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## Abstract

The exorbitant privilege literature analyses the positive returns differential on net foreign assets enjoyed by the United States in the last quarter of the twentieth century as the issuer of the global reserve currency. In the first age of international financial integration (1871–1914), the global reserve currency was the British pound sterling. Whether the United Kingdom enjoyed a similar privilege is analysed with a new dataset, encompassing microdata on railroad and government financial securities. The use of microdata avoids the flaws that have plagued the US studies, particularly the use of incompatible aggregate variables. A monthly proxy for the British international investment position is constructed and estimates for capital gains and dividend yields obtained. The estimation points to an average privilege of 8.3% of GDP, with high variation. The finding supports the claim that in part exorbitant privilege is a general characteristic of the issuer of the global reserve currency and not unique to the late twentieth century US. Nonetheless, a decomposition of returns shows that there were fundamental differences between pre-war Britain and the late twentieth century US investment patterns and their response to the advantage presented by exorbitant privilege.

**Key words:** Exorbitant privilege, return differential, global reserve currency, international investment position.

**JEL classification:** F36, F62, N23.

(1) Bank of England. Email: carlos.vanhombeeck@bankofengland.co.uk

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Publications and Design Team, Bank of England, Threadneedle Street, London, EC2R 8AH
Telephone +44 (0)20 7601 4030 email publications@bankofengland.co.uk


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# 1 Introduction

The United States dollar has been the main international currency since the Second World War and the creation of the Bretton Woods framework.[1] Exorbitant privilege derives from the US dollar's status as the main international currency: over the postwar period, the US has been able to borrow from abroad at low rates and invest abroad at higher rates (in terms of yields and returns); the difference is its "*exorbitant privilege*." There is no precise definition of exorbitant privilege in the literature - the concept was introduced as a way to explain particular characteristics of the US of the late twentieth century. The US indirectly utilized the return differential to finance a persistent current account deficit. The main goal of the US literature was not to explain the origin of exorbitant privilege, but rather to take it as given and to assess how it affects the dynamics and sustainability of the US external accounts.[2] The notion of exorbitant privilege explained the financing of extraordinary consumption as manifested by the current account deficit.

This paper looks instead at the first age of international financial integration and financial account liberalization from 1871 to the outbreak of the First World War and the hegemon of that era, Britain, to assess if Britain also enjoyed an exorbitant privilege when the pound sterling was the main international currency. The answer clarifies whether exorbitant privilege is a general characteristic of the issuer of the global reserve currency or if it is unique to the recent US.[3] I reach the answer by estimating the net revenues received from Britain's external position.

Periods of high financial integration such as 1870-1914 and the last quarter of the twentieth century are characterized by the ease of performing commercial and financial transactions between countries. The greater the number of financial transactions between countries, the larger the amounts of external assets and liabilities exchanged between countries and the size of exorbitant privilege to the issuer of the global reserve currency.

Keynes (1919) described the level of financial (and commercial) integration of the global economy prior to 1914 and the centrality of Britain to it:

> The inhabitant of London could order by telephone, sipping his morning tea in bed, the various products of the whole earth, in such quantity as he might see fit, and reasonably expect their early delivery upon his doorstep; he could at the same moment and by the same means adventure his wealth in the natural resources and new enterprises of any quarter of the world, and share, without exertion or even trouble, in their prospective fruits and advantages; or he could decide to couple the security of his fortunes with the good faith of the townspeople of any substantial municipality in any continent that fancy or information might

[1] The main international currency is often referred to as the global reserve currency. A reserve currency serves as a store of value in an international environment. A currency is selected as the preferred asset for a variety of reasons (financial sector development, institutions, military power, economic policies, importance in global trade, size of the economy, the lovely weather of a New Hampshire resort). The asset provides stable returns across states of nature or time. *The currency is an instrument to acquire the safe asset*, such as sovereign debt of the reserve country. In the last quarter of the twentieth century, US Treasury bills were regarded as the global safe asset and since they are traded in dollars, their demand translates into dollar demand.

[2] The return differential is also known as the valuation effect in the literature, since different valuations on assets and liabilities are one of the main components of the return differential. On the United States, Gourinchas and Rey (2014) conclude: "Valuation effects (...) account for an important and increasing part of the dynamics of the net foreign asset positions of countries. For the U.S., valuation effects have tended to be positive and economically large."

[3] Since the dollar is the only reserve currency that has existed during the current period of financial integration, one contribution of this work is to add information about a new currency and an earlier historical period to the exorbitant privilege literature. The period from 1914 to 1945 saw a decline in financial integration due to two world wars and the Great Depression.

recommend.

The level of financial integration declined sharply after 1914 and would not be reached again until the second half of the twentieth century. Britain was the core of the global economy from 1871 to 1914 and the pound sterling was the main international currency. London was the financial center of the world and the main channel through which British exported capital (an average of 5% of GDP annually). Estimates of the net external position of Britain before the First World War are controversial, but fall in a range between 120% and 160% of GDP.[4]

I require a measure of the total returns on the British external portfolio to assess the existence of exorbitant privilege. Because aggregate data is not available for pre-1914 Britain, I use a dataset based in individual securities. The lack of aggregate data, however, is a blessing rather than a curse. The flaws that plague the existing exorbitant privilege literature stem from the use of incompatible sets of aggregate data. By building estimates of external positions from underlying microdata on flows, prices, and yields of securities, I avoid these flaws. Part of the data presented here has been used in the economic history literature on the British export of capital, but I apply it in a novel way to estimate the net external asset position of Britain.

My estimates, based on net capital gains and dividend yields, indicate that on average Britain received a significant benefit from its external position during the pre-WWI period. The average figure of 8.3% of its GDP is higher than estimates for the US in the last quarter of the twentieth century. A decomposition of the returns shows that the largest part of the effect came from the excess return within each class of asset and not from Britain holding assets that were riskier than its liabilities. British investors had a strong preference for safe assets, which means that they dissipated part of the advantage of being the issuer of the global reserve currency. As a result, for most of the period analyzed and given the returns on its net investment position, Britain would not have received positive revenues from the rest of the word if it had been a large net debtor country (as is the case of the US).

The next three subsections contain background material: clarification of concepts, a formal accounting framework and a description of the role of the pound sterling in the gold standard. The data and the main results are presented after the international finance and finance history literatures review.

In parallel to the literature for the US, this paper aims to attest the existence of exorbitant privilege for Britain as a historical fact.[5] I do not pursue the decomposition of the causes of exorbitant privilege. The discussion of the causes is implicitly embedded in any attempt to define exorbitant privilege, as hinted by Rogoff and Tashiro (2015):

> The broader definition, of course, confounds many different phenomena, not all of which can necessarily be thought of as "privilege".[6] If a US company builds an auto plant in a risky and unstable emerging market, a

[4] A large literature devoted to the question of the long-term impact on growth of the export of capital asks if British investors acted rationally by sending capital abroad instead of investing in domestic industries. This issue is not discussed in detail here. Important references are McCloskey (1970), Kennedy (1974) and Crafts (1979).

[5] The use of the term exorbitant privilege has the same objective: to keep harmony with the US literature. Its use here is a a bit irksome because the UK was providing capital to the world. Thanks to Ethan Itzetzki for this comment.

[6] They adopt two definitions of exorbitant privilege. While the narrowest definition includes only securities issued by the government of the country that issued the main international currency, the broader definition encompasses cost advantages for all types of investment instruments.

high return might be regarded as compensation for taking a greater risk than a foreign company that invests in the US market.

Subsection 3.6 contains very preliminary evidence for inflation differential and currency composition of the return differential. It is a first step to the literature, together with the decomposition of direct investment return by Curcuru, Thomas and Warnock (2013). Several factors, such as depreciation risk, military power, legal system, and volatility might be included in a potential list of explanations. The microdata presented here has the important advantage of enabling future empirical analysis on the causes of exorbitant privilege, a topic that has so far eluded researchers using late twentieth century aggregate data.

## 1.1 Concepts

Since the literature evolved from the analysis of a specific case, most of its conclusions are entangled with idiosyncratic American characteristics. It is useful to shed light on some confusion surrounding the literature by clearly separating all the concepts that have been aloft before applying them to the British case.

I call the first primitive concept *pure* exorbitant privilege: it is a positive return differential between securities issued in the main international currency and similar securities issued in other currencies.[7] The most direct way to verify whether this phenomenon exists is by comparing the returns of identical securities paid in both the main international currency and other currency. The analysis of this type of security allows us to roughly isolate the component of the return differential associated with the distinct currencies. Two securities in the database presented in this paper possess this particular characteristic. Both were bonds from American railroads (the Allegheny Valley Railroad Company and the Cleveland, Columbus, and Cincinnati and Indianapolis Railway Company) payable either in gold/sterling or in dollars. The following excerpts were taken from the Stock Exchange Yearbook of 1869:

> **Allegheny Valley Railroad Company** - The amount was $9,000,000 7%, currency bonds of $1,000 each; but to meet the natural dislike of this market to currency bonds, the Pennsylvania company, which guarantees both the principal and interest of these bonds, arranged that, at the option of the subscriber, both principal and interest should be paid in sterling, in which case, however, the interest was reduced to 6%. (...) The price of issue was 88%.
>
> **Cleveland, Columbus, and Cincinnati and Indianapolis Railway Company** – The £500,000 consolidated mortgage bonds of £200 of this company, quoted in the official list, were issued in November, 1874, by Messrs. J. S. Morgan & Co. The price was £176 per bond. Interest is payable the 1st of June and December at the rate of 6%, per annum in sterling, by the London agents, or at the rate of 7%, per annum in currency,

[7] The main point here is that the issuer of the global reserve currency is the one capable of producing more of that currency. For example, the US would be able to print dollars to pay for its external liabilities. In this sense, exorbitant privilege is more connected to the identity of the issuer than the currency of issuance. A French company issuing in dollars will not be able to derive a benefit. I use the concept above for expositional purposes, but also because the country that issues the global reserve currency has an extraordinary capacity of issuing liabilities in its own currency. See more below.

by the company, at New York, at the option of the holder.[8]

Both of these railroad bonds show clear and direct evidence of a "pure" exorbitant privilege: exactly the same asset paying two different yields when interest is paid in different currencies. Suppose that instead of one bond with two options for currency of payment, there are two securities identical in every respect except for the currency in which interest and principal were paid. Comparison of yields of the two bonds gives us a direct estimate of the pure exorbitant privilege Britain enjoyed (at the level of individual bonds). American borrowers paid a 100 basis point premium to borrow in dollars rather than sterling or gold.

Securities that are payable simultaneously in two currencies, however, are rare. The usual solution is to calculate the average return on securities issued by one country (mostly denominated in the currency of that country) and compare it to the average return on similar securities issued by other countries. On average, British securities paid 200 to 300 basis points less than similar foreign securities.[9]

The next step of the analysis is to estimate the aggregate effect of pure exorbitant privilege: is the positive return differential strong enough to affect macroeconomic variables, such as those of the external accounts? If macroeconomic variables are affected, the country enjoys *aggregate* exorbitant privilege. To analyze aggregate exorbitant privilege, it is useful to introduce an intermediate concept: *weighted* exorbitant privilege. Both weighted and aggregate exorbitant privileges are derived from the definitions of external assets and liabilities. It is usually the case that the external liabilities of the country that issues the main international currency are primarily denominated in the main international currency (US treasuries are denominated in dollars). Data from Bénétrix, Lane and Shambaugh (2015) show that from 1990 to 2012, 85% of the US liabilities were in local currency, while the figure for other advanced economies went from 40% to 70% and for other countries from 10% to 60%. Since some liabilities are necessarily denominated in local currency (such as land), the debt figure (one of the classes within liabilities) might give a better measurement. For debt, the US liabilities in dollars were 80% of the total liabilities, the figures for local currency debt over total debt went from 30% to 55% for advanced economies and was zero throughout the period for other economies.[10] Since its assets are denominated in currencies of other countries, the currency compositions of external assets and liabilities are different, with external assets mostly denominated in other currencies and external liabilities mostly denominated in the global reserve currency. Since pure exorbitant privilege implies that a security denominated in the global reserve currency pays a lower return than a similar security denominated in other currency, the portfolio composed of Britain's external assets receives a higher return than the portfolio composed by British external liabilities.[11]

Weighted exorbitant privilege is simply the calculation of a weighted average of securities' returns, using as weights the shares of the securities in the overall external assets and liabilities, since different types of assets may enjoy different pure

[8] The Stock Exchange Yearbook was a financial publication that explained the securities traded in the London Stock Exchange. "Currency" means dollars.

[9] Table 5 in the appendix compiles results from the economic history literature.

[10] The stylized fact that the international liabilities of emerging markets are also denominated in the main international currency (and not in their national currencies) is called "original sin" in the literature. See Eichengreen, Hausmann and Panizza (2007) for a review.

[11] The point is not to argue that the aggregate positive returns differential is caused by currency composition. I am simply stating that an aggregate positive return differential exists.

exorbitant privileges. If, as in the case of the US, external assets and liabilities have similar magnitudes, the weighted average on returns is a good proxy to the revenues that the country receives from the rest of the world. For example, if a country that issues the global reserve currency has external assets and liabilities of 100% of GDP and the weighted exorbitant privilege is 2% (the difference between the weighted returns on assets and weighted returns on liabilities is two percentage points), the country will receive 2% of GDP of revenues from the rest of the world. Different compositions of the asset or liability portfolios compound different returns, generating a stronger or weaker aggregate result.

Aggregate exorbitant privilege depends on the composition of the country's asset position (weighted exorbitant privilege), as well as on the absolute size of the country's external positions. Large gross foreign asset and liabilities positions amplify the revenues generated by the security premium received by the country that issues the international currency.[12] Rogoff and Tashiro (2015) argue that "To the extent a country (say the United States) does enjoy higher rates of return on foreign assets than it pays on comparable liabilities to foreigners, then it can earn a profit by "grossing up" the size of its balance sheet in much the same manner that a hedge fund does." The final result of the "grossing up" is aggregate exorbitant privilege. In the example above, the issuer country received 2% of GDP, but if its external assets were 200% of GDP instead of 100%, the aggregate exorbitant privilege could jump to 6% of GDP (using weighted returns on assets of 4% and weighted returns on liabilities of 2%).

Another example elucidates how exorbitant privilege relates to the dynamics of the US external account in the late twentieth century. Consider a country with a current account deficit of 3% of GDP, gross external assets of 100% of GDP and external liabilities of 200% of GDP (which means that the country is a debtor with a net external position of -100% of GDP). If the capital gain on assets is 4.5% and the capital gain on liabilities is 0.5%, and if yields on assets are 1.6% and on liabilities 0.3%, this country would still receive positive net resources from the rest of the world equal to 0.5% of GDP. The positive return differential between assets and liabilities (weighted exorbitant privilege) is large enough to outweigh the debtor position of the country. The return differential manifests itself as an aggregate exorbitant privilege and it interferes with the dynamics of the external accounts since it means that this country accumulates less external liabilities than in the absence of the phenomenon.

My main goal is to document pure exorbitant privilege as an historical fact by measuring the existence of the aggregate counterpart, a replication of the literature for the US. Since Britain's current account was not in deficit for most years, the pure exorbitant privilege manifested itself in the export of capital. A more general concept of aggregate exorbitant (as defined above) is necessary to attest pure exorbitant privilege. In the two countries nonetheless the origin of the phenomenon is the same: issuing the global reserve currency.

[12] The expression "security premium" is used interchangeably with "positive return differential". While both refer to the difference in yields between securities quoted in the main international currency and securities quoted in other currencies, "security premium" implies that the difference in yields is related to the status of the main international currency as a tool to acquire the safe asset. The security premium concept is not related to seigniorage. It is useful to compare the country issuing the reserve currency to a monopolist that charges a mark-up for its output, in this case the safe asset. Since it faces a more elastic demand for its assets than other countries, the issuer of the global reserve currency is able to issue a large amount of debt without significantly affecting its interest rate. As an example of the confusion surrounding the literature, there is the perception that the term exorbitant privilege should be applied only to what I call pure exorbitant privilege and that once compositions effects are folded the phenomenon I am analyzing should be called simply returns differentials.

## 1.2 The Gold Standard

In the nineteenth century, the international monetary system was the gold standard.[13] Under this system, countries fixed the prices of their domestic currencies in terms of a specified amount of gold, which meant that exchange rates were fixed.[14] Since gold was the core of the system, a question immediately arises: Was the actual reserve currency in the late nineteenth century gold, with the pound sterling only being a close substitute? In that case, gold would benefit from the extra demand generated by its status as the global reserve asset, affecting positively the price of the metal.[15] Gold producers would enjoy this valuation effect, meaning that Britain and the pound sterling per se would not enjoy an exorbitant privilege.

