Weak and Strong States: Political Transformations and Sovereign Credit Risk in 18th and 19th Century Continental Europe

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Abstract: Which political innovations cause sovereign credit risk to fall? In this paper, I evaluate two competing claims. North and Weingast (1989) argue that limited government improves sovereign creditworthiness by placing constitutional constraints on a strong ruler. Epstein (2000), however, claims that unification of domestic political and economic institutions promotes economic efficiency. By extension, fiscal centralization should reduce sovereign credit risk by granting undivided fiscal authority to a weak ruler. I examine how fiscal centralization and limited government influenced sovereign creditworthiness in Continental Europe during the 18th and 19th centuries. Prior to the French Revolution, many Continental states suffered from fiscal fragmentation and absolutist rule. Fiscal centralization occurred in most Continental states from 1789 to 1815, resolving the fragmentation problem. Limited government, which resolved the problem of absolutist rule, did not emerge in most Continental states until the 1830s and 1840s, however. I use government bond yield data to test how sovereign credit risk varied with these institutional reforms. My results suggest a non-trivial link between limited government institutions and financial property rights to public debt. In particular, I find that limited government led to significant improvements in sovereign creditworthiness, but that fiscal centralization did not. At the same time, the evidence indicates that fiscal centralization was likely a pre-condition to reduce sovereign credit risk.

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1. Introduction

The relationship between political power and sovereign creditworthiness is subject to intense debate. Many scholars highlight the “weak” state problem in public finance.¹ Spatial fragmentation of a ruler’s fiscal authority hinders the state’s ability to collect taxes and fulfill debt obligations, making him a poor credit risk. Fiscal centralization promotes creditworthiness by enlarging the ruler’s tax base, which increases revenues and facilitates debt service. Centralization, however, is not a panacea. Indeed, other scholars emphasize the “strong” state problem in public finance.² Rulers with undivided fiscal authority and great judicial power are more likely to pursue irresponsible policies, spending recklessly and defaulting on debts when convenient.

Limited government, which places constitutional constraints on the ruler’s fiscal actions, is often cited as the solution to the strong state problem. North and Weingast (1989) offer a seminal account of this argument, claiming that constitutional reforms in England with the Glorious Revolution of 1688 had profound effects on public finance. Following this political change, Parliament gained control over fiscal policy. In turn, the English Crown was able to provide a credible promise to repay its debts, giving it access to cheaper, more plentiful loans. North and Weingast claim that improvements in sovereign creditworthiness had positive repercussions for economic development. The Crown’s commitment to debt service signaled respect for private property rights in general, which encouraged investment and growth.

North and Weingast’s argument for limited government has not gone unchallenged, however. Epstein (2000), among others, points out that England was centralized from medieval times, making it anomalous among European countries. Elsewhere, there was divided fiscal authority, meaning that central governments had to negotiate with provincial bodies over tax revenues. Epstein argues that domestic political and economic fragmentation, and not limits to the ruler’s power, was the main cause of institutional inefficiency. In this vein, North and Weingast conflate the creditworthiness benefits of limited government with those of fiscal centralization. Hence, resolution of the weak state problem rather than the strong state one was most important to improve creditworthiness.

The exceptional nature of English financial history makes it difficult to determine whether a causal link between limited government and sovereign creditworthiness truly exists. Moreover, the contemporary evidence suggests that both sorts of problems have important economic consequences. Singapore, South Korea, and Taiwan, for instance, have achieved economic growth under strong state regimes. Others, like North Korea or Iran, however, have suffered. At the same time, limited government regimes in North America and Western Europe preside over rich economies. Certain weak states in Africa, though, are among the poorest. Examination of the long-term effects of political changes on sovereign creditworthiness is a useful step to improve our understanding of the ways in which weak and strong state problems influence development.

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3 See chapter 1, particularly pages 5-9, and chapter 2. Also refer to Brewer (1989), 3-7, and Sacks (1994), 14-29.
4 For strong state problems in Asia, see Wade (1990). Also see Acemoglu (2005).
5 For weak state problems in Africa, see Herbst (2000). Also see Acemoglu (2005).
In this paper, I evaluate weak and strong state problems in Continental Europe over the 18\textsuperscript{th} and 19\textsuperscript{th} centuries. Prior to the French Revolution, many Continental states suffered from divided fiscal authority characteristic of weak states and absolute fiscal discretion characteristic of strong ones. Fiscal centralization occurred rapidly from 1789 to 1815, resolving the weak state problem. The strong state problem of fiscal autocracy remained for several decades, however, until limited government began to appear in the 1830s. Thus, most Continental political regimes evolved as follows: fragmented and absolutist, to centralized and absolutist, to centralized and limited.

