

# **Bloodshed or Reforms? The Determinants of Sovereign Bond Spreads in Modern History**

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## **Abstract**

We present historical data on sovereign bond spreads drawn from 300 years of data (from the late seventeenth century to the late twentieth century), which appear to be inconsistent with the North and Weingast (1989) view that institutional changes and reforms can reduce the cost of government debt soon after they are implemented. Extended time series data on British government debt from the late seventeenth century until 1815 show that, for over a century after the Glorious Revolution and even in the nineteenth century, wars and episodes of instability were a significant and robust determinant of the risk premium on British government debt. Furthermore, we show that the effect of wars on the cost of debt is due in part to “country risk,” not only to war-induced budget deficits. Results reproduced from Sussman and Yafeh (2000) suggest that in nineteenth century Japan, as well as in large samples of emerging markets in the period 1870-1913 and in the 1990s (Mauro, Sussman and Yafeh, 2006) wars and political instability were strongly correlated with the cost of debt, whereas institutional changes were not. Our overall reading of the historical evidence is therefore that institutional reforms rarely have a rapid and significant impact on bond spreads which tend to respond, at least in the short run, primarily to crises and instability.

**KEYWORDS:** Institutional reforms; credible commitment; sovereign debt; bond yields.

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<sup>1</sup> Prepared for the conference “Credible Commitment: Rethinking the Glorious Revolution and the Rise of Financial Capitalism,” Cambridge, March 2010. We thank Roi Azoff and Tomer Yafeh for excellent research assistance. Some of the material presented in this paper draws on the book *Emerging Markets and Financial Globalization: Sovereign Bond Spreads in 1870-1913 and Today* (by Paolo Mauro and the present authors, Oxford University Press, 2006), as well as on two earlier articles by the present authors (Sussman and Yafeh 2000 and 2006). Both authors are of the Hebrew University of Jerusalem and CEPR. Yafeh is also affiliated with ECGI.

## **I. Introduction**

What determines differences in interest rates faced by borrowing developing countries? In light of the immense interest in the effects of institutions on economic development following North (1990) and North and Weingast (1989), this paper uses historical data on sovereign debt drawn from various periods and countries from the 1690s to the 1990s to examine the extent to which changes in institutional quality have an immediate and direct impact on the cost of debt of borrowing nations, in comparison with the role played by wars and episodes of violent political turmoil. Our main conclusion is that, throughout historical periods, geographic zones, and data sets, wars and instability consistently affect borrowing costs, whereas institutional reforms typically do not elicit investor response in the short run, perhaps because a long period of time is needed to establish their credibility, or because the very nature of the reform process is gradual and cumulative.

To provide a broad perspective on these questions, it is helpful to review (some of) the historical evidence over the past 300 years: we examine the cost associated with Britain's government debt starting around the Glorious Revolution, the central institutional change highlighted by North and Weingast (1989), continuing throughout most of the eighteenth century (discussed in Sussman and Yafeh, 2006), and ending in the early nineteenth century (after the Napoleonic Wars, new evidence presented here for the first time). We then turn to Meiji Japan (discussed in Sussman and Yafeh, 2000), a country that experienced one of the most fundamental institutional changes in the nineteenth century, move on to a large sample of other developing countries of the period 1870–1913, and conclude our investigation in the 1990s (Mauro, Sussman and Yafeh, 2006). For all of these countries and time periods, we

study the determinants of spreads on government bonds and find that institutional changes and reforms have never been a major driver of the cost of capital of borrowing nations. Instead, the primary determinant of the cost of capital is peace and political stability. While good institutions are likely to contribute to economic growth in the long run, the historical support for the mechanism proposed by North and Weingast (1989) — that institutional reforms lower the cost of capital in the short run and hence foster financial and economic development — is limited.

The objectives of the present study are two-fold. First, it presents, in a unified framework, results from different data sets and time periods presented in our own previous research (Sussman and Yafeh, 2000, Mauro, Sussman and Yafeh, 2002, Mauro, Sussman and Yafeh, 2006, Sussman and Yafeh, 2006, and Sussman and Yafeh, 2007). Second, it extends the available data series on the cost of British government debt into the nineteenth century, through the conclusion of the Napoleonic wars, and provides new evidence on the determinants of Britain's cost of debt. During that period, the cost of British government debt increased substantially. While Barro (1987) has attributed the higher borrowing rates to the effect of military spending on government expenditure, we demonstrate that the rising cost of debt reflected also a direct increase in the risk premium due to the uncertainty associated with the outcome of the war. These findings confirm that wars and military spending were the primary drivers of variations in cost of Britain's government debt even when the country was already (relatively) rich, industrialized, and institutionally developed. Our findings for Britain are also echoed for Japan, which, following the dramatic victory over Russia in 1904-1905, enjoyed nearly unrestricted access to foreign capital market. Apparently, Japan's surprising military victory reduced the uncertainty related to the sustainability of Japanese

economic development and debt repayment capacity much more than nearly three decades of institutional and economic reforms.

The present paper is naturally related to previous studies which have cast some doubt on the importance of institutional changes in seventeenth and eighteenth century Britain in comparison with other changes.<sup>2</sup> The present study is also closely related to studies of the relation between the cost of capital, institutional changes, and political events: for example, Epstein (2000) studies Europe between 1300 and 1750 and argues that differences in formal constitutional arrangements do not account for differences in interest rates. Summerhill (2005a and 2005b) studies Brazil in the nineteenth century and finds some impact of institutional changes on the government's ability to borrow (mostly domestically), although most of the "structural breaks" he identifies seem to be closely related to revolts and instability. Finally, Saigheh (2009) examines the case of Argentina and argues that the Constitution of 1859 did lead to a "break" in Argentina's cost of capital. The evidence in this literature on this issue is therefore mixed.

The remainder of this paper is structured in chronological order. The next section, the main empirical section of the paper, presents the data and evidence for Britain between 1695 and 1815. Section III reproduces the evidence for Meiji Japan. Section IV discusses other emerging markets in the pre-World War I era, and Section V presents (very briefly) evidence from the 1990s. In presenting the findings for the various periods, we focus primarily on

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<sup>2</sup> See, for example, Brewer (1990), Ferguson (2001), O'Brien (2002), and Stasavage (2002, 2003, and 2007). All of these are reviewed in more detail in Sussman and Yafeh (2006) as well as in other papers presented at the Credible Commitment conference.

simple statistics and graphical presentations and refer the reader to more rigorous econometric analyses presented elsewhere. Section VI concludes the paper.

