

Constitutions and Commitment: Evidence on the Relation between Institutions and the Cost of Capital

Nathan Sussman

The Hebrew University of Jerusalem
msussman@mscc.huji.ac.il

Yishay Yafeh

The Hebrew University of Jerusalem and The University of Montreal
msyafeh@mscc.huji.ac.il

This draft: August, 2003

Abstract

This paper challenges the North and Weingast (1989) view that attributes Britain's ascendancy to economic supremacy to institutions that provided protection of property rights starting in the late seventeenth century. We show that for much of the eighteenth century, interest rates in Britain remained fairly high, and fluctuated considerably in response to political instability. We also show that the volume of British government debt remained low for nearly a century after the institutional changes described by North and Weingast. Finally, we show that British interest rates moved in tandem with Dutch interest rates, suggesting that Britain did not embark on a different path following the institutional changes of the late seventeenth century. We conclude that, in the short run, institutional reforms do not lead to higher growth by lowering the cost of capital. For emerging markets today, this result implies that the immediate financial rewards for internal stability and peace are likely to exceed the short-term benefits from institutional reforms, which are rewarded only in the long run.

* We wish to thank Wantje Fritschy for her comments and advice regarding the Dutch data. We are also grateful to Jacob Metzger, Joel Mokyr, Petra Moser, Yona Rubinstein, Andrei Shleifer, Peter Temin, and to seminar participants in Tel Aviv University and at the conference "From Stagnation to Growth" (St. Gallen) for helpful comments and suggestions. This paper was written while Yishay Yafeh was visiting the Berglas School of Economics, Tel Aviv University, and the Institute of Economic Research, Hitotsubashi University, whose hospitality is gratefully acknowledged.

I. Introduction

In a famous article, Nobel Laureate Douglass North and Barry Weingast (North and Weingast, 1989) propose a powerful answer to the old question why was Britain the first country to undergo an industrial revolution and embark on modern economic growth. The explanation offered by North and Weingast focuses on the power sharing institutions that evolved in Britain at the end of the seventeenth century and in the early eighteenth century, following the Glorious Revolution. North and Weingast argue that these institutions made the government (and the Crown) credibly committed not to renege on its debt and to uphold the property rights of individual creditors to whom the government owed money. North and Weingast also argue that, following these institutional changes, the cost of capital to the British government declined substantially, a phenomenon, which they interpret as a fall in the required risk premium. They claim that this decline in interest rates prompted the development of financial markets in Britain and lowered the cost of capital to private entrepreneurs. As a result, economic development in Britain far exceeded the relatively slow economic progress experienced by France and the Netherlands in the eighteenth century, two countries that had been as developed as Britain up to the seventeenth century.

The idea that the protection of property rights is of utmost importance for the economic and financial development of nations has become extremely influential in economics in recent years. In a series of studies that have dramatically changed the academic discourse in financial economics, La Porta et al. (e.g., 1997, 1998) argue that countries whose legal system is of the British common law tradition offer better protection to outside investors. As result, financial markets in common law countries tend

to be more developed and entrepreneurs enjoy better access to external finance. Other authors, e.g. Levine and Zervos (1998) have emphasized the empirical relation between such financial development and economic growth. Acemoglu et al. (2002) also view institutions transplanted from Europe as crucial for economic growth. It is therefore both of importance and of relevance to contemporary economic literature to revisit the empirical foundations of the North and Weingast view of Britain's financial development, and the relation between institutions, financial systems, and economic growth.

North and Weingast's claim on the importance of property rights in seventeenth century Britain is supported by empirical evidence of three types. First, they provide some evidence on a decline in interest rates on British government debt in the late seventeenth century. This evidence is based on an incomplete interest rate time series, with observations for several years in the late seventeenth and early eighteenth centuries. Second, North and Weingast offer evidence on an increase in the volume of British government debt around the same time period. Finally, they also provide a general description of the development of the London Stock Exchange in the eighteenth century.¹

In this paper we attempt to contribute in two ways to the discussion of the hypothesis that institutional change promotes economic growth by reducing the risk premium on government bonds, both generally and specifically in the context of Britain in the seventeenth and eighteenth centuries. Our first contribution is an investigation of trends and structural breaks in British interest rates starting in the late seventeenth century and continuing throughout the eighteenth century, a much longer period of

¹ Part of the rise in the volume of trade on the London Stock Exchange during the period was related to the South Sea Bubble, an event that did not contribute to sustained growth, and led to popular resentment that hindered British equity markets for over a century.

observation than North and Weingast's. The main conclusion that emerges from this investigation is that interest rates in Britain continued to be fairly high throughout most of the eighteenth century, and even increased in response to instability and wars. Similarly, major increases in the volume of British government debt took place only fairly late in the eighteenth century, much later than the period identified by North and Weingast.

Our second contribution is a comparison of interest rates in Britain and the Netherlands between the late-seventeenth century and the late eighteenth century. This comparison shows that some of the trends in interest rates in Britain starting in the late seventeenth century were actually shared by the Netherlands as well, during a period in which no dramatic institutional changes took place in that country. Furthermore, on a per-capita basis, the Netherlands continued to be a larger borrower than Britain for the entire eighteenth century. Finally, some of our statistical tests suggest that interest rates in Britain were influenced, to a large extent, by Dutch borrowing and interest rates, not by domestic institutional changes.² When British capital markets finally became important (in the second half of the eighteenth century) the industrial revolution had already started, suggesting the possibility that much of the development of financial markets in Britain was in response to economic development rather than the other way around. The comparison with the Netherlands also suggests that efficient financial markets are not a sufficient condition for a technological revolution.

We conclude that, while institutional changes and the protection of property rights have probably contributed in the long run to Britain's ascendancy to economic supremacy, the effect of these changes was much slower and took place much later than

² Oppers (1993) shows, using a different methodology, that Dutch lending was important in keeping British borrowing rates low until the 1770s.

the North and Weingast view suggests. The effect of institutional changes on both government borrowing and on financial markets more generally appears to have been protracted. Much like what Sussman and Yafeh (2000) describe for Japan in the nineteenth century, interest rate fluctuations in eighteenth century Britain appear to have been mostly in response to wars and instability, rather than in response to the constitution and commitment that are so well described by North and Weingast. While we do not dispute the claim that some institutions promote economic growth more than others, evidence from both eighteenth century Britain and nineteenth century Japan suggest that the establishment of the “right” institutions is not “rewarded” by a swift reduction in the cost of capital.

Another possible interpretation of our finding that institutional changes did not have an immediate impact on the financial development of Britain is that the difference between Britain and Continental Europe lies in institutional developments that took place long before the Glorious Revolution of the seventeenth century. One such institution is the British common law legal system, which may have provided a more adequate environment for financial and economic activity than the French civil law (La Porta et al., 1997, 1998). The origin of this difference, however, dates back four or five hundred years before the institutional changes that North and Weingast emphasize (Glaeser and Shleifer, 2002).

The rest of the paper is organized as follows. The next section surveys some of the related literature. Section III describes the data used in this study; Section IV presents our econometric approach and results, and Section V concludes.