To assess how sovereign credit risk varied with each political change, I construct a new panel dataset of 18\textsuperscript{th} and 19\textsuperscript{th} century government bond yields for 9 European states. Next, I specify and estimate several variations of an econometric model that regresses the yield data on political regimes, among other variables. My results indicate that resolution of the strong state problem through limited government rather than resolution of the weak state problem through fiscal centralization was what mattered to sovereign creditworthiness. I find that centralized and absolutist regimes were never associated with significantly lower yields relative to fragmented and absolutist ones, and in some cases were associated with higher yields. This suggests that fiscal centralization was not sufficient to reduce sovereign credit risk. Centralized and limited regimes were associated with significantly lower yields relative to fragmented and absolutist ones, however, suggesting that limited government improved creditworthiness. At the same time, my findings indicate that fiscal centralization may well have been a pre-condition to reduce sovereign credit risk, a point that we lose sight of by focusing exclusively on
English institutional history, which stood out among European sovereigns because of early centralization.

The rest of the paper proceeds as follows. In section 2, I develop a simple theoretical framework to explain the possible effects of political transformations on sovereign creditworthiness. In section 3, I identify fiscal centralization and the rise of limited government within European states, both of which may be dated with relative precision. I also perform a quantitative assessment of fiscal fragmentation over the 18th and 19th centuries. In section 4, I conduct empirical tests that relate sovereign creditworthiness to political regimes. First, I examine 18th and 19th century yield trends in government bonds in France and the Netherlands, the two countries for which I possess data that covers all three political regimes. After, I perform a systematic analysis that incorporates many other 18th and 19th century European states. In section 5, I consider the creditworthiness effects of two other factors: the Napoleonic Wars and financial innovations. Section 6 concludes.

2. Theoretical Underpinnings

In this section, I explore how political regimes affect sovereign creditworthiness as reflected in yield levels on government-issued debt. To do so, I build on the theory put forth first by Eaton and Gersovitz (1981) and later extended by Ghosh, Mookherjee, and Ray (2000) and Stasavage (2005).

In its reduced form, the ruler weighs the utility from debt repayment \( U_R \) against the utility from debt default \( U_D \) each and every period to determine whether he prefers to repay outstanding debts or default on them. The utility from repayment takes the form \( U_R = \left( r_i - d_i, p_i \right) = \left( r_i - d_i \right) \), where \( r_i \) is the capitalized revenue level that corresponds with...
political regime $i$, $d_i$ is the debt level that the ruler chooses for political regime $i$, and $p_i$ is the political penalty for default that corresponds with political regime $i$. The utility from default takes the form $U_D(r_i, d_i, p_i) = (r_i - p_i)$. Hence, the ruler wishes to repay loans rather than default on them so long as the penalty for default is greater than the outstanding debt, $p_i > d_i$. Investors are unaware of just how large is the penalty $p_i$ that the ruler that defaults will face. In turn, they do not know the exact debt level $d_i^*$ beyond which the ruler will default, or else they will not lend to the ruler at or past that point. The ruler’s decision is reflected in the yield level, which will be low if the ruler chooses repayment, indicating high creditworthiness, or high if the ruler chooses default, indicating low creditworthiness.

I now examine how $r_i$, $d_i$, and $p_i$ vary with political regimes. To do so, I consider two political transformations. The first is from fragmented ($F$) to centralized ($C$) fiscal systems. Associated with this transformation are two capitalized revenue levels, $r_F$ and $r_C$. Consistent with the weak state argument, I assume that fiscal centralization increases sovereign revenues by enlarging the state’s tax base: $r_C > r_F > 0$. The second institutional change is from absolutist government ($A$) to limited government ($L$). Associated with this transformation are two political penalty levels, $p_A$ and $p_L$. Consistent with the strong state argument, I assume that limited government increases the default penalty by implementing constitutional constraints: $p_L > p_A > 0$.

In combination, there are four possible political regimes, which table 1 illustrates: fragmented and absolutist ($FA$); fragmented and limited ($FL$); centralized and absolutist ($CA$); and centralized and limited ($CL$). All depend on the capitalized revenue level $r_F$ or $r_C$ and the political penalty level $p_A$ or $p_L$. European history provides an example of each
sort of political regime. Prior to the French Revolution (1789), there was a fragmented and absolutist regime \((FA)\) in France. The Dutch Republic (1584-1795) possessed a fragmented and limited regime \((FL)\). A centralized and absolutist regime \((CA)\) existed in the Netherlands from 1814 to 1848. I explore each these cases at length in section 4. Lastly, there was a centralized and limited regime \((CL)\) in England following the Glorious Revolution (1688).

The first political transformation that many 18\textsuperscript{th} and 19\textsuperscript{th} century Continental European states experienced was fiscal centralization (i.e., \(FA\) to \(CA\)), which increased sovereign tax revenues from \(r_F\) to \(r_C\). The creditworthiness effect of this reform depended on how the ruler’s chosen debt level \(d_i\) changed in response to it. If the debt level decreased or remained constant, \(d_{CA} \leq d_{FA}\), then the payoff to debt repayment \(U_R = (r_C - d_{CA})\) would rise. An increase in revenues would also increase the payoff to debt default, \(U_D = (r_C - p_A)\). As long as \((r_C - d_{CA}) > (r_C - p_A)\), however, the ruler would prefer repayment to default. In turn, the yield level under the centralized political regime would fall, indicating high creditworthiness. Indeed, this is the weak state argument, which claims that undivided fiscal authority improved sovereign creditworthiness by centralizing revenue collection, making debts more easily repayable.