## **II. Britain: from the Glorious Revolution to Waterloo**

Figures 1A 1B (reproduced from Sussman and Yafeh, 2006) display estimates of the cost of British government debt starting soon after the institutional changes of the late seventeenth century, highlighted by North and Weingast (1989). Figure 1A presents several estimates of the absolute cost of British debt (interest rates), and Figure 1B presents the interest rate differential (“spread” in modern parlance) between British government debt and debt issued by the Province of Holland.<sup>3</sup> Both figures suggest that early in the eighteenth century, when Britain was involved in military conflicts, its cost of debt was high: Despite the newly established institutions, the four decades following the Glorious Revolution can be characterized as a period of a high and fluctuating cost of capital, rather than as an era of permanently low interest rates, suggesting that wars and military conflicts had a more direct effect on interest rates than the establishment of “good” institutions. Subsequent major wars, e.g. the Seven Years War (1756-1763) and the American War of Independence both had noticeable effects on Britain’s cost of debt nearly a century after the institutional changes of the Glorious Revolution.

Figure 1C (which is based on newly collected data on the number of enlisted men in the navy, drawn from the British Parliamentary Papers) suggests that the pattern by which

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<sup>3</sup> See Sussman and Yafeh (2006) for details on the construction of the various series used in these figures, as well as for comparisons of Britain’s cost of debt with that of several Continental European countries.

wars were the primary driver of fluctuations in the cost of capital of Britain, the most economically and institutionally advanced country of the time, continued well into the nineteenth century. Consol yields (interest rates on perpetual government bonds) hovered around 6 percent during periods of turmoil (in the 1780s and in the first decade of the nineteenth century), levels roughly similar to those of the 1720s.<sup>4</sup> Moreover, Figure 1C suggests that the cost of British debt co-moved fairly closely with the number of enlisted men in the British navy, a proxy for the wars and the intensity of actual and impending military conflicts.

The effect of wars on British interest rates has been studied before. Barro (1987) demonstrates that war finance can explain most of the variation in long term interest rates in Britain from 1700 to World War I. His interpretation is that wartime spending is associated with budget deficits that have to be financed by borrowing (i.e. a temporary effect), and also with an increased debt to GDP ratio (a longer term effect). He also notes that

“Over the sample of more than two hundred years, I found two examples of major budget deficits that were unrelated to wartime (or the business cycle). One episode featured compensation payments to slaveowners in 1835-36, and the other involved a political dispute over the income tax in 1909-10. Because of the ‘exogeneity’ of these deficits, it is interesting that interest rates showed no special movements at these times.”

(Barro, 1987, p. 246).

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<sup>4</sup> The comparison of absolute interest rate levels should be treated with caution; the series for the early eighteenth century are based on a variety of indirect estimates described in Sussman and Yafeh (2006). Consol yields, which are used in Figure 1C, are only available starting in the middle of the eighteenth century.

In light of the evidence presented above, we interpret Barro's findings in a different way: Wars had an additional effect on the British risk premium above and beyond the direct economic costs associated with military spending. While temporary deficits did not have an impact on long term bond prices, those associated with wars did. This suggests that wars introduced a component of uncertainty regarding the future ability to repay the loans, which could explain why investors reacted differently to deficits caused by wars in comparison with deficits of similar magnitudes driven by other reasons.

Table 1 presents this intuition in a more formal way for the period 1750-1820, extending the analysis of Sussman and Yafeh (2006), which ended in 1790. We present a regression (column 1) of the British consol yield on a number of macroeconomic variables which are commonly used in the literature on the cost of debt, namely, the debt per capita (the concept of GDP, and therefore also the concept of debt to GDP, did not exist at the time), current government deficit, government revenues, and export per capita (a proxy for GDP per capita). Since British consols were bonds yielding a nominal return, we also include the inflation rate and, in line with the literature on the gold standard (Bordo and White, 1991), a dummy variable to indicate whether Britain was on a gold fixed exchange rate or not. All of the variables have the expected signs and are statistically significant: Increases in the deficit or debt raise the cost of capital, and increases in the ability to pay – tax (government) revenues and economic growth — reduce it. Inflation has a positive and significant effect on nominal yields.

In column 2 we add to the regression the number of seamen in the British navy, our proxy for the intensity of actual and impending military conflicts. The coefficient on the number of seamen in the navy is highly significant beyond the direct monetary effect it had,

which is captured by the deficit or the debt per capita variables, and the indirect economic effects, which are captured, for instance, by government revenues. This suggests that the intensity of the war had a direct effect on the risk premium associated with long term British bonds. Moreover, the statistical significance of the dummy variable of the gold standard declines when the size of the navy is included in the regression, suggesting that the decision to go off the gold standard was correlated with the intensity of the war and the uncertainty it produced. Indeed, when Britain went off the gold standard in 1797 it was because of a run on the reserves of the Bank of England allegedly precipitated by fears of a French invasion. Dropping the gold standard dummy variable from the equation (column 3) leaves the results virtually unchanged, suggesting that the direct effect of being “on” gold was hardly significant.<sup>5</sup>

Another way to gauge the effect of the uncertainty due to the intensity of the war is to compare the constant terms in the regressions of column 1 and column 2. When the size of the navy is included in the regression, the constant drops from 249 basis points to 208 basis points suggesting that the difference (of about 40 basis points) measures the average risk premium associated with wars.

We proceed to provide some more direct measures of the effects of war on long term yields by focusing on the period of the Napoleonic wars. Using data on the actual dates of major battles, as well as on the dates in which battles were reported in the *London Times* (depending on the location of the battles, these dates could be far apart), the regression in

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<sup>5</sup> The gold standard involved also an indirect effect, due to the ability to finance the deficit by inflation tax, as captured by the inflation variable.

Table 2, column 1 suggests that, on average, a naval battle raised the yield by 40-50 basis points (a figure consistent with the findings of the previous table), whereas a land battle is associated with a yield increase of about 30 basis points, presumably because the navy was regarded as the “wooden wall” of Britain whereas the army fought mainly overseas.

The regressions in columns 2 and 3 include both the size of the navy (log of the number of enlisted men, column 2) and the size of the army (column 3). In line with our previous findings, the size of the navy seems to be a particularly important explanatory variable because its size could be viewed as a proxy for the extent of foreign threats on Britain itself.<sup>6</sup> Interestingly, dummy variables that take the value one on the dates of the Truce of Amiens (1801) and of war declarations (1803 with France, 1812 with the United States) have the expected signs (negative and positive, respectively). All of these results are consistent with the views that changes in the cost of capital associated with wars reflect more than their fiscal effects.

