, the surplus shrinks to zero. For any given choke price, as the slope of the

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[9]In a standard lifecycle saving model with borrowing constraints, having stochastic idiosyncratic rates of return yield endogenous fat-tailed wealth distribution, as shown in Benhabib et al. (2015), but the important thing for our purposes is domestic investment opportunities yield lower returns than foreign returns.

capital supply curve becomes increasingly inelastic (due to more uninsurable dispersion in rates of return), the surplus increases.

As already implied, many theories of imperialism can be built into determinants of the supply curve of foreign investment thus formulated, which predicts the level of rents generated from empire. Countries will be willing to expend up to the total surplus return when weapons both raise the return on foreign investment as well as secure the market. We show that this model nests the major economic theories of imperialism by channeling them into changes in the relative return from domestic vs foreign assets for investors. The value of empire depends on the level of foreign investment and the gap between the counterfactual rate of return at home. This is captured by the shaded region in Figure 1, the total surplus from empire (denoted S), which is given by the area between the demand and supply curves for foreign capital. If r_{choke} is very close to r^* and ϕ is small, then the value of empire could be low despite relatively high foreign investment. And if r_{choke} is very low and ϕ very high, then the value of empire could be high despite low investment. The latter case is more likely, too, in the presence of high inequality (so that, e.g., the very rich face very low rates of return domestically) and financial frictions that ensure a considerable dispersion of domestic rates of return reflected in ϕ.

We incorporate military mobilization in the simplest way. If the metropole can spend W on armaments and military mobilization to decrease the risk premium ρ, so that $\rho = \rho'(W) < 0$ and $\rho'' > 0$, then the metropole chooses W to maximize the total surplus form empire minus the costs of armaments, or national foreign profit net of empire costs given by

$$\Pi(W) = S(r - \rho(W)) - W, \tag{2}$$

and resulting in the first order condition, below. (It is easy to check the second-order condition from Equation 1.)

$$-\rho'(W)S'(r - \rho(W) = 1 \tag{3}$$

The left-hand side of Equation 3 is the marginal benefits of expenditures on armaments, cap-

turing the marginal effect on the risk-premium, times the effect on the total surplus from the capital-supply curve, which is the mass of rates of return below the foreign interest rate, times the total size of savings. Equation 3 equates this marginal benefit to the marginal cost of armaments (fixed to 1). Obviously, if armaments have to be financed out of taxes on income, especially taxes on capital income or top incomes, then the opportunity cost of armaments to the government could itself be a function of y and r, and may reflect a variety of political concerns. Given the autocratic nature and limited franchise of most of the belligerents pre-1914, we do not pursue this here.

The desired comparative statics follow from Equation 1 and the term $\frac{\bar{s}\alpha y}{\phi}$. Increases in the value of the surplus from empire from either higher savings (driven by higher inequality and increased income), or domestic financial frictions via lower ϕ, will increase the value of reducing the risk premium abroad $\rho(W)$ and increase armaments W.

2.1 Monopolies at Home and Abroad

The term monopoly is used frequently in the classic imperialist writings, but it seems to have different economic meanings, even within the same writer. It could mean that the investments have either domestic or international market power. On one hand, it could mean that domestic production is concentrated, which would drive down the demand for capital goods (as the price of capital goods went up) even as it increased the capital share α (return on investments plus pure profit). On the other hand it could mean that the home country investors have market power vis-vis the foreign country, which would lead them to, similarly, reduce the supply of capital goods to the country. Often it seems to imply both, but then the net effect on the supply of capital goods is ambiguous. If it was only domestic monopolization, then domestic demand for capital should fall, reducing the demand for capital goods at home (shifting down r_{choke}) and increasing the supply of foreign capital.

If it was only foreign monopolization, then Figure 1 would be unchanged because of the perfectly elastic demand for foreign investment. If instead the r^* curve was downward sloping, so that the capital demand curve was less than perfectly elastic, then, as Figure ?? shows below, the rich-country investors can increase the surplus extracted by *reducing* the capital goods flow, and

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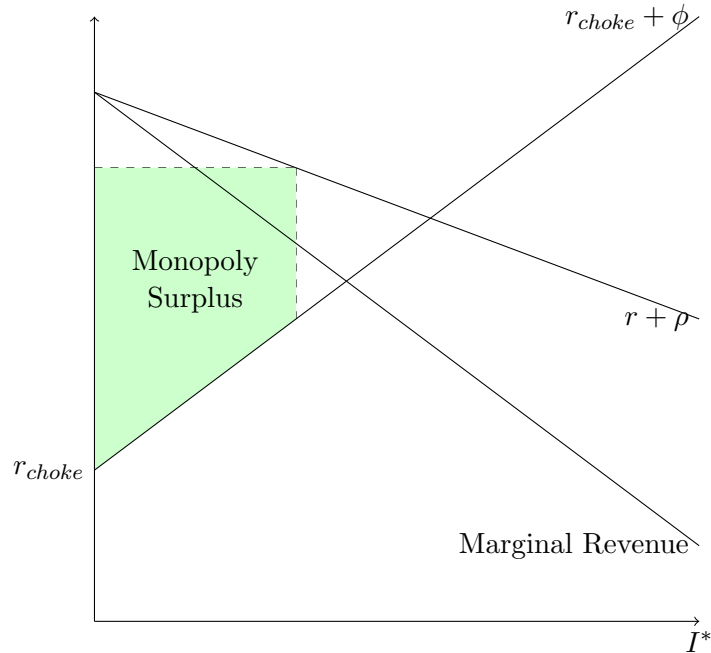
Figure 2: Foreign investment supply and surplus income from imperialism with market power in the international capital market for imperial investment.

increasing the required rate of profit, thus increasing the total value of the financial flow. (Though not drawn to scale, the monopoly surplus exceeds the surplus from imperialism in Figure 1.) Just as a monopolist in the product market restricts supply to increase profits, a monopoly supplier of capital to a colony could restrict supply of capital goods.

The latter interpretation is one endorsed by Robert Lucas in his famous 1990 paper "Why Capital Doesn't Flow from Rich Countries to Poor." Citing Adam Smith on mercantile colonialism, Lucas suggests that a barrier to capital mobility is that the rich country operates as a monopoly supplier of capital to (or equivalently a monopsony purchaser of labor in) the colony, restricting capital entry in order to raise the rate of profit. In order to connect this "restricted supply" to a larger foreign wealth share it is perhaps easiest to think of "capital" first as capital goods: technology, steel, and steam engines, that are being sent abroad. A monopolist supplier of capital wants to increase the rate of profit on capital goods, and can do so by restraining the quantity sold. But the actual financial flow will be larger, because the price paid to those capital goods will be higher.

Further, we can understand the international competition for investment in the model with a few

national monopolies (a global oligopoly), competing for profit. Imagine a model where the aggregate demand for capital from a colony is given by $r(k + K_{row})$, where K_{row} is all the capital supplied by the rest of the world. Then this problem has the same structure as a Cournot equilibrium, where the monopoly distortion (and additional surplus) falls with the number of national monopolies investing. Reducing access of investments from the rest of the world to the destination country clearly raises profits of the source country. This point can be related to the claim by most authors (Hobson, Luxemburg, Lenin) that, in some cases, metropoles will have incentive to exclude other potential colonial powers from the countries they control.

However, if both domestic and foreign monopolization go up, the relative share of either investment or wealth held abroad is indeterminate. Investment will contract both at home and abroad, but total profits (and wealth shares) held abroad and at home will both increase. We think a more faithful reading of the classical imperialist literature emphasizes the domestic monopolization reducing the demand for domestic capital; while the international market power may have had limited number of actors, it is unclear that the national monopolies were capacity constrained in any sense, making the international demand for investment relatively elastic.

In sum, this model helps us organize the classical imperialist literature. All the major writers variously emphasize underconsumption, domestic monopoly, and inequality as reasons for imperialism. What our model shows is that all of these forces act as outward shifts in the foreign capital supply curve, resulting in a larger outflow of capital abroad as well as a large total surplus from colonies.

Situating different authors within the model sketched above, we note that Hobson emphasizes high domestic inequality, which in the model is approximated by the relative income of capitalists $\frac{\alpha}{\delta}$, and domestic monopolies driven by the second industrial revolution. He argues that the rate of return at home (r_{choke} and ϕ) is depressed even as savings are high (caused by high inequality), and thus the supply of investment abroad (K_f) increases, raising, in turn, the overall surplus from imperial investment.

Hilferding adds to this by emphasizing the role of the financial industry in increasing domestic monopolization, something that is outside our model but similar to the recent literature showing

common ownership of companies by financial institutions leading to effective cartelization.[10] Luxemburg highlights the high rate of return abroad as well as domestic underconsumption. But we can think of domestic underconsumption as a form of "secular stagnation" (?) resulting in a low r_{choke}.

Finally, the upshot of all of these accounts was that the value of imperialism generated the imperative for militarization (although not war itself!). The surplus from empire, and thus the potential value of military mobilization, increases to the degree that the supply of foreign investment shifts right or becomes less elastic, as well as to the degree that the return on foreign investment increases, or monopoly power the country goes up. If the imperial surplus were small or zero, there would be no (economic) point in military mobilization.

We next look at the empirical evidence for the variables used in the model.

3 An Overview of Income and Wealth Inequality in the Run-Up to the Great War

Our data on inequality of income and wealth in the decades before the World War I are very incomplete. Yet they are not inexistent, and a careful combination of all coeval sources and the comparison of their movements over the 1860-1914 period allows us to form a picture of the evolution of inequality in the major countries prior to the war. We shall look at three types of measured inequality (based on three different sources of data), which although covering countries and periods very unevenly can provide us with a general idea of the level and movement of inequality in the half-century before the War. The first type of inequality is inequality in income that, in principle, includes the entire population. Data for such estimates come principally from social tables. The second type of inequality is concentration of income among the top 1% of income earners. The data come from fiscal sources (i.e. tax records). The third type of inequality is concentration of wealth among the top 1% of wealth holders. The data also come from fiscal sources.

Income inequality, measured by the Gini coefficient, for the period 1860–1914 is shown in Table

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[10]See Azar et al. (2018).

1 and for a more limited sample of countries in Figure 3. Since the data are scarce, we present them as decadal averages. We include major belligerent countries for which data are available, plus the Netherlands that, while it mobilized the army, stayed neutral during the War, and was both a significant international investor and a major imperial power. The data for the Central Powers are limited to Prussia/Germany.[11] More detailed discussion of the data for England/UK, United States, and Prussia/Germany is provided in Appendix A.

Table 1: Inequality in major belligerent countries (Ginis of disposable per capita income)

Decade	England/Great Britain	USA	Netherlands	Japan	Prussia	Italy	Russia
1860s	57	49				50	
1870s		51				45	
1880s	52			40	32	47	
1890s				43	32	47	
1900s				47	33	49	38[a]
1910–14	55	49	50	47	32	46	
2005–15	35	41	29	32	31	36	35
GDP per capita around 1914	4930	4800	3900	1330	3060	2200	1350
Source of pre-1914 data	Social tables	Social tables	Fiscal data combined with other information	Fiscal data combined with other information	Fiscal data combined with other information	Household budgets	Social tables

[a] Only European Russia.

SOURCES: For pre-1914 data see Appendix A. 2005–15 Ginis based on Luxembourg Income Survey per capita data. GDPs per capita from the Maddison project, 2013 update.

Most of our information comes from social tables which give the list of salient socio-economic groups with their estimated mean household incomes and population sizes. While social tables are the best source that we have for the 19th century and early 20th century, they have many shortcomings: the number of social groups may be small, the group averages may conceal large within-group variances (e.g. the average income of merchants may be representative of only small fraction of merchants: many may be much richer, and many much poorer than the average) etc.

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[11]In the discussion, we treat Prussia as synonymous with Germany. According to the last pre-World War I population census in 1907, Prussia accounted for 62 percent of the German population (Wavell Grant, 2002, p. 11).

Social tables are the key source of the data for England/Great Britain where their origin goes back to Gregory King's 1688 social table, and also for the United States where Lindert & Williamson (2016) have recently recreated very detailed social tables for the period 1774–1870. Compared with the fiscal sources, social tables have the advantage of covering, in principle, the entire population, from the poorest to the richest. Fiscal data, obviously, cover only the tax payers whose share may, at times, be very low. Social tables are estimates of the "full distribution" although because of their "compressed" nature, social tables, compared to standard modern household surveys that interview thousands of individuals, tend to underestimate inequality.