The second possibility is that, after fiscal centralization, the ruler chose to increase the debt \(d_{CA}\) in a manner that more than offset the increase in tax revenues \(r_C\), such that \((d_{CA} - r_C) > (d_{FA} - r_F)\). Though investors remained uncertain of the debt level \(d_i^*\) beyond which the ruler would default, they were aware that the default ceiling had risen (i.e., \(d_{CA}^* > d_{FA}^*\)), enabling the ruler to borrow a greater amount under the centralized political regime \((CA)\) than under the previous one \((FA)\). In turn, the payoff to
debt repayment $U_R = (r_C - d_{CA})$ would decline, becoming negative. The increase in revenues accompanying fiscal centralization would still improve the payoff to debt default, $U_D = (r_C - p_A)$, however, making it more attractive than before. Thus, the ruler would prefer default to repayment so long as $(r_C - p_A) > (r_C - d_{CA})$, and the yield level associated with the centralized political regime would rise, indicating low creditworthiness. This illustrates the strong state argument, which claims that centralization aggravated the problem of fiscal abuse by an absolutist ruler, who was able to expand the debt without fear of political reprisal, since the default penalty $p_A$ remained low.

The second political transformation that many 18th and 19th century Continental European states experienced was the emergence of limited government (i.e., $CA$ to $CL$), which increased the default penalty from $p_A$ to $p_L$. Afterwards, parliament controlled the state’s purse strings, meaning that it would retaliate against any ruler that did not properly service its debts by denying the ruler access to future credit or by replacing him. If the ruler’s chosen debt levels decreased or remained constant, $d_{CL} \leq d_{CA}$, then the payoff to debt repayment $U_R = (r_C - d_{CL})$ would increase or remain unchanged, since tax revenues were as before. An increase in the default penalty, however, would decrease the payoff to debt default, $U_D = (r_C - p_L)$. Hence, the ruler would prefer repayment to default. In turn, the yield level associated with the limited government regime would fall, indicating high creditworthiness.

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6 Even when legal and coercive methods to insure that governments service outstanding debt obligations are weak, creditors may still penalize states that default. One option is to deny the sovereign access to future loans, which encourages the government to repay current debts. In this regard, sovereign loan contracts rely upon the government borrower’s self-interest. Bulow and Rogoff (1989), however, show that reputation is not always enough to support sovereign lending. Rather, they point to direct sanctions by international lenders as an effective way to encourage debt repayment. In addition, Eichengreen (1987) and Lindert and Morton (1989) find that past payment records have little bearing on a country's ability to borrow internationally. These works highlight the important roles that non-reputational mechanisms, including domestic institutions like limited government, play to reduce sovereign credit risk and promote debt repayment.
creditworthiness. Indeed, this result would hold so long as the increase in debt was less than the increase in the default penalty, \((d_{CL} - d_{CA}) < (p_L - p_A)\), reflecting the strong state argument which claims that constitutional constraints limited the ruler’s fiscal discretion. On the other hand, if debt increased past this threshold, such that \((d_{CL} - d_{CA}) > (p_L - p_A)\), then the ruler would prefer default to repayment, though he would be held accountable and denied future loans or removed from office. In this case, the yield level associated with the limited government regime would rise, indicating low creditworthiness.

3. Political Reforms on the Continent

In this section, I document two sorts of political transformations in 18th and 19th century Continental states: fiscal centralization and the rise of limited government. After, I examine yield levels over the different political regimes that they delineate to test which theoretical implications are borne out by the data.

3.1 Fiscal Centralization

I define fiscal centralization to have occurred when the state’s central government secured its revenues through a tax system with uniform rates throughout the country. Table 2 indicates that these reforms took place swiftly on the Continent from 1789 to 1815. Beforehand, Continental rulers had to bargain over tax amounts with local courts and provincial bodies. To win political cooperation from provincial elites, they often endorsed the particularistic tax privileges that, ironically, thwarted improvements in tax

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7 This definition does not imply that the central government gained a monopoly over taxation after fiscal centralization. Indeed, there may still have been competition between local and national tax (e.g., state and federal) agencies. In the United States, for example, fiscal centralization occurred with the Constitution of 1788, which gave Congress the power to ensure that individual states complied with national tax standards (beforehand, under the Articles of Confederation, Congress could only request funds from the states). States maintained the ability to levy taxes, however. See Edling (2003).
collection. In turn, divided fiscal authority reduced creditworthiness, since crowns did not have the means to repay debts, making default more likely.

In pre-centralization France, for example, the tax structure was very uneven. Whole towns and provinces avoided certain duties. Exemptions were also made for elites. By the middle of the 15th century, nobles in central and northern France became exempt from the taille, an important land tax. In the south, they only paid on non-noble holdings. As time went on, royal officers won comparable exemptions. Other privileged groups, like wealthy urban dwellers, often avoided sales taxes.8

In Spain, too, it was impossible for the various kingdoms united under the sovereign to agree upon a standard tax system. To increase revenues, the monarch had to impose new taxes with separate administrations, sub-contracted out at the provincial, district, or town level, only worsening the problem of divided fiscal authority.9 Indeed, 18th century per-capita taxes were actually lower in France and Spain, which were ruled by absolute monarchs, than in the Netherlands or Britain, where representative institutions held sway.10

I am able to make a quantitative assessment of the extent of fiscal fragmentation within 18th and 19th century Continental states. Prior to centralization, different regions within most countries had distinct fiscal and legal institutions, which translated into disparate tax rates. At the same time, crossing from one zone of parceled sovereignty into another often involved paying an internal tariff. I measure fiscal fragmentation in terms of internal customs borders because they are easier to determine than fiscal ones. By the

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same token, the elimination of domestic tariffs typically corresponded with fiscal centralization.