Table 3 presents a “search for structural breaks” in the (daily) consol yield series for the years 1790-1815 (see Sussman and Yafeh, 2000, for a detailed description of this statistical procedure). Peace is associated with significant declines in consol yields and wars, or preparations for them, are associated with increases in yields. This is not surprising; the interesting finding here is that, more than a century after the fundamental institutional changes of the seventeenth century, British yields were still quite volatile and sensitive to political and war-related events, despite the institutional superiority of Britain over its rivals.

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<sup>6</sup> Interestingly, the (log of the) number of enlisted men in the navy and in the army are not very highly correlated, with a correlation coefficient of about 0.28.

Moving to an international comparison, Table 4 suggests that the institutionally under-developed United States, soon after its independence, borrowed at rates which were comparable to those of Britain: Controlling for standard macroeconomic variables such as debt per capita and the government deficit (which should proxy for the risk of default), Britain did not borrow at lower rates than the United States (the constant term in column 3 is not statistically different from zero). This finding echoes the comparisons made in Sussman and Yafeh (2006) between the cost of debt of institutionally developed Britain of the seventeenth century and its Continental European counterparts – Britain did not borrow more, or at a lower cost, than the Netherlands or other European powers.

The basic statistics presented here (and more sophisticated econometric analyses presented in Sussman and Yafeh, 2006) are consistent with the view that macroeconomic variables and wars are crucial for understanding fluctuations in Britain's cost of capital for a very long period after the fundamental institutional change embodied in the Glorious Revolution. As noted before, this conclusion is consistent with the results of Barro (1987), who documents fluctuations in consol yields during war times between the early eighteenth and early twentieth century, with Wright (1999), who calculates the volume of British debt in periods of war and in periods of peace, and with Brown et al. (2006), who document substantial volatility in consol yields during the eighteenth century, coinciding with military conflicts, in contrast with the stability of the "Pax Britannica" of the nineteenth century. However, our emphasis here is not on the risk that government debt might crowd out private investment (as in Barro, 1987), but on the special effect of military events and spending, especially with regard to the navy and naval battles, which appear to be a better proxy for risk than military spending in general.

### III. Meiji Japan

Figure 2, reproduced from Sussman and Yafeh (2000), describes the interest rate differential (or “spread”) between Japanese government bonds and British consol yields during the Meiji period. The figure suggests that the establishment of most state institutions in Japan (between the late 1870s and the 1890s) was not perceived as “news” with an immediate effect on the risk associated with Japanese government debt in London. Almost none of the significant reforms of the Meiji period, e.g. the establishment of the Bank of Japan and the introduction of “modern” monetary policy, the promulgation of the Meiji Constitution, or the introduction of parliamentary elections, produced any quantitatively significant market response in London. Nevertheless, the adoption of the Gold Standard in 1897 (an institutional change which can be viewed as a “summary statistic” incorporating a number of preceding cumulative reforms) did lead to a dramatic decline in yields and an increase in volume of Japanese foreign debt.

In line with our results for Britain, some international political events affected yields far more than did the introduction of new institutions. For example, with the onset of the 1904 war with Russia, yields on Japanese bonds in London increased significantly. However, Japan’s victory in the war was followed by a (not very large) decline in yields to a level below their pre-war level and, more importantly, by a substantial increase in Japan’s ability to raise capital abroad, described in considerable detail in Sussman and Yafeh (2007). Even during the war, when military spending was on the rise, commentary in the *London Times* (15 April, 1904) attributed the rising prices (declining yields) of Japanese bonds (and the opposite trends of Russian bonds) to the surprising Russian naval defeat. In early May 1904, a new 10,000,000 pound Japanese loan was in such high demand that the *Times* expressed

regret that its scale was not large enough to satisfy all the investors who wanted to participate. The Japanese victory at Kin-chau elicited praise in the press: “The recognition of the completeness of the Japanese victory at Kin-chau... (led to) praise for Japanese skill, courage,.... Even more than the Japanese valor, does the Japanese deliberation, thoroughness and scientific conduct of their military operations (deserve praise)....” (30 May 1904: 5). Following a sequence of Japanese victories later in the year and commensurate headlines in the British press, the *Times* commended Japanese bonds precisely because “(military victories) show that Japan is as ready to work on the best modern methods in finance as in war” (August 27, 1904: 11). Indeed, the news report generate the impression of a direct link between the enthusiasm for Japanese bonds in London and developments on the front, ranging from relatively minor victories such as the sinking of a Russian battleship in early December 1904 to the fall of Port Arthur, around which Japanese bond prices rose by about 15%. Similarly, “the progress of the Japanese army towards Mukden encouraged the bulls of Japanese bonds” (March 7, 1905: 11), and the swift subsequent military successes raised bond prices (lowered yields) even further because markets were apparently concerned that any Russian military success might prolong the war.

Following the war with Russia, Japan became one of the largest borrowers on the London market, and was able to issue debt in foreign bond markets other than London as well. Moreover, in the years after the victory over Russia, foreign debt was issued not only by the Japanese government itself, but also by quasi-governmental institutions (e.g. Tokyo Harbourworks, Osaka Electric Tramway, the South Manchurian Rail Company, and the Imperial Industrial Bank of Japan), municipalities and even some private Japanese companies (e.g. Kanegafuchi Spinning). And there is yet more evidence on the impact of the war on the

perception of Japan on the London market: underwriting commissions on Japanese bonds, another measure of risk, declined by a third after the victory over Russia, and furthermore, the Japanese government was no longer required to back its debt by securities (e.g. customs income) deposited in London (Suzuki, 1994).

Further support for the claim that the military victory over Russia improved Japan's credit rating in subsequent years can be found quite explicitly in news articles published in subsequent years. For example, starting in 1905 there was concern in Britain over the burden of Japan's war expenditures. The *Economist*, however, advised its readers not to worry because "the sagacity with which the finances of Japan have been administered during a period of stress and anxiety is a good augury..." (23 February 1905: 2072). A later *Economist* article, titled "Japan as a Borrower," explained the "phenomenal success" of Japan's loan operations as "...due about equally to the enhanced reputation of Japan by reason of her military and naval exploits, and the skillful manner in which her loan flotations ha[d] been conducted..." (20 July 1907: 1212). It seems that the reputation acquired during the successful war with Russia made it possible in later years for Japan to withstand investors' concerns (expressed in many news articles) regarding its increasing fiscal deficit. Apparently, the London market for sovereign debt was much more interested in, and impressed by, the outcome of the war against Russia than by the institutional changes and reforms in the decades prior to the war.