Household budgets, used for Italy, are in principle similar to social tables because they too cover the entire distribution. The approach consists in "post-sampling", that is finding as many as possible of household budgets from a given period and using information on location, household size and profession of households obtained from such budgets, assigning to each observation an ex post sampling weight. It is equivalent to treating whatever information exists (and is not random) as having been derived from a stratified random survey. The method was pioneered by Brandolini & Vecchi (2011) in their study of post-Unification Italy.

Finally, we show in Table 1 also estimates for Prussia and Japan that combine fiscal data with other sources of information (e.g. agricultural wages, income distributions in individual cities etc.) to produce a "full distribution". Heterogeneity of sources makes comparison between the countries more problematic but allows for (careful) within-country over-time comparisons.

From Table 1 and Figure 3 we can make three conclusions. First, on the eve of World War I, Ginis of all countries lay in a rather narrow range between 46 and 55 Gini points with the exception of Prussia (which is probably explained by the "piece-wise" construction of the Prussian data) and Russia (which was covered only in part). It is also important to note that the richest county, Great Britain was also a county with the highest level of inequality. Given that the social tables are likely to underestimate inequality, the "true" British inequality might have been even higher, approximately in the range of inequality levels in today's Latin America.

Second, there is no general tendency toward rising or decreasing inequality during the 1860-1914 period. Only Japan shows a strong increase in inequality. England/UK, United States, Italy, and

Prussia (in that order by their inequality levels) show high, but not rising, inequality.

Third, inequality then was much greater than inequality in the same countries today. In the UK and the Netherlands, the difference is enormous: inequality is some 20 Gini points lower today, that is, it is only about 60 percent of the Gini value before the Great War. The United States is somewhat of an exception because today's inequality is "only" 6 Gini points lower.
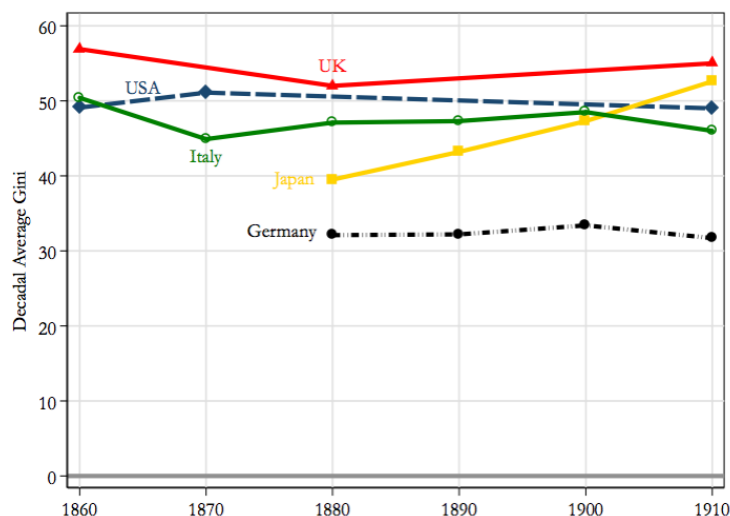
Figure 3: Estimated income inequality, 1860–1910

Table 2 shows income concentration data for a more limited sample of countries. These results are based on fiscal data provided by the World Wealth and Income Database.[12] Fiscal data, especially at the inception of the era of direct taxation in the US, UK, France and elsewhere covered only the richest people, and thus they might provide reasonably good estimates of income concentration (the share of total income received by the top 1%) but not estimates of the entire distribution. In other words, they are a good measure of the importance of top income earners or wealth holders but are truncated and cannot be treated as a measure of inequality of the entire distribution. However, they are valuable: top income share estimates combined with the "full-distribution" data from Table 1 should give us a better hold on the evolution of inequality.

Fiscal data are even more sparse than those from social tables principally because modern system of direct taxation was born in several advanced countries just around the time of World

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[12]The data for the Austrian part (Cisleuthania) of the Austro-Hungarian Empire come from Novokmet (2017). Austria accounted for close to 60 percent of the population of Austria-Hungary (30 out of 52 million).

Table 2: Income concentration in major belligerent countries (top 1% share of fiscal income)

Decade	UK	USA	Netherlands	Germany	Austria	France	Japan	Russia
1880s				17			17	
1890s				18	17		15	
1900s				18	17	22	22	18
1910–14	22	18	21	18	18	22	32	
2005–15	14	18	5[a]	11[a]		9	9	

[a] Data for 1998 or 1999.

War I (in France in 1913, in the US in 1915).[13] Top 1% income shares in countries considered here ranged between 18 and 32 percent of total fiscal income. There was a tendency toward increasing concentration of income in Japan (strongly) and Germany and Austria (less so). The result for Japan accords well with what we found using "full-distribution" data (although it should be pointed out that the two sources are not entirely independent). For France, for which we do not have full-distribution data, we find high but unchanged income concentration. The same (top 1% receiving above 20 percent of all income) is true for the UK and the Netherlands. The American case is interesting. The pre-World War I top 1% results confirm the relatively low US inequality that we found using the "full distribution" data. This is, of course, in contrast with today's situation when the United States, compared to the same countries, has the highest concentration.

Table 3 and Figure 4 show the wealth concentration data (also obtained from the World Wealth and Income Database). We have the data for only three countries.[14] As expected, wealth is much more concentrated than income. The United Kingdom exhibits by far greater wealth concentration than France and the US: the top 1% controlled around 70 percent of British wealth and that share appears quite stable over the quarter century for which we have the data. Data on French wealth concentration go back to the mid-19th century. They show a significant increase in concentration, from around one half of all wealth being in the hands of the top 1% to around 55–56 percent in the

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[13]In Britain, income tax existed without interruption, although with many modifications, since the early 1840s. But the top 1% fiscal income share for the United Kingdom is available in the WWID only from 1919. Atkinson (2003) gives the share of the top 0.05% from 1908, but the estimated top 1% is not available before 1919. In Prussia, income taxes existed since 1822 (Grant (2014)).

[14]We leave out the data for Japan, which are clearly unrealistic or are defined very differently. Japan's top 1% wealth share of 19 percent just before the War is out of proportion with the results from other countries and Japan's own top 1% income share of almost a third. It would be extremely unusual to have top 1% income share exceed the top 1% wealth share, and to do so by a large margin.

decades before the War. The US top 1% wealth share while increasing is much lower than in both European countries.

Table 3: Wealth concentration in major belligerent countries (top 1% share of wealth)

Decade	UK	USA	France
1860s			49
1870s			48
1880s			49
1890s	71		
1900s	71		56
1910–14	68	44	55
2005–15	20	36	23

SOURCES: World Wealth and Income Database (accessed 25 February 2017).
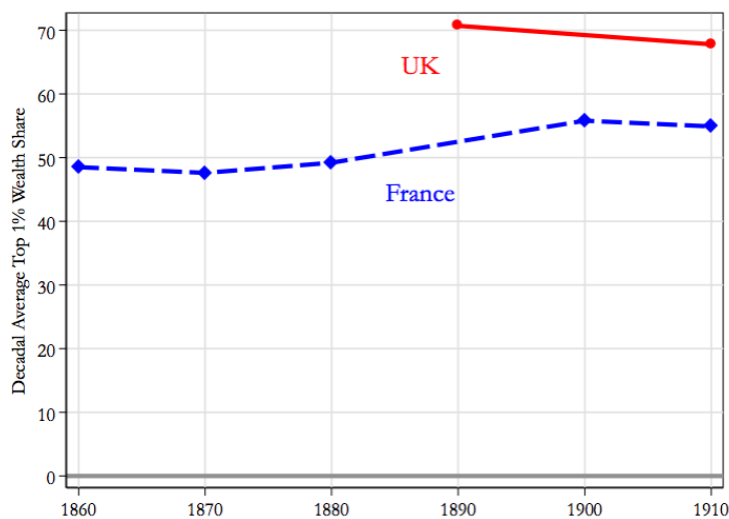
Figure 4: Wealth concentration (share of total wealth owned by top 1% of wealth holders), 1860–1910

Overall, when we summarize the results obtained from the three indicators, they seem to point to high but generally stable wealth and income inequalities. Japan alone exhibits increasing income inequality and income concentration, France shows substantially rising wealth concentration, and England/UK stands out by extremely high levels of both income and wealth inequalities, but without tendency towards their further increase. For both UK and France wealth concentration was at, or around, its historical high in 1914.
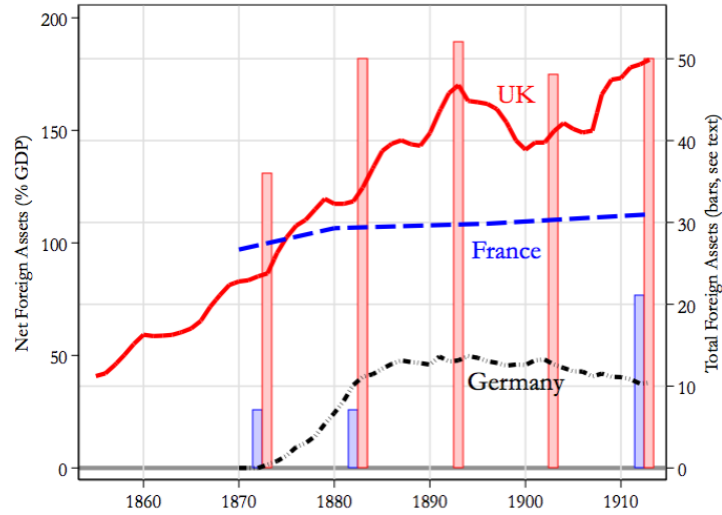
Figure 5: National wealth: net foreign assets as percent of GDP (lines, left axis); French foreign assets as percent of total assets (blue bars, right axis); British foreign and colonial securities on London Stock Exchange (red bars, right axis)

4   The Composition of National Financial Holdings

4.1   Rising share of foreign assets

The line graphs in Figure 5 (measured along the vertical left-hand side axis) plot the evolution of net foreign assets (NFA) relative to GDP before 1913 in the three core countries, using data from Piketty & Zucman (2014). The ratio of net foreign assets to total GDP was larger in France in 1870 than in the United Kingdom—even though the UK controlled roughly six times more territory by 1878. This is quickly reversed, however. The UK displays impressive growth in its net foreign asset position, nearly doubling the share relative to GDP between 1870 and 1892, increasing from 83 percent to 166 percent, while France's position increases more moderately, beginning at 97 percent of GDP and increasing to only 112 percent before the war. Germany also substantially increases foreign asset holdings relative to national income by the 1890s. In 1870 it had no discernible net foreign assets, but by the mid 1880s foreign assets amounted to approximately 50 percent of GDP. However, unlike Britain, its NFA/GDP ratio peaked at 50 percent, before tapering slightly in the early 20th century.

Historical data on Britain's share of net foreign assets, as compared to its total output, are much

more comprehensive than for other countries and illustrate the tremendous accumulation of foreign wealth across its empire between 1855 and the early 1890s. The nearly twenty percentage point decline in foreign assets from the mid 1890s until the turn of the 20th century is likely attributed to the material losses from the Second Boer war. However, afterwards foreign assets surpassed their previous peak of 170 percent of GDP and rose to a new high of 181 percent by 1913.

The bar graphs in Figure 5 (measured along the right-hand side axis) document two additional metrics of foreign asset growth, though only for France (blue bars) and Britain (red bars). The French data represent the stock of foreign financial assets as a share of total assets held by Parisian decedents between 1872 and 1912. (The data come from Piketty et al. (2014) and are reproduced in greater detail in Appendix B; they include all financial assets, both foreign and domestic, as well as the residual amount of non-financial assets.) They show a marked increase in the importance of foreign assets in the estates of wealthy Parisians. Despite aggregate French net foreign assets as a share of GDP not changing significantly overall in this same time period, foreign assets were still becoming increasingly important amongst top wealth holders.

The red bars in Figure 5 describe the total nominal value of foreign and British colonial securities quoted on the London Stock Exchange's official list. (Table B.2 in Appendix B provides asset class decompositions of the Stock Exchange data from Michie (2001).) It is unsurprising that securities listed on the stock exchange in London mimic aggregate measures of British net foreign asset holdings, but it helps establish the clarity of the trends before the Great War.