The classical description of the gold standard by Hume (1742) is very simplified and tied entirely to trade flows. The inclusion of financial markets adds complexity. Exporters and importers used bills of exchange to finance the movement of goods. A bill discounted by an exporter in a local bank would reach the buyer's bank in a foreign country through a network of banks. Banks would sell and buy bills of exchange going in both directions, reducing the necessity of sending gold physically. Gold was shipped to cover net flows, not gross flows and only for persistent imbalances over time. Bills of exchange were denominated in the currency of the largest financial houses of the time, located in Britain. Other financial flows were also important. Besides bills of exchange, investors could buy bonds, equities, insurance and arbitrage the market price of gold in different locations. The composition of sovereign international reserves was also different from the classical description. While the core countries maintained primarily gold as international reserves, others kept their international reserves in the form of currencies of countries that were convertible in gold and had strong credibility. Countries such as India, Japan and Russia earned a positive yield on their reserves by keeping them in the form of British Treasury bills or bank deposits in London. [16]

While gold was the core of the monetary system of the nineteenth century, a large superstructure of financial arrangements and transactions surrounded it. Britain's central position in global finance, trade and industry meant that the British financial markets were the most liquid and sophisticated in the world. Instruments denominated in pound sterling composed the international financial superstructure, including the majority of financial securities and international reserves. The direct consequence was that British assets and the pound sterling assumed a major independent role in the international financial system even in the presence of gold. While gold was a settlement currency, the pound sterling was the global reserve currency.

[13] Chapter 2 of Eichengreen (1998) provides more details on the history of the gold standard.

[14] Since the gold standard was a fixed exchange rate regime, valuation effects coming from exchange rate dynamics between the major countries were nule. For the US for example, from 1879 (after the greenback period) to 1914, the annual average of the exchange rate between the US dollar to the pound sterling (also known as "the cable") was very close to the official rate of 4.85 dollars per pound sterling with an annual standard deviation of only 2 cents. Currencies from countries in the so called periphery presented much more variation since many entered and left the gold standard during the period.

[15] The safety aspect is natural, since gold is a metal with intrinsic value. The pound sterling would be safe only to the extent of its interchangeability with gold, in which case sterling would be an ersatz reserve currency.

[16] The figures from Lindert (1969) show that official (central banks and governments) foreign exchange reserves amounted to 22% of official gold reserves in 1913 (when excluding Britain, which held the largest official gold reserves after the US. For obvious reasons, pounds sterling were not held as international reserves by Britain). This figure is almost surely underestimated since the author lacks foreign exchange reserves data for many countries. Table 4 in the appendix shows that sterling-denominated assets were the preferred asset of official institutions when excluding gold. The sterling share amounted to 43% of foreign exchange reserves in 1899 (followed by the franc with 11%). In 1913, the corresponding shares were 38% and 24%.

## 1.3 A simple model of external budget constraint accounting

The discussion of exorbitant privilege is filled with different concepts and definitions. A simple formal representation of variables at issue is a requirement to clearly compare between the US estimates and the ones I construct for Britain. I need to distinguish between price variables (capital gains and yields) and stock variables (the international assets and liabilities of countries) to disentangle pure and aggregate exorbitant privilege. Simple definitions derived within the accounting framework encapsulate both concepts.

The general accounting framework for the net foreign asset position is based on Lane and Milesi-Ferretti (2007) and Habib (2010). The net foreign position of a country for period $t$ can be written as $NFA_t = A_t - L_t$, where $A_t$ denotes the stock of gross external assets and $L_t$ the stock of gross external liabilities. The change in the net foreign position can be decomposed into its main determinants:

$$NFA_t - NFA_{t-1} = CA_t + KG_t \tag{1}$$

The change in the net foreign position is equal to the current account balance ($CA$) plus $KG$, the capital gain or loss.[17] The valuation component $KG$ is the key to transforming the underlying *flows* $CA$ into changes in *stocks* ($NFA_t - NFA_{t-1}$). It can be defined as the result of changes in asset prices ($P$) and exchange rates ($e$) at which assets and liabilities are valued at the end of each period:

$$\begin{aligned} KG_t &= \sum_i \left[ \left( \frac{P_t^i e_t^i}{P_{t-1}^i e_{t-1}^i} - 1 \right) A_{t-1}^i \right] - \sum_i \left[ \left( \frac{P_t^i e_t^i}{P_{t-1}^i e_{t-1}^i} - 1 \right) L_{t-1}^i \right] \\ &= kg_t^A A_{t-1} - kg_t^L L_{t-1} \end{aligned} \tag{2}$$

$A^i$ and $L^j$ represent the $i$ securities that compose gross external assets and $j$ securities that compose gross external liabilities.[18]. The current account $CA$ equals the sum of the balance on goods, services and current transfers ($BGST$) and the investment income balance $IB_t = i_t^A A_{t-1} - i_t^L L_{t-1}$, where $i^A$ and $i^L$ are the nominal yields on assets and liabilities.[19] Denoting ratios to GDP ($Y$) with lowercase letters, we can express equation 1 as:

$$nfa_t - nfa_{t-1} = \frac{(kg_t^A + i_t^A)A_{t-1} - (kg_t^L + i_t^L)L_{t-1}}{Y_t} + bgst_t - \frac{\gamma_t}{(1+\gamma_t)} nfa_{t-1} \tag{3}$$

[17] The fundamental identity of balance of payments accounting is $CA_t + FA_t = 0$. The origin of international investment positions are the flows of the financial account ($FA$). The capital account (a small item in the balance of payments encompassing capital transfers) and *errors and omissions* are ignored.

[18] This procedure of price updating is called mark-to-market. This is a standard procedure for the calculation of a country's international investment position, as formally described in the International Monetary Fund Balance of Payments Manual (BPM). Version 6 of the BPM states: "Positions of financial assets and liabilities should, in general, be valued as if they were acquired in market transactions on the balance sheet reporting date. Many financial assets are traded in markets on a regular basis and therefore can be valued by directly using the price quotations from these markets". This message is even clearer in the previous version of the Manual: "In principle, all asset and liability stocks comprising a country's international investment position should be measured at market prices. This concept assumes that such stocks are continuously (regularly) revalued—for example, by reference to actual market prices for financial assets such as shares and bonds or, in the case of direct investment, by reference to enterprise balance sheets".

[19] The component *compensation of employees* that is usually included in the income balance is small if compared to investment income. It can be included instead in $BGST$.

where $\gamma$ is the growth rate of nominal GDP.

One potential consequence of pure exorbitant privilege is that $kg_t^A > kg_t^L$.[20] Since there is a positive return differential between securities quoted in the main international currency and securities quoted in other currencies, this condition must also hold in average or aggregated terms. Yields on investments ($i_t^A$,$i_t^L$) are also a component of equation 3. Depending on the type of asset, the positive spread between returns on assets and liabilities can occur in dividends, coupon payments or earnings on direct investment that can be incorporated in the equation as $kg_t^A + i_t^A > kg_t^L + i_t^L$. Differently from capital gains represented by $kg$, yields are periodical flows and only affect external liabilities and assets to the extent that they are reinvested.

Two definitions of aggregate exorbitant privilege are usually used in the literature.[21] The first is that the US income balance of the current account is positive despite the country being an international debtor since 1988. This is translated by $(L_{t-1}/A_{t-1}) > 1$ and $i_t^A > i_t^L(L_{t-1}/A_{t-1})$. The second is that there is a significant positive difference between the constructed net asset position and the cumulated current account series. By solving equation 1 backward for past values of $NFA$ and assuming that $NFA_0 = 0$, the result is $NFA_t = \sum_{i=0}^{t} CA_i + \sum_{i=0}^{t} KG_i$. If $NFA_t > \sum_{i=0}^{t} CA_i$, then $\sum_{i=0}^{t} KG_i > 0$.[22]

By requiring that $nfa_t - nfa_{t-1} > bgst_t$, or that at each period the variation in the net foreign asset position is greater than the flows of goods, services and transfers, I reach a definition of aggregate exorbitant privilege encompassing most of the definitions stated before:

$$kg_t^A + i_t^A - \gamma_t > (kg_t^L + i_t^L - \gamma_t)\frac{L_{t-1}}{A_{t-1}} \tag{4}$$

This equation might be complemented by $bgst_t < 0$. In the case of the US in the last quarter of the twentieth century and the UK in the period 1871-1914, $BGST$ is negative. In both cases, the relation $i_t^A A_{t-1} > i_t^L L_{t-1}$ holds, and in the case of Britain $i_t^A A_{t-1} > i_t^L L_{t-1} - BGST_t$.[23] None of the expressions depends directly on the sign of $A - L$, but some expressions are function of the ratio $L/A$. This means that exorbitant privilege can occur in a country with a positive net external position ($(L/A) < 1$) as in Britain. In the case of the US, liabilities are greater than assets ($(L/A) > 1$).

The literature has used the concepts above with the objective of finding a characteristic that could single out the issuer of the global reserve currency. Habib (2010) plots net external positions, cumulated $BGST$, cumulated investment income

[20] This is weighted exorbitant privilege, since pure exorbitant privilege applies to individual assets. $kg_t^A > kg_t^L$ is a weighted average of pure exorbitant privileges, according to equation 2.

[21] See the description of Gourinchas and Rey (2007) in the next section. McCauley (2015) explains several concepts of exorbitant privilege, including seigniorage. The discussion that follows relates directly to his concept (4), although it is also linked to his concepts (1) and (3). A usually neglected topic contained in the discussion is the role of adverse selection when foreign firms acquire American assets: "Cross-border acquisitions in the competitive US market for corporate control do not get the pick of the litter and are often divested."

[22] Since the first definition of the literature states that $IB > 0$, this condition can also be rewritten as $NFA_t > \sum_{i=0}^{t} BGST_i$. Gourinchas and Rey (2007) state the second definition in terms of GDP. The correct procedure would be to use equation 3 to get $nfa_t > \sum_{i=0}^{t}(bgst_i/(1+\gamma)^{t-i})$. Since their paper is mostly based on graphical analysis, it seems possible that they used instead $nfa_t > \sum_{i=0}^{t}(CA_i/Y_i)$. Despite being the first work to use the expression "exorbitant privilege", it provides no formal definition. Their introduction contains a vague explanation: "For some, it refers to the fact that the US's income balance has remained positive all these years, despite mounting net liabilities. For others (...) exorbitant privilege referred to the ability of the US to run large direct investment surpluses, ultimately financed by the issuance of dollars held sometimes involuntarily by foreign central banks."

[23] Since 1876, the trade balance was mostly in deficit, while the current account remained in positive territory due to the so-called "invisible" account given by services and income.

balance ($i_t^A A_{t-1} - i_t^L L_{t-1}$) and cumulated $KG$ for six countries from 1980 to 2007. He finds that the US is the only country that presents a consistent pattern of positive $KG$ and income account. Australia, Argentina and Brazil have negative investment income balance, while Germany and Japan (surplus countries) have negative capital gains. Gourinchas and Rey (2014) find that for the period 1970 to 2010, Germany, Japan, Russia, India and China present negative capital gains, while the figure is mixed for Brazil and UK.

Most of the analysis of pure and aggregate exorbitant privilege follows the literature and relates to the conditions $kg_t^A + i_t^A > kg_t^L + i_t^L$ and from equation 4. These conditions constitute intuitive criteria for exorbitant privilege, not a decomposition of the causes of the phenomenon.

## 2 Literature Review

All the existing references of the international finance literature use aggregate data to build estimates of net external positions and exorbitant privilege. The reason for the use of aggregate data is the unavailability and complexity of the underlying microdata. The first attempt to estimate the net external position in the United States (and other countries) for recent years was Lane and Milesi-Ferretti (2001), followed by revisions and extensions in Lane and Milesi-Ferretti (2007). They tackle the lack of data on external assets and liabilities by constructing estimates of $KG_t$ since 1970 based on aggregate country data. The price adjustment term ($kg$) is estimated at the aggregate level using generic measures of prices, such as the Morgan Stanley Capital Index and national stock market indexes, and exchange rates. They assume that equity external asset positions of all countries are the same and that the portfolio of external liabilities is the same as the composition of national stock market indexes. Their second paper uses additional data (such as the IMF's Coordinated Portfolio Investment Survey) to improve and extend the original estimates, but relies on the same methodology.

Gourinchas and Rey (2007) (hereafter GR) examine the US case more closely. Gross external asset and liability series are constructed by updating aggregate data with generic indexes of prices and exchange rates, using aggregate data for each class of investment. Their main objective is to highlight the role of the US as a leveraged financial intermediary (short in short-term and fixed-income securities and long in external equity and direct investment) at the center of the international financial system. Related to this special position, GR define exorbitant privilege through the two puzzles mentioned above (a positive US income balance despite the country being an international debtor and the positive difference between the constructed net asset position and the cumulated current account series). The first is the "income puzzle" and the second the "position puzzle".

GR also present a decomposition of excess returns (returns on assets minus returns on liabilities) into two channels. Defining $r^i = i^i + kg^i$ as total returns for $i = (A, L)$ and $\alpha_j$ and $\lambda_j$ as the weights of each investment class $j$ (equity, debt, direct investment and other) in total assets and liabilities, the difference in total returns may be directly decomposed as:

$$\underbrace{r^A - r^L}_{\text{Total Excess Returns}} = \underbrace{\sum_j \frac{(\alpha_j + \lambda_j)}{2}(r_j^A - r_j^L)}_{\text{Total Return Effect}} + \underbrace{\sum_j (\alpha_j - \lambda_j)\frac{(r_j^A + r_j^L)}{2}}_{\text{Composition Effect}} \quad (5)$$

The total return effect refers to the fact that the US usually receives a higher return on its assets than it pays on its liabilities *for each class of assets*. For this channel, since only returns are being compared, the portfolio positions of assets and liabilities are not relevant. This is the most important channel explaining the advantageous external position for the US. The second term on the right-hand side is the composition effect. The US external assets are composed mainly of FDI and equities, investments with higher risk (and return). In contrast, debt, bank loans and trade credit dominate the US foreign liabilities. These different compositions are compounded by the currency composition of assets and liabilities. Given the returns on individual asset classes, the different compositions of assets and liabilities generate different aggregate returns. For the period 1973-2004, the excess return received by the US was 3.3%, with 2.4% coming from the return effect and 0.9% from the composition effect.

The most recent contribution to the exorbitant privilege literature is Curcuru, Thomas and Warnock (2013), henceforth CTW.[24] They show that differences among various estimates (from GR and the following literature) for the excess returns in the US come from the use of different databases that are inconsistent. Specifically, existing estimates of $KG$ in equation 1 are calculated based on the existing series of $NFA$ and $CA$, but the $NFA$ statistics contain a residual term $OC$ (other changes) that is possibly related to missing flows. The inclusion of this term in the calculation generates biased estimates of excess returns.[25] CTW argue that a more accurate estimate of the excess return for the period 1990-2011 is 1.8%, but the value varies considerably with the chosen time interval. Their estimates for the two channels are:

- *Composition effect.* Measurement of the composition effect is not controversial, since the difference in composition between US external assets and liabilities is clear, but their estimate for the period 1990-2011 is only 0.1%.[26]
- *Return effect.* Using corrected data, capital gains are only 1.6% for assets and 1.2% for liabilities over the period 1990-2011. The yield differential $(i_A - i_L)$ is responsible for the major part (1.4%) of the total return differential.

The direct consequences for the two puzzles are:

[24] Other previous references are the subsequent work of Gourinchas, Rey and Govillot (2010) and Habib (2010). In the first paper, the time coverage of the original database was extended to include the recent crisis period. The US transferred wealth to the rest of world during the crisis, which is the expected offsetting duty from the benefit received during tranquil times. Habib (2010) compares the US to 48 other countries for the period 1981-2007. He concludes that indeed the US exhibits exorbitant capital gains when compared to other countries, and confirms the importance of the return effect. More recently, Rogoff and Tashiro (2015) analyze the case of modern Japan and conclude that the world's largest creditor (for many years) and second largest market economy also enjoys exorbitant privilege. The case of Japan is particularly suitable to be compared to Britain, since both countries maintained current account surpluses and positive net external position. A precursor of the exorbitant literature with the name "dark matter" is Hausmann and Sturzenegger (2006).