#### **IV. Emerging Markets in the Period 1870-1914**

Mauro, Sussman and Yafeh (2002 and 2006) construct series of sovereign bond spreads (yields above those of British consols) for a large sample of emerging markets in the

period from 1870 to World War I. Mauro, Sussman and Yafeh (2006) combine the spread data with newspaper articles from the *London Times* and the Economist's *Investor's Monthly Manual*, and classify them into categories, including institutional reforms and wars and political instability.

Using this database, in Chapter 4, Mauro, Sussman and Yafeh (2006) list the events which corresponded to the largest (absolute) changes in the cost of capital of borrowing nations – most of these events are related to wars and other forms of instability and stability and violence. Because of the large number of listed events, we do not reproduce these results here. Instead, Table 5 (reproduced from Mauro, Sussman and Yafeh, 2002) presents the events associated with “structural breaks” in the spread series of eighteen emerging markets; again, the vast majority of them are associated with rebellions, wars, and instability rather than institutional change. Table 6 presents regression results from one specification out of several examined in Mauro, Sussman and Yafeh (2006). News on wars and instability are significantly correlated with spreads, unlike news about reforms. This result holds in a variety of regression specifications (including regressions with additional controls for macroeconomic effects), and is consistent with our findings for Britain and for Japan described above.

## **V. Emerging Markets in the 1990s**

Table 7 presents regression specifications similar to those of Table 6 for a sample of emerging markets in the 1990s (also drawn from Mauro, Sussman and Yafeh, 2006). Although in general, news reports have a weaker effect on bond spreads in the modern period (in part, because of a much larger extent of co-movement in asset prices across countries in

the 1990s in comparison with the pre-World War I period, see Mauro, Sussman and Yafeh, 2002), wars and related instability are still associated with higher spreads in this period too, whereas institutional changes are only weakly related to spreads in a manner that is not consistently statistically significant; this result, however, is not completely robust and changes somewhat in alternative regression specifications.<sup>7</sup>

## **VI. Conclusions**

This short paper presents a comparative analysis of the determinants of the cost of sovereign bonds issued by borrowing governments over three centuries. The main result is that wars and episodes of politically-motivated violence have the most immediate and pronounced impact on the cost of borrowing. This effect seems to be driven by more than the standard fiscal concerns associated with military spending and is, we believe, a reflection of the instability and risk associated with military conflicts. In contrast, institutional and political reforms (such as the introduction of a constitution) or efficiency-enhancing structural reforms seldom reduce the cost of capital quickly: only in a few instances did reforms of the monetary framework (such as the introduction of the gold standard in nineteenth century Japan or a currency board in Bulgaria of the 1990s) have a rapid and substantial impact on spreads.

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<sup>7</sup> While the effect of war and instability on spreads remains unchanged in a variety of regression specifications, in some specifications which include additional macroeconomic control variables, there is also some limited evidence for an effect of institutional changes on borrowing costs; see Mauro, Sussman and Yafeh (2006), Chapter 5, for further details.

Considering the evidence from all periods jointly, in the short run peace and stability seem to matter more for countries' borrowing costs than does the establishment of investor-friendly institutions. While we do think that appropriate reforms can be beneficial in the long run, their benefits seem to accrue in a gradual manner; novel institutions are rarely rewarded swiftly by financial markets. Thus, on the whole, our impression, on the basis of both the results presented above and in our previous research, is that the aspects of (broadly defined) institutional quality that matter the most relate to ensuring the absence of violence (international wars or domestic turmoil) and, more generally, the quality of *de facto* rather than *de jure* institutions.