The relative changes in the importance of all foreign assets as a share of total financial assets between Paris and London (either held by estates, as in Paris, or quoted on the stock exchange, as in London) are impressive. In Paris, between 1872 and 1913, foreign assets became more than four times as large a component in decedent estates, increasing from only 13 percent to 40 percent. Meanwhile on the London Stock Exchange, the importance of foreign assets grew as well. In 1873, foreign (including colonial) assets were already a relatively larger component of total financial assets (36 percent) in London than in Paris (13 percent). This increased to around 50 percent in London by 1883 and fluctuated around this level until before the war.

4.2 Typical portfolio

Before addressing the rates of return on these foreign assets in Section 6, it is important to consider what a typical portfolio allocation may have looked like so that we study returns on the appropriate assets. The most detailed data available, also from Piketty et al. (2014), capture only a subset of French investors, Parisian decedents. Piketty and his co-authors utilize estate tax payments to glimpse into the portfolios of individual rich households (see Table B.1 in Appendix B). Overall, bonds dominate both domestic and foreign financial asset portfolios and their relative importance in foreign financial holdings increases over time. This is less so in domestic financial assets, though bonds still outweigh equities three to one.[15] There are also increasing shares in foreign equity holdings over time, as territorial assets (and markets) grew. Throughout this period, financial assets comprised a steady 62–63 percent of net estates, with the remaining third invested in real estate and a marginal two-to-three percent in furniture. Though foreign assets accounted for only seven-to-eight percent of total assets through 1882, by 1912 the share had jumped to over 20 percent.

Data from Bersch & Kaminsky (2008) reveal that over this same period foreign securities in the leading German stock exchanges were also heavily biased towards bonds. Among foreign assets, 92 percent were bonds and only eight percent equities.

Disaggregated views of the London Stock Exchange securities data provide actual allocations in the UK market by investment type (see Table B.2 in Appendix B). As already noted, a significant increase in foreign assets occurs in the decade between 1873 and 1883, but it tops out in 1893 at 42 percent of the total nominal value of all securities. The bulk of equity investment was made in railroad securities. The consistent increase observed in foreign railway equities is largely driven by listings from US railroads, which accounted for over two-thirds of foreign railroad investment on the exchange by 1913. The nominal value of foreign securities in total plateaus around 40 percent by 1883, and remains practically constant in the three decades before the Great War. As for the foreign asset composition, while bonds are initially important their share declines from 62 percent

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[15]Jordà et al. (2019) only study domestic assets, but, consistent with our determinants of imperialism story, document a steadily falling domestic rate of return on both equities and housing in the decades leading up to World War I.

to 37 percent.[16]

We turn to one final source on British investment to ascertain the relative importance of bonds in foreign investment. Data on 703 "high class" British securities studied by Edelstein (1982), and utilized in Section 7, reveal that bonds consistently play the role of the dominant financial asset amongst both colonial and foreign securities. ("High class" securities are defined as those that are issued by governments or companies with secure reputations as market borrowers.)[17] According to the data, between 1870 and 1900, roughly 60 percent of foreign and colonial "high class" securities were bonds. Between 1901 and 1906, 65 percent of foreign securities and half of all colonial securities were bonds. And in the final years before the War, from 1907 until 1913, roughly two-thirds of all foreign securities and 40 percent of colonial securities were bonds.

Bonds, therefore, are the key asset type we will use to compare domestic and foreign rates of return since they are dominant within the clearly documented rise in aggregate net foreign asset positions amongst the core countries.

## 5 Foreign Asset Holdings Across the Wealth Distribution

Our claim is that it is investors at the top of the wealth distribution who owned most foreign assets and thus earned the lion's share of the greater returns those assets produced (as we will show in the next Section). This theoretical interpretation is supported by empirical evidence from the Parisian decedent data which show that wealthier estates held more foreign assets as a share of total assets than other parts of the distribution. It was also wealthy households, we will argue, that had an incentive to politically support military expansion in order to enforce and secure returns on these foreign assets.

Figure 6 gives evidence of not only the disproportionate share of foreign assets held by wealthy estates (that is, those beginning from around the 75th percentile of the overall wealth distribution), but also the large increase in those foreign asset holdings between 1872 and 1912 across the top of

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[16]At the same time, bonds play an increasing role in colonial securities, going from 29 percent of the nominal value to over 55 percent.

[17]See Edelstein (2010) for details on the selection criteria imposed in his sample selection.

22
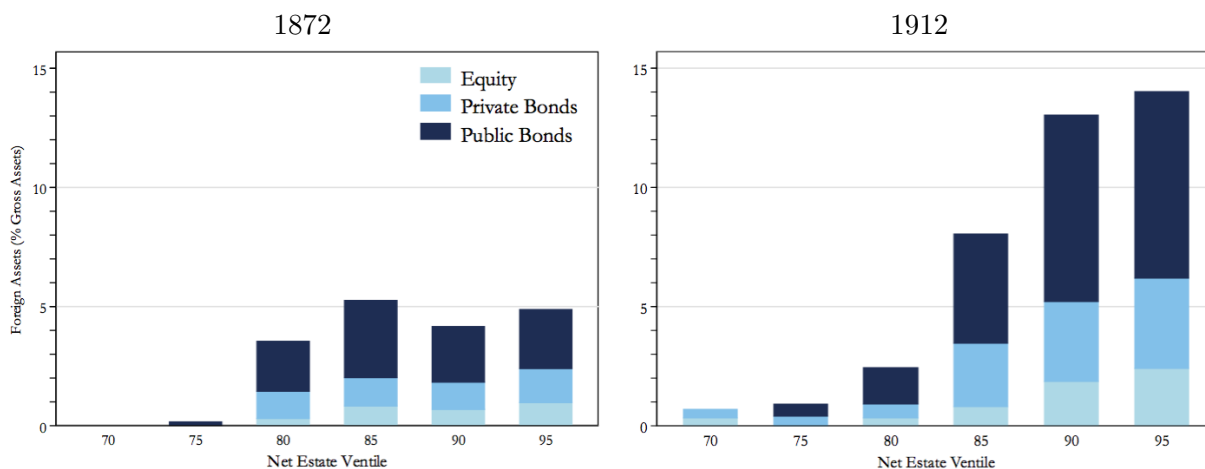
Figure 6: Distribution of Parisian decedents' foreign assets by type (% gross assets)

NOTES: Only Parisian decedents with positive net estate values are included. The data also exclude the top 1% of estates.

the wealth distribution.[18] By 1912 there is roughly a tripling of foreign assets as a share of gross assets. This is almost entirely driven by the top 10% of Parisian estates, from around five percent of gross assets among the richest households to almost 15 percent. However, the increase in foreign assets is likely even greater for the top ventile. The skewness is biased downwards because the data in Figure 6 exclude the top 1% (withheld for anonymity).

Figure 7 presents data on wealthy households in the UK and their holdings of foreign assets. The data are derived from probate records between 1870 and 1902—and thus miss the strong increase in foreign assets by the British after the turn of the century. However, because they are probate records, they capture estates left by elite households. The cutoff value in gross wealth for the bottom probate quartile is 783 British pounds. Using British estate distribution data from Alvaredo et al. (2018) over the same time period, we know this bottom probate quartile is approximately located at the level of households just below the top 5% of the wealth distribution. The third quartile of the probate data would fall just below the top 1% of the British wealth distribution. In other words, Figure 7 is capturing only the wealthiest households, starting at roughly the top 7% and continuing all the way to the top of the distribution. At the same time, it also captures the overwhelming

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[18]Data also exist for 1882, but we do not include them as there is little discernible change from 1872. The magnitude of foreign asset holdings remains the same, only the distribution becomes slightly more skewed towards the top.

SOURCE: Rutterford & Sotiropoulos (2016)
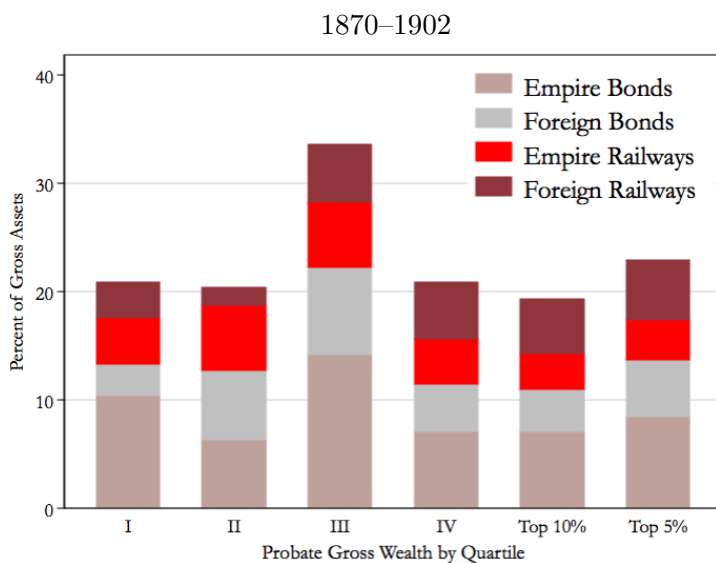
Figure 7: Distribution of British probate gross wealth by quartile: foreign and imperial assets by type (% gross assets).

NOTES: Quartiles are computed within probate sample, which begins at the 93th percentile of the overall distribution.

majority of British wealth. From Alvaredo et al. (2018), we know that the top 10% of estates owned 96 percent of all wealth. Overall, rich British households have a similar investment portfolio to that of wealthy Parisians, composed of increasing shares of foreign assets. The share is never less than 20 percent of gross assets and at the end of the period reaches almost a third.

What we have shown in the previous two sections is that the first era of globalization coincided with two major trends in the half-century before the Great War: significant increase in net foreign assets as a component of national wealth; and the increasing concentration of foreign asset holdings among the richest households. Next, we provide evidence that returns on foreign assets, even when risk-adjusted, earned superior returns over domestic assets.

6   Rates of Return on Foreign Assets

Was the export of domestic capital driven by a search for higher yields? That is, was Lenin correct in ascribing capital export to "overripe" capitalism finding a "field for 'profitable' investment"(Lenin (1917)[p.71])? We interpret "overripe" in pseudo-Marxist terms, equivalent to a decreasing domestic

rate of return relative to foreign rates, and document meaningful differences between domestic and foreign rates of return for the "core" countries in this Section.[19]

A precondition for a difference in risk-adjusted rates of return is some type of capital market failure. Importantly for generating a pattern that foreign rates of return are higher than domestic rates of return, and foreign assets are held by the rich, is that domestic credit market failures prevented rich agents from lending to poor agents at home, even though they could invest in colonies abroad. It is not difficult to believe that standard information problems, such as collateral constraints, in the domestic credit market might have plagued late 19th century core economies, making the foreign investment margin seem more attractive than the domestic.

There exist a number of competing theories about why foreign, and in particular colonial, rates of return might exceed domestic returns in the advanced economies of the late 19th century. One is that advanced economies have a larger availability of capital and accumulated savings and thus lower interest rates. Another is that colonies have cheaper labor and lower land rents.[20] This section will not point to one particular narrative over another, but instead present evidence for the systematic superiority of foreign, relative to domestic, rates of return on bonds, which, as we have seen, were the most common foreign asset type held by investors.

Given the preference for investing in bonds during the first era of globalization, how different were foreign and domestic bond returns? To answer this we examine historic total bond return data from the Global Financial Data (GFD) database. The data are compiled from a wide array of primary historical sources and are inclusive of reinvested interest and coupon payments, and adjusted for inflation—however negligible in the 19th century. These real total returns on bonds are separated into foreign bond portfolios by simply excluding the three belligerents, the UK, France and Germany, and then calculating a straight arithmetic average of all the remaining country bond

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[19]Of course, a precursor to the Lenin hypothesis, as discussed in Section 1, is Hobson's conjecture that excess savings, from high domestic inequality, led to overseas investment and imperialist tendencies. Edelstein (1982) finds conditional evidence of this in the UK between 1870 and 1913, arguing that the net foreign investment booms of 1877–1890 and 1903–1913 were driven by the "disjuncture between desired savings and desired domestic investment" (p. 192).