[25] According to CTW, $NFA$ and $CA$, "which have completely different revisions policies and come from different data collection systems, are not consistent with one another." and "discrepancies in estimates of returns differentials owed in large part to past BEA (Bureau of Economic Analysis) policies of regularly revising positions, rarely revising flows, and never publicly releasing revisions to valuation adjustments." CTW also quote statisticians of the BEA: "'Other changes' are changes in position that cannot be attributed to price changes, exchange rate changes, or financial flows... it is unlikely that significant price or exchange rate changes have been erroneously included in 'other changes'... it is far more likely that financial flows that could not be identified from revisions to position estimates have been commingled with statistical changes in the 'other changes' category."

[26] The sample period is an important source of variation of estimates, as Gourinchas and Rey (2014) indicate. Nonetheless, since the net external position of the US was more negative in the nineties than in the seventies, the comparison between the two results is still possible, which means that CWT would find a smaller result if they included in their sample years going back to 1970 or 1952.

- The income puzzle is driven exclusively by yields on direct investment. Of the total direct investment earnings differential of 5.6%, the authors estimate that at least 2.4% comes from genuine reasons, such as direct investment assets being riskier and more mature than direct investment liabilities. On the other hand, at least 1.8% comes from a technical illusion created by the accounting of direct investment assets before tax and liabilities after tax.

- Position puzzle: Since CTW's estimate of differences in capital gains is smaller than previous estimates, the explanation for the difference between net external assets and the cumulated current account must reside somewhere else. CTW find that valuation adjustments (updated to solve the compatibility problems between balance of payments and international investment position statistics) still explain the greatest part of the gap. They also correct for statistical discrepancies between the current and financial accounts.[27]

An important contribution of CTW is to assimilate work done by statisticians from the Bureau of Economic Analysis (BEA), the official compilers of the American aggregate data used in previous papers. Since the calculations of aggregate variables are marked by extreme and increasing complexity, the only group capable of accessing the underlying (and large) data and knowledgeable enough to treat and adapt it is the one that produced those statistics in the first place.

The international finance literature's range for differences in total returns (capital gains plus yields) is wide, going from 0.6 to 6.9, depending on the specification of error terms and period of estimation.[28] The estimates of Gourinchas and Rey (2014) for the US valuation component as a share of GDP ranges from 0.84% for the period 1971 – 1980 to 4.75% of GDP for the period 2001 - 2010.These broad ranges are a reflection of the fact that the aggregate data utilized by these authors is not suitable to answer the questions of interest.

Meissner and Taylor (2008) is the only previous discussion of exorbitant privilege for Britain from 1870 to 1914. According to their work, Britain realized a diminishing privilege over the pre-war period. They estimate returns by regressing the income account on the net external position of Britain. Since there are no official figures for the British net external position during this period, they use an estimate from Imlah (1958) originally backed out from the income accounts, which corresponds to the stock of assets that results in the observed income account for a chosen rate of return. By construction, Meissner and Taylor's estimated rate of return must equal Imlah's chosen rate of return, as the authors acknowledge. In the end, the authors rely primarily on prior evidence from the literature on returns, specifically Davis and Huttenback (1986).

Several studies have analyzed the returns on British investment in the nineteenth century to determine whether British investors were acting rationally when they invested resources abroad rather than at home. The export of British capital is one of the main characteristics of capital flows in the nineteenth century. The general conclusion is that, from the point of view of modern capital flow theories, British investors lacked home bias and behaved according to neoclassical models by sending capital to where it obtained the highest return. To reach this conclusion, this branch of the economic history

[27] In theory $CA_t + FA_t = 0$, but in practice measurement errors and omissions mean that an error term $E_t$ exists ($CA_t + FA_t + E_t = 0$). Since the origin of international investment positions are the flows of the financial account ($FA$), using $CA$ as a proxy for $FA$ is acceptable as long $E$ is small.

[28] See table 10.3 from Gourinchas and Rey (2014) and tables 1, 2 and 3 from Curcuru, Thomas and Warnock (2013).

literature has already generated estimates of return differentials.[29] The evidence on the existence of pure exorbitant privilege is a necessary condition to show the existence of aggregate exorbitant privilege.[30]

Edelstein (1982) collected data on returns and used portfolio optimization techniques to conclude that British investors received a higher return from overseas investments than domestic ones. Goetzmann and Ukhov (2006) argued that British investors were aware of the benefits of diversification even if they lacked a formal theory. Using modern portfolio theory, they conclude that foreign debt and equity presented a high return when compared to their domestic counterparts. The inclusion of foreign assets in the British portfolio improved the risk-return characteristics of the portfolio frontier. British investors would have benefited from investment overseas because of the diversification of assets, even if average returns had been similar to domestic returns. In most cases, if short sales were allowed, the authors found that rational investors should have shorted UK debt (generally defined) to invest in foreign assets.

Chabot and Kurz (2010) apply the same techniques to an expanded monthly database collected from several sources. Given the imperfect correlation between domestic and foreign assets, the inclusion of foreign assets expanded the mean-variance frontier. This is further confirmed by tests showing that foreign assets were not spanned by domestic assets. The inclusion of foreign assets could increase the utility of a British investor by 10% to 89%, depending on parameters used in the utility function. Finally, Edlinger, Merli and Parent (2013) add French data on portfolio allocations and find that the inclusion of more European securities made French allocations more balanced than British allocations.

The exact numbers differ across authors but all agree that British assets paid on average a lower return (capital gain plus yield) than comparable assets from other countries *for each class of asset* (with one exception). This is evidence that Britain benefited from a pure exorbitant privilege.

# 3 Main Results

## 3.1 Data

The primary source of the new data presented is the *Investor's Monthly Manual* (IMM) from 1869 to 1914, a monthly publication providing information on all the securities traded on the London Stock Exchange (LSE) and other local British stock exchanges for the pre-WWI period, including stocks and bonds. For each security, the data set contains three groups of data that are relevant to calculate the international investment position: financial flows ($FA$), prices ($P$) and dividend yields ($i$). $FA$ and $KG$ (calculated from $FA$ and $P$) are directly available from one consistent data source. Supplementary information such as the county of origin of firms, type of issuer (government, private, sector of business), class of asset

[29] The existence of colonies is an important difference between the US and UK. Because of the inherent condition of colonies, the metropolis derives extraordinary income from direct political control. While most of these papers on the UK do not tackle the issue directly, the literature on Imperialism (the economics of empire) is extensive. Foreman-Peck (1989) does not find evidence of extraordinary income from India, the most important British colony after American independence. Davis and Huttenback (1986), in their definitive work, conclude that colonies did not represent an outrageous source of net revenues to Britain. In conclusion, the return differential with respect to colonies was not significantly different from what the British enjoyed in relation to other countries.

[30] Table 5 in the appendix contains a summary of estimated return differentials in the literature, with each reference containing different samples of coverage and classes of securities. Curiously, even though this literature has used information on prices of British assets and flows of investments originating from Britain, no one has gone a step further and connected these two series to build an international investment position.

(equity, debt) and currency can also be constructed from the source. The International Center for Finance (ICF) of the Yale School of Management recently digitalized the pages of every issue of the IMM from 1869 to 1929 and transformed the data into an electronic database.[31] The second data source is the *Stock Exchange Yearbook* (SEY). It was an annual publication with the purpose of serving as a compendium of information for the securities listed in the London Stock Exchange. The annual SEY is a perfect complement to the more timely IMM, since it contained detailed information in the form of text for each company and security.[32]

The data sample of this paper contains securities from four sectors: foreign and British railroad securities and foreign and British sovereign securities.[33] In total, 601,869 observations are available for total capital and 571,452 for prices. Those observations correspond to 3,680 securities traded between January 1869 and July 1914, of which 42 are British sovereign/government bonds, 1,202 are British railroads and 875 foreign sovereign bonds. Government/sovereign securities were the main class of assets traded at the LSE and British government securities were the safe asset of the period.[34] Railroads were the most important sector of private investment for the period. The US was the major destination for British foreign investments in railroads, but the sample includes countries from all continents, including Canada, Argentina, India, the Ottoman Empire and Brazil. Foreign sovereign securities and foreign railroad securities represented 68% of the total number of foreign securities traded at the LSE (Stone (1999)). According to the *Stock Exchange Official Intelligence* for 1902 (page 1898), the total capital of sovereign/government and railroad securities amounted to 88% of the total capital of all securities traded at the LSE.

On average, 30% of the securities are equity (which means that 70% are debt), and 14% are preferred shares (meaning that common stock is 47% of total equity). In the case of Britain, 50% of securities are equity and 28% of securities are preferred stock, while for the rest of the world these shares are 18% and 6%. While all British securities are quoted in pounds, 23% of foreign securities are quoted in dollars, but almost 14% of the total or 61% of those quoted in dollars contain a sterling or gold clause, which guarantees the payment in pounds or gold (abolishing exchange rate risk).[35]

[31] The nomenclature used in this paper is modern. In the original data, a variety of names were used to denote fixed-income securities or securities founded in debt: sovereign bonds were called stocks, while railway bonds were called debenture stocks (and the coupon rate was stated in the name of the security). Securities modernly known as stocks or equities were usually called shares. Nonetheless, sometimes the expression *capital stock* was used. Shares were classified as *ordinary* or *preference*. *Ordinary share* or simply *share* corresponds to the modern common stock. *Preference shares* (or modernly preferred stocks) were securities with priority over common stocks on earnings (and usually had a fixed return rate). *Deferred shares* were securities that would be paid after common stocks, but they were less important in frequency.

[32] The editions of the Stock Exchange Yearbook from 1875 to 1895 were acquired thanks to the generous support of the fellowship instituted by the family of Professor Allan G. Gruchy at the University of Maryland. Another source for information on securities traded in the LSE is the Stock Exchange Intelligence (also known as Burdett's Stock Exchange Intelligence).

[33] British securities are those from England, Scotland and all of Ireland (Wales is part of England).

[34] Besides Exchequer bonds and bills, consols and war loans, the securities classified as government include debt from the Red Sea Telegraph Company, the Metropolitan Police and equity from the Bank of England and the Bank of Ireland. The last two securities were almost bonds, since they had fixed yields. Also originally included were sovereign bonds from other countries, such as Turkey and Transvaal that carried official guarantees from the British government. I opted to assign those last bonds to the countries that originally issued the securities for the sake of keeping a pure geographic breakdown of securities. Of course, when considered under the principle of ultimate borrower, those securities would be British liabilities.

[35] In Brazil, there was a government profit-guarantee system, as explained by Abreu (2000). In the United States, American companies issued securities with pound and gold guarantees during the period when coinage of silver was under discussion.

## 3.2 British International Investment Position

The London Stock Exchange (LSE) was the largest and most liquid exchange in the world by far. According to Davis and Cull (2002), in 1910 one-third of the paid-up value of all negotiable securities on the planet were quoted on the LSE. The London Stock Exchange was the international stock exchange. Foreign companies (for example, American railways) issued securities there. Investors from other countries, such as France, utilized the services of the LSE when composing their investment portfolios. Since Britain was the largest exporter of capital for the period analyzed and the largest share of this investment was in the form of portfolio securities, the London Stock Exchange was the natural conduit through which those resources reached their destinations.[36]

Figure 1 maps the average shares of British capital allocation through the LSE in each country for the period 1869-1914 (total amount of British capital allocated to a country's securities in the period 1869-1914 over the total global amount of British capital allocated to foreign securities for the same period). The upper panel contains data for sovereign securities; the middle panel is dedicated to railroad securities and the lower panel to the total sum of the two sectors. The two sectors are distinct in terms of allocation of capital: while holdings of railroad securities were heavily concentrated in the US (with over 55% of the British capital in railroads), holdings of foreign sovereign securities were more equally distributed among several countries, led by Russia and France. The US only received between 1% and 5% of the British capital allocated to sovereign securities. Combining railroad and sovereign securities, the most popular foreign securities overall for British capital were American and French, followed by Russian and Spanish. The heterogeneous distribution of resources and growth indicates that "pull" factors were important in explaining the British allocation of capital.[37] In the case of railroads, the rapid expansion of the American rail network and companies during that period explains the position of the US as the top destination for British capital. By the end of the period, the expansion of American railroads slowed, since tracks already covered most of the territory, and British investors were instead buying railroad securities from Argentina and South Africa and German and Japanese sovereign bonds.

### 3.2.1 Procedure

The procedure to build the proxy for the British International Investment Position ties together three separate steps: the calculation of aggregate capital flows, the estimates of net external positions (as in Lane and Milesi-Ferretti (2007) and other sources, including the IMF and official compilers), and finally the calculation of aggregate exorbitant privilege. To understand how I generate data on external assets, consider the following example:

- A British investor buys a security issued by a foreign firm on the London Stock Exchange (LSE). This represents a portfolio flow from Britain to the receiver country ($FA$). The flow gives birth to a liability from the receiver's side and an asset from Britain's side that constitutes a stock (in the sense of a quantity of something accumulated for future use - $NFA$).

[36] The appendix contains a summary of the main assumptions and their background. See also next section.
[37] Edelstein (1982) favors push factors after careful analysis.

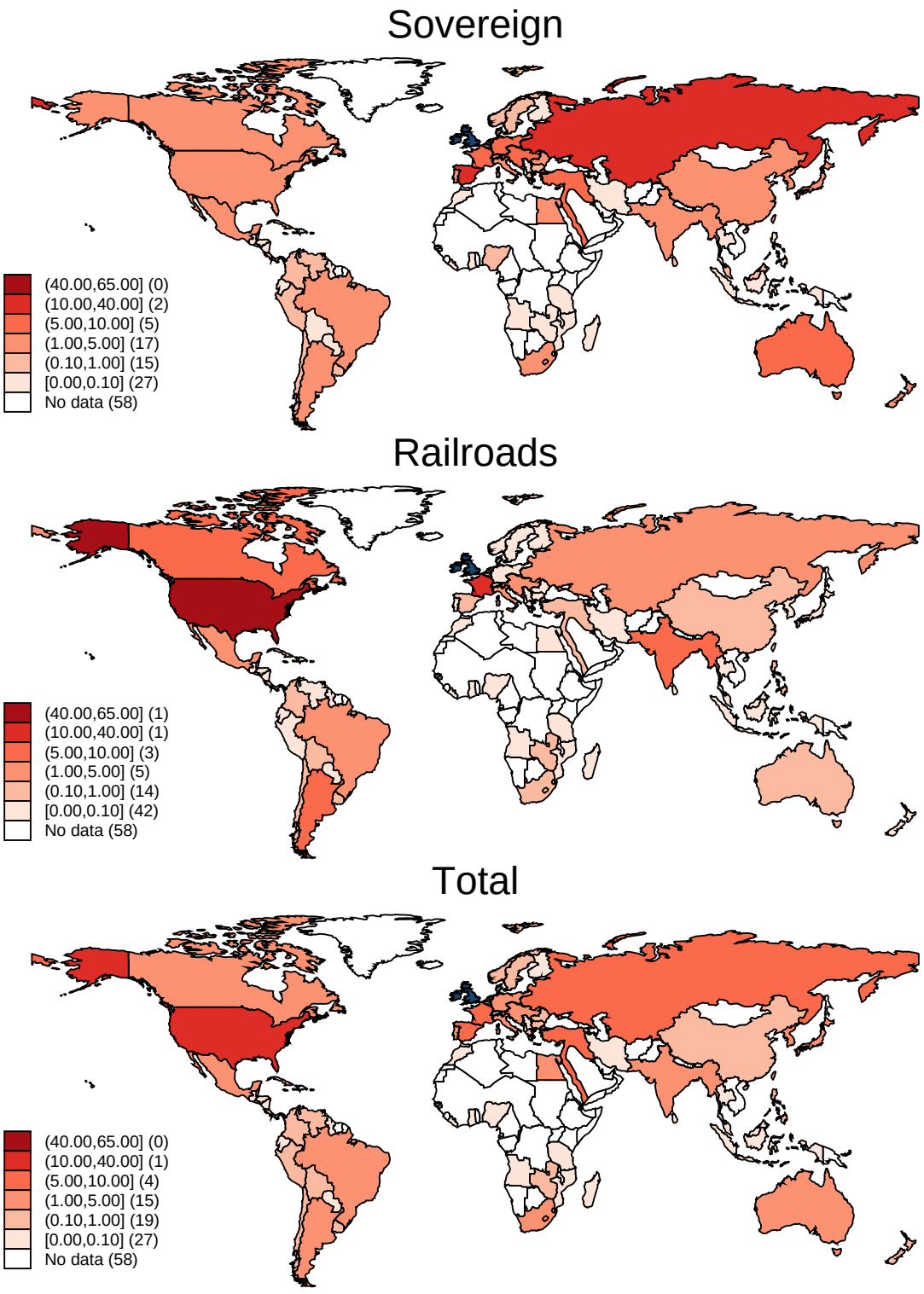


Figure 1: Average Distribution of British Investment for the period 1869-1914 (total amount of British capital allocated to the securities of the country for the period 1869-1914 over the total global amount of British capital allocated to foreign securities for the same period).