II. A Literature Survey

The present paper is related to several previous studies of the North and Weingast hypothesis and of the changes in Britain's financial markets starting in the late seventeenth century. Writing long before North and Weingast, McCulloch (1837) describes the determinants of interest rates in Britain as follows: "In the beginning of the funding system, the term fund meant that the taxes or funds appropriated to the discharge of the principal and interest of loans.... Owing perhaps, to the scarcity of disposable capital, but far more owing to the supposed insecurity of the Revolutionary establishment, the rate of interest paid by the government in the early part of the funding system was, comparatively high. But, as the country became richer, and the confidence of the public in the stability of the government was increased, ministers were enabled to take measures for reducing the interest, first in 1716 and then in 1749" (p. 585). This view, dating back to 1837, suggests that the decline in interest rates in 1716 and 1749 followed the high interest rates caused by the instability of the Glorious Revolution (not by the Stuart regime). It also suggests that initially, the British funding system started out by assigning specific tax receipts to pay for interest and principal, a measure that was common among problematic sovereign borrowers of the nineteenth century, such as the Ottoman Empire – hardly the forebear of institutional reform.

Moving to more recent studies, Clark (1996) examines whether or not private (real) rents on agricultural land declined following the decline in interest rates on government debt in Britain, finding little support for this conjecture. Quinn (2001) also examines the conjecture that private interest rates declined in response to the decline in the government cost of capital. Using archival bank interest rates he rejects this

conjecture, and provides a number of explanations why increased government borrowing did not lower private interest rates, as North and Weingast suggest. Wells and Wills (2000) use Bank of England stock price information to examine the impact of threats to the institutional changes of the seventeenth century. Their analysis ends in 1714, but up to that period they find that stock prices declined in periods of threats to the newly established institutions, such as the Jacobite rebellion of 1708. Our analysis adds a long-term view to Wells and Wills' (2000) study, casting some doubt on institutions as the main cause of interest rate fluctuations in eighteenth century Britain.

In addition to these attempts to provide evidence based on British interest rates, several other studies cast some doubt on the relative importance of changes in the protection of property rights, in comparison with other institutional changes in seventeenth and eighteenth century Britain. Brewer (1990), for example, attributes Britain's economic and military success to the emergence of a strong government, which he views as the most important transformation that took place at the time. O'Brien (2001) attributes Britain's success to the administrative foundations for a fiscal state, which were put in place in the seventeenth century, and made the British government far more able to collect taxes than her European rival governments.

The present study is also closely related to several studies of the relation between the cost of capital, institutional changes, and political events. Barro (1987) and Wright (1999) document the relationship between long-term interest rates and wars for the eighteenth and nineteenth centuries. Ferguson (2001) studies long-run fluctuations in British interest rates, and reaches the conclusion that political events were the most important determinant of these fluctuations. Epstein (2000, chapter 2) argues that

differences in formal constitutional arrangements do not account for differences in interest rates across Europe between 1300 and 1750. Sussman and Yafeh (2000) investigate the importance of institutional changes and political events in determining the cost of Japanese government debt traded in London between 1870 and 1914, an era of dramatic institutional change in Japan. They find that institutional change, reforms, a constitution and other similar factors had little impact on yields on bonds issued by the Japanese government at that time. By contrast, political developments such as wars (e.g. with Russia), and economic changes (e.g. the Gold Standard) were far more important factors affecting Japan's cost of (foreign) capital. The main conclusion that emerges from their analysis is that a country's cost of capital does not respond immediately to institutional reforms, in contrast with what the North and Weingast view implies, and very much like our findings here.

Finally, methodologically, the present study applies some of the search for structural breaks techniques applied in Sussman and Yafeh (2000) and in Mauro, Sussman, and Yafeh (2002) to identify important turning points in the series of British interest rates.

III. Interest Rates and Political Changes in Eighteenth Century Britain

Data and Methodological issues

While the North-Weingast argument is very appealing and has won many advocates, its empirical foundations are less than perfectly convincing. The main obstacle is the absence of a high frequency time series of government borrowing rates or government bonds yields for the period following the Glorious Revolution (1688) up

until 1753, when British Consol prices become available for the first time.³ This lacuna is critical for any empirical test of the North and Weingast thesis.

Attempts to bridge this gap have generally followed two different routes. The first is based on examinations of interest rates on private loans, and attempts to infer from them whether or not interest rates declined starting in the late seventeenth century (Clark, 1996, Quinn, 2001). These studies essentially test the conjecture that the (assumed) reduction in the government's cost of capital led to a decline in the private cost of capital, but do not examine directly if, indeed, interest rates on government bonds experienced a significant change in the late seventeenth century. Moreover, this conjecture is based on the assumption that British capital markets were integrated, an assumption which contradicts Buchinsky and Polak (1993), who show that British capital markets were segmented up until the late eighteenth century.

The second route is based on substitute financial assets from which inference is made about government borrowing rates. Thus, Wells and Wills (2000) use the Bank of England shares as a proxy for government bonds, an approach, which requires that the Bank of England stock be correlated with British government bonds. This, however, need not be the case because, at the time, the Bank of England was a private lending institution that made out loans to the government. With the exception of a very severe threat to the existence of the London capital market, the Bank's profit could increase with the rate of interest charged to the government, so that Bank of England stock prices may well have been inversely related to government bond prices. In fact, during the Seven Years War (1756-1763), when, for the first time, both Bank of England stock prices and Consol daily yields are available, we find that the correlation between the yields on the two

³ Data on 3 percent annuities are available from as early as 1729; see Sinclair (1803).

assets is close to zero (-0.07). Furthermore, for the period 1730 to 1753, we find that the 3 percent annuities and the Bank of England stock prices are not co-integrated at all, and that the R-squared of the first differences equation is quite low (0.18).

Instead of following the existing two routes, we apply a more direct test of the North-Weingast hypothesis, using an implied measure of the government's borrowing cost based on the ratio between debt service payments and total government debt (taken from Mitchell, 1988). This measure accounts for the long-term average cost of government borrowing. For the initial years following the Glorious Revolution this measure may be an upward bias of the government's cost of capital, because many of the loans contracted were of short duration and debt service charges included not only interest payments but also debt retirement. We therefore compute also a measure of debt charges minus terminable loans. This measure of interest rates may be biased downwards, because the cost of short-term loans (of less than one year, common during war times) is ignored. The true cost of capital is probably in between these two measures. We describe both series in the next section, and use the unadjusted debt service to debt series in the statistical analysis that follows.⁴

An important feature of borrowing in the eighteenth century was that once a "permanent" debt level was established at a given interest rate, 3 percent, additional borrowing was made by issuing similar bonds with the same coupon. Variations in the risk premium were typically not reflected in new Consols with different interest rates, but rather in discounts on the purchasing price of new bond issues.⁵ Therefore, drawing

⁴ Implicitly, the use of both series is based on the assumption that the risk premium required by investors is constant, so that changes in the average interest rate trace marginal changes (up to a constant). This assumption could hold if investors have a CARA utility function.

⁵ According to McCulloch (1837), this form of borrowing became a feature of British debt management

conclusions from the fact that that the coupon on British Consols declined in 1731 (3 percent coal duties) or 1739 (introduction of 3 percent annuities) as reported by North and Weingast does not necessarily imply that from then on the British government borrowed at these rates.⁶ To address this point, we use, in addition to average fiscal measures of the government's cost of capital, data on actual (not coupon) marginal borrowing rates taken from Sinclair (1803)⁷. Measures of the government's cost of capital are combined with data on population, total government expenditure and output, drawn from Mitchell (1988).