[20]This difference in rates of return may belie an alternative investment motive: diversification. Some evidence is provided by excerpts from contemporaneous financial publications in Chabot & Kurz (2009) that urge investors to broaden their income flows and insulate themselves from domestic downturns. A covariance matrix of average monthly returns across eight categories of assets, calculated from a detailed dataset of 518,224 individual 28-day stock and bond returns between 1866 and 1907 by the authors, provides more evidence of the generally counter-cyclical behavior of domestic and foreign markets.

returns. Ideally, these foreign bond returns would be weighted according to actual asset allocations in each metropole's aggregate foreign bond portfolio. These weights, however, change substantially in our time window (as seen in the few available data points in Table B.2 Appendix B, for example) and we only have snapshots of what this distribution may have looked for each of the core countries. Thus we rely on a simple average of all foreign bond returns.

Our estimates of the return rate spread, or the difference in real rates of return between foreign and domestic bonds, between 1870 and 1913 are summarized in Figure 8, below. The spreads in real return rates are shown as five-year moving averages, where positive values indicate greater foreign returns and negative values favor domestic returns. Averaging across 28-day mean returns in their large dataset, Chabot & Kurz (2009) present the following hierarchy of bond return rates: $B_{US} > B_{for.corp.} > B_{for.gov} > B_{UKcorp.} > B_{UKgov}$, (where $for.$ stands for foreign, gov for government, and $corp$ for corporation) which broadly mirrors our own findings with respect to government bonds.
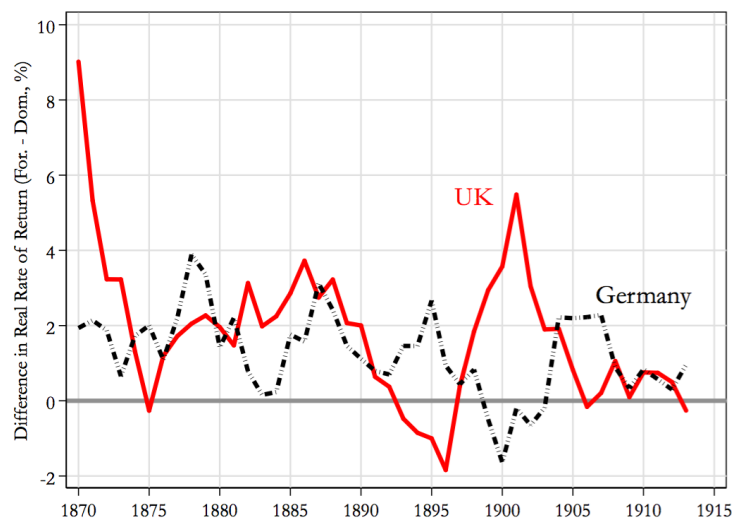
SOURCE: Global Financial Data, Total Return Bond Indices

Figure 8: Real return rate spread between foreign and domestic bonds

NOTES: Estimated real rates of return on bonds are five-year moving averages. Foreign bond portfolios exclude the UK, France, and Germany, and consist of average real bond returns of the following countries: Australia, Austria-Hungary, Belgium, Canada, Denmark, India, Italy, Japan, the Netherlands, Norway, Spain, Sweden, South Africa, and the US.

Examining Figure 8, two things are apparent. First, the spreads on real rates of return from bonds exhibit strong cyclical behavior for each country—even when smoothed with a five-year

moving average. Fluctuations in British return rate spreads beginning in 1890, for example, coincide with a brief bubble in Argentine investments, which crashed (the Baring Crisis), and a subsequent expansion in 1893 fueled by Australian gold speculation, which suffered a steeper crash that spring after no lender of last resort materialized.[21] The increase in foreign bond returns relative to British bond returns near the turn of the century is concurrent with the 1899–1902 (Second) Boer War in South Africa. The relatively steep decline after the Boer war is examined in greater detail in Section F.

The second important takeaway is that the spreads in real rates of return from bonds are positive, on average, for both the UK and Germany. Averaging the spreads in real rates of return across the entire time window, from 1870 until 1913, we find that British investors had nearly 1.9 percent to gain by investing abroad (and 1.6 percent by investing in colonies only). Germans could expect, on average, to earn 1.4 percent more by investing abroad.

In a recent working paper, Grossman (2017) utilizes the large, granular dataset of historic security data from Investors Monthly Manual and digitized by the Yale University International Center for Finance to study historic British financial returns. Though our data, in Figure 8, utilize aggregated total return bond indices, Grossman's results using individual security data mirror our own, namely that non-British rates of return dominated for a period of 40 years, from 1869 until 1909. Grossman's results also reveal a strong dip in the rate of return spread in the 1890s, though it remains positive on average over that decade—as it does in our case. As a robustness check, Grossman shifts his decades, which originally begin in 1869, to match the periods used by Edelstein (1982). (We turn to the Edelstein securities data, below, in Section 7, to estimate risk-adjusted return spreads.) With the exception of British returns dominating foreign returns during 6 years between 1870 and 1876, Grossman's data still reveal superior non-British returns for all other periods until 1910.

Studying summary data from Esteves (2011), and calculating the difference in real rates of return between "non-sovereign and non-colonial foreign securities" issued for sale on the Paris bourse and a domestic French bond, we find superior returns on foreign equities and bonds for French investors as well. Figure 9 plots the spread in the real rates of return between the foreign security portfolio

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[21]Kindleberger & Aliber (2005)

SOURCE: Esteves (2011), Tables 5–7.
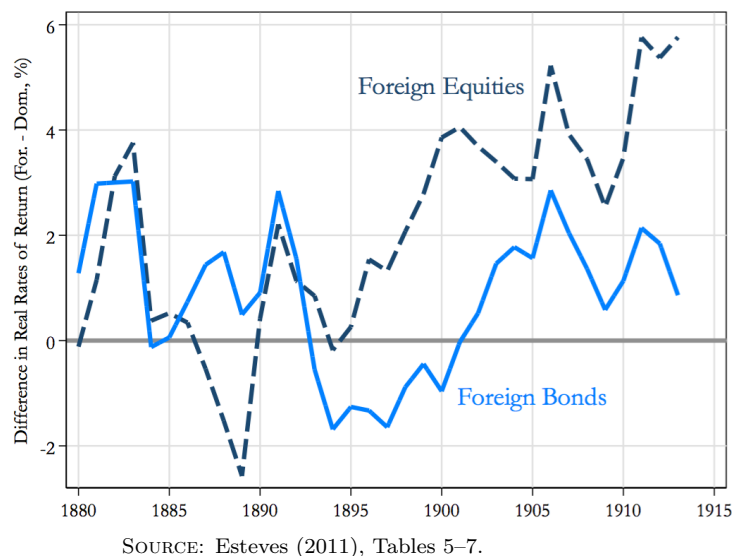
Figure 9: Real return rate spread between French foreign securities and domestic French bond

relative to domestic French bonds. It is generally positive and increasing. The superior returns of foreign equities are even greater than those of foreign bonds, beginning in the mid-1890s.

Note that although the values in Figure 9 are annual, and not moving averages as in the previous graph, the vicissitudinous spreads observed for Germany and the UK also transpire in the French data. For example, the enormous swing in the spread, from a local maximum of nearly four percent in 1882 (and thus greater foreign returns) to over negative two percent for foreign equities by 1889, parallels a French foreign investment bubble into southeastern European bank stocks, fed by short-term lending to brokers and bursting in 1882.[22]

Overall, the Esteves data suggest foreign equities of French investors average a 2.2 percent higher real return than French domestic bonds over the entire time period. Foreign bonds average 0.9 percent better.

It could therefore be said that each of the three core countries exhibits "overripe" domestic markets in comparison to foreign alternatives in the 30 to 40 years before the war.

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[22]Kindleberger & Aliber (2005)[pp. 77–80]

7   Risk-Adjusted Rates of Return

We now consider the possibility that the impressive differences between foreign and domestic returns in the previous Section could be attributable to risk. Financial models assume expected rates of return are increasing in the level of risk. Therefore, foreign asset risk premia may be one important reason for the observed average higher rates of return on foreign bonds (and equities, in the case of France). One such risk is sovereign default, or severe price fluctuations of bonds more broadly. If a country was more likely to default on its international obligations or fluctuate severely in prices, investors would demand a higher rate of interest in order to consider the investment. (They may also prefer a growing military to help decrease such risks, as we argue below.)

While both foreign bond and equity rates of return appear to dominate domestic British returns, we test whether or not higher foreign returns were actually a reward for potential financial losses. That is, we ask if superior foreign returns were driven by risk premia. Edelstein (1982) finds that, overall, average risk-adjusted non-domestic returns between 1870 and 1913 generally outperformed domestic ones in Britain. His risk-adjusted return represents the residual from a simple linear model between realized returns and the covariance between a security's return and the market's.[23]

In order to compare average rates of return between securities with varying risk profiles, we calculate the Sharpe ratio. The ratio, a useful measure to compare relative returns as derived in Sharpe (1964), can be written as

$$S_{kt} = \frac{\overline{R}_{kt} - R_{ft}}{\sigma_{kt}}, \tag{4}$$

where $\overline{R}_{kt}$ is the average realized rate of return for portfolio k in year t, R_f represents the risk-free rate for the same time period, and σ_{kt} the standard deviation, or risk, of portfolio k's returns in year t. Using the Edelstein data on realized real rates of return for 703 British and foreign securities, we compare domestic, foreign, and colonial risk-adjusted returns for both bonds and equities for each year between 1870 and 1913.[24] Figure 10 plots the results, showing the differences in Sharpe ratios

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[23]See Edelstein (1982), Table 8.6.

[24]Some British crown colonies within the sample became dominions between 1870 and 1913: Australia (1901), New Zealand (1907), and South Africa (1910). Each is counted as either a foreign country or colony for the relevant time period in our analysis. Canada became a dominion in 1867 and is thus treated as a foreign country throughout.

between foreign or colonial portfolios and domestic (British) ones, both for bonds and equities.[25] Higher values in the spread indicate a superior foreign return relative to domestic returns after accounting for both systematic and idiosyncratic risks faced by the portfolios.
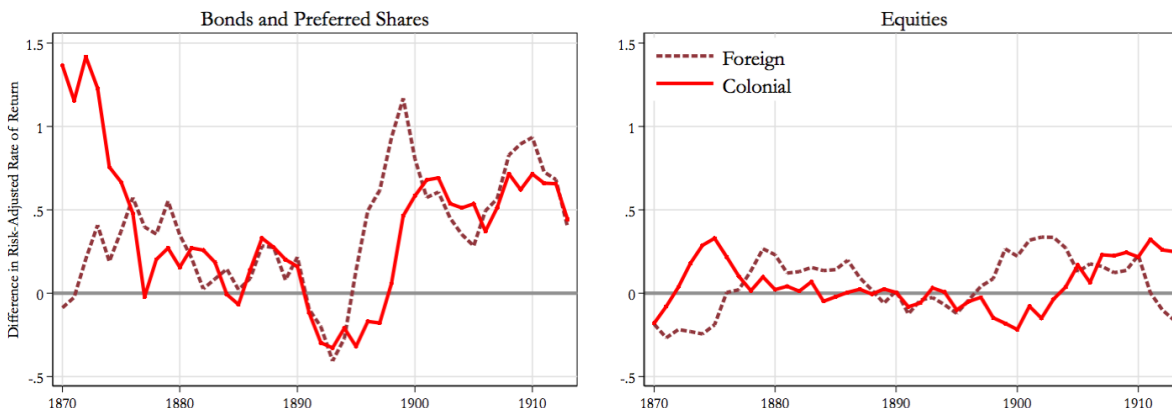
Figure 10: Risk-adjusted return rate spread between foreign or colonial and British securities

Some revealing trends emerge. First, bonds and preferred equity shares (both forms of long-term securities) earn better risk-adjusted returns than regular equities. (The number of equities versus bonds in the overall dataset is comparable, 320 to 383.) Second, both foreign bond and colonial bond realized returns dominate domestic returns after adjusting for risk. This is true in nearly every period, except for the early-to-mid 1890s, the finding that parallels what we show in Figure 8 above. The superiority of foreign and colonial bond returns accelerates, reaching some of their highest average levels in the late 1890s through 1913—the height of foreign competition for colonial assets.

Equity returns, on the other hand, are less consistently dominated by colonial firms. While they gain an advantage relative to domestic equity returns in the 1870s, the advantage regresses to zero in the 1880s and early 1890s. It even becomes negative during the second Boer war. It is only after the conclusion of the war that colonial equities earn a superior risk-adjusted return relative to domestic ones. This supports our contention that military intervention positively contributed to economic returns, thus incentivizing wealthy savers to support military expansion. Non-colonial foreign equities, however, largely outperform domestic equities, with exceptions only at the very

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[25]Five year moving averages are presented for all Sharpe ratios since the series are volatile and sensitive to business cycles.

beginning and end of our time window.