- Once the stock of each security is determined, and given the issuance price for each security ($P_0$), it is possible to update the value of this stock by the stream of market prices ($\{P_t\}_{t=1}^{T}$) for each month since the security was issued (or since the data is first available). In an organized market such as the LSE an investor could sell the security at the quoted price at any moment. These prices are used to measure the capital gains ($kg$) or valuation effects. [38]

- If the investor holds the security until maturity, he receives the security's face value (or nominal value). This represents a reverse flow from the country that initially received the investment to Britain and reduces the stock of Britain's external assets.

- Depending on the type of security, the investor is entitled to receive periodic flows of money before the date of maturity. Those are the dividend or coupon yields ($i$), which affect the current account but do not directly affect the external asset position of Britain. An exception is dividends paid with new securities.

- The total return is the combination of the capital gains and the dividend or coupon yield.

- British external liabilities are calculated by using the stock of capital of British securities bought by foreign investors, following the same steps described above with reversed signs.

After the aggregation of all securities, two series are constructed for each class of investment (sovereign / railroad) and geographical location (UK / foreign):

1. Issuance price series: the sum of the capital value of each outstanding security for each month, measured at issuance prices.

2. Market prices series: the sum of the capital value of each outstanding security for each month, measured at current market prices (updated by $\{P_t\}_{t=1}^{T}$).

The last series is a proxy for the British external position.[39] Foreign securities compose UK's external assets while British securities compose UK's external liabilities. The valuation component $KG$ (the cumulative capital gains on UK external assets and liabilities) is given by the difference between the issuance price series and the current market price series. Comparing market prices and issuance prices is analogous to a comparison of series constructed from cumulated current account balances (without valuation effects in the language of Gourinchas and Rey (2007)) and net external positions (calculated taking into account valuation effects). In this case, however, both estimates come from the same

[38] The issuance price is usually different from the security's face value or nominal price. Some securities were sold at par value or even at a premium over face value. With respect to debt securities, the coupon rate is an important component of the discussion, since the issuance price is related to the difference between the coupon rate offered by the security and the market rate. A discount of the issuance price relative to face value usually implies that the security's coupon rate was below the initial market interest rate, since the capital gains coming from the difference between the nominal value and the issuance price would offset the lower coupon rate.

[39] Dollar denominated securities (mostly from the US, Canada and some Latin America countries) were converted at the official exchange rate. From 1878 to 1914, I used the official exchange rate of 4.86. Before that, in the greenback period, the exchange rate was as high as 6.48 in 1869. Note that for most of the period, it was common practice in the London financial market to use the round value 4 shillings per dollar, which translates into 5 dollars per pound sterling. For securities from other countries (Germany, Italy, Russia, Austrian-Hungarian Empire, The Netherlands, Spain, Japan, Belgium, Denmark, India and France) that were clearly quoted in their national currencies, I used market rates from the *Handbook of World Exchange Rates.*

data source and builds up from microdata on individual financial securities. British external position is calculated directly from the financial flows $FA$, avoiding problems with respect to errors and omissions of the balance of payments and in line with the suggestions of Borio and Disyatat (2015).

A **key assumption** of this paper is that British investors' holdings for each security are given by a proportion of the total capital listed for that security at the LSE.[40] In order to make an allowance for foreign agents buying foreign securities at the LSE, I assume that British investors held only 80% of the nominal capital stock of foreign railroad securities and 60% of the nominal capital stock of foreign sovereign securities traded on the LSE. In the same vein, in order to make an allowance for foreign agents buying British securities at the LSE, I assume that only 80% of the nominal capital stock of British securities traded on the LSE was held by British investors. Those assumptions are on the extreme side of existing estimates in both cases (as exposed below). By overestimating the share of foreign agents in possession of British and foreign assets traded at the LSE, I likely understate the UK net external assets position (and the net revenues coming from it).

A large literature addresses this issue in order to reach an overall figure for the stock of British assets on the eve of the First World War. The main challenge is that there is no record of the ownership of nominee holdings of bonds (the most popular security), due to the popularity in London before 1914 of "bearer" bonds (payable simply to "bearer" without further specification). As for stocks, Davis and Huttenback (1986) (cited by Davis and Gallman (2001)) collect data from a random sample of corporations required to file equity structure statements, including addresses of stockholders. The sample contains 260 firms registered between 1883 and 1907, 75 with their principal operations outside Britain, and 79,944 stockholders. They select reports made three to five years after registration to avoid capturing the original owners of the firms. The result is that 82.9% of the stockholders of foreign firms listed on the LSE were located in the UK (76.7% in England alone). For UK firms, the figure is 99.4% and the total average (including also the separate category Empire) is 89.5%.

Braggion and Moore (2013) collected data for the distribution of the number of shareholders from each location at the time of the IPO of equity securities. They find that investors from England, Scotland and Ireland accounted for 86.36% of the total. French and American investors came in second (2.56%) and third (2.45%) respectively.[41]

Of course, the total average can mask large variations between sectors, as pointed out by Kindersley (1929) for the period after the Great War (admittedly an event that constitutes a structural break). Platt mentions that "foreign government stock (sovereign bonds) was almost certainly held by foreigners to the extent of 30-40% before the First World War" and his overall estimate for securities held by foreigners is 15%.[42] Not taking into account British investors buying

[40] For some US railway securities, the IMM lists the total value traded in UK and the US, instead of the value traded only in the UK. A comparison with Burdett's Stock Exchange Intelligence for the year of 1881 revealed that within a group of 48 American railway securities, 13 suffered from this problem (the total number of American railways securities was 123, but there was not enough information to check the remaining 83). Curiously, these 13 securities were all bonds. Grossman (2002), referring only to equity, affirms that the same reporting problem exists for some French railways. This issue overstates British external asset position, since a proportion of the whole capital stock of the firm would be attributed to British investors, instead of a proportion of the exact amount effectively trading at the LSE.

[41] A growing literature addresses the issue of ownership. For recent examples, see Rutterford, Sotiropoulos and van Lieshout (2017), Acheson et al. (2016), Rutterford et al. (2009) and Hannah (2007).

[42] Britain's external liabilities probably started growing after 1900 in connection to the financing of expenditures related to the Second Boer War, possibly by bonds or bank loans. While the government was borrowing from abroad, the country as a whole was still exporting capital.

foreign-issued securities in stock exchanges outside Britain also understates the British external asset position, but Platt (1986) states that "British holdings on foreign exchanges fell far short of foreign holdings in London, and it is convenient but unrealistic to claim that they cancelled each other out."

### 3.2.2 Results

Figure 2 shows the issuance and market price series for foreign railroad and government securities (panel A), and for British railroad and government securities (panel B). The value of outstanding foreign railroad securities rises almost continuously from 1869 to 1914 in both series (issuance price and market price). Cumulative capital gains (the difference between the two series) are negative before 1880 and positive between 1880 and 1900. Market value increases after 1900, meaning that capital gains are higher for the last years of the sample. For UK railroad securities, the market price series is above the issuance price series for the entire period before 1907. Cumulative capital gains increase almost continuously from 1869 until around 1895 and decline thereafter, turning negative from 1907 to 1914. The value of outstanding foreign government bonds grows at a slower rate than foreign railroad securities, but the level of the former is higher than the level of the latter. Cumulative capital gains are smaller than those from railroad securities and usually close to zero. UK government securities' cumulative capital gains are smaller than for foreign sovereign bonds. They are mildly positive for a short period from 1895 to around 1900 and then turn negative after 1900. The value of outstanding foreign securities is much higher than the value of outstanding British securities in both classes (railroads/sovereign).

Figure 3 (panels A and B) scales the series presented in figure 2 (panels A and B) by UK's nominal GDP. As explained, figure 3 assumes that British investors owned 80% of the outstanding value of foreign railroad securities traded at the LSE, 80% of the outstanding value of British railroad and government securities traded at the LSE (so that foreign investors owned 20% of British securities) and 60% of foreign government securities. [43] The sum of the market price series for foreign government and railroad securities is a proxy for the total British external asset position while the sum of the market price series for British government and railroad securities is a proxy for the total British external liability position. The difference between the former and the latter constitutes a proxy for the British net external position. To my knowledge, this is the first monthly time series estimate of the British external position that takes into account capital gains and follows the modern methodology for the compilation of international investment positions.[44]

Nonetheless, Meissner and Taylor (2008) affirm that "British net external assets roughly equaled gross external assets, and Britain became a very large net creditor".

[43] The nominal GDP series is from Thomas, Hills and Dimsdale (2010). The series includes the GDP for the whole island of Ireland. The formula for the top panel of figure 3 panel A is 0.8*((Issuance or Market Prices Series of Foreign Railroad Securities))/GDP, for the bottom panel of figure 3 panel A is 0.6*((Issuance or Market Price Series of Foreign Government Securities))/GDP and for the two panels of figure 3 panel B is 0.2*((Issuance or Market Price Series of British Railroads or Government Securities))/GDP.

[44] Previous estimates are in the range of 120% - 160% of GDP for total assets before First World War. Using the issuance prices (since the previous estimates did not take in consideration capital gains), I obtain a value around 160%. Multiplying 150% by 1.1 (since the sample represents around 90% of the total value of securities traded at the LSE), I obtain approximately 160%. Curiously, this figure does not change by much when taking in account capital gains for the specific year of 1914. Previous attempts to calculate the amount of British investments overseas on the eve of the First World War followed three strategies. The first was to calculate the level of investment by making assumptions about the return on investments and using the income account of the current account (Imlah (1958) is an example). The second used the residual of the current account. The third and most influential, known as the Jenks-Simon series, used new issues of capital in the London Stock Exchange (Stone (1999) and Davis and Huttenback (1986) are recent examples). None of these methods made any attempt to calculate valuation effects. Furthermore, since the Jenks-Simon series focused on primary issues, it ignored developments in the secondary markets (and hence in the capital stock of the security), such as defaults, repatriations, reinvested earnings, redemptions and even the maturity of the issue. For example, a security issued in 1876 that matured after twenty years would still be included in the "stock" of British international investments

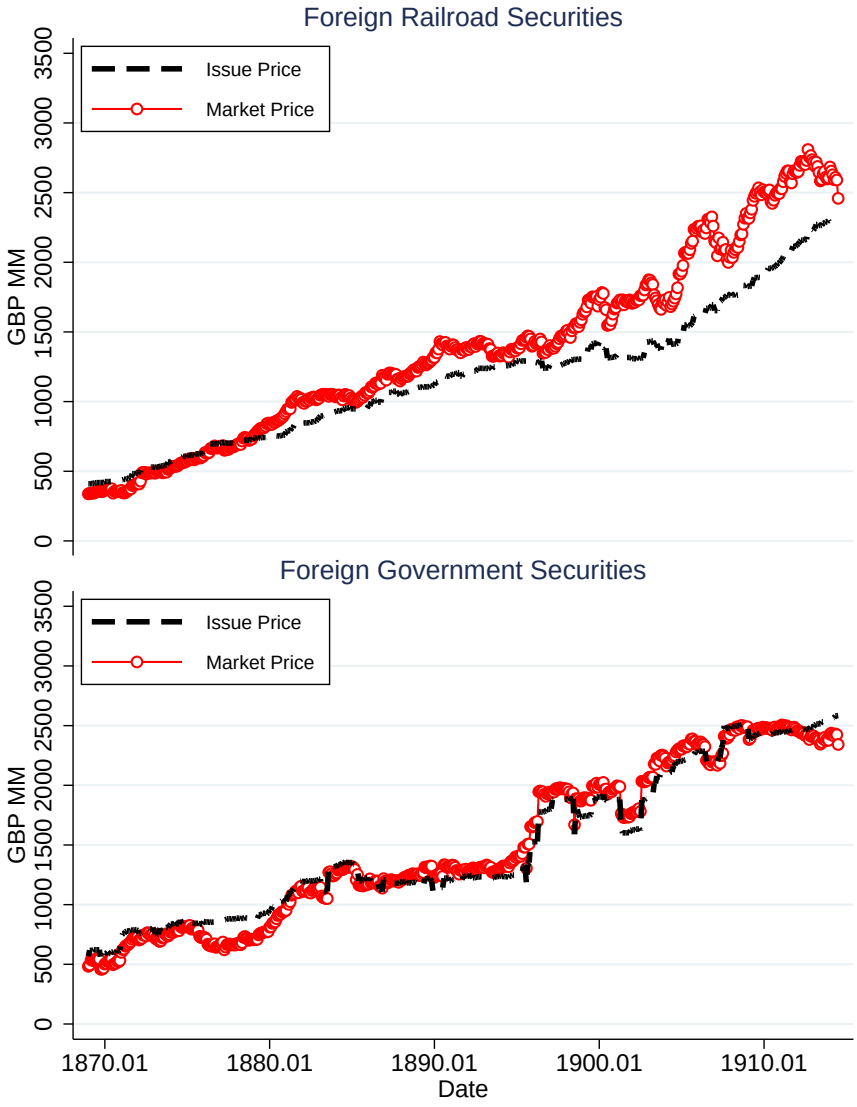


Figure 2: Panel A - Value of outstanding foreign railroad securities and British railroad and government securities (Millions of pounds sterling). Issue or issuance price series is the sum of the capital value of each outstanding security for each month, measured at issuance prices. Market prices series is the sum of the capital value of each outstanding security for each month, measured at current market prices.

The issuance price series for foreign railway holdings oscillates between 60% and 80% of GDP from 1885 to 1914, after increasing from 35% to 60% of GDP between 1869 and 1885. The market price series has three distinct periods. In the first, between 1869 and 1885, it increases from 30% of GDP to 80% of GDP, eventually overtaking the issuance price series in 1880. It then stabilizes at around 80% of GDP until 1905, when it moves to another level around 100% of GDP. The

on the eve of the First World War. Another important point is that my estimate and some of the references cited above rely exclusively on portfolio investments. Platt (1986) estimates that direct investment (the other main foreign investment category besides portfolio investment) was only 8% to 15% of total British investment overseas. With respect to the most important destination of British foreign investments for this period, Wilkins (2009) affirms that "it has long been accepted that in the late nineteenth and early twentieth centuries, the value of foreign portfolio investment far exceeded that of foreign direct investment in the United States."Still according to Platt, the definition of direct investment employed before 1914 was all the capital invested privately that did not pass through a public stock exchange, or "investment that did not leave traces in the securities markets". However, according to modern practice, some investments in securities are classified as direct investment if the share acquired by the investor is high enough to guarantee operational control of the firm.