A brief overview of 18th and 19th century political geography suggests that we should divide up Continental Europe in the following manner. Territories to the west of the Rhine River – Belgium, France, the Netherlands, Portugal, and Spain – possessed stable borders. Thus, politico-economic fragmentation was due to internal divisions. East of the Rhine, however, in Germania and on the Italian peninsula, sovereign borders changed considerably over time. This meant that for these territories fragmentation was a result of both internal and external divisions.

My sample consists of 48 fiscal zones for England, France, Germania, the Italian peninsula, the Netherlands, Portugal, and Spain, each of which contained an independent set of fiscal and legal institutions. To determine fiscal zones, I used historical accounts to locate the major internal customs borders within each sample state. I then computed the area of each fiscal zone at different time intervals from 1700 to 1871 using the internal customs borders as guides.

3.1.a Fragmentation in 1750

One may suppose that absolutism and undivided fiscal authority went hand-in-hand. Continental political regimes were sharply fragmented in 1750, however. Table 3

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11 See fiscal zones appendix at www.bol.ucla.edu/~mdincecc/ for additional details.
12 I use the term “Germania” to denote the territory that would become Germany in 1871. Similarly, “Italian peninsula” denotes the territory that would become Italy in 1861. Indeed, both Germany and Italy were merely geographical expressions prior to unification (Toniolo 1990, 49, and Western Europe 2003, 359).
13 External divisions were solved by consolidation between 19th century German and Italian states, respectively. Internal divisions were also widespread. Within 18th century Piedmont, for example, the monarch ruled separately over the duchies of Savoy, Aosta, Saluzzo, Monferrat, the principalities of Oneglia and Piedmont, the county of Nice, and later the Kingdom of Sardinia. See Woolf (1979), 63-66.
14 1871 is the year in which Germany, the last major state in Western Europe, was established.
indicates that – notwithstanding England, which was centralized from medieval times – there was a divergence between the average size of fiscal zones and total sovereign area.\textsuperscript{15} In France, the size of the average fiscal zone comprised just 8 percent of total sovereign area.\textsuperscript{16} In both the Netherlands and Spain, it was only 50 percent of total sovereign area. Also note that the percentages for the Iberian states (i.e., Portugal and Spain) greatly understate the extent of fiscal fragmentation in 1750, since internal customs were unified centuries before fiscal centralization. I explore this point in greater detail in section 3.1.c. Hence, with the (i.e., misleading) exception of Spain, use of the median rather than average fiscal zone does not alter the results (see table 4). Indeed, for France the median fiscal zone comprised a smaller percentage of total sovereign area (i.e., 5 percent) than did the average one. Finally, Table 5 indicates the size of the largest fiscal zone as a fraction of sovereign area. Though the percentages rise from the average and median cases, serious fiscal divisions remain. In France, for example, the largest fiscal zone comprised just 38 percent of total sovereign area. Thus, we find significant fiscal fragmentation within Continental states in 1750.

Figure 1, which plots the cumulative distribution of the sizes of fiscal zones for sample regions and states in 1750, supports this result. If there were no internal fragmentation, then the regions line and the states line would coincide. The regions line lies well above the states line, however. In particular, 75 percent of fiscal regions, but only 52 percent of sample states, were less than 50,000 sq km. Similarly, 85 percent of fiscal regions, but just 60 percent of sample states, were less than 100,000 sq km. Lastly,


\textsuperscript{16} Since I am concerned with centralization internal to states themselves, I restrict my calculations of total sovereign areas to domestic Continental territories.
over 90 percent of fiscal zones, but only 65 percent of sample states, were less than 250,000 sq km. Hence, figure 1 indicates that in 1750 internal fragmentation had to be eliminated to create larger fiscal zones.

Indeed, table 6 suggests that in 1750 Continental fiscal zones were small. The average fiscal zone of 87,000 sq km was just two-fifths of its size in 1815 and two-sevenths of its size in 1871. One example is particularly striking: the average fiscal zone in France, at 44,000 sq km, was over 100,000 sq km less than that of England, the only territory at the time with undivided fiscal authority. This also indicates that internal fiscal fragmentation was quite severe in 1750. Had France been centralized, its fiscal zone would have been more than three and one-half times as large as in England.

Moreover, by limiting my analysis to major internal customs borders, I have seriously understated the true extent of divided fiscal authority on the Continent. In France, for example, the largest fiscal zone was the Five Great Farms, at 208,000 sq km. Within the Five Great Farms itself, however, there was a great deal of fiscal fragmentation.\(^\text{17}\) Instances such as this suggest that in 1750 fiscal fragmentation was much worse than the already-low statistics indicate.