The aggregate trends outlined above in Figure 10 are generally consistent with those observed at the sector level. That is, we estimate the spread in risk-adjusted rates of return using the Sharpe ratio while specifically looking grouping by securities by financial equities, social overhead capital bonds and equities (which are primarily railroad and telegraph firms), and government bonds. Results are all presented in Appendix C, Figures C.1–C.4. The difference in risk adjusted returns between foreign and colonial financial equities closely aligns with Edelstein's results.

8   The Pre-1914 Empirical Relationship Between Inequality, Foreign Assets, and Militarization

Finally, we examine the cross-country correlations between inequality, foreign assets, and the military, corroborating the economic origins of pre-war militarism. Given the severe endogeneity, sample selection, finite-sample, and measurement error problems, these correlations should be taken as suggestive. While there is limited cross-sectional variation, the use of cross-country data still allows us to see the broad patterns across countries: were the countries most involved in foreign investments the ones who expanded their militaries the most.

8.1   Were domestic wealth and income inequalities associated with accumulation of foreign assets?

Perhaps the key idea which links high inequality ("misdistribution") of income and wealth in late capitalism and imperialism is decision of the rich to invest more in foreign assets, which we show in the model, is a consequence of imperfect credit markets. In this section we show that inequality was correlated with the NFA/GDP ratio in the pre-1914 period, using the patchy and incomplete data that are available. We show the robustness of this correlation in regressions presented in Appendix E, limiting ourselves to descriptive time-series graphs for the two countries that we have the best data for, and which happen to be the most important belligerents, the United Kingdom and Germany.

Our theory is primarily about wealth inequality. The wealth inequality data are overwhelmingly from the UK and there the share of NFA has tended to move broadly together with concentration of wealth as shown in Figure 11 (as indeed argued, although without appropriate data, by Hobson). But this relationship also appears in cross-country variation. In fact, the ranking by wealth concentration (UK with approximately 92 percent in the hands of the top decile, followed by France with 84 percent and the US with 78 percent) corresponds exactly to the ranking of the three countries' NFA/GDP ratios (UK between 150 and 180 percent, France with 112 percent and the United States with -11 percent).
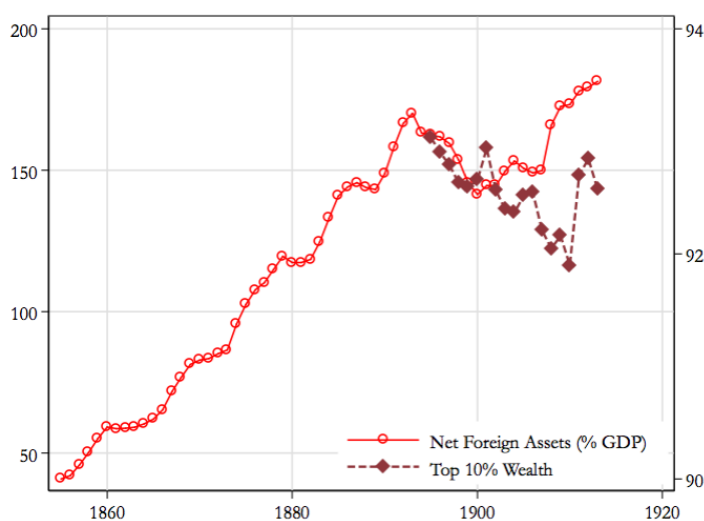

Figure 11: United Kingdom, 1855–1913: The ratio between net foreign assets and GDP, and top 10% wealth concentration

Consider now the use of income Gini coefficient instead of top 10% wealth. The most abundant data here is from Germany. The German relationship between NFA/GDP and Gini is shown in Figure 12, and displays a clear positive correlation. In Appendix E, we show that an increase in income inequality of one Gini point across countries is associated, on average, with about eight percentage points increase in the NFA/GDP ratio.

Appendix E also shows a variety of specifications exploring this variation. Throughout the dependent variable is the ratio between the stock of foreign assets held by a country and its GDP. We use two inequality variables (separately): Gini coefficient for income distribution, and the share of wealth held by the top decile (that is, by the 10% of the richest wealth-holders). We use top 10%
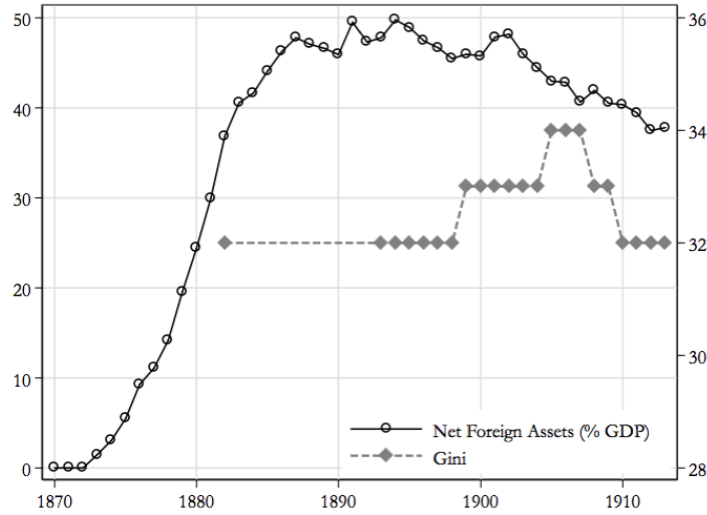
Figure 12: Germany, 1870–1913: The ratio between net foreign assets and GDP, and income Gini

in preference to top 1% because, by the end of the period we consider, significant wealth has spread beyond the top 1% and as the results of Piketty et al. (2014) on ownership of foreign wealth by income groups in France discussed above show, investments in foreign assets were not made only by the top 1%. We also use two controls: estimated level of democracy (Polity IV variable "democracy" which is calculated as democracy–autocracy score and ranges from +10 (10–0) to -10 (0–10)) and GDP per capita in 1990 PPP dollars obtained from the 2013 update of the Maddison project. For inequality variables we expect a positive correlation with NFA/GDP. We also expect that richer countries will be more likely to have greater savings and to look for investment opportunities abroad more, while we do not have a prior expectation for the role of democracy.

Overall, we retrieve in five out of six regressions a highly significant positive association between inequality measures and accumulation of net foreign assets, a borderline significant positive relationship in one case, and the coefficients that are relatively high for cross-country regressions but (understandably) smaller when we use country fixed effects. GDP per capita is generally (4 out of 6 cases) positively correlated with greater share of foreign assets, but its effects are not statistically significant. This result may not be very important per se, but acquires, we believe, greater significance when contrasted with the results we obtain for the inequality variables. It is very clear that in a "contest" between GDP per capita and inequality as to which one may be more strongly associated with greater accumulation of foreign assets, it is the latter than wins. It is an

outcome consistent with the Hobson-Lenin hypothesis.

We turn next to testing the second part of the hypothesis: do countries that invest more in foreign assets tend to have a larger military?

8.2 Was a greater share of foreign assets associated with more military?

The empirical evidence of the association between foreign assets and militarization is introduced graphically and then supported with linear regression results. The data are assembled from a variety of sources, beginning with the Piketty & Zucman (2014) data on historic national wealth levels. This provides not only net foreign assets (as a percent of GDP) but also net aggregate wealth-income ratios—which serve as a control variable. Our key dependent variable, military personnel as a share of the total population (measured in logs), comes from the fourth version of the collaborative *Correlates of War Project* database on National Material Capabilities.[26] As in the previous section, we utilize the historic GDP per capita data from the Maddison project as well as the Polity IV project's measure of democracy as additional controls.[27]
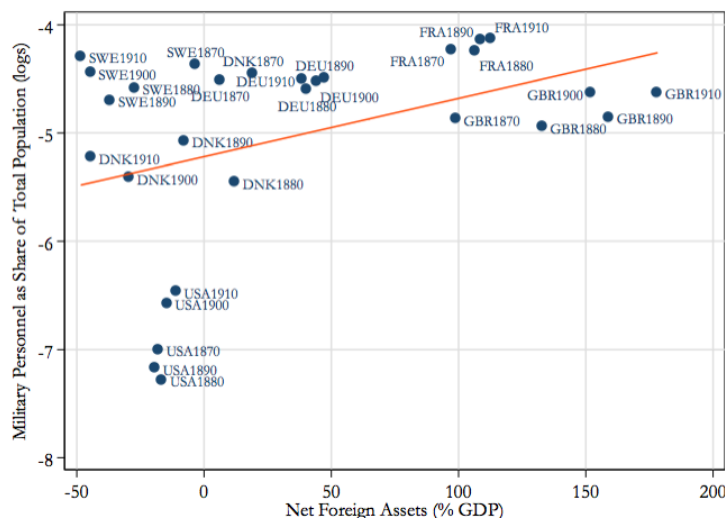
Figure ?? plots the relationship between military personnel and net foreign assets (again, as a share of GDP). All the core countries are included along with Denmark, Sweden, and the United States. Thus our data sample captures not only belligerents but also neutral yet relatively wealthy observers of the war. The data in this section are much less sparse than the inequality data in the previous section, which means that we can rely more on formal econometric analysis.

Figure ?? plots decadal averages of military personnel and net foreign assets for each country and includes a linear fit but excludes any control variables. Examining only the decade-long averages plotted, the relationship is clearly positively sloped. (The slope of the regression line is significant at five percent.) While it appears that this is mostly driven by the low foreign asset values and low militarization of the US observations, removing them retains the significantly positive relationship. Both the French and German observations are clustered above the average, while the British are below it, reflecting the below average size of the British military given its very high level of net foreign asset holdings. If each of the three belligerent countries were examined independently, each

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[26]See Singer (1987) and Sarkees & Wayman (2010).
[27]See Project (2013) and Marshall et al. (2015).

Figure 13: Military personnel as share of total population and net foreign assets, decadal averages: 1870–1913

country exhibits the positive relationship between net foreign assets and militarization individually. The positive relationship remains, and is significant at the one percent level, after controlling for net national wealth as a share of GDP, GDP per capita, and country and year fixed effects.

We believe military conscription data are most robust for empirically testing the relationship between foreign wealth and military since men are easier to count than expenditures. However, we also include the binned scatter plot of each country's total naval tonnage (in logs) versus its net foreign assets in Figure 14, both measured as decadal averages. The historical data on total naval tonnage from Crisher & Souva (2014) measure the total displacement of a country's active military ships. Again, a strongly positively sloping relationship exists, and remains so when controlling for net wealth as a share of GDP, GDP per capita, and country and year fixed effects, lending further support to the empirical basis for foreign wealth leading to greater militarization between 1870 and 1913.

Table 4 presents the estimation results from a simple linear model regressing military personnel as a share of the total population on net foreign assets as a share of GDP.[28] Country and year fixed effects are used in each model estimated, though the significance, magnitude, and sign of the

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[28]The estimation method applies Driscoll & Kraay (1998) standard errors, which account for heteroskedastic, autocorrelated, and cross-sectionally dependent disturbances.
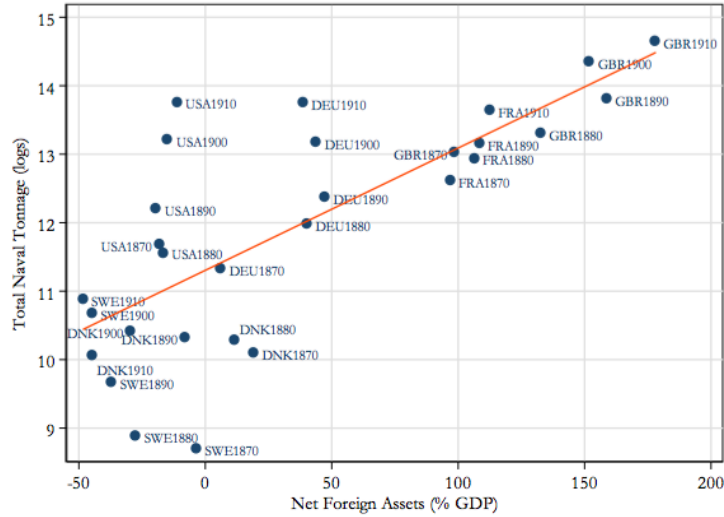
Figure 14: Total naval tonnage and net foreign assets, decadal averages: 1870–1913

Table 4: Linear estimates of military personnel as share of total population

	(1)	(2)	(3)	(4)
Net Foreign Assets / GDP	0.005**	0.005**	0.005**	0.004**
	(0.002)	(0.002)	(0.002)	(0.002)
log GDP Per Capita (1990 GK USD)		0.201	0.523	0.280
		(0.631)	(0.787)	(0.836)
Wealth-Income Ratio			0.001	0.001
			(0.001)	(0.001)
Democracy				0.020
				(0.021)
Constant	-5.015***	-6.496	-9.566	-7.756
	(0.095)	(5.204)	(6.954)	(7.305)
Country and Year FE	Yes	Yes	Yes	Yes
Within-R^2	0.412	0.413	0.431	0.439
Countries	6	6	6	6
Obs	184	184	183	183

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

association persists without reliance on fixed effects. Our results support the finding of a positive and significant association between a country's net foreign asset holdings (as a share of GDP) and military personnel between 1870 and 1913. The effect holds while adding successive control variables, such as GDP per capita, and a country's aggregate wealth-income ratio. Though it is conventional to analyze net foreign assets (a stock) as a share of GDP (a flow), considering them as a share of total net wealth (and thus a stock divided by a stock) in the regressions such as in Table

4 yields nearly identical results (not shown here). Additionally, regressing naval tonnage in place of military personnel in each of the specifications also yields positive and statistically significant and meaningful results (also not shown).