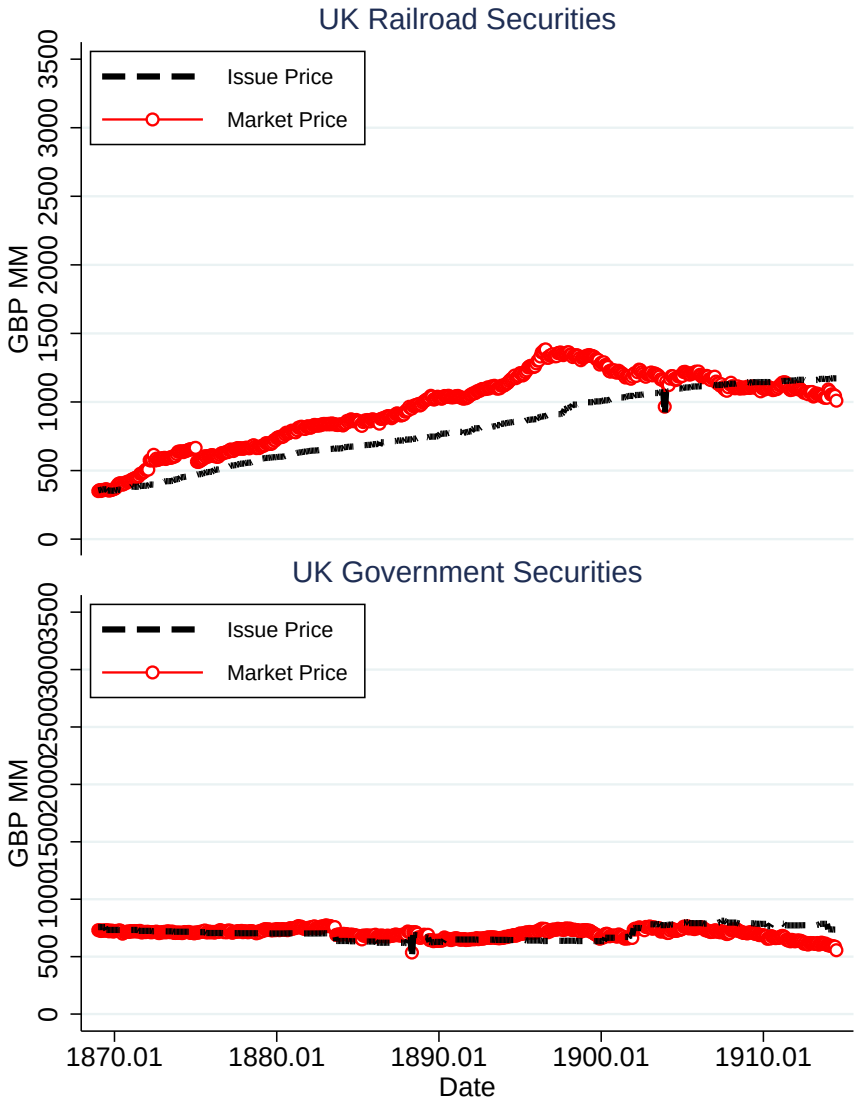


Figure 2: Panel B - Value of outstanding British railroad and government securities (Millions of pounds sterling). Issue or issuance price series is the sum of the capital value of each outstanding security for each month, measured at issuance prices. Market prices series is the sum of the capital value of each outstanding security for each month, measured at current market prices.

sudden drop in July 1914 probably reflects the events that led to the First World War.

The issuance and market price series for foreign government securities holdings rise from around 40% of GDP in 1869 to around 60% of GDP in 1885. Both series are very close for most of the period, with the exception of the period between 1875 to 1882, when capital gains were negative. When scaled by the ratio of ownership of British assets, the capital gains on liabilities coming from UK railway securities in the years 1869-1910 are lower than the capital gains on foreign assets for most years. Capital gains on UK government securities are very low when compared to those of UK and foreign railroad securities.

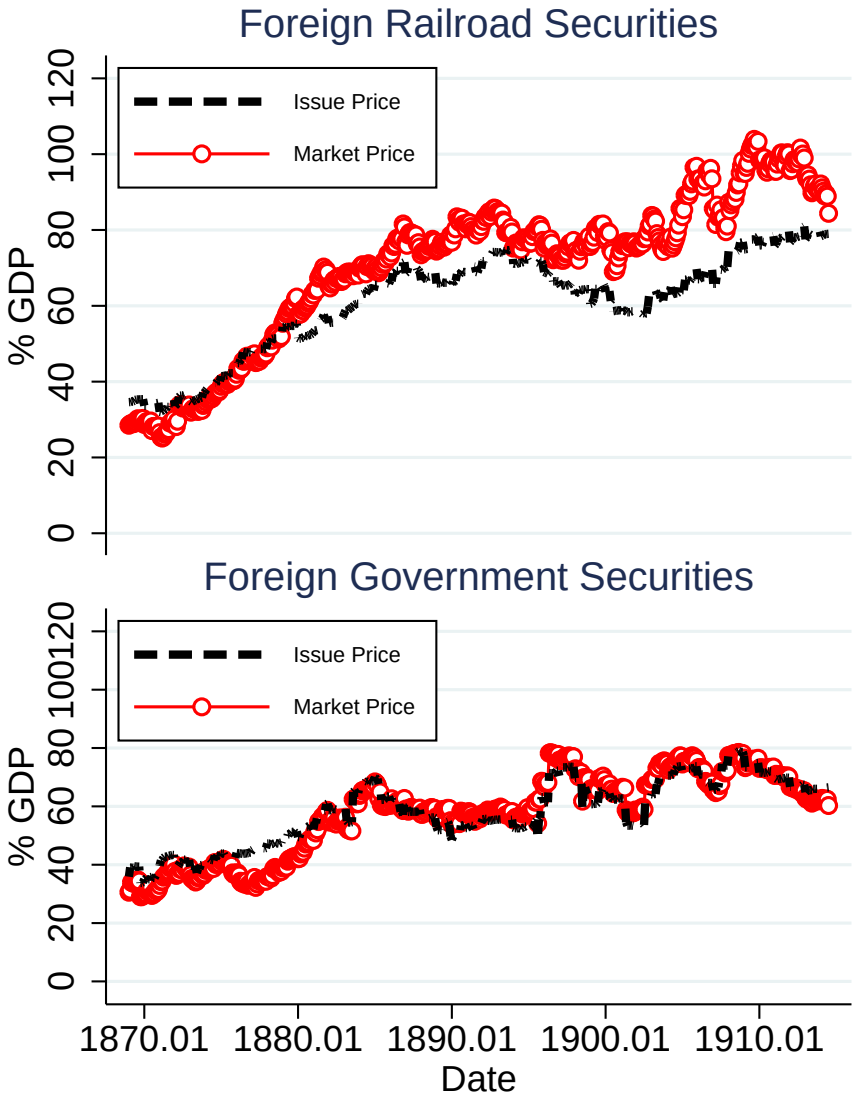


Figure 3: Panel A - Measures of UK external assets (expressed as percentage of GDP and scaled by 80 percent for railroads and 60 percent for government securities). The formula for the top panel is *0.8*(Issuance or Market Prices Series of Foreign Railroad Securities) / GDP*. For the bottom panel is *0.6*(Issuance or Market Price Series of Foreign Government Securities) / GDP*.

### 3.3 Dividend yield estimates

Dividend yields and coupon rates ($i$) are the other necessary component for measurement of exorbitant privilege. The IMM contains specific columns for dividend yields.[45] The estimates for coupon payments on government securities use the coupon rates collected in the names of the securities.

Figure 4 presents the series for dividend and interest income derived from the information on dividend yields and coupon rates of the database.[46] The figure also presents yearly estimates from the income account of the current account

[45] The IMM and the financial market of the period 1869-1914 do not differentiate between equity and debt securities. Coupon payments of debt securities were also called dividend payments.

[46] For each security and each month, the coupon rate and the dividend yields were multiplied by the outstanding value of the capital of the security. The result is the dividend / interest income in pounds sterling. This income was multiplied by the factors of 0.6, 0.8 and 0.2

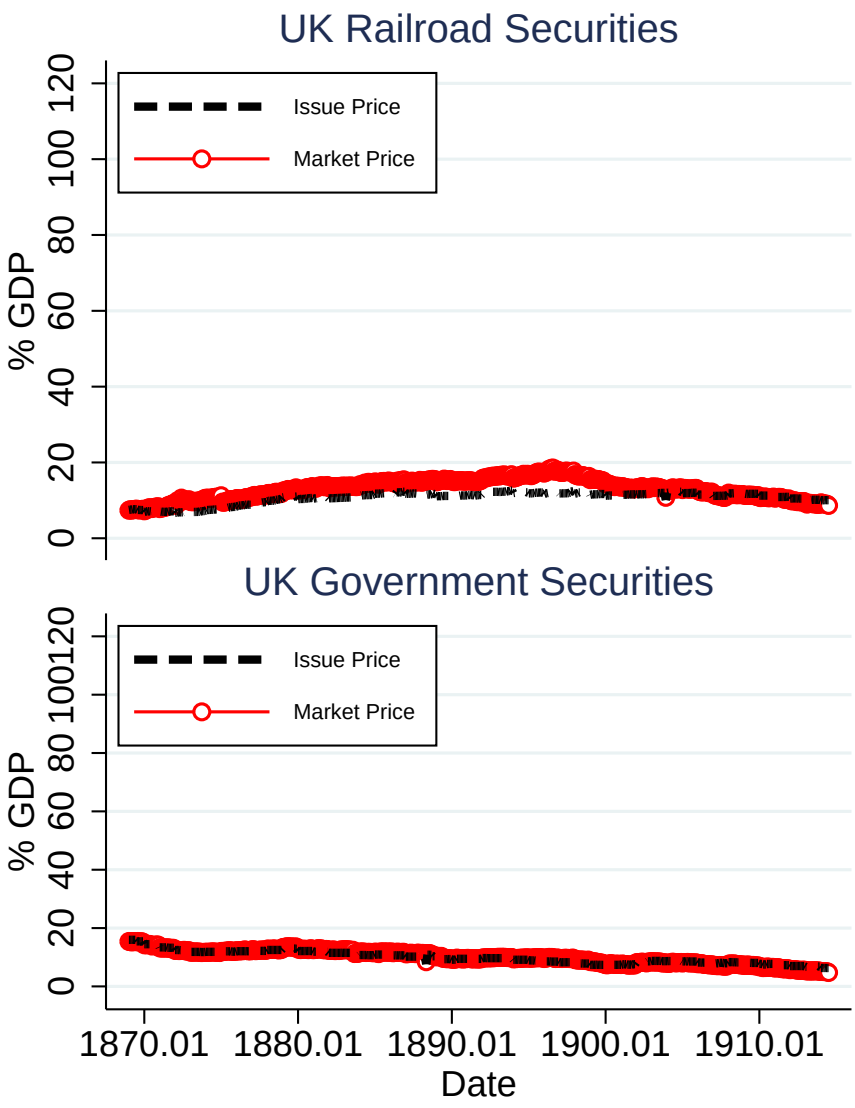


Figure 3: Panel B - Measures of UK external liabilities (expressed as percentage of GDP and scaled by 20 percent). The formula for the two panels is *0.2*(Issuance or Market Price Series of British Railroads or Government Securities) / GDP*.

from the existing literature (Mitchell (1988)). Since dividend and interest incomes on external assets and liabilities are the source of the revenues represented by the income account, the comparison between the two sets of series is direct. The series "Income Assets New" represents the dividend and interest income from foreign railroad and government securities while the series "Income Liabilities New" represents the dividend and interest income from British railroad and government securities. The levels of both series are close to the ones from the literature, with minor deviations. While the increase in dividends / interest income from 1905 to 1914 is more accentuated in the new asset series (probably due to the growth of the stock of foreign railroad securities), both asset series (from this paper and from Mitchell) oscillate around 6-7% of GDP annually from 1880 to 1905. The new liabilities series is above the corresponding series from the literature for most

respectively for foreign government securities, foreign railroad securities and British securities. After aggregation into two series for foreign securities and British securities, they were divided by GDP.

of the period. The new liabilities series actually declines a bit over time while the series from Mitchell rises a bit. Since the British external liabilities position was small in comparison to the external assets position, the liabilities yields are also small in comparison to asset yields.

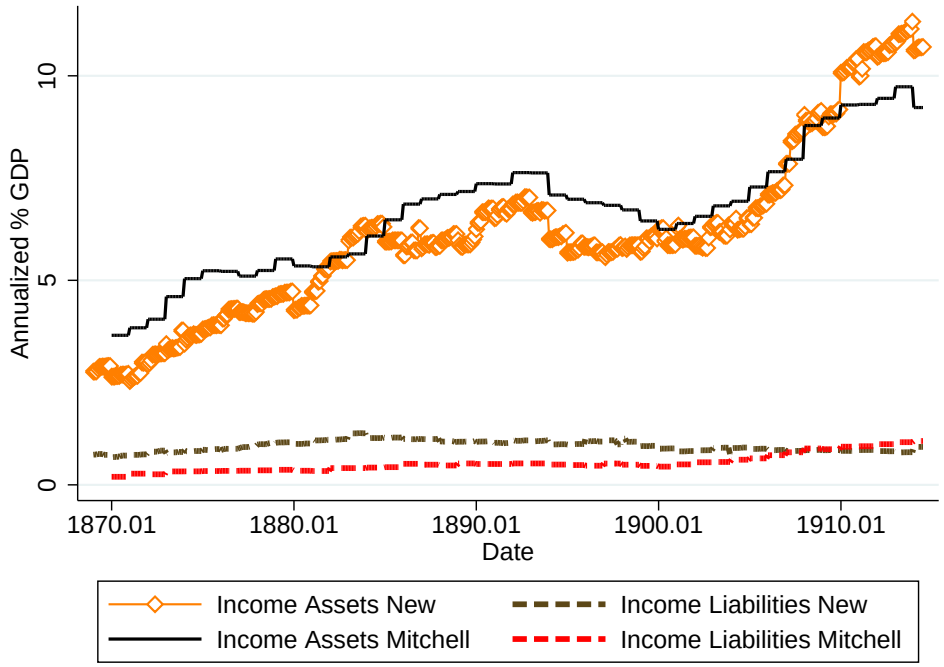


Figure 4: Dividend and coupon income on external assets and liabilities (percentage of GDP). Series "New" are calculated by multiplying the coupon rate and the dividend yields by the outstanding value of the capital of each security and aggregating (taking into account the percentages of 80/60/20). "Mitchell" refers to the estimates of the income account of the current account from Mitchell (1988).

### 3.4 Aggregate Exorbitant Privilege

My benchmark measure of net revenues earned by Britain vis-a-vis the rest of the world (or aggregate exorbitant privilege) is the sum of the capital gains (yearly variation) and dividend/interest income calculated from the proxies for external liabilities and assets in the previous sections. Capital gains are the sum of the differences between yearly variation in market price series and issuance price series of foreign securities (railroad / sovereign) minus the differences between market price series and issuance price series of British securities (railroad / sovereign) in figure 3. Dividend and interest income come from figure 4. Figure 5 presents the results as a percentage of GDP. Since liabilities are scaled by a factor of 0.2 (20% foreign holdings of British securities), most of the dynamics of net revenues comes from the dynamics of capital gains and dividend/interest income from external railroad assets. On average, capital gains on foreign railroad securities and to a lesser extent from foreign government securities boosted the revenues received by Britain by 3% of GDP, with significant volatility. The series reached peaks of 25% of GDP in some months but the average is 8.3% of GDP, with

substantial fluctuations.[47]

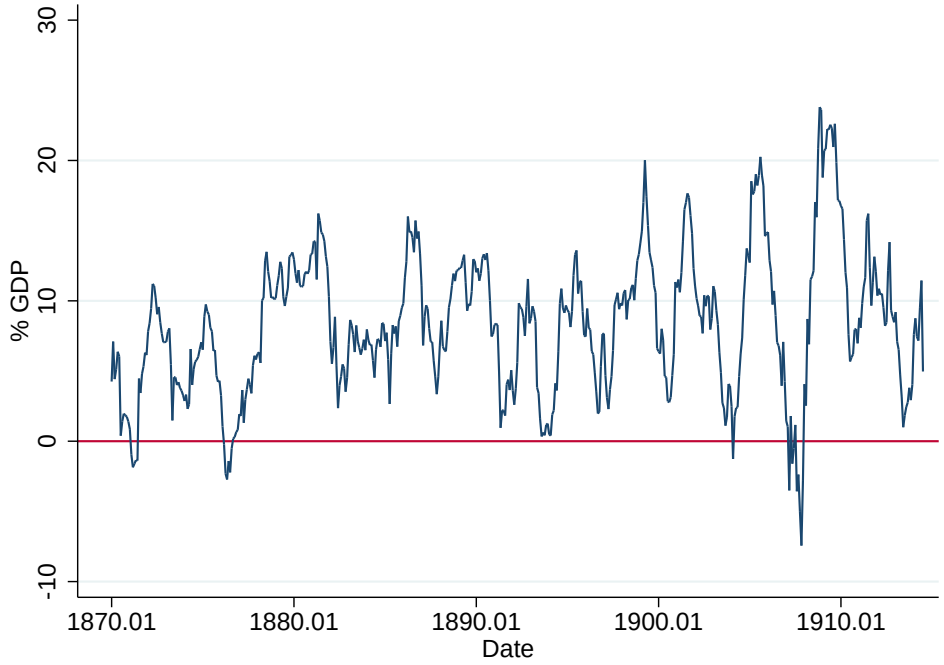


Figure 5: Measure of net revenues earned by Britain vis-a-vis the rest of the world (aggregate exorbitant privilege as a percentage of GDP). Revenues are the sum of excess capital gains (differences between market price series and issuance price series in figure 3) and dividend and interest income from figure 4. The two components (from figures 3 and 4) take into account the percentages of 80/60/20.