In addition to providing new estimates of the cost of capital to the British government, we also compare British government borrowing rates with those of the Province of Holland, the largest and wealthiest in the Netherlands.⁸ Provincial government borrowing for Holland and the exchange rate between London and Amsterdam are based the European State Finance Database, and data on population are from de Vries and van der Woude (1996).

IV. Empirical Analysis and Results

Institutional Change and Interest Rates in Eighteenth Century Britain

Figure 1 describes three series of interest rates on British government debt; two are based on the ratio of debt service to total debt, and one on marginal interest rates drawn from Sinclair (1803). The picture that emerges using the debt service to debt ratio

during the reign of George II (starting 1727). It continued into the twentieth century.

⁶ See North and Weingast (1989), pp. 823-824. The discussion on p. 823 suggests that with the issue of 3 percent bonds, Britain achieved a permanent decline in government borrowing rates.

⁷ Computed by Sinclair as the value of the coupon (£3) divided by the issue price of the Consol.

⁸ Although precise data are not available, in the eighteenth century the Province of Holland accounted for about 60-70 percent of total Dutch debt, and its population, around 800,000, constituted about 40 percent of the total population in the Netherlands (based on private communication with W. Fritschy).

is that interest rates rose until 1709, and then declined to a plateau that continued until about 1717. From then on interest rates declined until they reached a minimum in the late 1750s, which was followed by a very gradual rise until the end of the century. Using the ratio of debt service to debt minus terminable annuities, we observe that interest rates reached the 4 percent level in 1714. We also observe an increase in interest rates in the early 1720s. These developments coincide with the following historical events. The initial years following the Glorious Revolution were associated with high levels of interest rates. With the coronation of Queen Anne in 1702, interest rates declined, perhaps due to the successful passing of the throne without Stuart intervention. However, Britain became involved in the War of the Spanish Succession (1701-1713), and interest rates began to rise, at least in the first part of the war period, and then declined after 1709. In 1715 Britain faced a Jacobite rebellion, and interest rates rose, until after the Pretender's defeat in December of that year. In 1717 Britain was again at war with Spain (the War of the Quadruple Alliance, 1717-1720), and interest rates increased, a trend which was reversed following Britain's decisive victories in 1718, when the Spanish fleet was destroyed. The rising interest rates in the early 1720s ended with the accession of George II to the throne (1727) and the signing of the treaty of Seville (1729), that brought peace to Britain until 1739. Then, when the War of Austrian Succession broke out, interest rates increased slightly. Following British victories in 1743, interest rates declined steadily, reaching a low point in 1759, but moderately rose again in the later stages of the Seven Years' War. Slowly increasing interest rates characterize the rest of the eighteenth century according to this interest rate series as well.

It is interesting to note that the reforms during the period 1695 to 1707 (the Act of Union with Scotland and securing the passage of the Crown to the house of Hanover), were not associated with a decline in interest rates. We conclude that, at least according to calculations of the British government's cost of capital derived from fiscal accounts, major wars seem to have had a larger impact on the cost of government borrowing than the reforms, much like what Sussman and Yafeh (2000) find for nineteenth century Japan. These results are also consistent with Mauro, Sussman, and Yafeh (2002), Table V, which documents "sharp changes" in the cost of capital of nineteenth century emerging markets: none of the sharp changes is associated with institutional changes; many are due to wars, rebellions and instability. Finally (and somewhat indirectly), our reading of Britain's cost of capital in the eighteenth century is in line with Rajan and Zingales (2003), who emphasize the impact of politics, not institutions, on financial markets.

Using Sinclair's interest rate series, we observe average rates of interest during reigns of different monarchs and during major wars. Because the data used by Sinclair are based on interest payments aggregated by reign, interest rates within regimes are "smoothed," whereas changes between regimes are accentuated. This series exhibits a gradual decline, more in line with the North and Weingast view, between 1695 and the mid-eighteenth century, with an increase around the time of the War of Austrian Succession. However, borrowing rates increased substantially during the American War of Independence.⁹ According to this series, at their peak in 1779, the marginal borrowing rate was 6.75 percent, a return to a level which prevailed only during the formative years of the reign of William, following the Glorious Revolution. Thus, the war in America

⁹ Sinclair provides annual figures for this period, rather than averages by reign.

reversed the entire path of declining interest rates, casting doubt on the credibility and stability of reforms and institutions.

Finally, we observe that the various Jacobite rebellions and pretensions to the British throne in the last decade of the seventeenth century and in the first decade of the eighteenth century produced no discernable effect, beyond the effect of the wars Britain fought. This supports our general impression that, in a long run perspective, these events were merely “blips,” especially when compared to major wars and international conflicts.

Search for Structural Breaks

We now turn to an iterative search for structural breaks in the interest rate series, identified through iterative estimation of the following equation:

$$(1) \log(i^{uk})_t = \beta_0 + \beta_1 \log(i^{uk})_{t-1} + \beta_2 \Delta \log(i^{uk})_{t-1} + \beta_3 EVENT_{long} + \beta_4 EVENT_{short},$$

where i^{uk}_t represents interest rates on British government debt in year t , $EVENT_{long}$ is a dummy variable that takes the value zero at all times prior to the proposed break and the value one from the time of the break onwards, and $EVENT_{short}$ takes the value one at the time of the event, and zero at all other times. If an event had a long-term impact on yields and the series is stationary then the “long” dummy variable will be different from zero. If the series is unit root, the “short” variable will capture permanent changes. The search for breaks involves repeated estimation of Equation (1) while moving the break date and the corresponding $EVENT$ dummy variables one observation at a time and recording their statistical significance. The first break date is at the point where the statistical significance of the appropriate $EVENT$ dummy is highest (the process can then be

repeated within each half of the sample to detect additional break points in sub-periods).¹⁰ Using this procedure and interest rates calculated as the ratio of debt service to total debt, we identify 1718, the year when the Spanish fleet is defeated, as the year in which the most significant long-term decline in interest rates takes place. It is also possible that this break is associated with a monetary reform that signaled the beginning of the Gold Standard in Britain¹¹.

All of the interest rate series in Figure 1, as well as the search for breaks, suggest that interest rates in Britain remained high and fluctuated considerably, even after the completion of the institutional changes of the seventeenth century. Only after the end of domestic and international instability did rates go down to a long-term lower level. This result is, again, in line with Sussman and Yafeh (2000), who find that in Meiji Japan too, institutional reforms did not generate an immediate response in the risk premium on government debt (traded abroad), and structural breaks were associated with other events, such as the victory over Russia.

A Comparison of Interest Rates and Debt Levels in Britain and Holland

We now turn to a comparison of government debt in Britain and in the Province of Holland during the eighteenth century. Figures 2 and 3 portray absolute and per capita debt levels in the two countries. It is evident that the government of Holland could (and did) borrow relatively more than her British counterpart. Even in absolute terms, Britain's debt exceeded that of Holland only around 1781, almost a century after the completion of

¹⁰ For further details on this methodology, see Sussman and Yafeh (2000).