In conclusion, net foreign assets remain significantly and positively related to military sizein terms of personnel or total naval tonnage. These empirical consistencies are also robust to estimation method, such as two-way fixed effects panel estimators. In conjunction with our evidence above on the links between inequality and foreign assets, this correlation further supports the economic theory of imperialism: high inequality begat high foreign assets, which begat incentives for military control and protection, which begat armaments and militarization.

The size of the coefficients in Table 4 suggests that a 10 percent increase in a country's net foreign asset holdings as a share of GDP would, on average, increase the number of military personnel as a share of the country's total population by 0.05 percent. Given the British average of 0.88 percent, French average of 1.54 percent, and the German average of 1.09 percent, the effect is meaningful.

While we highlight data on militarization, this should not be taken to be the only, or even the primary mechanism by which foreign asset holdings, and ultimately domestic wealth inequality, inflame geopolitical tensions. The fraction of the population in the military is simply one (measurable) consequence of the drastic increase in foreign asset exposure experienced by the core countries in the late 19th century. Battleships to secure trade routes (represented by naval tonnage in Figure 14), treaties among minor and major powers, colonial conquests both formal and informal, were all potentially consequences of domestic political pressures to secure promised income streams from foreign assets. These forces were neatly summarized by Bernhard von Bülow, German State Secretary for Foreign Affairs, and future Chancellor, in defense of the second naval bill in December, 1899:

> When the English speak of a greater Britain,' when the French talk of The New France,' when the Russians open up Asia for themselves, we too have a right to aspire to a greater Germany. If we do not create a navy sufficient to protect our trade, our natives in foreign lands, our missions and the safety of our shores, we are threatening the most

vital interests of our nation. In the coming century the German people will be either the hammer or the anvil.[29]

9   Conclusion

In this paper we have presented empirical evidence for imperialist theories of the outbreak of World War I. We find that they stand up reasonably well to scrutiny. The belligerent countries exhibited prior to the War very high levels of income and wealth inequality (actually, in most countries inequalities were at their historical peaks); the holdings of net foreign assets expanded absolutely and relatively; such assets were held almost entirely by the rich; and foreign assets bore higher average returns than similar classes of domestic assets, even adjusting for risk. We also find evidence that countries that were more unequal owned more foreign assets and those that owned more foreign assets (as a share of their GDP) kept larger armies. Thus, all the ingredients for a war were present. This does not mean that the war had to break out in 1914: it could have broken out at a different date, or a different place, or perhaps not at all. We simply argue that all prerequisites for a war were there, and had clear economic rationales.

The interest in the economic forces leading to the war is natural given contemporary parallels. Like today, the pre-1914 period was characterized by rising inequality within countries as well as newly emerging industrial powers challenging incumbent rich countries for economic and territorial influence. Brunnermeier et al. (2018) explicitly draw parallels between US- China rivalry today and UK-Germany rivalry in the early 20th century. Germany conflicted with England over international technological standards in telegraphs, access to frontier intellectual property (with Alfred Krupp masquerading as an aristocrat to gain access to British metalworking plants), German vulnerability to British (and French) financial networks, and the use of infrastructure (e.g. a planned Berlin-Baghdad railway) to create trade routes immune from imperial competition. Yet, they do not note the similar increase in inequality in both countries in both time periods. While we don't believe the imperialist model we have constructed is directly applicable to contemporary geopolitics, rethinking a role of inequality in generating international rivalries may be a fruitful line of inquiry.

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[29]Luxembourg, Rosa (1916), The Junius Pamphlet, available online: https://www.marxists.org/archive/luxemburg/1915/junius/, Chapter 3.

The theory we investigate here is different from the approaches that have recently been popularized by Thomas Piketty (2014) in *Capital in the 21st Century*, and by Walter Scheidel (2017) in *The Great Leveler*. Both books highlight the role of modern warfare (in Piketty's case explicitly World War I) in effecting reductions in income and wealth inequalities. The mechanism is well-known: destruction of physical assets, increased taxes to pay for the war, hyperinflation, nationalization of property. These discussions focus on the effect of major wars on inequality. We were here however concerned with the origin of World War I and how high inequality might itself have led to the war. This is why we consider imperialist theories of the war to be "endogenous": they argue that the seeds of wars exist within highly unequal capitalist societies themselves. As the classical theorists of 19th century imperialism argued, domestic inequality can drive foreign war.

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Appendices - ONLINE ONLY PUBLICATION

A Income inequality in England/Great Britain, United States and Prussia/Germany

A.1 England/Great Britain

English/British income inequality data are more plentiful than for other countries, principally thanks to the social tables (a technique that was created in England by Gregory King). English data are also important because they portray the evolution of inequality in the first industrializing country in the world, and they thus acquire an importance that goes beyond a simple country study.

The key sources of English/British data are, as already mentioned, the social tables, and toward the end of the 19th century national Censuses combined with wage, rent and other data. We use here seven data sources, named after their authors: Gregory King's for 1688, Joseph Massie's for 1759, Patrick Colquhoun's for 1801–3, William Smee's for 1841, Dudley Baxter's for 1867 (both Smee and Baxter estimates were based on Censuses), Arthur Bowley and Josiah Stamp's for 1880, and finally Bowley, Stamp and Guy Routh based on the UK Census for 1911–3. The last three estimates cover Great Britain and are the ones that we use here (to construct Table 1). However, to get a longer-term overview, it is useful to compare them with the earlier England and Wales estimates.
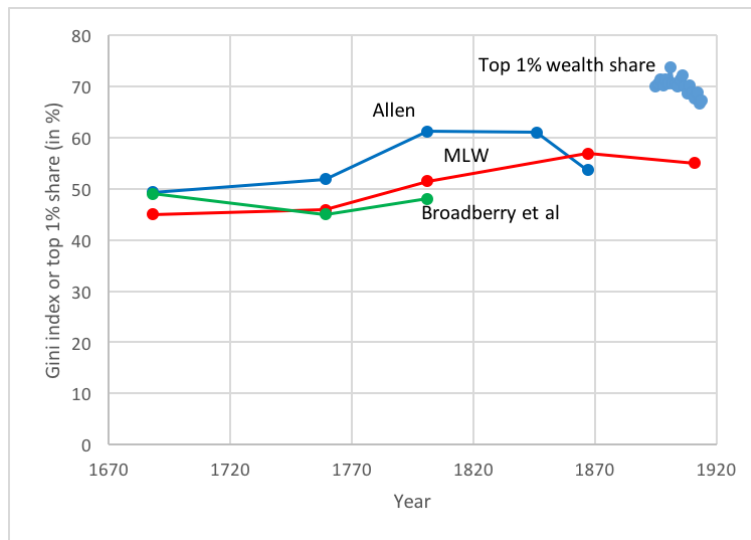
Figure A.1: English/British income inequality 1688–1913 (based on social tables) and top 1% wealth share (1895–1914)

Figure A.1 shows the estimates of English/British inequality over the period 1688–1911 by different authors. They are using the same underlying social tables. The difference in results stems from two types of adjustments that authors make to the original social tables. In order to ensure social group consistency over time (that is, to have the same social groups included over a longer period), some authors like Allen (2016) and Broadberry et al. (2016) recombine various social groups, sometimes taking several groups and combining them into one. This creates some (even if often small) divergence between their Ginis and the Ginis calculated directly from the original tables. The second type of adjustment made by researchers is an attempt to make the social tables

fit more closely the modern survey approach by adjusting for the average household size of different groups. In the original data, some social groups (e.g. the top income groups in Gregory King's table: temporal lords, baronets, spiritual lords) have an average household size in double digits, significantly greater than the others. Once we move to a Gini calculated on a per capita basis, which gives a much more realistic idea of inequality (as in Milanovic et al. (2011)) the results will again diverge from the original tables. This explains why different authors come up with different inequality estimates while working with the same underlying "material." These differences in results may also imply a somewhat different reading of the evolution of English/British inequality in the 18th and 19th centuries.

MLW results shown in Figure A.1 build on the Lindert & Williamson (1983) reworking of the British social tables. They display sustained increase in income inequality over almost two centuries with a peak occurring in the last third of the 19th century, followed by a slight decline afterwards.[30] In a recent paper, Allen (2016) took the same social tables, but reorganized the social groups, and Ginis calculated from his tables are somewhat higher.[31] More importantly, they show a high plateau of inequality lasting over the first half of the 19th century and the decline beginning earlier, perhaps already by 1850. Although the differences in Gini levels between MLW and Allen estimates are not very large, the interpretation of inequality movement is different. According to Allen, the Industrial Revolution, which accelerated after the end of the Napoleonic Wars, just kept British inequality at a very high level, but did not increase it as the MLW data imply. Finally for completeness, we show the Broadberry et al. (2016) recent results which cover only the period up to 1800 and are based on a yet a different reworking of the social tables.

As an additional check on income inequality data, we show in A.1 the annual data from 1895 to 1914 of the top 1% wealth share. The top 1% possessed, as we have already seen, an extraordinary high share of British wealth (around 70 percent), but that share displays, after the turn of the century a slight downward tendency. By the end of our period, it was down to 67 percent. In fact, after 1907, top 1% wealth share remained below 70 percent in all years, while before 1907, it was always at 70 percent or above.

A.2   United States

The situation with the United States is simpler because we have only one consistent series of social tables (and one set of calculations based on them; Lindert & Williamson (2016)). According to these data, US inequality steadily rises from Independence to about 1860–1870 when it reaches the peak of 51 Gini points. It is worth mentioning that the US peak, calculated from the same type of data and from about equally detailed sources, is substantially lower than the British peak, which occurs around the same time and reaches, according to both Allen and MLW estimates, around 60 Gini points.

By 1913, US income inequality was slightly less than in 1870 although one needs to be cautious there since the datum for 1913 is a regression estimate based on the long-run relationship between the Gini, rate of unemployment, and the top 5% share of fiscal income (Smolensky & Plotnick

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[30]The data are extremely sparse and we are talking here of changes as if they took place incrementally and over the entire periods while in reality, had we had the data for all the years, we would have certainly found periods of increases or declines. When we simply connect two data points, much separated in time, we obviously miss the changes in the intervening years.

[31]Also, to keep comparability with the earlier social tables, Allen modifies Smee's table to include only England and Wales (rather than the entire Great Britain).