What do these figures mean in terms of equation 4? Figure 6 presents the answer. The left-hand side of equation 4 represents the capital gains and dividend yields on external assets ($kg_t^A + i_t^A - \gamma$) while the right-hand side adds the yields and capital gains on external liabilities ($kg_t^L + i_t^L - \gamma$) scaled by the ratio of liabilities over assets ($L_{t-1}/A_{t-1}$). The condition for the existence of exorbitant privilege is fulfilled for almost the whole period, with the exception of short intervals around 1871, 1895 and 1908. Since British external liabilities are tiny with comparison to British external assets, the right-hand side of the equation is almost flat (since it is scaled by liabilities over assets) with comparison to the left-hand side.

On average, the pure exorbitant privilege enjoyed by Britain was strong enough to manifest itself in aggregate terms. The aggregate revenues received by Britain were larger than the estimates for the US in the last quarter of the twentieth century and represented by themselves a significant macroeconomic value, comparable for example to the investment component of the GDP of many countries.

[47] Tables 1 and 2 of the appendix show that the ratios of 80% for British ownership of foreign railroads securities, 60% of British ownership of foreign sovereign securities, 20% of foreign ownership of British securities assumed in this paper are not determinant for the result. Table 1 varies the ratio of British ownership of railroads securities from 70% to 100% while varying the ratio of ownership of British securities by foreigners from 0% to 30%. In table 2, the ratio of ownership of foreign government securities by British varies from 50% to 80% while the ratio of ownership of British securities by foreigners varies from 0% to 30%. In the two tables, using the most adverse conditions to the existence of revenues (high ownership of British securities by foreigners and low ownership of foreign securities by British), the estimates reached a low level of around 8.5% of GDP (the highest levels are around 12.7% of GDP).

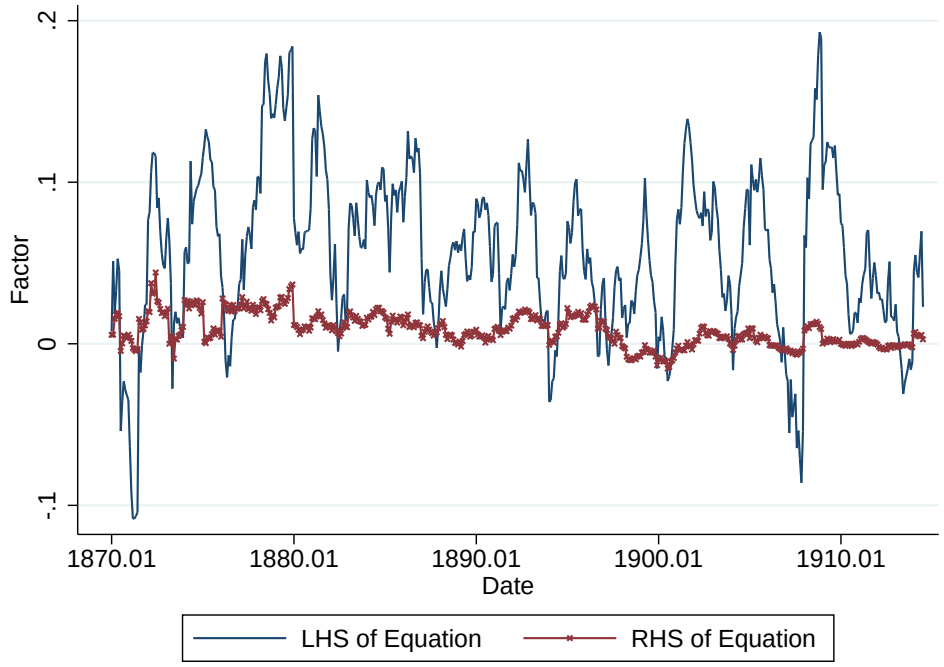


Figure 6: Equation 4 for Britain in the period 1869 – 1914. Equation 4 is $(kg_t^A + i_t^A - \gamma) > (kg_t^L + i_t^L - \gamma)(L_{t-1}/A_{t-1})$, where $kg_t^A$, $i_t^A$, $kg_t^L$, $i_t^L$, $\gamma$, $L_{t-1}$ and $A_{t-1}$ are respectively capital gains on assets, dividend yields / interest rates on assets, capital gains on liabilities, dividend yields / interest rates on liabilities, nominal growth rate of GDP and external liabilities and external assets.

### 3.5 Robustness

Tables 1 and 2 show that the ratios of 80% for British ownership of foreign railroads securities, 60% of British ownership of foreign sovereign securities, 20% of foreign ownership of British securities assumed in this paper are not determinant for the result. Table 1 varies the ratio of British ownership of railroads securities from 70% to 100% while varying the ratio of ownership of British securities by foreigners from 0% to 30%. In table 2, the ratio of ownership of foreign government securities by British varies from 50% to 80% while the ratio of ownership of British securities by foreigners varies from 0% to 30%. In the two tables, using the most adverse conditions to the existence of revenues (high ownership of British securities by foreigners and low ownership of foreign securities by British), the estimates reached a low level of around 7% of GDP (the highest levels are around 12.7% of GDP).

A second robustness check is to compare the dividend payments I obtain from the data with the estimates from Mitchell (1988) for the income account of the British current account. The ratios are obtained by calculating the proportion of foreign ownership on British assets and liabilities in order to match the figures from Mitchell (1988). This is shown in figure 7. By using these ratios, the estimate of the average revenues received by Britain for the whole period is 6.5% of GDP. In this case, the size of the British net external position is smaller than assumed in the literature, around 130% of GDP.

| Ownership of Foreign RR securities by British \ Ownership of British Securities by Foreigners | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **70** | 8.7 | 8.6 | 8.5 | 8.3 | 8.2 | 8.1 | 8.0 | 7.9 | 7.7 | 7.6 | 7.5 | 7.4 | 7.3 | 7.2 | 7.0 | 6.9 |
| **72** | 8.9 | 8.7 | 8.6 | 8.5 | 8.4 | 8.3 | 8.1 | 8.0 | 7.9 | 7.8 | 7.7 | 7.6 | 7.4 | 7.3 | 7.2 | 7.1 |
| **74** | 9.0 | 8.9 | 8.8 | 8.7 | 8.5 | 8.4 | 8.3 | 8.2 | 8.1 | 8.0 | 7.8 | 7.7 | 7.6 | 7.5 | 7.4 | 7.2 |
| **76** | 9.2 | 9.1 | 8.9 | 8.8 | 8.7 | 8.6 | 8.5 | 8.4 | 8.2 | 8.1 | 8.0 | 7.9 | 7.8 | 7.6 | 7.5 | 7.4 |
| **78** | 9.3 | 9.2 | 9.1 | 9.0 | 8.9 | 8.8 | 8.6 | 8.5 | 8.4 | 8.3 | 8.2 | 8.0 | 7.9 | 7.8 | 7.7 | 7.6 |
| **80** | 9.5 | 9.4 | 9.3 | 9.2 | 9.0 | 8.9 | 8.8 | 8.7 | 8.6 | 8.4 | **8.3** | 8.2 | 8.1 | 8.0 | 7.9 | 7.7 |
| **82** | 9.7 | 9.6 | 9.4 | 9.3 | 9.2 | 9.1 | 9.0 | 8.8 | 8.7 | 8.6 | 8.5 | 8.4 | 8.3 | 8.1 | 8.0 | 7.9 |
| **84** | 9.8 | 9.7 | 9.6 | 9.5 | 9.4 | 9.2 | 9.1 | 9.0 | 8.9 | 8.8 | 8.7 | 8.5 | 8.4 | 8.3 | 8.2 | 8.1 |
| **86** | 10.0 | 9.9 | 9.8 | 9.6 | 9.5 | 9.4 | 9.3 | 9.2 | 9.1 | 8.9 | 8.8 | 8.7 | 8.6 | 8.5 | 8.3 | 8.2 |
| **88** | 10.2 | 10.0 | 9.9 | 9.8 | 9.7 | 9.6 | 9.5 | 9.3 | 9.2 | 9.1 | 9.0 | 8.9 | 8.7 | 8.6 | 8.5 | 8.4 |
| **90** | 10.3 | 10.2 | 10.1 | 10.0 | 9.9 | 9.7 | 9.6 | 9.5 | 9.4 | 9.3 | 9.1 | 9.0 | 8.9 | 8.8 | 8.7 | 8.6 |
| **92** | 10.5 | 10.4 | 10.3 | 10.1 | 10.0 | 9.9 | 9.8 | 9.7 | 9.5 | 9.4 | 9.3 | 9.2 | 9.1 | 9.0 | 8.8 | 8.7 |
| **94** | 10.7 | 10.5 | 10.4 | 10.3 | 10.2 | 10.1 | 9.9 | 9.8 | 9.7 | 9.6 | 9.5 | 9.4 | 9.2 | 9.1 | 9.0 | 8.9 |
| **96** | 10.8 | 10.7 | 10.6 | 10.5 | 10.3 | 10.2 | 10.1 | 10.0 | 9.9 | 9.8 | 9.6 | 9.5 | 9.4 | 9.3 | 9.2 | 9.0 |
| **98** | 11.0 | 10.9 | 10.7 | 10.6 | 10.5 | 10.4 | 10.3 | 10.2 | 10.0 | 9.9 | 9.8 | 9.7 | 9.6 | 9.4 | 9.3 | 9.2 |
| **100** | 11.1 | 11.0 | 10.9 | 10.8 | 10.7 | 10.6 | 10.4 | 10.3 | 10.2 | 10.1 | 10.0 | 9.8 | 9.7 | 9.6 | 9.5 | 9.4 |

Table 1: Exorbitant Privilege for the period 1869-1914 (percent of GDP): Variation in the ratio of ownership of British and foreign railroad securities.

| Ownership of Foreign Gov. securities by British | Ownership of British Securities by Foreigners | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 |
| **50** | 9.0 | 8.9 | 8.8 | 8.7 | 8.5 | 8.4 | 8.3 | 8.2 | 8.1 | 8.0 | 7.8 | 7.7 | 7.6 | 7.5 | 7.4 | 7.2 |
| **52** | 9.1 | 9.0 | 8.9 | 8.8 | 8.6 | 8.5 | 8.4 | 8.3 | 8.2 | 8.0 | 7.9 | 7.8 | 7.7 | 7.6 | 7.5 | 7.3 |
| **54** | 9.2 | 9.1 | 9.0 | 8.9 | 8.7 | 8.6 | 8.5 | 8.4 | 8.3 | 8.1 | 8.0 | 7.9 | 7.8 | 7.7 | 7.6 | 7.4 |
| **56** | 9.3 | 9.2 | 9.1 | 9.0 | 8.8 | 8.7 | 8.6 | 8.5 | 8.4 | 8.2 | 8.1 | 8.0 | 7.9 | 7.8 | 7.7 | 7.5 |
| **58** | 9.4 | 9.3 | 9.2 | 9.1 | 8.9 | 8.8 | 8.7 | 8.6 | 8.5 | 8.3 | 8.2 | 8.1 | 8.0 | 7.9 | 7.8 | 7.6 |
| **60** | 9.5 | 9.4 | 9.3 | 9.2 | 9.0 | 8.9 | 8.8 | 8.7 | 8.6 | 8.4 | **8.3** | 8.2 | 8.1 | 8.0 | 7.9 | 7.7 |
| **62** | 9.6 | 9.5 | 9.4 | 9.3 | 9.1 | 9.0 | 8.9 | 8.8 | 8.7 | 8.5 | 8.4 | 8.3 | 8.2 | 8.1 | 8.0 | 7.8 |
| **64** | 9.7 | 9.6 | 9.5 | 9.4 | 9.2 | 9.1 | 9.0 | 8.9 | 8.8 | 8.6 | 8.5 | 8.4 | 8.3 | 8.2 | 8.0 | 7.9 |
| **66** | 9.8 | 9.7 | 9.6 | 9.5 | 9.3 | 9.2 | 9.1 | 9.0 | 8.9 | 8.7 | 8.6 | 8.5 | 8.4 | 8.3 | 8.1 | 8.0 |
| **68** | 9.9 | 9.8 | 9.7 | 9.5 | 9.4 | 9.3 | 9.2 | 9.1 | 9.0 | 8.8 | 8.7 | 8.6 | 8.5 | 8.4 | 8.2 | 8.1 |
| **70** | 10.0 | 9.9 | 9.8 | 9.6 | 9.5 | 9.4 | 9.3 | 9.2 | 9.1 | 8.9 | 8.8 | 8.7 | 8.6 | 8.5 | 8.3 | 8.2 |
| **72** | 10.1 | 10.0 | 9.9 | 9.7 | 9.6 | 9.5 | 9.4 | 9.3 | 9.2 | 9.0 | 8.9 | 8.8 | 8.7 | 8.6 | 8.4 | 8.3 |
| **74** | 10.2 | 10.1 | 10.0 | 9.8 | 9.7 | 9.6 | 9.5 | 9.4 | 9.3 | 9.1 | 9.0 | 8.9 | 8.8 | 8.7 | 8.5 | 8.4 |
| **76** | 10.3 | 10.2 | 10.1 | 9.9 | 9.8 | 9.7 | 9.6 | 9.5 | 9.4 | 9.2 | 9.1 | 9.0 | 8.9 | 8.8 | 8.6 | 8.5 |
| **78** | 10.4 | 10.3 | 10.2 | 10.0 | 9.9 | 9.8 | 9.7 | 9.6 | 9.5 | 9.3 | 9.2 | 9.1 | 9.0 | 8.9 | 8.7 | 8.6 |
| **80** | 10.5 | 10.4 | 10.3 | 10.1 | 10.0 | 9.9 | 9.8 | 9.7 | 9.5 | 9.4 | 9.3 | 9.2 | 9.1 | 9.0 | 8.8 | 8.7 |

Table 2: Exorbitant Privilege for the period 1869-1914 (percent of GDP): Variation in the ratio of ownership of British and foreign government securities.

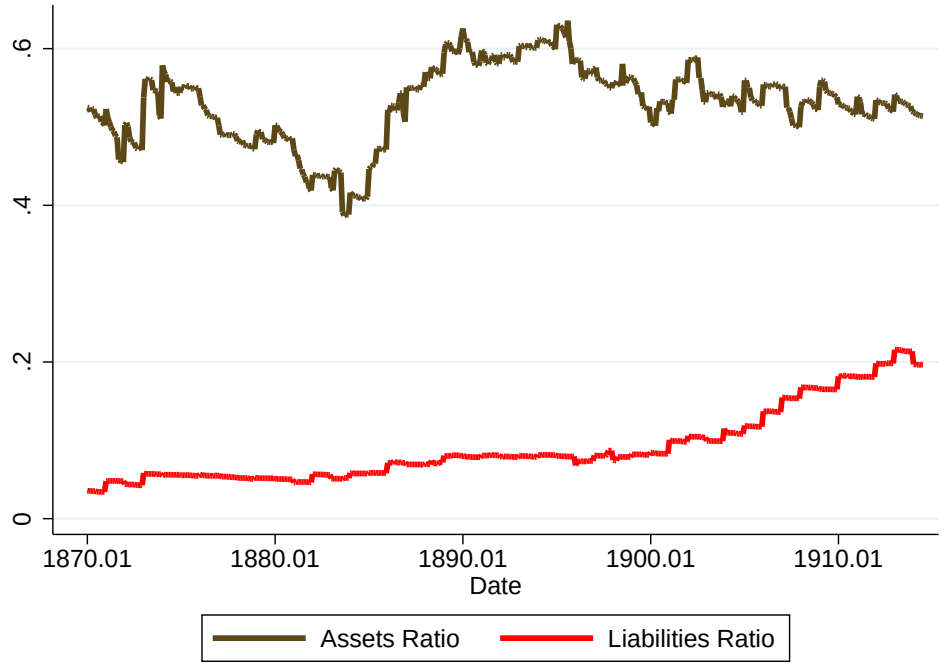


Figure 7: Ratios of foreign and British ownership of securities obtained by comparing dividend payments for foreign and British securities with the estimates from Mitchell (1988).