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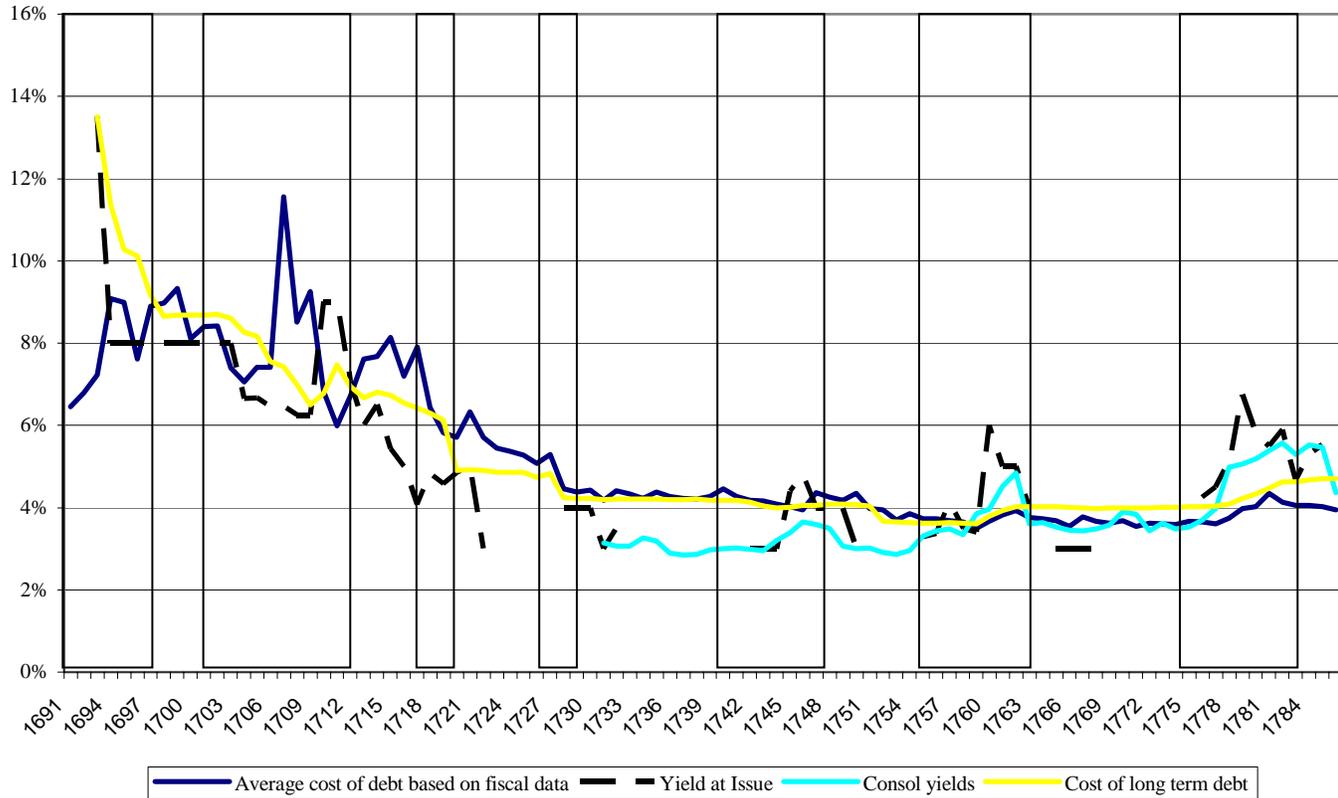
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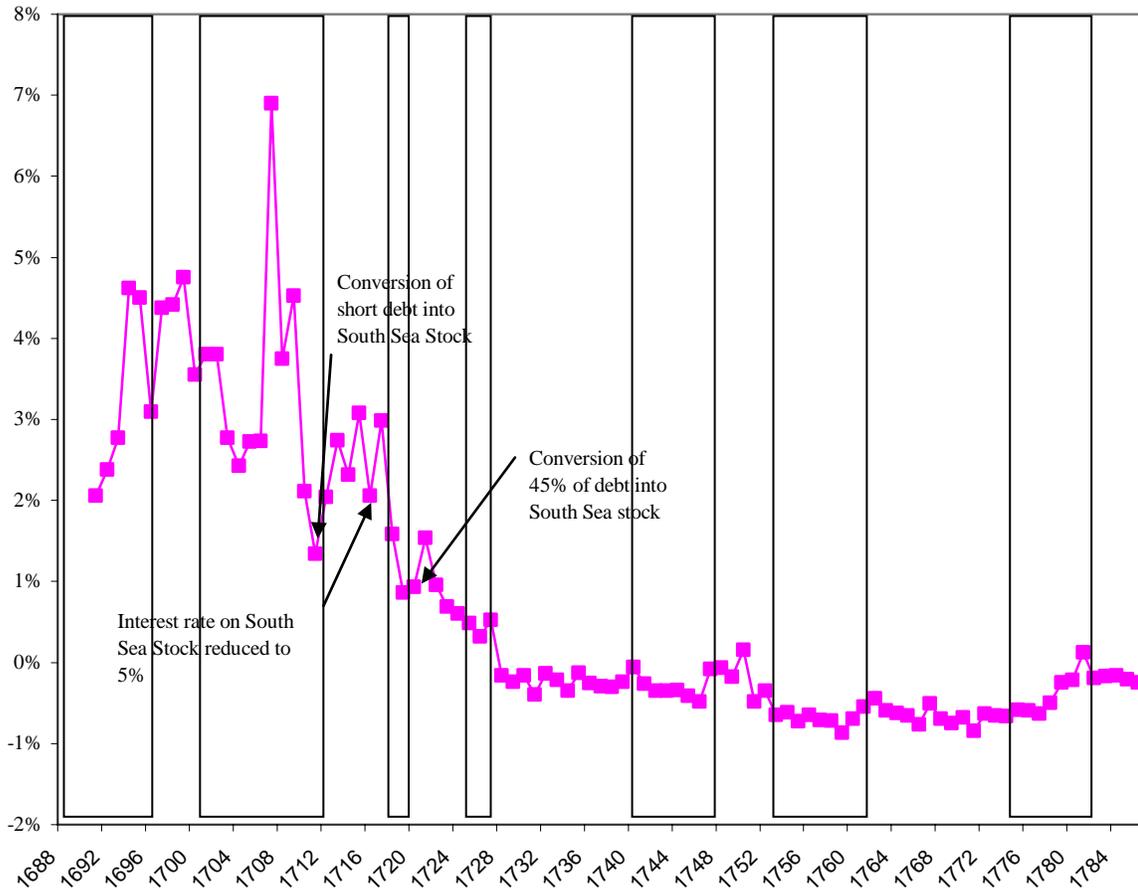
**Figure 1A: Estimates of the Cost of Debt, Britain 1692-1790**

Source: Sussman and Yafeh (2006), Figure 1A, where the definitions of the various measures of the cost of capital are provided. War years (shaded) are the following: 1688-1697: War of League of Augsburg; 1701-1712: War of the Spanish Succession; 1718-1720: War of the Quadruple Alliance; 1727-1729: War with Spain; 1740-1748: War of the Austrian Succession; 1755-1763: Seven Years War; 1775-1783: War of American Independence.



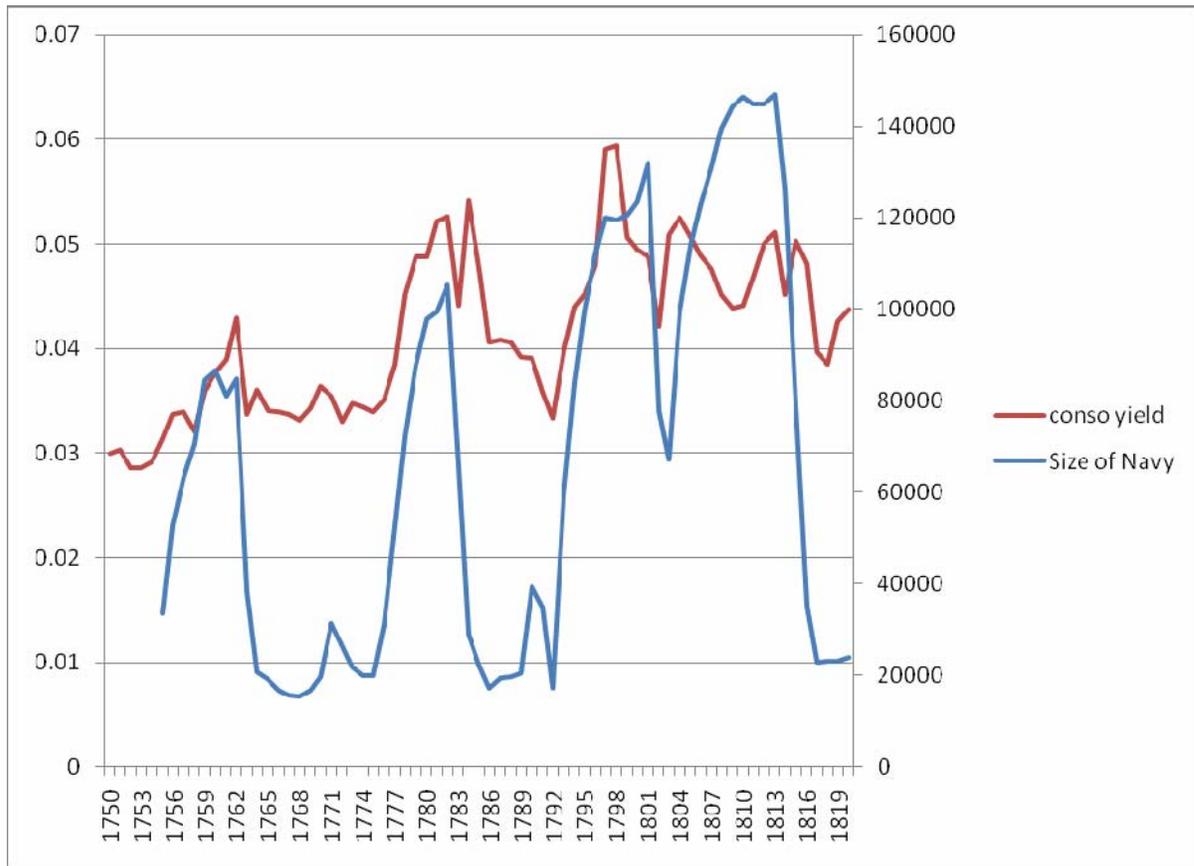
**Figure 1B: Interest Rate Differential, Britain vs. the Province of Holland, 1692-1790**