\textbf{3.1.b Centralization During and After the French Revolution}

Divided fiscal authority plagued Continental rulers for centuries. Fiscal centralization occurred rapidly from 1789 to 1815 in a great many Continental states, though, as a result of French military conquest.\(^\text{18}\) In France itself, the elimination of internal customs and the introduction of a national taxation system took place during the

\(^{17}\) See section 3.1 for sources. Also refer to Henderson (1939), 21, Van Houtte (1977), 296, Woolf (1979), 63-66, and Mata and Valerio (1993), among others.

Revolutionary decade of the 1790s. In Belgium, fiscal and legal reforms began under French occupation in 1795, continuing under Dutch rule (1814-1830) and following independence.\(^{19}\) The French conquered the Dutch Republic in 1795, replacing its federalist-style fiscal and legal institutions with centralized ones.\(^{20}\) In Germania, Napoleon trimmed the number of states from over 300 to 38 by 1815. On the Italian peninsula, he reduced them by one-half, from 14 to 7. Along the way, fragmented tariff and taxation systems were unified within the now-larger states.\(^{21}\) Fiscal centralization occurred in Piedmont in 1802, Bavaria in 1804, Naples in 1806, and the Papal States in 1810. Indeed, the simple threat of takeover by France was often enough to instigate institutional change. Prussia, for instance, made quick fiscal and legal reforms after French defeat in battle in 1806.\(^{22}\)

On the Iberian Peninsula, however, Napoleon did little to implement political and economic changes.\(^{23}\) As mentioned, Portuguese and Spanish internal tariffs were unified long before fiscal centralization. Portugal was free of major internal custom borders by the 16\(^{th}\) century.\(^{24}\) In Spain, Bourbon king Philip V abolished internal customs between Castile, Aragon, Catalonia, and Valencia in 1714. Basque customs were eliminated in 1757, when Spain became a single free trade zone.\(^{25}\) The Iberian countries lagged far behind in the adoption of fiscal and legal reforms, though, which did not take hold until the 1830s and 1840s.\(^{26}\) In 19\(^{th}\) century Spain, for example, liberal reformers relied for

\(^{19}\) See, for instance, Godechot et al. (1971), 226-228.
\(^{22}\) Godechot et al. (1971), 122-123, 147-148.
\(^{23}\) See political regimes appendix at www.bol.ucla.edu/~mdincecc/ for additional details.
\(^{24}\) Mata and Valerio (1993).
\(^{26}\) See political regimes appendix at www.bol.ucla.edu/~mdincecc/ for additional details.
years on band-aid fixes such as deficits, expensive short-term loans, and non-payment of salaries rather than modernize the ancient, outmoded fiscal system.\textsuperscript{27} This means the results in tables 3 through 5 seriously understate the extent of fiscal fragmentation in Portugal and Spain, which was more prolonged than in other Continental states.

In most cases, the elimination of internal fiscal borders on the Continent began in the 1790s. As tables 3 through 5 indicate, by 1815 fiscal zones and total sovereign area coincided in France, the Netherlands, and Spain. Figure 1, which displays the cumulative distribution of the sizes of fiscal zones for sample regions and states in 1750 and 1815, shows that there was significant growth in the size of fiscal zones over this period. For example, only 44 percent of fiscal regions were less than 50,000 sq km in 1815, compared with 75 percent in 1750. Indeed, by 1815, the regions and states lines overlapped. Since the regions line moved greatly from 1750 to 1815, but the states line changed little, we may attribute growth in fiscal zones during this time to centralization within sample states rather than to increases in state size. Figure 2, which displays the cumulative distribution of the sizes of fiscal zones for sample regions and states in 1815 and 1871, indicates that fiscal zones continued to enlarge over the 19\textsuperscript{th} century. The regions and states lines moved in unison, however, meaning that growth in the size of fiscal zones during this period was a result of customs unions between states (i.e., the Zollverein agreements in 1834 and 1867 in Germania) or consolidation of multiple states (i.e., the unification of Italy in 1861), rather than centralization within states, most of which had already occurred by 1815. Lastly, table 6 shows that the average fiscal zone in

Europe nearly tripled in size from 1750 to 1815 to 219,000 sq km, indicating a dramatic increase.28

3.2 The Rise of Limited Government

Fiscal centralization strengthened the power of Continental monarchs, who no longer negotiated over taxation with different provincial bodies. In this regard, Continental rulers came to resemble the English Crown prior to limited government (i.e., pre-1688). With undivided fiscal authority, Continental sovereigns secured important new tax revenues, making it easier to fulfill debt obligations. At the same time, constitutional constraints did not limit rulers. Table 2 indicates that in general there was a gap of several decades between fiscal centralization and limited government, which I define to have emerged when parliament gained the constitutional right to control the national budget. Following this change, parliament could constrain the ruler’s spending, actively monitoring sovereign debts. To meet my criteria, parliament’s power had to hold for at least ten consecutive years.