(1992)) and thus methodologically quite different from the Lindert-Williamson social tables. Finally, it is important to mention that Lindert-Williamson analysis includes slaves throughout (that is, until the Emancipation in 1865) with their estimated received and imputed incomes.
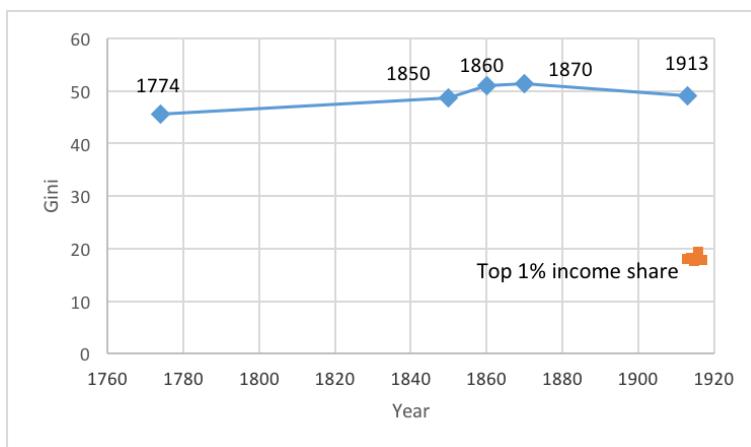

Figure A.2: US income inequality 1774–1913 (based on social tables except 1913) and top 1% income share (1913–1917)

US fiscal data are available from 1913 and in Figure A.2 we show them up to 1917. There is not much variability there: the top 1% income share stays at 17–18 percent throughout. A comparison with Great Britain is difficult to make because the first equivalent estimate for the UK is from 1919 and thus includes the effects of the war. However, for the top 1% wealth share, we do have one estimate for the United States (1910) and the share there (44 percent) is much inferior to the one that we find for Great Britain (around 70 percent). Thus, it seems that at the eve of World War I, both income inequality and wealth concentration (and especially the latter) were much lower in United States than in the Great Britain. Both countries also show steady and high income inequality and income or wealth concentrations with all of them being on a high plateau rather than either evincing a tendency to go up or down.[32]

A.3 Prussia/Germany

The data for Prussia come from fiscal sources studied by Grant (2014). Because of the changes in the fiscal rules (including the variable threshold income after which direct taxes are assessed), the data before 1891 are not directly comparable with those after 1891. However, there is a consistent series from 1891 until 1914. That series has been "augmented" by other information, such as rural incomes, wages of low-skilled workers and the like, to generate an estimate of the overall income distribution. Based on such "augmented" data Wavell Grant calculates annual Ginis. What is strikingly different from the results for Great Britain and the United States is a very low level of inequality, staying throughout the period at under 35 Gini points and dropping as low as 32 on the eve of the War. This is less than two-thirds of the British level of inequality at the same time. It is impossible to say whether the inequality level of Germany as a whole might have been greater than for Prussia alone, but even so, it is unlikely that it would have reached Ginis of above 50 that we find for the US and Great Britain.

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[32]An exception to that may be decreasing wealth concentration in Great Britain.
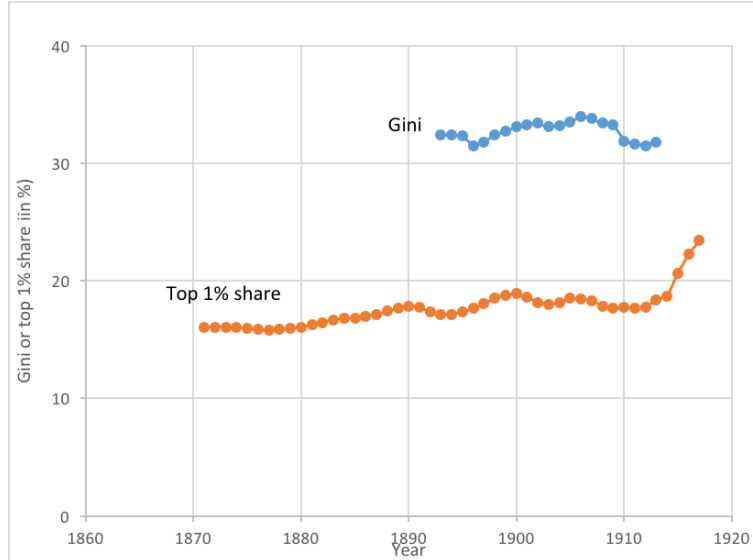
Figure A.3: Prussian income inequality 1893–1914 (based on "augmented" fiscal data) and top 1% German income share (1871–1917) calculated from consolidated fiscal data

More important however is the evolution of inequality. Over the period we consider here inequality seems to have been remarkably stable, whether estimated on the basis of Ginis calculated form the overall Prussian distribution, or from the all-German top 1% share.[33] The all-German top 1% income share from 1871 onward in Figure A.3 is estimated by Charlotte Bartels (2017). It combines fiscal data from eight German states which all had until 1920 different fiscal systems. Bartels' unified series does not include the data from the states that represented about 10 percent of German 1871 population. The all-German top 1% share in Figure A.3 is slightly rising from 16 percent in 1871 to just below 20 percent on the eve of the War. This is similar to the US results. Combining this with the finding of an overall much lower inequality in Prussia than in the US, one could conclude that top-heaviness in both countries was about the same but that there was more income homogeneity among the rest of the population (the bottom 99%) in Prussia, and possibly in Germany, than in the United States.

Bartels' German data also reveal a strong increase in the top 1% coinciding with the war and continuing up to 1917. The same result was recently obtained by Gómez León & De Jong (2019) who use an entirely different source (social tables). This is rather unexpected since the general presumption, especially after Piketty (2014), was that mass-mobilization wars would, through higher taxation of the rich and destruction of physical assets, reduce income concentration. Yet, as Ferguson (1998) and Offer (1989) argue, Prussian landed aristocracy was extremely averse to higher taxation, even during the war, and might have been able to limit real income losses by increasing its share of a reduced overall income.

A.4 Sources of data

<u>Table 1</u>

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[33]This is consistent with the argument in Dumke (1991), who favors the existence of a Kuznets curve during Prussian industrialization: a fast increase in inequality between 1870 and 1900 followed by stable inequality up to the outbreak of the War.

Netherlands Soltow, Lee and Jan Luiten van Zanden (1998). *Income and Wealth Inequality in the Netherlands $16^{th} - 20^{th}$ Century*. Amsterdam: Het Spinhuis.

Japan Minami, Ryoshin (2008), "Income Distribution in Japan: Historical Perspective and its Implications", *Japan Labor Review*, vol. 5(4), Autumn.

Italy Brandolini, Andrea and Giovanni Vecchi (2011), "The Well-Being of Italians: A Comparative Historical Approach", Banca d'Italia, Economic History Working Papers.

Russia Nafziger, Steven and Peter Lindert (2012), "Russian Inequality on the Eve of the Revolution", NBER Working Paper No. 18383, September.

Table 2

Japan Moriguchi, Chiaki and Emmanuel Saez (2008), "The Evolution of Income Concentration in Japan, 1885–2002: Evidence from Income Tax Statistics", *Review of Economics and Statistics*, vol. 90(4), pp. 713–734.

Austria Novokmet, Filip (2017), "The Long-Run Evolution of Inequality in the Czech Lands: Top Income Shares 1898–2015", Ph.D. dissertation (unpublished), and personal communication from the author.

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B Composition of Foreign Assets by Parisian Decedents and London Stock Exchange Securities

Table B.1: Financial asset portfolio composition: Parisian decedents, 1872–1912 (%)

	Financial Assets									Non-
	Domestic				*Foreign*				Other	Financial
	Equities	Priv. bonds	Gov. bonds	Total	Equities	Priv. bonds	Gov. bonds	Total	Financial Assets	Assets
				(1)				(2)	(3)	(4)
1872	16	19	11	46	1	2	4	7	10	37
1882	16	19	13	48	2	2	3	7	8	37
1912	13	14	5	32	7	5	9	21	8	39

Source: Piketty et al. (2014), Table B11

Note: Assets in columns (1)–(4) sum to 100 percent.

Table B.2: Total nominal values of securities quoted in London Stock Exchange official list (%)

	British				*Colonial*			*Foreign*		
	Bonds	Rail	Other Equities	Total	Bonds	Rail	Total	Bonds	Rail	Total
1873	38	17	9	63	2	5	7	18	11	29
1883	25	18	7	51	4	4	7	23	19	42
1893	18	17	11	47	5	5	10	15	27	42
1903	16	16	20	51	5	4	9	15	24	39
1913	14	13	22	48	4	5	9	15	26	41

Source: Michie (2001), Table 3.3

C Differences in Foreign (Colonial) and British Risk-Adjusted Rates of Return
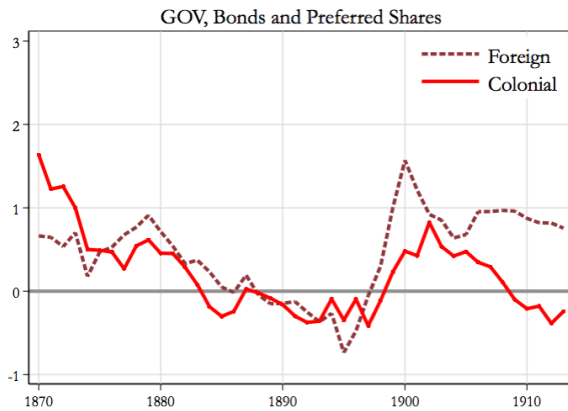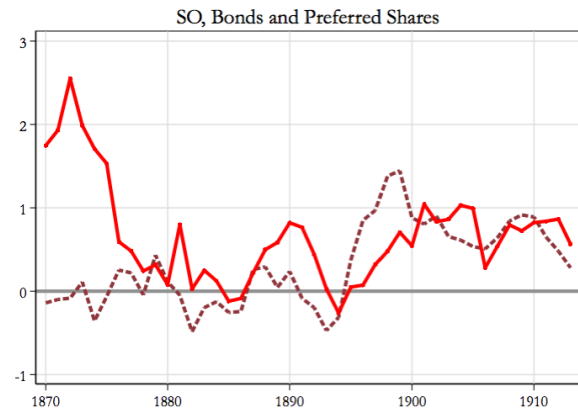

Figure C.1: Government bonds

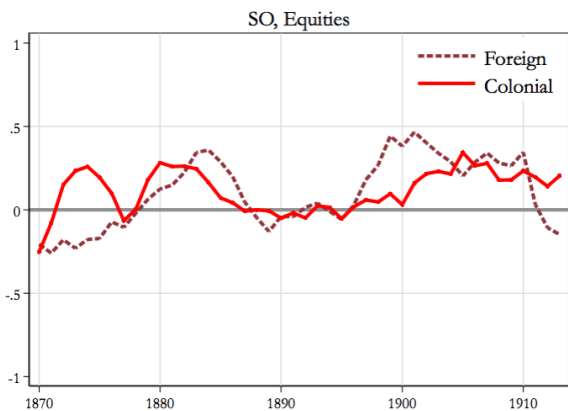**Figure C.2:** Social overhead capital bonds

Figure C.3: Social overhead capital equities
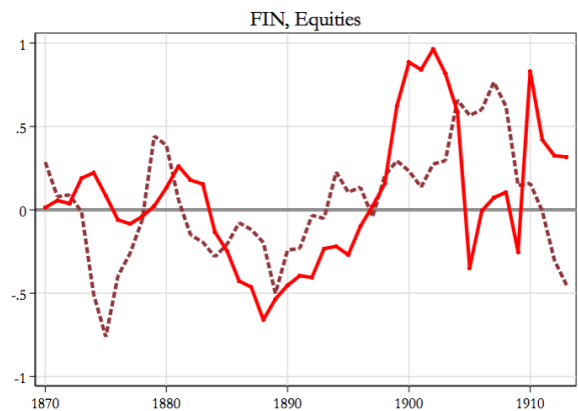
Figure C.4: Financial equities

D Historical examples of sanctions or military force

Promotion of British free trade was historically independent of foreign policy decisions, shunning economic intervention in pursuit of *laissez faire* ideals. Earlier in the nineteenth century, civil servants even viewed commerce with contempt. France, historically, took a different tack. "The refusal of a quotation on the Bourse was a weapon that the Government used with some frequency,

and to this extent it was able to influence the nature and direction of French overseas investments, often along purely political lines," D.C.M. Platt writes.[34] By the twentieth century, however, more aggressive displays of political power in support of economic agendas began to unfold. Here we examine evidence in support of our thesis that increasing militarization by imperial powers was a means of reducing foreign risk premier by eventually coercing debtor states through physical enforcement of international financial contracts.

Before states imposed trade sanctions on defaulting governments, shareholder organizations like the Corporation of Foreign Bondholders (formed in 1873) coordinated with each other to protect the interests of foreign and colonial asset holders. Market signals, such as interest rate hikes on states in default, were another mechanism, albeit one that proved largely ineffective and short-lived.