### 3.5.1 Composition and return effects for capital gains

Gourinchas and Rey (2007) decompose excess returns in the US in the second half of the twentieth century into total return and composition effects. They find that in the case of the US, external assets are dominated by classes of assets with higher risk profile than those of external liabilities. Figure 8 shows the composition of British securities (government and railroads) in the top panel and of foreign securities (government and railroads) in the lower panel. The top panel represents the portfolio composed of British external liabilities and the lower panel the portfolio composed of British external assets.[48] The usual ascendant scale of risk goes from debt (which promises a fixed return to the investor) to preferred shares (which promise a fixed return after the payment of bonds) and to common shares (the residual receivers of eventual profit distribution). The first important aspect to notice in the two panels is the relative dominance of debt instruments. The share of debt is higher than 85% in the lower panel and ranges from 80% to 60% in the upper panel. The immediate conclusion from figure 8 is that there is a large difference between the composition of British external assets and British external liabilities. Taking into account that debt securities are associated with a lower profile of risk, the figure suggests that Britain's profile was the inverse of the US of the late twentieth century: external assets were dominated by classes of securities with a lower risk profile than those of external liabilities.[49]

Table 3 presents the decomposition of total excess returns (capital gains + dividend yields) on British net external

[48] In order to carry out the analysis presented in this section, I assume that foreign investors bought British assets in a fixed proportion with respect to the total amount traded at the LSE. For example, investors would hold portfolios composed of 50% of British government securities and 50% of British railway securities. This might not be true, since foreign investors may have been biased to one type of British security. If that security was government bonds, the estimates presented here are a lower bound of the possible range for the composition effect.

[49] This is compatible to evidence that British investors preferred debt securities. See Platt (1986).

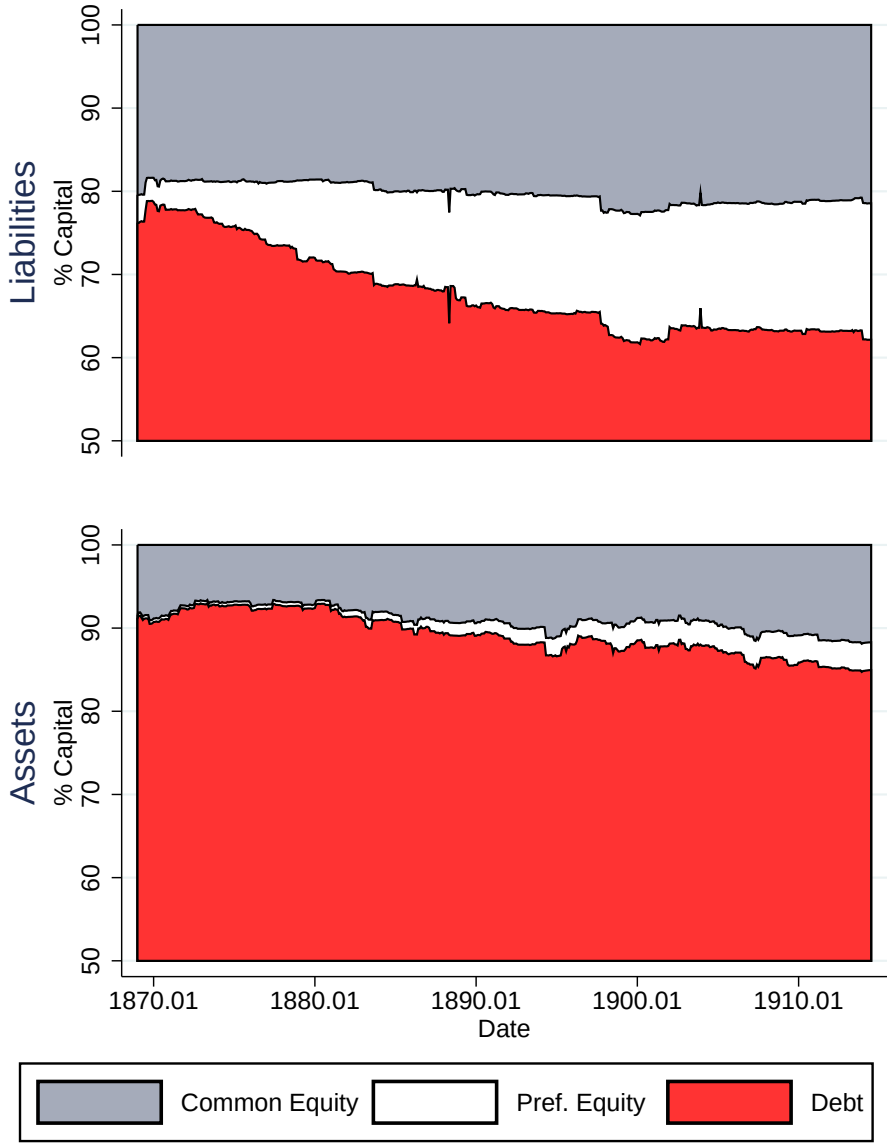


Figure 8: Composition of portfolios in terms of class of assets. (In black and white charts, debt is the area below).

assets into the composition effect and the total return effect, following equation 5. The total excess return here corresponds to a weighted exorbitant privilege, since I am not taking into account that British assets are much larger than British liabilities.[50] The total return effect is the difference between returns of assets and liabilities *within each class of asset* (sovereign, railroad debt, railroad common equity, and railroad preferred equity), not taking into account the shares of each class of asset in the composition of assets and liabilities. As an example, the difference in returns between British railroad common equity and foreign railroad common equity contributes to the total return effect.

[50] The difference between British and American relative sizes of gross external assets and liabilities is important. While for the US gross external liabilities are 1 to 1.5 times the size of the gross external assets (175% of GDP compared to 150% of GDP on average from 1990 to 2004), for Britain gross external assets were probably more than 10 times higher than gross external liabilities during this period (180% of GDP compared to 10% of GDP). While Gourinchas and Rey (2007) gave equal weight to comparable magnitudes (150% of GDP and 175% of GDP), I am giving equal weights to completely different magnitudes. The direct consequence is that some of the results might be counterintuitive. This is the spirit of the difference between weighted exorbitant privilege and aggregate exorbitant privilege.

The composition effect is the difference in returns caused by differences in the composition of the asset and liability portfolios. If external assets are less concentrated in equity than external liabilities, the difference between the share of equity in assets and the share of equity in liabilities is negative. For example, if equities are 10% of assets and 30% of liabilities, the difference is -20%. The composition effect for equity is -20% multiplied by the average of the returns of equities on assets and equities on liabilities. Given the returns on individual asset classes (the average between the returns of the same class in assets and liabilities), the different compositions of assets and liabilities generate different aggregate returns.

Given the composition of UK's external assets and liabilities in figure 8, it is no surprise that the composition effect is negative: the portfolio composed of British external assets is less risky than the portfolio composed of British external liabilities. A large part of the result comes from railroad equity securities, while sovereign securities present a positive composition effect for most decades (since sovereign securities are all debt). The total return effect on British net external assets derives from the difference in returns within each class of asset and not from the different composition of assets and liabilities. Since the composition effect is negative, positive total excess returns mean that the return effect is positive and large. The overall total excess return is positive (0.8%), but this is a result largely of the decade from 1900 to 1909. For those years, the total return effect was 6%, boosted by strong returns in railroad securities of all classes. In most other decades, the total return effect is positive but only large enough to compensate for the negative composition effect. The results for the total return effect are compatible in terms of overall magnitude with the findings of Gourinchas and Rey (2007) and Habib (2010) for the US in the last quarter of the twentieth century. Because the composition effect for the US is positive and for Britain is usually negative, the overall total excess return for Britain is smaller than for the US in the twentieth century. The fact that the total return effect is positive confirms the findings of table 5 in the appendix about pure exorbitant privilege: British securities paid a lower return than comparable foreign securities. Nonetheless, the fact that British invested mainly in safe assets (debt) took away part of the benefit of issuing the global reserve currency.[51]

### 3.5.2 Separating between returns and aggregate positions

It is clear from the last section that the overall excess returns from the British net external position were positive but very low, because Britain's external asset position was less risky than Britain's external liability position. With a low total excess return (0.1%), how is it possible that Britain received a large amount of revenues from the rest of the world? The answer is that Britain was a surplus country and accumulated a large net external position, which reached around 180% of GDP on the eve of the First World War. By contrast, the US has maintained a large negative external position in recent decades. Is it possible that Britain received large aggregate revenues from the rest of world simply because its large positive net external position leveraged small excess returns? Figure 9 answers this question by plotting three series. The first one ("Actual") is the actual ratio of liabilities over assets ($L/A$) derived from my data. The second one ("No Income") is the ratio of liabilities over assets that would make the right-hand side of equation 4 equal to the left-hand

[51] I am not claiming that investment in safe assets is a flawed strategy. I am just claiming that Britain did not take advantage of the spread between the returns on its assets and liabilities.

| | | 1869-1879 | 1880-1889 | 1890-1899 | 1900-1909 | 1910-1914 | Total |
|---|---|---|---|---|---|---|---|
| Composition Effect | RR Equity (Com.) | -0.9 | -0.6 | -0.7 | -1.0 | -0.4 | -0.8 |
| | RR Equity (Pref.) | -0.7 | -2.2 | -1.2 | -1.1 | -0.4 | -1.2 |
| | RR Debt | 1.0 | 0.8 | 0.7 | 0.4 | 0.4 | 0.7 |
| | RR Total | -0.6 | -2.0 | -1.2 | -1.7 | -0.5 | -1.3 |
| | Sovereign | 0.1 | 0.5 | 0.3 | 0.4 | 0.0 | 0.3 |
| | Total | **-0.5** | **-1.5** | **-1.0** | **-1.2** | **-0.5** | **-1.0** |
| Total Return Effect | RR Equity (Com.) | -0.6 | -0.7 | 0.2 | 2.4 | 0.2 | 0.3 |
| | RR Equity (Pref.) | -0.1 | 1.2 | 0.3 | 0.9 | -0.4 | 0.5 |
| | RR Debt | -0.9 | -0.5 | 0.0 | 1.3 | -0.1 | 0.0 |
| | RR Total | -1.5 | 0.0 | 0.5 | 4.6 | -0.3 | 0.7 |
| | Sovereign | -0.1 | 2.6 | 0.4 | 1.4 | 0.9 | 1.0 |
| | Total | **-1.7** | **2.6** | **0.9** | **6.0** | **0.7** | **1.8** |
| RR Total Excess Return | | -2.1 | -2.1 | -0.8 | 2.9 | -0.8 | -0.6 |
| Sov. Total Excess Return | | 0.0 | 3.1 | 0.7 | 1.8 | 1.0 | 1.3 |
| Total Excess Return | | **-2.1** | **1.0** | **0.0** | **4.8** | **0.2** | **0.8** |

Table 3: Average yearly returns for each class of asset by decade.

side of equation 4, given the (monthly) returns calculated for figure 6.[52] If returns on liabilities are higher than returns on assets, the ratio of liabilities over assets will be lower than 100% (and the country has to be a net creditor to receive a positive income from the rest of the world). The chart also depicts the ratio of liabilities over assets for the US for the period 1982-2004 (the line was "stretched" in order to compare to Britain, so that one year for the US series in the lower axis corresponds to two years of the two British series in the upper axis). From the series "Actual", Britain maintained a large and growing creditor position with the ratio of liabilities over assets falling from 30% to close to 10% over the period. From the series "No Income" and given the capital gains and dividend yields on assets and liabilities, the ratio of liabilities over assets needed to equalize returns on Britain's assets and liabilities would be just below 100% for most of the period. Britain would not have been able to sustain a large negative net external position during this period. This pattern changed for a short period around 1900. The US has been able to maintain a negative net position that was not sustainable by Britain, given the low excess returns (in comparison to the US) that the latter received. Britain received large revenues from the rest of the world because of its large and positive net external position, but the net returns on its external position would have not allowed Britain to reach the status of a large debtor country receiving positive revenues from the rest of the world until 1900. The source of British income from its external position is the difference between the blue line ("No Income") and the orange line ("Actual") in figure 9. The greater is the difference between the two lines, the larger is the leveraging of a small returns differential by a large positive stock position.

The flip side of the analysis presented in the previous paragraph is to ask how much revenue the US of the last decade of the twentieth century and first decade of the twenty-first century would receive, given the returns on its net external position, if it was a large net lender to the rest of the world. I use the estimates from Curcuru, Thomas and Warnock (2013), which are on the lower side of the literature. They calculate that the average return differential of the American

[52] $(L_{t-1}/A_{t-1}) = (kg_t^A + i_t^A - \gamma)/(kg_t^L + i_t^L - \gamma)$ given $kg_t^A$, $i_t^A$, $kg_t^L$, $i_t^L$ calculated for figure 10.

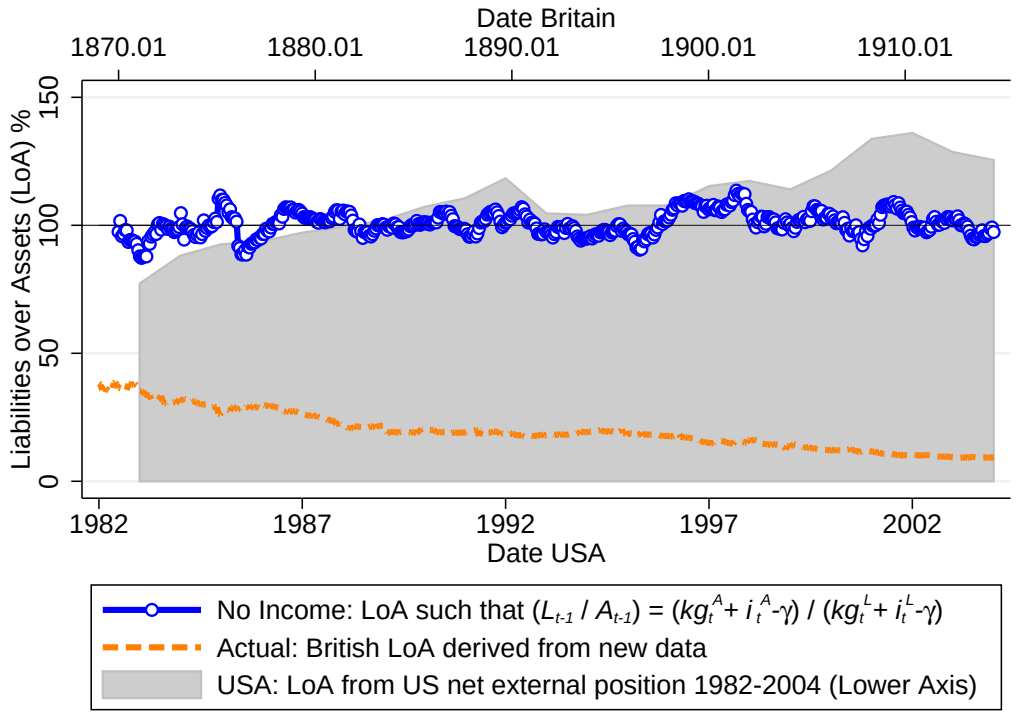


Figure 9: Comparison of actual British Liabilities over Assets (1871 - 1914) to simulated British Liabilities over Assets with no income and US Liabilities over Assets (1982 - 2004).

net external position is 1.9%. By using their returns series, the US received an average revenue of 0.82% of GDP in the period 1990-2011 (the figure from Gourinchas and Rey (2014) is 3.3% of GDP for the period 1991–2010). If the US maintained a large and positive net external position comparable to the UK of the years 1893-1914 (average of 145% of GDP), this figure would jump by thirteen times to 10.6% of GDP.

## 3.6 Initial Assessment of the Causes of Exorbitant Privilege

In this section, I preliminarily explore two explanations for the return differential: inflation differential and the currency composition of Britain's net external assets.

### 3.6.1 Inflation

An important observation with respect to the rates of return calculated above is that they are nominal, since information contained in the IMM are nominal. Dividend yields and capital gains are calculated by using nominal values of capital for each security. A possible explanation for the difference in nominal returns between securities of two countries could be the difference in inflation rates between countries. The exorbitant privilege literature with respect to the US calculates nominal returns and the compatibility between estimates of returns for Britain in the period 1870-1914 and the US in the last quarter of the twentieth century is the main reason to calculate nominal returns to Britain. The advent of persistent high inflation occurs in the twentieth century after the Second World War, which means that it is a more serious issue for

estimates of returns in the last quarter of the twentieth century than before the First World War.

Securities denominated in pounds sterling from foreign countries are protected from inflation. In theory, other securities could be vulnerable, but persistent higher rates of inflation with respect to other countries should not be a frequent event under the gold standard, since the discrepancy of prices would create a deficit in the trade balance and trigger gold movements. A complete comparison of real rates of returns across the globe is not the objective of this section. Instead, I focus on the rates of inflation of Britain and the US. Data availability and the position of the US as the largest destination of British capital and the country with the most non pound-denominated securities determine the choice of the US.