¹¹ Although the adoption of a de-facto Gold Standard was not fully understood at the time, the move to increase the gold to silver ratio in Britain initiated gold flows, which may have provided liquidity for the London financial market. When interest rates are measured using the series that excludes terminable loans the identified break date is earlier, around 1709, after the initial instability associated with the War of the Spanish Succession.

the institutional and constitutional reforms described by North and Weingast and two or three decades after the onset of the industrial revolution. Since Britain's population at the time was more than ten times that of Holland, the per capita debt of Britain remained relatively small and was by an order of magnitude smaller than that of Holland during the entire eighteenth century. Our reading of Figures 2 and 3 is therefore that, even without major institutional changes, the government of Holland appears to have been able to access financial markets and raise money more easily than its British counterpart. (Conversely, despite the ability to borrow of the Dutch government, no industrial revolution took place in Holland at the time). Moreover, the British capital market remained smaller and less leveraged than the Dutch capital market throughout the entire eighteenth century. This suggests that the effect of institutional changes on government debt was not so dramatic before the onset of the industrial revolution.

Figures 4 and 5 portray the cost of debt for the two governments, measured as the ratio of debt services to government expenditures and the nominal ratios of debt service to debt. All our measures of the cost of capital of the two governments portray a similar picture. Evidently, interest rates in the two countries moved together so that Britain did not embark onto a different "path" in the eighteenth century (see also Neal, 1990, on financial integration of the two countries starting in the eighteenth century). Figure 4 describes fiscal cycles (debt service to government expenditures), which were related to European wars, and seem to have been quite similar in the two countries, with British cycles being somewhat more volatile. Figure 5 shows that, despite its larger volume of debt, interest rates in Holland were lower in the early decades of the eighteenth century

than British interest rates, which appear to have been high due to the political instability in Britain described above.¹²

We now proceed to a more formal analysis. Implicitly, the North and Weingast view of the world can be expressed as

$$(2) i^{uk}_t = \gamma_0 + \gamma_1 Z_t.$$

In Equation (2) a set of unobservable institutions, denoted by Z , determines British government borrowing rates in any given year. Because institutions are not directly observable, inferences are drawn from the time series properties of British interest rates, which could be driven by many factors.

The approach we adopt here is to replace Equation (2) by a standard risk premium model for an international borrower, leaving institutions, which are still unobservable, to be part of the error term:

$$(3) y_t = i^{uk}_t - i^{nl}_t = \delta_0 + \delta_1(\text{export})_t + \delta_2(\text{debt/population})_t + \delta_3(\text{Dutch debt/British debt})_t + \varepsilon_t.$$

Table 1 displays co-integration estimates of Equation (3), where interest rates are measured as the ratio of debt service to debt.¹³ Much like modern “spreads,” the British-Dutch interest rate differential in the eighteenth century was related to Britain’s ability to pay (debt per capita and exports), as well as to the volume of debt in Holland, as measured by the ratio of (absolute) Dutch to British debt. The relative debt of the two countries is used as a proxy for liquidity constraints in the London capital market, caused by demand for capital in Holland. Up until the middle of the eighteenth century, an

¹² Nevertheless, differences in interest rates are much smaller if the series that excludes terminable loans is used for Britain.

¹³ The hypothesis that the series are unit root cannot be rejected, and we therefore use the Johansen co-integration procedure. The results in this and the subsequent tables remain unchanged when the interest rates series that excludes terminable loans is used.

increase in Dutch debt above that of Britain's led to "crowding out" (higher cost) of the latter. Figure 6, which portrays the ratio of Holland to British government debt, sheds further light on this phenomenon. It can be seen that during the War of the Spanish Succession (1701-1713) Dutch borrowing increased, and this may have been one of the reasons for the high interest rates in Britain (Figures 1 and 5), adding to the financial costs of Britain's own involvement in the conflict. By contrast, an increase in British debt not accompanied by a commensurate increase in the Dutch debt was associated with a lower interest rate differential, controlling for the effects of Britain's debt per capita and exports on the risk premium, presumably because of a flow of Dutch capital to Britain.¹⁴

The results reported in Table 1 suggest that an important force behind the decline in British borrowing rates is the growth of exports (or economic development more generally). It may be argued that the growth of exports may have been somehow related to the Glorious Revolution. However, this assertion contradicts Clark (2001) who shows that the British economy and exports followed a trend that started as early as the sixteenth century (the upheaval of the seventeenth century may have slowed down this growth trend). But even if export growth can be attributed to the institutional changes of the seventeenth century, this is a significant departure from the original North and Weingast hypothesis, which viewed the interest rates as the mechanism through which institutional changes bring about economic growth.

Another implication of the co-integration analysis of Table 1 is that it is possible to account for the unit root stochastic properties of the British-Dutch interest differential ("spread") series by economic variables that share similar stochastic properties. Recall

¹⁴ The co-integration regression results and the "crowding out" remain unchanged when the level of Dutch debt is used, rather than the ratio of Dutch to British debt; see the right-hand-side column of Table 1.

that the effect of institutions is part of the unobservable error term. Because, after accounting for the other economic variables, the error term is stationary and independent of the other explanatory variables, anything included in that term could not have had a permanent effect on the spread. Therefore all political and military events that are not correlated with the other explanatory variables, with the exception of those that cause a structural break in the series, merely produce a transitory “white noise” effect. In other words, to the extent that institutional change had an impact on British “spreads,” it was through a long and gradual process rather than through a one-time change. To affect interest rates, such a process should have had an effect on the secular growth trend of the British economy. Indeed, it is quite likely that the fruits attributed to the Glorious Revolution were probably sown centuries earlier.

To verify that the long-term relationship from Table 1 is consistent with the short-term dynamics we use vector error-correction. Here the dependent variable is the change in the risk premium, which is denoted by $\Delta(y_t)$:

$$(4) \Delta(y_t) = \alpha + \beta(y_t - \hat{y}_t) + \delta(\Delta\text{Export})_t + \varepsilon_t,$$

where \hat{y} is the fitted value of the risk premium from Equation (3) and Δ denotes change over time. The results, displayed in Table 2, indicate that the co-integration relationship generates a plausible short run dynamic relationship, whereby deviations from the long run relationship are corrected within approximately two to three years.¹⁵

Finally, Table 3 displays the results of VAR (vector auto-regression) analysis of changes in the relation between British and Dutch interest rates during our period of observation. Consider the Equations (5) and (6):

¹⁵ Other possible error correction model specifications do not generate plausible results and are not shown.

$$(5) i_t^{uk} = \alpha_1 + \eta_1 i_{t-1}^{uk} + \phi_1 i_{t-1}^{nl} + \varphi_1 \frac{D_t^{nl}}{D_t^{uk}} + v_{1t}$$

$$(6) i_t^{nl} = \alpha_2 + \eta_2 i_{t-1}^{nl} + \phi_2 i_{t-1}^{uk} + \varphi_2 \frac{D_t^{nl}}{D_t^{uk}} + v_{2t},$$

where $\varphi_t > 0$ implies “crowding out” of British debt by Dutch borrowing.

Much like the results in Table 1, this analysis suggests that the volume and cost of Dutch government debt affected the cost of debt of the British government. During the first half of the eighteenth century, the effect of interest rates in Holland on the cost of British debt was particularly pronounced. British interest rates were very sensitive to Dutch interest rates, and a high volume of debt in Holland would raise the costs of borrowing in Britain, again, in line with the results in Table 1. However, the financial relationship between the two countries changed in the second half of the eighteenth century, as the London capital market gradually grew in importance. After 1750 the two markets seem to have been equally important. The impact of interest rates in Amsterdam on London rates became lower, and, for the first time, British rates had some effect on Amsterdam rates as well (according to the VAR results of Table 3, prior to 1750 Dutch interest rates were not “caused” by interest rates in Britain).¹⁶ Both Table 1 and Table 3 show that, during the second half of the eighteenth century, the relative borrowing needs of the two governments affected both markets in a similar way (with an increase in debt raising interest rates). Thus, there is no longer evidence of “crowding out” of British debt by Dutch debt in this period.