Interest rates are measured as the ratio of debt service to debt. Source: Sussman and Yafeh (2006), Figure 1B.



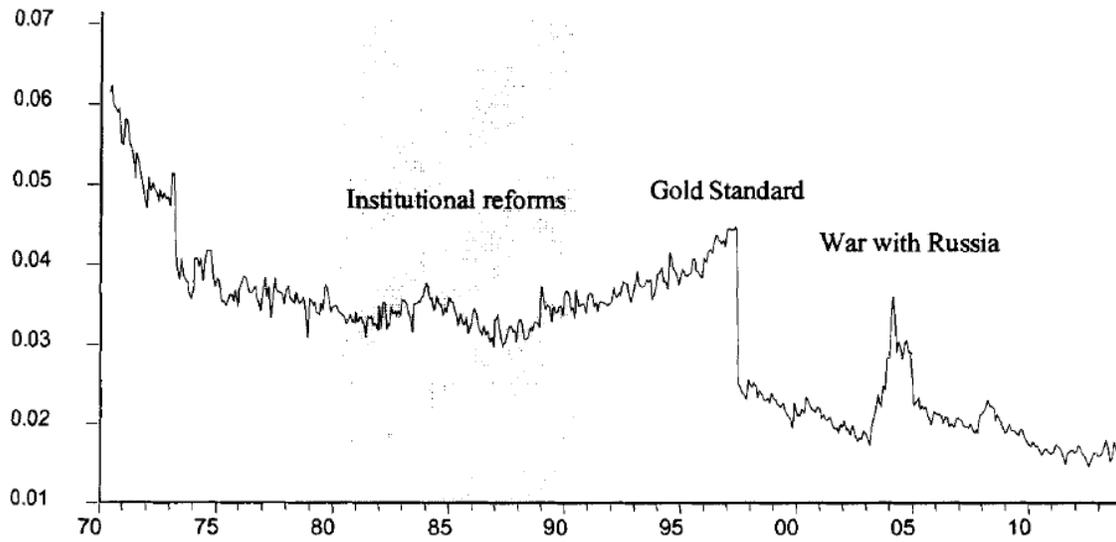
**Figure 1C: British Consol Yields and the Size of the British Navy**

On the left axis: 3% British daily consol yields for the period 1750-1809 drawn from data provided by Larry Neal in European State Finance Database, [www.le.ac.uk/hi/bon/ESFDB](http://www.le.ac.uk/hi/bon/ESFDB) and, for the period 1809-1815, from the *London Times*. On the right axis: The number of enlisted men in the navy from House of Commons Papers 1868-69 (366) pp. 1150, 51, 57, 58.



**Figure 2: Japanese Government Bond Yields vs. British Consols, 1870-1914**

Source: Sussman and Yafeh (2000), Figure 1



**Table 1: The Determinants of Consol Yields, 1750-1820**

Sources: Annual British consol yields and macroeconomic data are from Mitchell (1998). The number of enlisted men in the navy is from House of Commons Papers 1868-69 (366) pp. 1150, 51, 57, 58. Single asterisks indicate significance at the 5 percent level; double asterisks indicate significance at the 1 percent level. Robust standard errors are in brackets.

	(1)	(2)	(3)
	<b>Consol Yield</b>	<b>Consol Yield</b>	<b>Consol Yield</b>
<b>Debt per capita</b>	0.0003	0.0005	0.0005
	(0.0001)**	(0.0001)**	(0.0001)**
<b>Government Deficit</b>	0.0006	0.0004	0.0004
	(0.0001)**	(0.0001)**	(0.0001)**
<b>Exports per capita</b>	0.001	0.0008	0.0007
	(0.0002)**	(0.0002)**	(0.0002)**
<b>Government revenues</b>	-0.0002	-0.0002	-0.0002
	(0.0000)**	(0.0000)**	(0.0000)**
<b>Inflation</b>	0.0164	0.0101	0.0112
	(0.0061)**	-0.0052	(0.0046)*
<b>Dummy: Gold Std</b>	-0.0029	-0.0014	
	(-0.0021)	(-0.0016)	
<b>No. of Navy Men</b>		0.0059	0.0062
		(0.0014)**	(0.0015)**
<b>Constant</b>	0.0249	0.0208	0.0191
	(0.0026)**	(0.0019)**	(0.0012)**
<b>Observations</b>	71	71	71
<b>R-squared</b>	0.86	0.9	0.89

**Table 2: The Determinants of Consol Yields, 1790-1815**

Sources: 3% British consol daily prices for the period 1750-1809 are from data provided by Larry Neal in: European State Finance Database, [www.le.ac.uk/hi/bon/ESFDB](http://www.le.ac.uk/hi/bon/ESFDB) and for the period 1809-1815 from the *London Times*. The figures on enlisted men in the navy and in the army are from House of Commons Papers 1868-69 (366) pp. 1150, 51, 57, 58. Single asterisks indicate significance at the 5 percent level; double asterisks indicate significance at the 1 percent level. Robust t-statistics are in brackets.