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28 There is also strong evidence suggesting a positive relationship between centralization and market integration and efficiency. Shiue and Keller (2005) use co-integration techniques to measure market efficiency in the 18th and 19th centuries. In a sample that includes locations in Belgium, Britain, France, Germania, the Italian peninsula, and the Netherlands, they find that, with the exception of Britain, which developed efficient markets earlier on, European market efficiency improved dramatically and suddenly over the decades of rapid centralization during and after the French Revolution. Indeed, the authors spot large differences between British and Continental market efficiency through the late 18th century, which comes as no surprise when one considers that England was centralized well before Continental states. Post-centralization efficiency levels on the Continent came to resemble British ones by 1850, however. In addition, Jacks (2005), who uses measures of price convergence and synchronization, also finds dramatic improvements in intra-national European market integration during the first half of the 19th century. Britain, which experienced the lowest relative transaction costs and price variance at the start of the 1800s, was again precocious. Lastly, Persson (2000) measures market integration within Europe by the speed at which equilibrium prices were restored after exogenous shocks. He finds that price adjustments back to equilibrium doubled and tripled in speed during the 19th century as compared to the 18th century. All told, this evidence is consistent with the argument that centralization increased domestic market integration and efficiency.
Though the definition of limited government is transparent, dating is at times open to debate. In France, for example, one could argue that limited government first arose in 1815. In that year, the restored Bourbon regime that replaced Napoleon was established as a nominal constitutional monarchy. I did not select 1815, however, because the National Assembly’s constitutional rights were particularly shaky in the years that followed. Indeed, the French Crown often abused its powers during the 1820s. Instead, I chose 1830. The revolution that occurred in that year demonstrated that in order to endure the Crown required the support of the National Assembly. Nearly two decades of relative political stability followed. Nonetheless, if the Bourbon monarchy did in fact achieve limited government, then I have misclassified French political regimes. This misclassification artificially lowers the mean yield level associated with fiscal centralization, however, by incorporating yields from 1815 to 1830 into the fiscally centralized and absolutist regime rather than the limited one, which biases against the hypothesis that fiscal centralization did not improve sovereign creditworthiness. If I continue to find that this hypothesis holds true, then my results will be more robust than otherwise. One could also claim that limited government did not emerge in France until 1870, since Napoleon III mounted a coup d’etat in 1851, establishing an authoritarian regime. This misclassification biases against the hypothesis that limited government improved sovereign creditworthiness, though, for it artificially increases the mean yield level under the limited regime. In turn, my results become stronger if I still find that limited government was associated with significantly lower yields.

29 See section 4.1 for additional historical details and relevant citations.
30 See section 4.1 for additional historical details and relevant citations.
31 This ambiguity also comes to light when comparing Bavarian, French, and Prussian yield series, which display similar trends from 1815 onwards, though I have dated limited government to 1818 in Bavaria,
Limited government first arose on the Continent in Bavaria, which implemented a liberal constitution until 1818. In France, it emerged in 1830. Limited government was established in Belgium in 1831, shortly after declaring independence from the Netherlands. Amid the revolutionary fervor that swept the Continent, it arose in Piedmont, Prussia, and the Netherlands in 1848. An attempt to enact limited government in Naples in that year failed, however. Indeed, Naples remained absolutist until its incorporation into the Kingdom of Italy (i.e., a constitutional monarchy) in 1861. In Portugal, a stable limited government was not established until 1851, thirty-one years after its era of liberal revolutions began. Similarly, in Spain, it did not emerge until 1876, following decades of failed constitutional initiatives.\textsuperscript{32}

4. Political Regimes and Sovereign Creditworthiness

In this section, I examine how political regimes affected sovereign creditworthiness. To do so, I use yields on long-term government bonds, which provide a succinct, direct measure of creditworthiness.\textsuperscript{33} First, I see how creditworthiness varied over political regimes within France and the Netherlands, the two countries for which I

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\item 1830 in France, and 1848 in Prussia. Certainly, factors besides political regime also influenced yield patterns. During the first half of the 19\textsuperscript{th} century, the National Assembly in France enjoyed greater constitutional rights than its counterpart in Prussia, though the political environment in Prussia was more stable. Yield trends in France and Prussia reflect such institutional characteristics well. So that Prussia was able to borrow more easily, however, Rothschild lenders urged King Frederick William II of Prussia to implement constitutional (i.e., limited) reforms (Ferguson 1998, 123-124). At the same time, one could argue that limited government did not emerge in Bavaria, France, and Prussia until the 1870s (for Germany, in fact, we may say that limited government did not exist until after World War II). In this scenario, the correct test would be to categorize pre-1870 yield data in centralized and absolutist regimes and post-1870 data in centralized, limited ones, requiring longer yield series than I have at present.
\item During the 19\textsuperscript{th} century, limited government on the Continent was less resilient to political upheaval than in England. In my definition, I ensure that a minimum standard for stable limited government is met by requiring that parliament’s constitutional veto power held for at least ten consecutive years. Any stronger criterion is impractical, however. I would have to discard most of the Continental data through World War II, for instance, if I required limited government to have been a “permanent” reform.
\item There is a large literature that uses historical data on government bond yields to evaluate the impact of changes in political institutions on the state’s fiscal performance. See, among others, Frey and Kucher (2000), Epstein (2000), Sussman and Yafeh (2000), Wells and Willis (2000), Quinn (2001), Stasavage (2005), and Summerhill (2005).
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have the longest time series of government bond yields. I offer the fragmented and absolutist political regime in 18th century France as an example of the weak state problem of divided fiscal authority. Similarly, I use the centralized and absolutist political regime in the Netherlands (1814-1848) as an example of the strong state problem that arises with absolute fiscal discretion. I then subject the French and Dutch data, along with yield series for a variety of other 19th century European states, to econometric analysis. The results of these empirical tests indicate the following. Fiscal centralization did not produce a marked decline in yields, suggesting that resolution of the weak state problem through undivided fiscal authority was not enough to reduce sovereign credit risk. Fiscal centralization may well have been a pre-condition to improve sovereign creditworthiness, though. On the other hand, limited government was associated with significantly lower yields, suggesting that resolution of the strong state problem through constitutional constraints was what really mattered to reduce sovereign credit risk.