Taken together, the empirical evidence we present suggests that the fruits of the institutional reforms of the seventeenth century did not immediately affect the London

¹⁶ There is some evidence that integration was hindered by the American War of Independence in which Britain and Holland took opposite sides.

financial market.¹⁷ Until at least 1750, the London capital market could not supply sufficient liquidity to meet the borrowing needs of the government, which relied heavily on capital inflows from Amsterdam. Had the institutional reforms created sufficient liquidity on the London market, interest rates in Britain would have probably declined much faster than they did. It appears that only with the gradual growth of the British economy (and of exports) did sufficient liquidity become available in London so that government borrowing rates in Britain were no longer subject to liquidity constraints imposed by the Dutch capital market. (Nevertheless, on a per-capita basis Britain still remained behind the Netherlands). The financial “ranking” of Britain and the Netherlands was reversed only in the second half of the eighteenth century, after the onset of the industrial revolution, several significant British military victories, and about a century after the completion of the institutional reforms that followed the Glorious Revolution.

IV. Concluding Remarks

The main conclusion that emerges from the present study is that financial markets do not “reward” countries for institutional reforms in the short run. While institutions matter for long run growth, the mechanism through which they make a difference is apparently not through an immediate reaction of financial markets and a reduction in the cost of capital. By contrast, financial markets do respond immediately to domestic instability and to major wars. This was the case in eighteenth century Britain, and this was the case a century and a half later in Meiji Japan. In both cases, it was not a constitution that made a big impact on the cost of

¹⁷ This is consistent with Allen’s (2001) findings regarding the standards of living in London and on the Continent and with Clark (2001), who does not identify any “break” in British growth rates in the seventeenth century.

government debt. Instead, it was a decisive military victory (over the Spanish fleet in the case of Britain, and over a major European power, Russia, in the case of Japan), that brought about a “break” in the interest rate series. More specifically in relation to England and the institutional changes of the seventeenth century, our results suggest that it was not the institutional changes which lowered interest rates after the Glorious Revolution, but more likely the end of the instability that the Revolution had generated. And government ability to borrow appears to have been as much affected by ability to tax and win wars (O’Brien, 2001) as by the protection of individual property rights.

The economic mechanism proposed by North and Weingast, where institutional change affects growth through interest rates, raises further questions: Standard macroeconomic theory suggests that government borrowing “crowds out” private investment. According to North and Weingast, government borrowing in Britain encouraged private investment by creating a liquid and secure market for government debt. Our empirical analysis suggests that higher government debt was associated with higher (government) borrowing rates; it is unlikely that it had the opposite effect on private rates. Moreover, since the British government issued debt almost exclusively to fight wars, the North and Weingast hypothesis attributes a positive effect of wars on growth. Again, the data we present show that borrowing rates increased during wars and declined in their aftermath. A historical irony is that the deposed Stuarts did not fight any major European wars. Was it, according to North and Weingast, their inability to borrow that constrained their military involvement, or was it their lack of military involvement that made it less important

for them to develop a market for government debt? The nineteenth century experience of belligerent regimes that did not advocate the rule of law, such as Tsarist Russia or the Ottoman Empire, suggest that contrary to the North and Weingast view, the absence of secure property rights was not much of a constraint when it came to foreign borrowing.

To conclude, we view Britain's ascendancy to a position of supremacy in Europe and in the world as a likely outcome of very long processes, perhaps related to the development of the legal system, science, and government tax collection. The evidence on the importance of the Glorious Revolution and the institutional changes of the seventeenth century as a turning point remains scarce.

Sources

L. van der Ent, W. Fritschy, E. Horling and R. Liesker, Dutch government finance data from the European State Finance Database, www.le.ac.uk/hi/bon/ESFDB/

McCulloch, John Ramsey (1837), *Dictionary, Practical, Theoretical and Historical, of Commerce and Commercial Navigation* (London, Longman Press).

Mitchell, Brian (1988), *International Historical Statistics* (New York, Stockton Press).

Neal, Larry, bond prices and exchange rates data from European State Finance Database, www.le.ac.uk/hi/bon/ESFDB/

Sinclair, John, (1803), *The History of the Public Revenue of the British Empire*, Vol. II, Appendix 2, pp. 28-33, (London, A. Strahan).

de Vries, Jan and Ad van der Woude (1996), *The First Modern Economy: Success, Failure, and Perseverance of the Dutch Economy, 1500-1815* (Cambridge, U.K., Cambridge University Press).

References

Acemoglu, Daron, Simon Johnson, and James Robinson. (2002), "The Rise of Europe: Atlantic Trade, Institutional Change and Economic Growth," NBER Working Paper No. 9378.

Allen, Robert (2001), "The Great Divergence in European Wages and Prices from the Middle Ages to the First World War," *Explorations in Economic History*, 38(4), pp. 411-47.

Barro Robert (1987), "Government Spending, Interest Rates, Prices, and Budget Deficits in the United Kingdom, 1701-1918," *Journal of Monetary Economics*, 20(2), pp. 221-48.

Brewer, John (1990), *The Sinews of Power: War, Money, and the English State, 1688 – 1783* (Cambridge, MA., Harvard University Press).

Buchinsky Moshe and Ben Polak (1993), "The Emergence of a National Capital Market in Britain, 1710-1880," *Journal of Economic History*, 53(3), pp. 1-24.

Clark, Gregory (1996), "The Political Foundations of Modern Economic Growth: Britain, 1540-1800," *Journal of Interdisciplinary History*, 26(4), pp. 563-88.

Clark, Gregory (2001), "The Secret History of the Industrial Revolution," unpublished mimeo, UC Davis.

Epstein, Stephan (2000), *Freedom and Growth: The Rise of States and Markets in Europe, 1300-1750* (London, Routledge).

Ferguson, Niall (2001), *The Cash Nexus: Money and Power in the Modern World, 1700-2000* (London, Penguin Press).

Glaeser, Edward and Andrei Shleifer (2002), "Legal Origins," *Quarterly Journal of Economics*, 117(4), pp. 1193-1230.

La Porta, Rafael, Florencio Lopez de Silanes, Andrei Shleifer, and Robert Vishny (1997), "Legal Determinants of External Finance," *Journal of Finance*, 52(3), pp. 1131-50.

La Porta, Rafael, Florencio Lopez de Silanes, Andrei Shleifer, and Robert Vishny (1998), "Law and Finance," *Journal of Political Economy*, 106(6), pp. 1113-55.

Levine, Ross and Sara Zervos (1998), "Stock Markets, Banks, and Economic Growth," *American Economic Review*, 88(3), pp. 537-58.

Mauro, Paolo, Nathan Sussman, and Yishay Yafeh (2002), "Emerging Market Spreads: Then versus Now," *Quarterly Journal of Economics*, 117(2), pp. 695-733.

Neal, Larry (1990), *The Rise of Financial Capitalism, International Capital Markets in the Age of Reason* (Cambridge, U.K., Cambridge University Press).