	(1)	(2)	(3)
	<b>Consol Yield</b>	<b>Consol Yield</b>	<b>Consol Yield</b>
<b>Dummy: News of Naval Battles Reported</b>	0.005	0.003	0.003
	(3.29)**	(2.12)*	(2.06)*
<b>Dummy: Naval Battle</b>	0.004	0.002	0.002
	(2.96)**	-1.63	-1.59
<b>Dummy: Land Battle</b>	0.003	0.001	0.001
	(2.43)*	-0.73	-0.72
<b>Dummy: News of Land Battle Reported</b>	0.003	0.001	0.001
	(2.36)*	-0.48	-0.51
<b>War Declaration Dummy (1803, 1812)</b>	0.005	0.004	0.004
	(2.30)*	(16.80)**	(28.19)**
<b>Dummy: Truce of Amiens</b>	-0.002	-0.004	-0.004
	(18.87)**	(57.15)**	(47.92)**
<b>Dummy: Dividend (coupon) Payment Date</b>	-0.001	0	-0.001
	(2.36)*	(2.29)*	(2.56)*
<b>Log of No. of Navy Men</b>		0.008	0.007
		(102.64)**	(39.60)**
<b>Log of No. of Army Men</b>			0
			-(1.53)
<b>Constant</b>	0.047	-0.045	-0.035
	(584.63)**	(51.31)**	(28.96)**
<b>Observations</b>	7084	7083	6514
<b>R-squared</b>	0.004	0.415	0.292

**Table 3: The Most Significant Structural Break Points  
British Consol Yields, 1790-1815**

Sources: 3% British consol daily prices for the period 1750-1809 are from data provided by Larry Neal in: European State Finance Database, [www.le.ac.uk/hi/bon/ESFDB](http://www.le.ac.uk/hi/bon/ESFDB) and for the period 1809-1815 from the *London Times*. Dates of major naval and land battles are from Cook and Stevenson (1980).

<b>Date</b>	<b>Change in Consol Yield (basis points)</b>	<b>Event</b>
October 2, 1801	-50	Truce of Amiens
July 8, 1812	+50	US Declares war on Britain
March 9, 1803	+30	King informs Parliament of French war preparations
March 14, 1803	+30	British Ambassador leaves France (end of the Truce of Amiens)
April 8, 1814	-30	Napoleon abdicates
July 23, 1805	+15	Rumors of combined French squadrons not far from Britain
March 31, 1815	+20	Reports of Napoleon in France, fear of another war

**Table 4: Yields on United States Bonds, 1792-1820**

Sources: Prices of U.S 6% consols traded in New York are from the data set Early US Securities Prices, compiled by Richard Sylla, Jack Wilson and Robert Wright, <http://eh.net/databases/early-us-securities-prices>. Annual data on outstanding debt from is Treasury Direct: [http://www.treasurydirect.gov/govt/reports/pd/histdebt/histdebt\\_histo1.htm](http://www.treasurydirect.gov/govt/reports/pd/histdebt/histdebt_histo1.htm). Government deficit is from: [www.usgovernmentpending.com](http://www.usgovernmentpending.com). Single asterisks indicate significance at the 5 percent level; double asterisks indicate significance at the 1 percent level. Robust t-statistics are in brackets.

	(1)	(2)	(3)
	<b>Yield_US</b>	<b>Yield_US</b>	<b>Yield_US minus Consol Yield</b>
<b>US Debt per Capita</b>	0.942	0.959	0.967
	(3.24)**	(5.71)**	(5.27)**
<b>US Gov Deficit per Capita</b>	2.903	2.709	2.616
	(4.59)**	(4.85)**	(4.13)**
<b>Consol Yield</b>		0.675	
		(6.18)**	
<b>Constant</b>	0.049	0.017	0.001
	(15.06)**	(3.52)**	-0.7
<b>Observations</b>	28	28	28
<b>R-squared</b>	0.44	0.79	0.59

**Table 5: Events Associated with Structural Breaks in the Spreads of Nineteenth Century Emerging Markets**

Source: Mauro, Sussman and Yafeh (2002), Table V

Country	Date	Sign	Event
<b>Argentina</b>	March 1876	Increase	Period of revolution and crisis
	June 1890	Increase	Baring Crisis
	July 1891	Increase	Failure of national bank
	April 1879	Decrease	Success against rebellion
	April 1896	Decrease	Improvement in the fiscal position
<b>Brazil</b>	April 1898	Increase	Following the crushing of Canada rebellion
	October 1890	Increase	Going off the gold standard, Baring crisis
	September 1895	Increase	Between revolt of military school and dissolution of congress
<b>Canada</b>	February 1912	Decrease	Pro-British Conservatives win important elections
<b>Chile</b>	November 1896	Decrease	Establishment of a financial inquiry commission?
	September 1891	Decrease	End of Civil war
	March 1886	Decrease	New regime
	November 1879	Decrease	Doing well in a war with Bolivia and Peru
	July 1876	Decrease	New information provided to market about financial position
<b>China</b>	June 1885	Decrease	?
	May 1896	Decrease	End of war with Japan
	July 1900	Increase	Boxer rebellion
<b>Egypt</b>	May 1879	Decrease	July, Ismail pasha deposed
	September 1881	Increase	Armed uprising
	April 1885	Increase	War against Sudan
<b>Greece</b>	July 1893	Increase	Financial crisis
	April 1897	Decrease	End of war with Turkey
<b>Hungary</b>	May 1877	Decrease	Hungary to be neutral in Balkan conflict between Turkey and Russia

<b>Japan</b>	August 1897	Decrease	Going onto the gold standard
	March 1904	Increase	War with Russia
<b>Mexico</b>	March 1879	Decrease	?
	August 1886	Decrease	Ease of tensions with the US?
	July 1894	Decrease	?
<b>Portugal</b>	July 1902	Decrease	Renegotiation of debt Going off the gold standard; bank
	March 1891	Increase	moratorium
	September 1907	Increase	Franco dictatorship; end of monarchy
<b>Queensland</b>	January 1891	Increase	Banking Crisis
	April 1893	Increase	Banking Crisis
<b>Russia</b>	April 1877	Increase	War with Turkey
	February 1903	Increase	Tensions with Japan?
<b>Sweden</b>	June 1881	Decrease	?
<b>Turkey</b>	July 1875	Increase	Trouble in Bosnia End of war with Russia, introduction of
	May 1878	Decrease	the gold standard
	September 1895	Increase	War against Greece
	October 1912	Increase	War in the Balkans
<b>Uruguay</b>	March 1892	Decrease	End of a financial crisis
	April 1877	Increase	Beginning of military rule
	February 1895	Increase	Instability leading to war
	January 1905	Decrease	End of civil war

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Data Sources: *The Economist's Investor's Monthly Manual*. The breaks are listed in the order in which they are obtained; see Mauro, Sussman and Yafeh (2002) for details.