4.1 Divided Fiscal Authority: Pre-Revolutionary France

Sargent and Velde (1995), among others, demonstrate how France was plagued by repeated fiscal crises prior to centralization, which did not occur until 1799. Indeed, there were at least three episodes of government default during the 18th century: 1713, 1759, and 1770. An important reason for the sovereign’s failure to fulfill debt obligations was the weak state problem of divided fiscal authority. As discussed in section 3.1, antiquated and inefficient local tax systems diminished the Crown’s tax base and impeded its ability to raise revenues, making it less likely to fulfill outstanding debts. Figure 3, which plots average annual yields on long-term government bonds in France from 1746 to 1870, indicates that prior to fiscal centralization, French yields were high
(i.e., around 4 to 10 percent), reflecting the Crown’s poor creditworthiness. They were also volatile, suggesting that the monarch had trouble securing enough revenue to reliably service its debts.

The French Revolution established a national tax system. Yields remained high and volatile through the end of the Napoleonic era in 1815, however, suggesting that resolution of the weak state problem of divided fiscal authority was not sufficient to establish sovereign creditworthiness (I consider the effect of the Napoleonic Wars on yields in section 6). Indeed, the drop in yields after 1815 corresponds with the restoration of the Bourbon monarchy, which was nominally limited. Political tension between royal and liberal forces went unresolved over the next several years, however. Power abuse by King Charles X, who acceded in 1824, led to revolution in 1830, when the Duke of Orleans (known as “Louis Phillippe”) agreed to abide by the principles of constitutional monarchy. Thus, I date limited government to 1830. For roughly twenty years thereafter, yields remained stable at just under 4 percent. In 1851, however, Napoleon III overthrew the liberal government, dissolving the National Assembly and establishing an authoritarian regime, which lasted through 1870. Note that yields jumped by roughly 1 percent over the 1850s and 1860s, corresponding with Napoleon III’s rule, which indicates a reduction in creditworthiness associated with this reversion to autocracy.

Table 7, which displays mean yields over the three French political regimes, supports the claim that fiscal centralization did not reduce sovereign credit risk and that limited government did so. Indeed, as table 8 shows, mean yields increased by 0.64 percent with fiscal centralization, suggesting that this political reform actually harmed

creditworthiness, but decreased by 2.60 percent with limited government. Table 8 also indicates that the difference-in-means calculation between the centralized and absolutist regime and the limited one is significant at the five percent level.

Moreover, figure 3 indicates a noticeable difference between French and British yield series. This is of particular importance because in England both fiscal centralization and limited government had occurred by 1688. Like French yields, British ones were also more volatile from the 1750s to the 1820s. What really matters, however, are variations in relative yield levels, which correspond with institutional differences between the two countries. Indeed, pre-limited government French yields were conspicuously higher and fluctuated more dramatically in comparison with British ones. Yield disparities between France and Britain became much less severe after France adopted limited government, however, implying that this political reform reduced French sovereign credit risk.

Table 7 indicates that British mean yields changed little over French political regimes. Yield variances were also a great deal more stable in Britain, particularly in comparison with French variances prior to limited government. In table 8, I compute difference-in-differences calculations that measure the change in mean French yields between political regimes after accounting for trends in (i.e., benchmark) British mean yields over the same time frames, providing an alternative test to the difference-in-means analysis. The previous result remains: limited government significantly improved sovereign creditworthiness in France.

4.2 Fiscal Abuse by an Autocrat: The Kingdom of the Netherlands, 1814-1848

Fiscal centralization in the Netherlands occurred under French occupation in 1806. At the end of the Napoleonic era, the Kingdom of the United Netherlands emerged,
investing King Willem I (and later, King Willem II) with hereditary absolutist powers.\textsuperscript{37} Figure 4 indicates that following centralization Dutch public debt grew from around 150 to 250 percent of national income.\textsuperscript{38} This evidence is consistent with the strong state argument that sovereign creditworthiness fell after fiscal centralization because of fiscal abuse. Willem I was able to include nearly all controversial items in his ten-year budgets of 1819 and 1829, investing heavily in the military and infrastructure, for instance. Indeed, though fiscal centralization nearly doubled the size of the Dutch tax base, and Europe remained politically stable, Willem I found it increasingly difficult to balance the national budget. As mentioned, Dutch public debt soared from 1815 to 1840. With limited government in 1848, however, public debt soon dropped to under 100 percent of national income (see figure 4). This is consistent with the strong state argument that limited government improved sovereign creditworthiness by enacting constitutional constraints. Most importantly, the Dutch Crown had to submit annual budgets to Parliament for approval.\textsuperscript{39}