North, Douglass and Barry Weingast (1989), "Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth-Century Britain," *Journal of Economic History*, 49(4), pp. 803-832.

O'Brien, Patrick (2001), "Fiscal Exceptionalism: Great Britain and its European Rivals – From Civil War to Triumph at Trafalgar and Waterloo," Working Paper No. 65/01, Department of Economic History, London School of Economics.

Oppers, Stefan (1993), "The Interest Rate Effect of Dutch Money in Eighteenth-Century Britain," *Journal of Economic History*, 53(3), pp. 25-43.

Quinn, Stephen (2001), "The Glorious Revolution's Effect on British Private Finance: A Microhistory, 1680-1705," *Journal of Economic History*, 61(3), pp. 593-615.

Rajan, Raghuram and Luigi Zingales (2003), "The Great Reversals: The Politics of Financial Development in the 20th Century," *Journal of Financial Economics* 69(1), pp. 5-50.

Sussman, Nathan and Yishay Yafeh (2000), "Institutions, Reforms, and Country Risk: Lessons from Japanese Government Debt in the Meiji Period," *Journal of Economic History*, 60 (2), pp. 442-67.

Wells, John and Douglas Wills (2000), "Revolution, Restoration, and Debt Repudiation: The Jacobite Threat to Britain's Institutions and Economic Growth," *Journal of Economic History*, 60 (2), pp. 418-441.

Wright, J. F. (1999), "British Government Borrowing in Wartime, 1750-1815," *Economic History Review*, 52(2), pp. 355-61.

Table 1
The Long-term Determinants of the British Risk Premium:
Co-integration Analysis

Dependent variable	British to Dutch “spread” (interest rate differential) 1699-1790	British to Dutch “spread” (interest rate differential) 1699-1749	British to Dutch “spread” (interest rate differential) 1750-1790	British to Dutch “spread” (interest rate differential) 1699-1790
British exports (million pounds)	-0.172 (0.074)	-0.77 (0.274)	-0.071 (0.022)	-0.535 (0.159)
British debt per capita	0.100 (0.027)	0.577 (0.189)	0.013 (0.007)	0.085 (0.046)
Dutch to British debt ratio	0.568 (0.038)	0.690 (0.093)	-0.060 (0.053)	
Dutch debt (million pounds)				0.038 (0.005)
N	92	51	41	92
Likelihood ratio	56.5	55.4	54.9	41.1
1% critical value	45.6	45.6	45.6	39.9

Note: Interest rates are measured as the ratio of debt service to debt. Estimation includes a dummy variable for 1718, when a structural break is identified in the series (except for the period 1750-1790). Standard errors are in parentheses.

For the regression with Dutch debt the reported critical value is 5%

Table 2
Short-run Dynamics of the British Risk Premium:
Vector Error Correction Analysis

Dependent variable	D(interest rate differential) 1699-1790	D(interest rate differential) 1699-1749	D(interest rate differential) 1750-1790
Error correction term	-0.520 (-0.072)	-0.459 (-0.094)	-0.378 (-0.121)
Change in exchange rate	2.376 (2.216)	3.716 (4.574)	0.870 (0.714)
Dummy for 1718	-1.062 (0.156)	-1.335 (0.286)	N/A
N	92	51	41
Adjusted R-square	0.36	0.32	0.200

Notes: based on the co-integration relationship of Table 1.
Forward exchange rate based on a two-year forward-looking variable.
Standard errors are in parenthesis.

Table 3
Cross-effects of the London and Amsterdam Capital Markets:
VAR analysis

Period	1698-1790		1698-1749		1750-1790	
	British borrowing rate	Dutch borrowing rate	British borrowing rate	Dutch borrowing rate	British borrowing rate	Dutch borrowing rate
British borrowing rate(-1)	0.476 (0.076)	0.007 (0.011)	0.449 (0.104)	0.005 (0.013)	0.671 (0.110)	0.187 (0.062)
Dutch borrowing rate(-1)	0.722 (0.140)	0.992 (0.020)	0.675 (0.202)	0.993 (0.026)	0.300 (0.097)	0.832 (0.055)
Dutch to British debt ratio	0.0017 (0.0006)	Insignificant	0.0023 (0.0009)	insignificant	-0.0005 (-0.0003)	insignificant
1718 dummy	-0.015 (-0.04)	Insignificant	-0.014 (-0.005)	insignificant		
N	92	92	51	51	41	41
Adjusted r-square	0.92	0.86	0.88	0.71	0.30	0.37

Note: Interest rates are measured as the ratio of debt service to debt. Standard errors are in parentheses.

Figure 1

Borrowing Rates for the British Government: 1692-1799

Sources: Mitchell (1988) and Sinclair (1803)

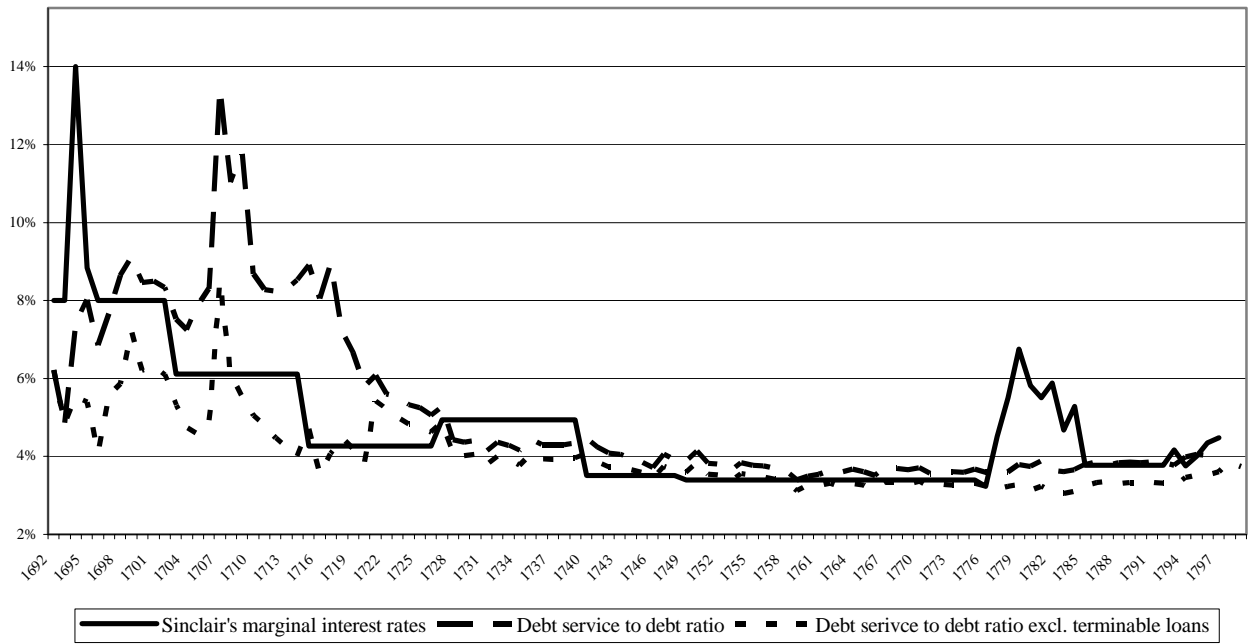
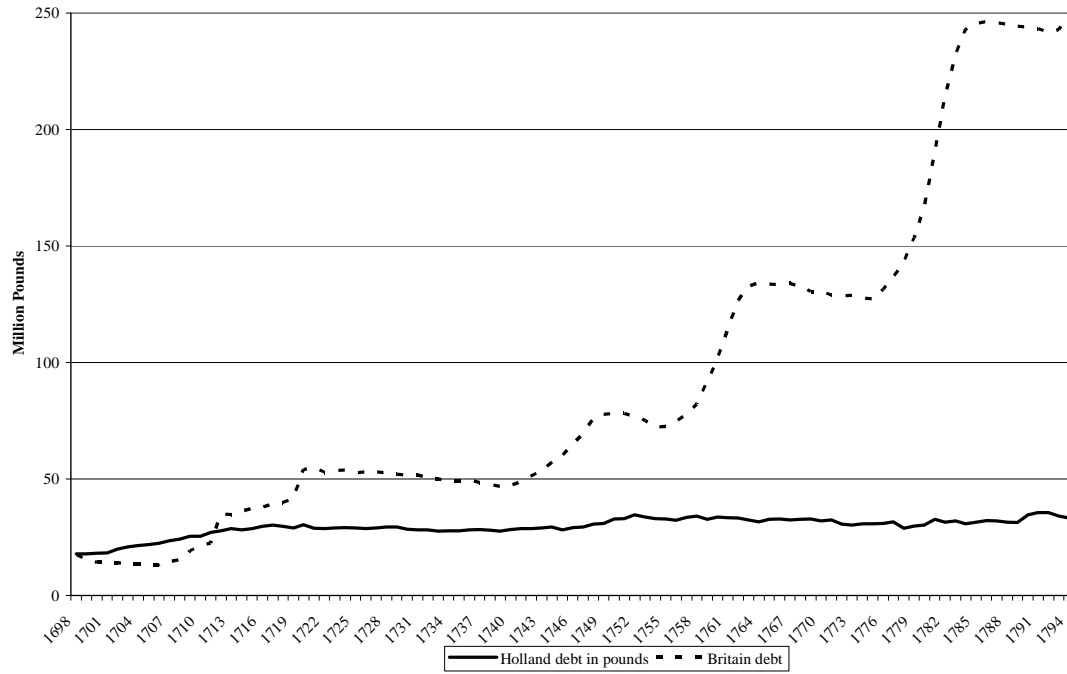