Figure 10 plots price indexes for the two countries (indexes with the base-year of 1873=100 in the panel above and rates of inflation year over year in the panel below).[53] In the beginning of the period, the US prices fell (possibly as a correction for high inflation during the Civil War). From 1873 to 1895, both countries followed similar dynamics and experienced strong deflation. From 1895 to 1900, inflation is positive again in both countries. The first large divergence occurs from 1900 to 1905, when the US experiences inflation and British prices are stable. From 1905 to 1914, both countries experience positive inflation, with a higher average in the US. At least for the period analyzed, inflation differentials between the two countries do not seem to be significant or a major cause for nominal returns differentials. The period between 1900 and 1905 is the only one with a substantial inflation differential. Another interesting aspect of the period 1873 to 1895 is that nominal rates of return are higher than *ex-post* real rates of return (using realized inflation to calculate the real rates of return).[54] Average inflation rate for the period 1872-1914 is -0.4% for the US and -0.5% for Britain.

### 3.6.2 Currency returns

The country that issues the global reserve currency derives an advantage because its liabilities are denominated in the global reserve currency while its assets are denominated in other currencies. The case of Britain is distinct for two reasons. The international monetary arrangement was the gold standard, which meant that most currencies in the world operated under a system of fixed exchange rates. Each currency in theory would be equivalent to the pound sterling, since it was convertible into gold and gold was convertible into pounds sterling. The main risk to the investor originated from the possibility of a country leaving the gold standard. The other main point is that the majority of the foreign securities traded in London were denominated in pounds, and the majority of the securities denominated in other currencies contained gold and sterling clauses. Considering these two caveats, figure 11 presents the breakdown of figure 5 into securities denominated in pounds and securities denominated in other currencies.[55] Even though they comprised a minority of the securities traded at the LSE, securities denominated in other currencies represent a significant share of the net return after 1898, while the net return from pound denominated securities gradually decreased. Had the new trend been maintained after 1914,

[53] Series for the US are the average of three indexes contained in Carter et al. (2006): the General Price Index (Snyder-Tucker), the Wholesale Price Index All Commodities (Warren and Pearson) and the Wholesale Price Index (Bureau of Labor Statistics). Series for Britain are the average of three indexes contained in Mitchell (1988): the Rousseaux Price Indices, the Sauerbeck-Statist Price Indices and the Board of Trade Wholesale Price Indices.

[54] Persistent deflation affects expectations as well. If estimates of expectations of inflation were available, ex-ante real rates of return would be higher than nominal rates of return.

[55] The breakdown is from assets' revenues since all the liabilities are denominated in pounds.

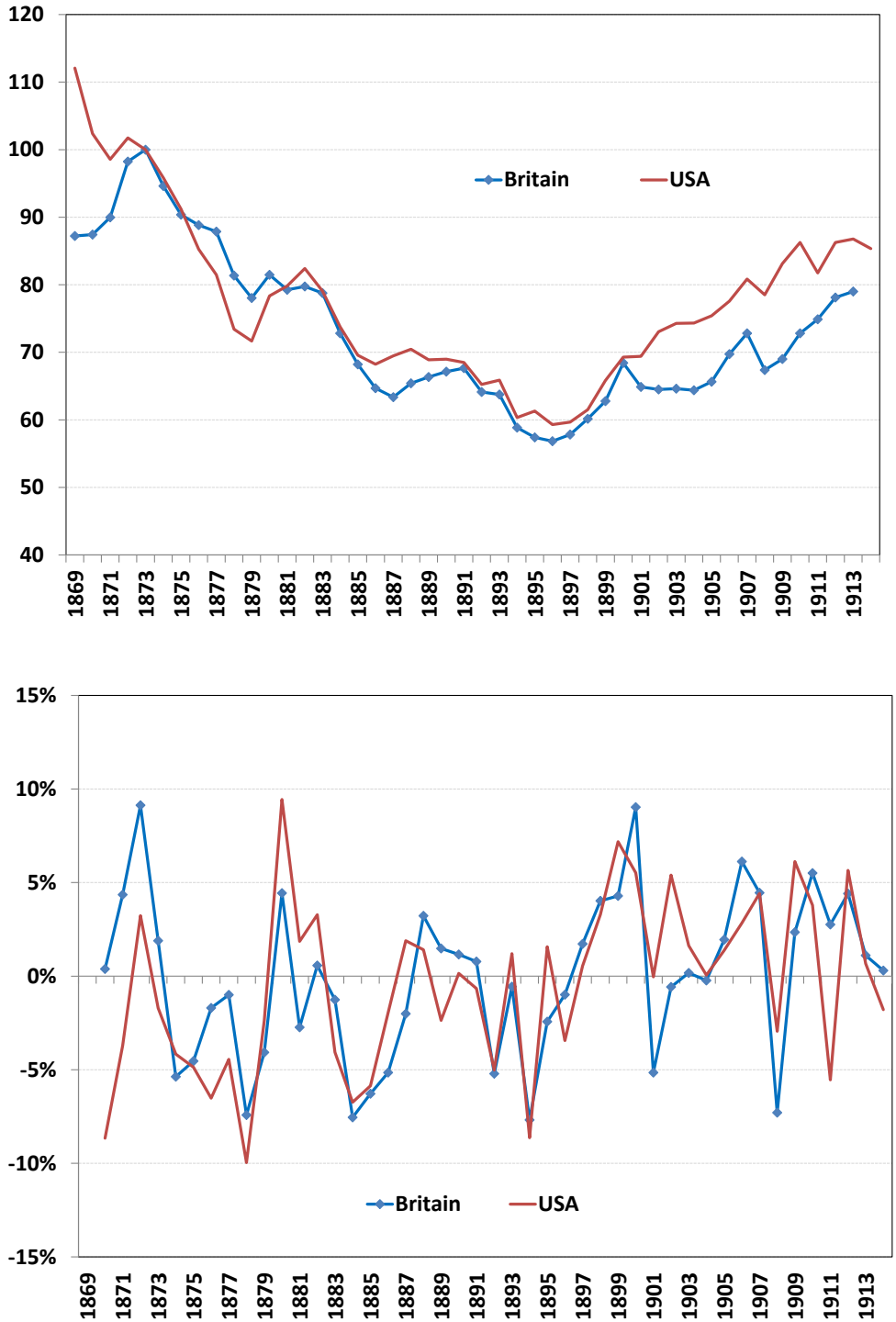


Figure 10: Prices in Britain and the US. Panel A (above): Average of price indexes (1873=100). Panel B (Below): Inflation Year over Year. Sources: Mitchell (1988) for Britain and Carter et al. (2006) for the US.

Britain could have received a growing benefit from its external asset position.

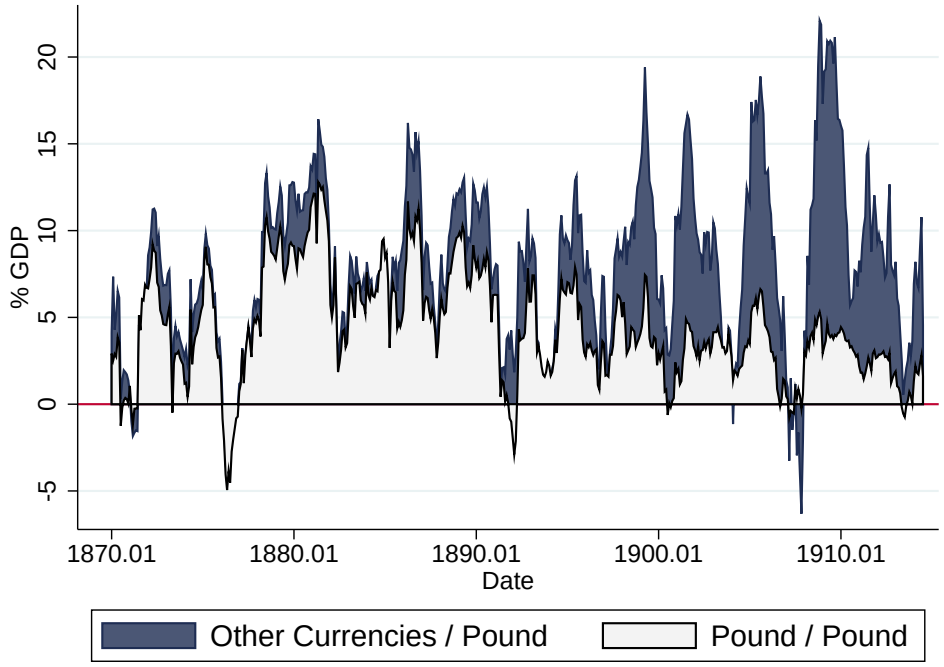


Figure 11: Measure of net revenues earned by Britain vis-a-vis the rest of the world (aggregate exorbitant privilege): breakdown between foreign securities in pounds and foreign securities in other currencies.

# 4 Conclusions

The main contributions of this work are threefold. By constructing estimates of the British net external position, as well as capital gains and dividend yields on the British net external position, I determined that Britain received a significant aggregate exorbitant privilege. The average net revenues of 8.3% of GDP over the period 1869-1914 represented an important part of Britain's economic structure. The country satisfied the necessary condition for the existence of an exorbitant privilege for most of the period.

The study also introduces another global reserve currency, the pound sterling, and brings another observation to the exorbitant privilege literature in the period 1870-1914. This important period is comparable in terms of integration of financial markets to the last quarter of the twentieth century. Since there was only one global reserve currency observation (the US dollar for the second half of the twentieth century) before this work, every feature of the particular US case was associated with the general exorbitant privilege phenomenon. With the analysis of another global reserve currency, it is possible to isolate the idiosyncrasies of the US case. One example is the severance of the link between being a debtor country and enjoying exorbitant privilege.

The final main contribution is the new dataset encompassing almost 90% of the value of securities traded at the London Stock Exchange.[56] The original source of the data has been used in the economic history literature, but I apply it in a

[56] A continuing effort to refine and expand the dataset is under way. The first step is to incorporate the remaining sectors. Although they represent only 12% of the value of securities traded at the LSE and their inclusion should not affect the main results, some might enrich the analysis of the period. Examples are commodities, industry, banks and local and municipal governments. Refinements of the data and the assumptions are also desirable. An exhaustive analysis of the units of dividends and currency of securities, a more comprehensive understanding of the conventions adopted by the IMM and the particularities of the period such as sinking funds and par values could also improve the quality

novel way to build the net external asset position of Britain. The methodology presented here to transform the data into significant macroeconomic variables is an independent contribution that could be applied to other countries, including the modern United States.

A theoretical explanation of exorbitant privilege was beyond the scope of this work. Some of the sections try to assess preliminarily hypotheses with respect to the origins of the return differential. The most important controls I can think of, besides inflation, are default and devaluation risks, volatility and maturity. The inclusion of those factors can also be an important step in the direction of developing a more theoretically based measure of exorbitant privilege. A serious treatment of risk is the most pressing issue. The original literature indicates that the benefits enjoyed by the issuer of the global reserve currency derive in part from the perception that it is the safe asset. One of the many achievements of the literature on Britain's export of capital before WWI is the assessment of the mean-variance frontier of British external investments. This assessment could be readily applied to the US in the last quarter of the twentieth century if more disaggregated data on the securities that compose the US net external position become available to researchers. The methodology of this paper can be directly applied to American microeconomic data in order to confirm or refute the results based on aggregate data from the international finance literature.

Similarly to the US in the last quarter of the twentieth century, the main part of Britain's excess returns derived from British external assets receiving higher returns than were paid on external liabilities for each class of asset. On the other hand, the British invested mostly in debt, a type of security with low returns and low risk. Different from the US, Britain's international investment position did not resemble the one from an investment bank, short in safe assets and long in risky assets. The lack of a composition effect (less risky assets than liabilities) was a handicap to Britain in relation to the US when comparing total returns.

The low total excess return on its net external position meant that the exceptional revenues received by Britain from the rest of the world were more a consequence of the sheer size of its net creditor position, which reached around 165% of GDP on the eve of the First World War. For most of the period analyzed and given the returns calculated above, Britain would not have received positive revenues from the rest of the word if it were a large net debtor country. After 1900, returns (mostly derived from securities in other currencies) increased, which meant that Britain would have been able to become a debtor country while still receiving positive net revenues from the rest of the world. The First World War probably interrupted this process.

The results are interesting not only for Britain but also for the US, since they allow the parsing out of the differences between two issuers of the global reserve currency. At least partially, the United States currently enjoys an exorbitant privilege because it is the issuer of the global reserve currency and not because it possesses some other unique characteristic. This means that any country that is in the unique position of issuing the global reserve currency in the future will enjoy similar benefits in terms of investors demanding lower returns to hold its securities.

The analysis reveals the existence of different responses to the advantage presented by an exorbitant privilege, instead

of the estimation. Finally, location of evidence of other British foreign investments besides portfolio, such as direct investment and bank loans could also improve the comparison to the US. The dataset will become publicly available.

of taking as given the particular features of the American case. Britain was an exporter of capital, continuously increasing its gross asset position. Britain leveraged the benefit from exorbitant privilege in proportion to the size of its external assets. Since Britain invested mostly in safe assets (debt), the leveraging of a small returns differential by a large positive stock position was a fundamental component of the aggregate benefit. In the jargon of this paper, Britain derived an aggregate exorbitant privilege not from the existence of a significant weighted exorbitant privilege, but from the "grossing up" of a small weighted exorbitant privilege.

On the other hand, the United States would be caught in a bubble equilibrium in the absence of exorbitant privilege.[57] By balancing the current account deficit with revenues arising from the position of the dollar as global reserve currency, the country has gone deeper and deeper into negative territory with respect to its net external position. What seems to be unique with respect to the US is its propensity to invest in risky foreign securities. The distinct profiles of risk between American external assets and liabilities boost the return differential enjoyed by the US. The effect is strong enough to permit the US to be a net debtor country. These dynamics would not be possible without the special position occupied by the dollar in the international financial system. These two distinct outcomes for Britain and the US are stylized facts that ought to be incorporated in future theoretical formulations of the problem. The pattern of a creditor country investing in safe assets while a debtor country prefers to invest in securities with a higher profile of risk could be endogenous, and this hypothesis could only be suggested after the completion of this work.

The results of this work are significant and will play an important part in our understanding of the international monetary system, the role of the global reserve currency, the advantages derived by Britain from the centrality of the pound sterling, as well as the dynamics of the modern US. It is also my hope that by exploiting further the dataset and the methodology presented here, the experiences of the past will help to shed light on the complexities of the future.

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[57] In the sense of not fulfilling a transversality condition given by the stream of future current account surpluses and the return on the present stock of net external liabilities.

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# Appendix

| Year | Gold | Sterling | Francs | Marks | Other | Total Non-Gold |
|---|---|---|---|---|---|---|
| 1899 | - | 105.1 | 27.2 | 24.2 | 9.4 | 246.6 |
| 1913 | 4846.2 | 425.4 | 275.1 | 136.9 | 55.3 | 1124.7 |

Table 4: Assets Holdings of Governments and Central Banks (USD Millions). The residual between total non-gold and the sum of currencies is unknown allocation. Source: Lindert (1969).

| Authors | Edelstein (1982) Goetzmann and Ukhov (2006) | | Chabot and Kurz (2010) | | Edlinger et al (2013) |
|---|---|---|---|---|---|
| Assets | UK Debt | 3.346 | UK Government Bonds | 2.906 | 3.52 - 5.05 |
| | | | UK Corporate Bonds | 3.982 | |
| | UK Equity | 6.608 | UK Corporate Stocks | 4.660 | 3.81 - 13.89 |
| | UK Preferred | 5.01 | | | |
| | Foreign Equity | 8.663 | Foreign Corporate Stocks | 7.13 | 5.02 - 9.28 |
| | | | *US Stocks* | 8.39 | |
| | Foreign Debt | 4.945 | Foreign Corporate Bonds | 6.03 | 5.01 - 5.17 |
| | | | Foreign Government Bonds | 5.89 | |
| | | | *US Bonds* | 6.86 | |
| | | | | FR Equity | 4.51 - 12.33 |
| | | | | Foreign FR Debt | 6.24 - 9.43 |
| | | | | Foregn FR Equity | 9.32 |
| Period | 1870-1913 | | 1866-1907 | | 1875-1913 |

Table 5: Survey on the literature on returns of financial assets for 1866 - 1913 (FR means France)