Supersanctions, the threat or implementation of financial "house arrest" by foreign administrators or the actual deployment or threat of gunboats, proved the most effective methods of enforcing contracts, Mitchener & Weidenmier (2010) argue. For example, in 1876 the British Foreign Office sent a delegation to Egypt, along with French counterparts, at the behest of Khedive Ismail to examine its finances. Fiscal control was the advised outcome. Resistance by Ismail proved futile as he was soon forced to abdicate in favor of his son, and by 1883 British negotiators agreed to, and oversaw, a debt settlement with creditors. A similar financial junta, the Council of Administration, took control of Turkey's debt settlement in 1881 after economic and political problems began three years prior. It issued the Decree of Mouharrem, a fiscal package of tax increases and debt repayments to bondholders, and remained in the country for the remainder of the gold standard era.

The decisive gunboat diplomacy episode played out between December 1902 and February 1903. Pitting Venezuela against the imperial triumvirate of Britain, Italy, and Germany, it established a violent precedent for future threats—and tested the parameters of Roosevelt's passive interpretation of the Monroe Doctrine, the aged American policy of opposing European imperialism in the Americas. As retold in Mitchell (1996), an assortment of "businessmen, imperialists, exporters, and right wingers called for intervention to collect outstanding claims." In partnership with eight British ships, who coordinated the blockade, Germany began seizing Venezuelan navy boats on December 9, ultimately sinking two unseaworthy ships and shelling the town of Puerto Cabello. Eventually, with the US arbitrating, an agreement was signed on February 13. Each of the three blockading powers received $27,500 and the Germans were to receive an additional $340,000 within three months.

In all, Mitchener & Weidenmier (2010) identify 12 episodes between 1870 and 1913 in which so-called supersanctions were deployed by creditor nations. What was their combined effect? The authors claim ex-ante default probabilities on a security's principal decreased by an average of 60 percent after a country experienced supersanctions. Furthermore, their risk premium decreased by around 200 basis points as a result of improved "fiscal discipline." Not only is there an empirically consistent relationship between the net foreign asset positions of imperial nations and levels of militarization prior to the First World War, but there also exist historical examples of countries using force, or threatening to, in order to coerce debtor countries into making bond payments.

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[34]Platt (1968), p. 6.

E Regression Results

E.1 Inequality and Net Foreign Assets Regressions

We estimate specifications of the form:

$$\frac{NFA_{it}}{GDP_{it}} = \beta_1 Inequality_{it} + \beta_2 Democracy_{it} + \beta_3 log(y_{it}) + \delta_i + \varepsilon_{it} \qquad (5)$$

The regressions are run in three formulations: pooled cross section and time regressions, country-fixed effects, and pooled regression over five-year averages. This is done because our data are very sparse and in some formulations we have one subset of countries and years while in other formulations we have another subset. The results are shown in Table E.1. Consider first the pooled regressions (columns 1 and 2 in Table E.1). Both income Gini and the share of wealth held by the top 10% (*Top10_wealth*) are positively correlated with NFA/GDP and are statistically significant at less than 0.1% level. For example, increase in the concentration of wealth among the top 10% by one percentage point is associated with more than 12 percentage point increase in the ratio between NFA and country's GDP (column 2). This result is driven however by the cross-country differences between the three countries that are included in the regression.

Table E.1: Net foreign assets and inequality

(dependent variable: ratio between net foreign assets and GDP)

	Pooled regressions		Country fixed effects		Pooled five-year averages	
	(1)	(2)	(3)	(4)	(5)	(6)
Gini	8.33***		5.87**		10.34***	
	(0.00)		(0.02)		(0.00)	
Top 10% wealth		12.19***		0.77		15.12***
		(0.00)		(0.07)		(0.005)
Democracy	-21.84***	12.71	0.35	2.19	-25.51***	25.75
	(0.00)	(0.19)	(0.84)	(0.81)	(0.005)	(0.28)
GDP per capita (log)	141.2***	-112.3*	11.79	93.9	123.8*	-153.5*
	(0.002)	(0.06)	(0.52)	(0.33)	(0.08)	(0.06)
Constant	-1336***	-122.4	-256.3	-728.9	-1267**	-142.3
	(0.001)	(0.77)	(0.11)	(0.60)	(0.03)	(0.62)
R^2 (within)	0.61	0.87	0.29	0.12	0.66	0.98
F	12.0	38.8	2.8	0.7	5.9	71.4
Countries	Germany	France	Germany	France	Germany	France
	Britain	Britain	Britain	Britain	Britain	Britain
	USA	USA	USA	USA	USA	USA
Obs	27	21	27	21	13	9

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Results for the five-year-average pooled regressions are shown in columns 5 and 6 (Table E.1). Although we now have a denser data set (since it suffices that a variable be available for one year in a five-year period) the number of possible data points is obviously very much reduced, and thus the overall number of observations becomes even smaller. Results for the five-year-average pooled

regressions are very similar to what we obtained with the yearly data: both inequality statistics are highly significant and the values of the coefficients are very close to the earlier results.

When we use country fixed effects (regressions 3 and 4 in Table E.1) income Gini remains positive and statistically significant but its value becomes smaller: a Gini point increase is associated, on the average, with 5.87 percentage point increase in the NFS/GDP ratio. This is not surprising because the main variability in pooled regressions came from inter-country differences. Once they are reflected in country intercepts, the effect of inequality within country on its accumulation of foreign assets, while still strongly positive, is less. For the *Top10_wealth* variable, the effect is also positive, again much smaller than in pooled regressions, and statistically significant only at the 7% level.

F   The returns to imperial expansion: evidence from the Second Boer War

In this section we present evidence from the Boer War on rates of return. The Second Boer War was both intellectually important for the development of the theory of imperialism and its most obvious poster-child. It also generates a clean shock in imperial governance that can be used to isolate the effect of incorporation into the British empire on investment risk. While general risk-adjusted returns are higher abroad, this could be due to a large number of other factors. The Ferguson & Schularick "empire effect" is likewise contaminated by many unobserved variables. In this section we look at bond returns across South African provinces before and after the (Second) Boer war, when two provinces went from Boer to British control. Our results here parallel the analysis in Mitchener & Weidenmier (2005), who show that the 1905 Roosevelt Corollary, excluding Europeans from the Americas, increased Central American bond prices by 74% in the subsequent year. They attribute this to inclusion in the American sphere increasing the likelihood that debt disputes would be resolved by American military power.

The intuition is similar: if we see the observed rate of return fall with imperial takeover of a territory (particularly relative to neighboring already-colonies), it is likely because the risk-premium (probability of reneging on repayment) falls. We use the same data from Ferguson & Schularick (2006), but focus on the bond returns from the South African provinces. We look at the effect of the British taking the Transvaal and Oranje from the Boers, and as Figure F.1 shows, there is a clear fall in the spread over British consols.

In Table F.1, below, we show the relative fall shown in Figure F.1 is, unsurprisingly, statistically significant across a variety of regression specifications, and adjusting for arbitrary autocorrelation within province (account for the few clusters with a wild-bootstrapped standard errors). The regression models are of the form

$$spread_{ct} = PostWar_t \times BoerControl_c + \delta_c + \delta_t + \epsilon_{ct}, \tag{6}$$

where c represents the South African colony and t the year. The relative impact of empire in this exercise is roughly 200 basis points, about double what Ferguson & Schularick (2006) estimate for the whole empire sample.

The Boer war lasted between October 1899 and May 1902, following a breakdown in negotiations over the disenfranchised status of English-speakers (*Uitlanders*) in the Boer provinces. But the political claims of *Uitlanders* were tied up in financial and mining designs on the gold-rich and

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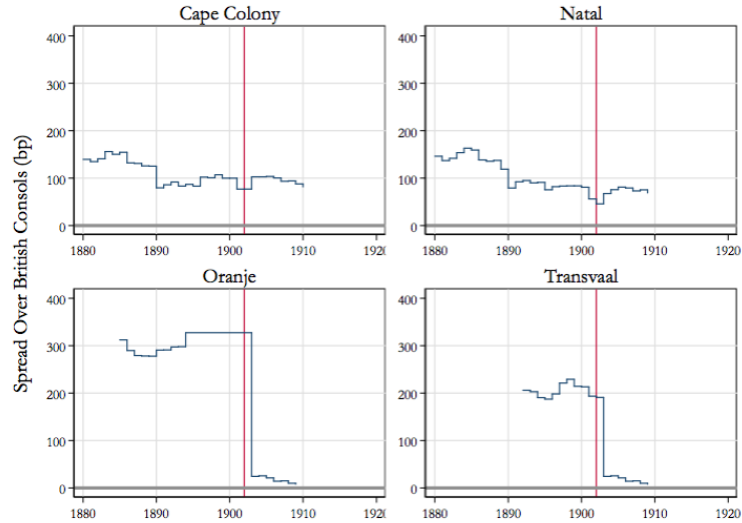
Figure F.1: Changes in South African spreads: 1872

NOTES: Data from Ferguson-Shularick. Red line indicates end of Second Boer War.

poorly governed Boer lands. Indeed the 1895 Jameson raid that was the precursor to the war was largely financed by De Beers mining magnates Cecil Rhodes and his employer Alfred Beit. Beit contributed 400,000 pounds towards the raid. Among British grievances was the mid-1895 Boer closing of trade routes that allowed Cape Colony (British) goods to avoid the high rates charged by the Transvaal railway.

But beyond the specifics, British financiers broadly bemoaned the corruption and waste of Paul Kruger's government, and punished it with high borrowing rates which still did not deter investment. (Smith, 1996, pp. 406) writes of pre-war Boer Transvaal: "The Transvaal, in turn, was dependent on the City of London. . . This dependency was not just in terms of the investment, long-term loans, and credits required by the capital-intensive gold mining industry. . . It extended into that whole network of financial, shipping, insurance, and technical services. . . which London was uniquely well-equipped to provide. In 1898, a modest attempt by German financiers to divert a small amount of gold from the Rand to Germany only served to show how uncompetitive Berlin and Paris were. . . in relation to London." While Smith concludes that British cabinet members were not overly swayed by mining interests (contra Hobson), he acknowledges that "capitalists did suffer from impositions at the hands of an inept and corrupt government."

Anticipating World War I, the war was expected to be short and decisively won by the British, but turned into a protracted conflict that wound up being the longest and costliest war fought by the British between Napoleon and 1914. While the war began as a conventional war, it rapidly became a counterinsurgency campaign against determined Boer guerrillas, with the British innovating many tactics that would become staples of 20th century asymmetric conflict, most famously the concentration camps for Boer families.

The conclusion of the war, and the resulting Treaty of Vereeniging, brought the Transvaal and the Cape Colony under the British colonial office (with a promise of self-government after a few years) and disarmed the Boers. The High Commissioner helped reorganize and improve gold production, doubling output between 1903 and 1907. But as decisive was a British-controlled government, unlikely to default on bonds held by British investors, likely raising the attractiveness

Table F.1: Spreads Over UK Consols

	(1)	(2)	(3)	(4)
Post War × Boer Control	-192.7***	-201.1***	-199.8***	-254.3***
	(15.61)	(13.66)	(13.00)	(15.38)
Boer Control	138.3***	149.1***		
	(9.457)	(8.457)		
Post War	-28.70**			
	(10.01)			
Province FE	No	No	Yes	Yes
Year FE	No	Yes	Yes	Yes
Controls	No	No	No	Yes
N	96	96	96	84

Standard errors, wild-bootstrapped by 4 province clusters, in parentheses.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

NOTES:There are 4 provinces: Cape Colony, Natal, Oranje, and Transvaal. Controls are log of exports per capita, trade balance, and public deficit (as share of GDP).

of bonds from these colonies. Imperial control here lowers the observed rates of return on bonds, which we interpret as evidence that the risk-premium *falls* with integration in the empire, just as in Ferguson & Schularick. The institutional effects are also similar to those identified by Ferguson & Schularick: default risk fell substantially once a territory was brought into the empire. The advantage of examining the Boer War is that it shows the impact of a direct military conquest of one colony, within geographically proximate and similar areas, where the transition from independence to colonial status was sudden and secured via a direct application of military force.

The increase in creditworthiness of the new South African additions to the British Empire was noted at the time. This example shows, we believe, that the decrease of the risk premium was compatible with a possible increase in the price of, and demand for, foreign assets.