Figure 2

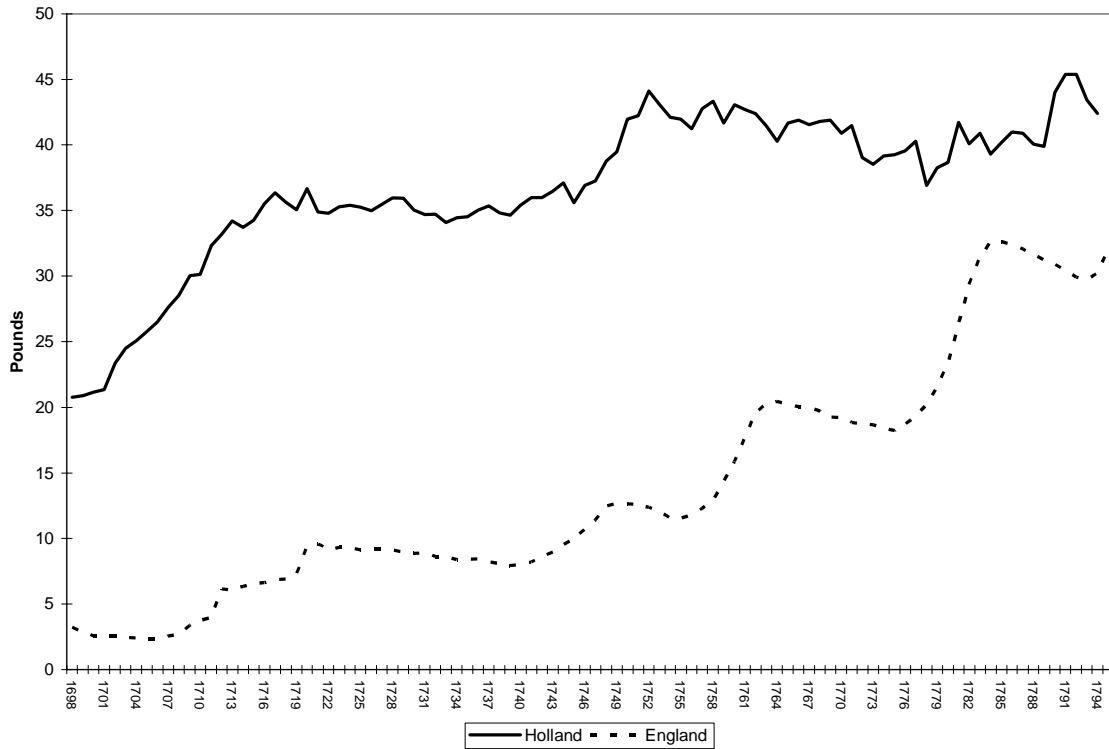
**Total Government Debt in Million Pounds in Britain and the Province of
Holland: 1698-1795**

Debt levels: Holland and Britain



Sources: Mitchell (1988) and European State Finance Database

Figure 3
Government Debt per Capita in Britain and the Province of Holland:
1698-1795 (in Pounds)



Sources: Mitchell (1988), de Vries and van der Woude (1996), and European State Finance Database

Figure 4
Government Debt Service to Expenditures in Britain and the Province of Holland:
1692-1799