**Table 6: Spreads and News, Panel Regressions, 1870–1913**

Source: Mauro, Sussman and Yafeh (2006), Table 5.2.

The dependent variable is the yield differential (“spread”) relative to British consol yields, and the sample consists of 627 country/year observations for eighteen contemporary emerging markets. Explanatory variables include news categories, which are calculated using all articles on each borrowing country in the *London Times* during the sample period. Single asterisks indicate significance at the 5 percent level; double asterisks indicate significance at the 1 percent level. Standard errors are in brackets.

	News in logarithms						News in fractions					
	No fixed effects			With fixed effects			No fixed effects			With fixed effects		
Wars	0.114 [0.021]*	0.109 [0.020]**	0.095 [0.018]**	0.052 [0.017]**	0.044 [0.014]**	0.044 [0.014]**	0.640 [0.115]*	0.540 [0.106]**	0.509 [0.096]**	0.359 [0.084]**	0.232 [0.065]**	0.234 [0.065]**
Good/Neutral economic	-0.165 [0.027]*	-0.098 [0.026]**	-0.049 [0.024]*	-0.147 [0.023]**	-0.033 [0.019]	-0.034 [0.020]	-0.302 [0.078]*	-0.108 [0.073]	-0.055 [0.067]	-0.314 [0.058]**	-0.088 [0.046]	-0.091 [0.047]
Bad economic	0.069 [0.032]*	0.066 [0.030]*	0.056 [0.027]*	0.041 [0.023]	0.052 [0.018]**	0.051 [0.018]**	0.834 [0.241]*	0.910 [0.221]**	0.783 [0.200]**	0.163 [0.175]	0.260 [0.136]	0.254 [0.137]
Reform	0.010 [0.034]	-0.006 [0.031]	0.020 [0.028]	-0.008 [0.026]	-0.017 [0.021]	-0.018 [0.021]	0.160 [0.293]	0.003 [0.269]	0.248 [0.245]	0.241 [0.211]	0.123 [0.164]	0.119 [0.165]
Political	-0.119 [0.023]*	-0.126 [0.021]**	-0.162 [0.019]**	-0.014 [0.023]	0.014 [0.018]	0.014 [0.018]	-0.346 [0.160]	-0.273 [0.147]	-0.280 [0.133]*	0.164 [0.124]	0.262 [0.097]**	0.261 [0.097]**
Foreign	0.071 [0.022]*	0.042 [0.021]*	0.019 [0.018]	0.007 [0.021]	-0.008 [0.017]	-0.007 [0.017]	0.360 [0.121]*	0.329 [0.111]**	0.249 [0.101]*	0.087 [0.108]	0.041 [0.084]	0.041 [0.085]
Default history			0.522 [0.041]**			0.027 [0.083]			0.488 [0.042]**			0.045 [0.082]
Portfolio spreads		0.453 [0.044]**	0.517 [0.040]**		0.561 [0.029]**	0.563 [0.030]**		0.498 [0.046]**	0.545 [0.042]**		0.555 [0.028]**	0.559 [0.029]**

**Table 7: Spreads and News, 1994–2002**  
 Source: Mauro, Sussman and Yafeh (2006), Table 5.5

The dependent variable is the yield differential (“spread”) relative to US Treasury Bonds for a sample of eight emerging markets. News indicators are based on articles in the *Financial Times* on each borrowing country during the sample period and refer to the number of news or to the fraction of all news for the category indicated. F.E. denotes regressions with country fixed effects; single asterisks indicate significance at the 5 percent level; double asterisks indicate significance at the 1 percent level. Standard errors are in brackets.

	Annual data				Quarterly data					
	Logs		Fractions		Logs		Fractions			
	No F.E.	With F.E.	No F.E.	With F.E.	No F.E.	With F.E.	No F.E.	With F.E.		
Wars/Instability	0.166 (0.079)*	0.183 (0.074)*	0.033 (0.086)	0.063 (0.074)	2.641 (0.699)*	1.683 (0.767)*	0.165 (0.056)*	0.041 (0.041)	1.155 (0.239)*	0.471 (0.177)*
Good/Neutral economic	0.397 (-0.108)*	0.366 (0.101)*	0.262 (0.102)*	0.208 (0.089)*	2.665 (0.503)**	1.316 (0.496)*	0.251 (0.047)**	0.121 (0.033)*	1.481 (0.206)**	0.542 (0.148)*
Bad economic	0.235 (0.089)*	0.217 (0.083)*	0.089 (0.086)	0.055 (0.074)	3.381 (0.684)*	1.722 (0.732)*	0.218 (0.051)*	0.071 (0.035)*	1.527 (0.234)**	0.514 (0.166)*
Reform	-0.331 (0.109)*	-0.294 (0.103)*	-0.125 (0.105)	-0.095 (0.091)	-1.282 (0.814)	-0.147 (0.681)	-0.217 (0.061)*	-0.103 (0.041)*	-0.013 (0.264)	-0.016 (0.174)
Political	-0.118 (-0.087)	-0.107 (0.081)	0.024 (0.082)	0.038 (0.071)	0.922 (0.539)	0.578 (0.476)	-0.031 (0.045)	0.098 (0.032)*	0.755 (0.200)*	0.463 (0.138)*
Foreign	-0.27 (0.087)*	-0.291 (0.082)*	-0.033 (0.103)	-0.079 (0.089)			-0.317 (0.053)**	-0.103 (0.039)*		
Portfolio spreads		0.798 (0.241)*		0.849 (0.184)*	0.799 (0.240)*	0.876 (0.184)*	0.869 (0.104)**	0.885 (0.068)**	0.878 (0.111)**	0.918 (0.071)**
Constant	1.653 (0.229)**	0.011 (0.540)	1.376 (0.290)*	-0.276 (0.437)	-1.221 (0.648)	-0.763 (0.554)	0.017 (0.222)	-0.054 (0.146)	-0.748 (0.274)*	-0.318 (0.182)
Number of observations	72	72	72	72	72	72	282	282	263	263