Sources: Mitchell (1988) and European State Finance Database

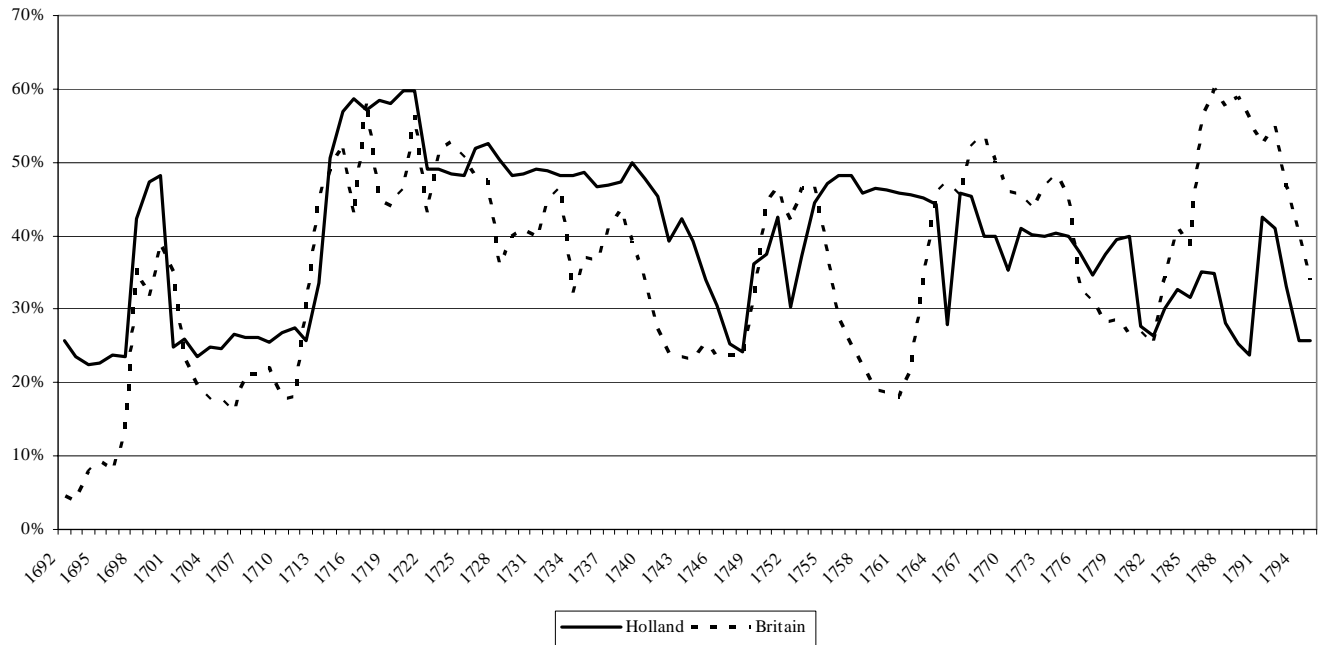


Figure 5
Government Debt Service to Debt in Britain and the Province of Holland: 1692-1795
 Sources: Mitchell (1988) and European State Finance Database

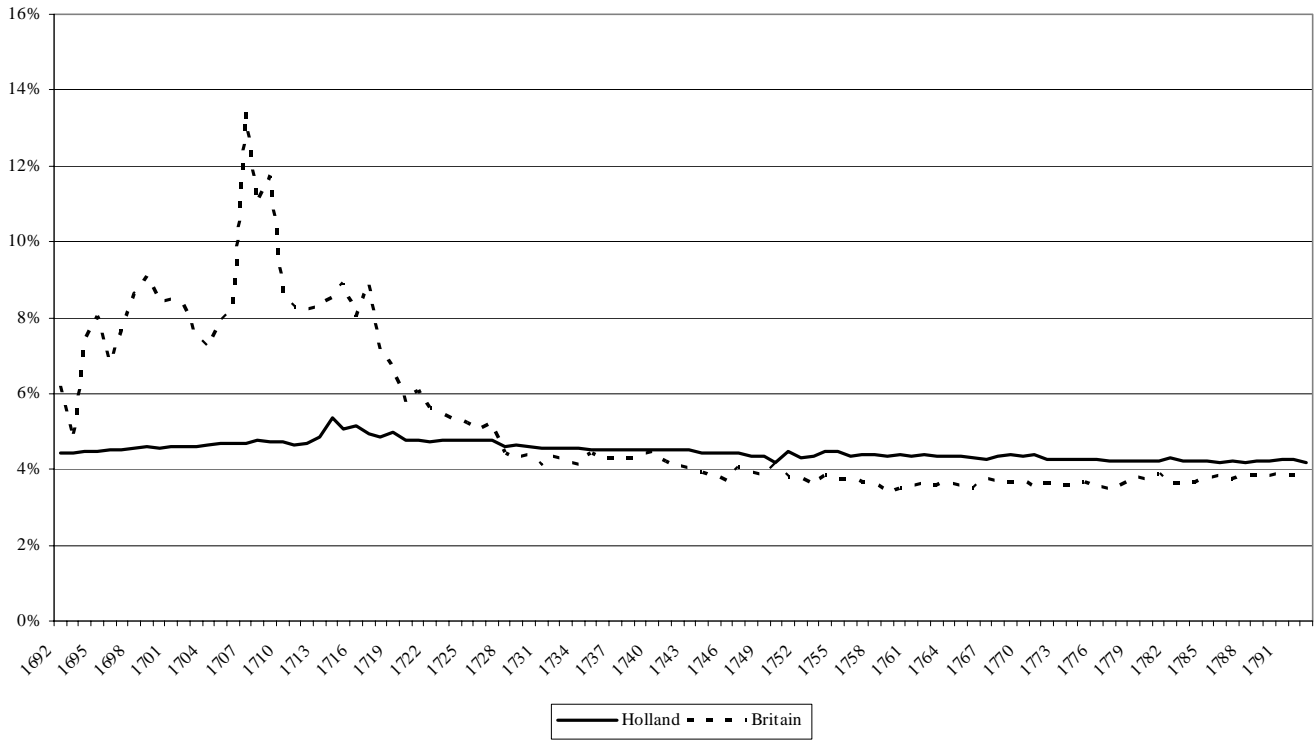
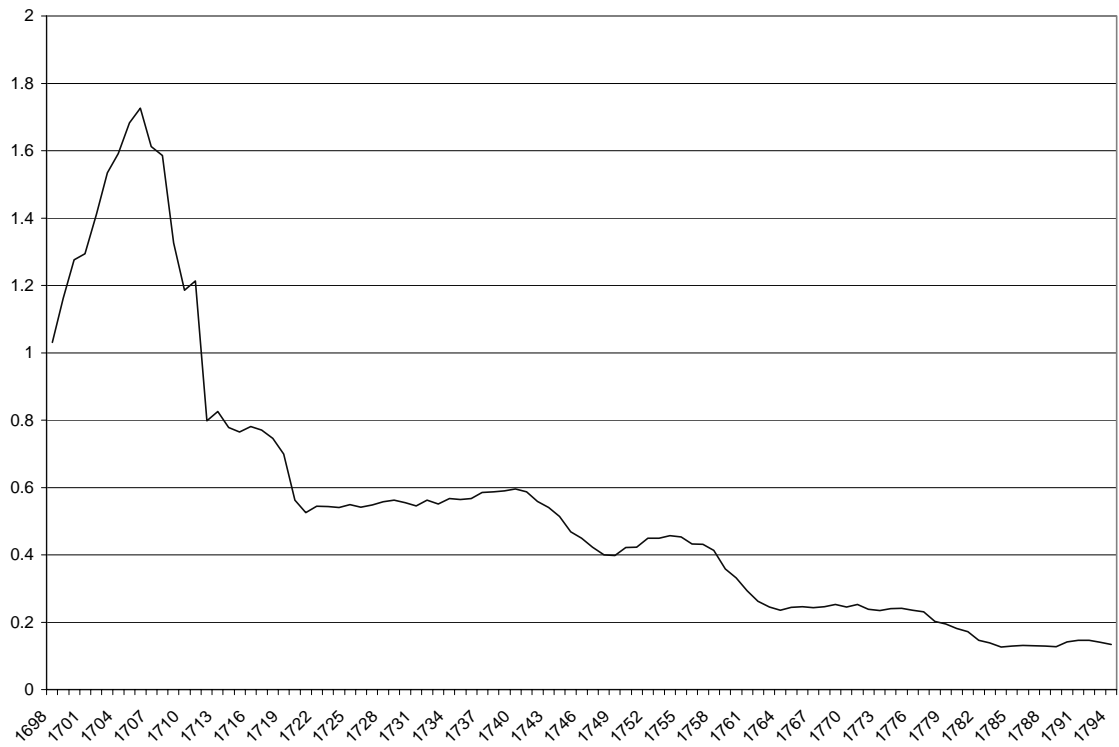


Figure 6

The Ratio of Holland to British Debt, 1697-1795



Sources: Mitchell (1988) and European State Finance Database