Figure 5, which plots average annual yields on long-term government bonds in the Netherlands from 1780 to 1870, indicates that – as in France – fiscal centralization did not improve sovereign credit risk and that limited government did so. Table 9, which displays mean yields over the three Dutch political regimes, supports this claim. In particular, mean yields increased by 1.33 percent with fiscal centralization but decreased by 1.31 percent with limited government. Table 10 indicates that both difference-in-

\textsuperscript{38} Rulers in pre-limited government states had great discretion over how and on what to spend government revenues. Yet parliaments exercised control over taxation. This explains why the Dutch Crown expanded the public debt, rather than raised taxes, to cover spending increases. See, for instance, Hoffman and Norberg (1994) and Hoffman and Rosenthal (1997).
\textsuperscript{39} Van Zanden and Van Riel (2004), 99, 105, 107.
means calculations between Dutch political regimes are significant at the five percent level.

Figure 5 also displays a visible difference between Dutch and British yield series. Though both Dutch and British yields were more volatile through the 1820s, pre-limited government yields in the Netherlands were higher and fluctuated more in comparison with British ones. As in France, yield disparities between the Netherlands and Britain became less severe after the Netherlands adopted limited government in 1848. Indeed, table 10 indicates that the difference-in-differences calculations that incorporate British benchmark yields are also significant at the five percent level, reinforcing the results of the difference-in-means analysis.

The Dutch case becomes all the more important after considering that the Netherlands was the only sample state to experience limited government prior to fiscal centralization. Recall from section 2 that the Dutch Republic (1584-1795) corresponds with the fragmented and limited political regime.40 Another look at figure 5 indicates that yields associated with the limited government regime in the Dutch Republic remained remarkably low through the start of the 1780s. This suggests that the (i.e., statistically significant) increase in Dutch mean yields of 1.33 percent shown in table 10 between the fragmented and limited regime and the centralized and absolutist one was a result of the loss of limited government at the end of the 18th century rather than fiscal centralization at the beginning of the 19th century.41 Thus, we find that limited government was not only

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41 Also see Veenendaal (1994). As table 9 indicates, the Dutch mean yield during political regime 1 (1780-1805) closely resembled the British mean yield over the same period, further indicating that limited government in the Dutch Republic reduced yield levels.
associated with low sovereign credit risk when it arose for the second time in 1848 but also when it first appeared in the Dutch Republic in previous centuries.

At the same time, the unique nature of Dutch financial history also highlights a positive role that fiscal centralization appears to have played to improve sovereign fiscal performance in terms of the number of government defaults. As noted, yields associated with the limited government regime in the Dutch Republic stayed low through the 1780s. Yet Van Zanden and Van Riel (2004), among others, have argued that over the long run divided fiscal authority seriously undermined the Republic’s ability to honor its debts, ultimately ruining its credit reputation. Indeed, the Republic possessed a highly decentralized institutional structure. Each of the seven provinces had its own systems of administration, taxation, and representation. In turn, the ruler of the Dutch Republic (i.e., statholder) was weak.\textsuperscript{42} Figure 5 reveals that yields increased rapidly towards the end of the 18\textsuperscript{th} century as Dutch fiscal troubles came to a head. The two-thirds default of 1810 was the last after-shock of the divided political regime.

Thus, the evidence suggests that the important difference between limited government in the Dutch Republic and limited government in the Netherlands post-1848 is that the latter regime possessed undivided fiscal authority, which enabled the central government to raise enough in tax revenues to fulfill its loan obligations. This means that fiscal centralization, while not sufficient, may have been a necessary condition to reduce sovereign credit risk. At the same time, the Dutch case suggests that over the long term

\textsuperscript{42} Van Zanden and Van Riel (2004), 32-34, 49-50.
limited government itself was not sufficient, either. Only after fiscal centralization were the creditworthiness gains wrought by limited government sustainable.\textsuperscript{43}

4.3 Regression Analysis

The French and Dutch cases offer examples of weak and strong state problems. They also suggest that fiscal centralization and limited government had important repercussions for sovereign creditworthiness. I now incorporate yield data on government bonds traded on London and Paris exchanges for 9 European states to systematically assess how creditworthiness varied with political transformations.

4.3.a Data

I draw on 18\textsuperscript{th} and 19\textsuperscript{th} century Bavarian, Belgian, British, Dutch, French, and Prussian nominal government bond yield series derived from secondary sources. I also call upon new 19\textsuperscript{th} century Italian (i.e., Naples, the Papal States, and Piedmont) nominal government bond yield series that I have collected from the \textit{Moniteur Universel}.\textsuperscript{44} Table 11 provides a summary of the states and years that the yield data covers. In all cases, I have chosen the longest running consecutive yield series available through 1870.\textsuperscript{45} I

\textsuperscript{43} To speculate, limited government may have been sufficient to signal low sovereign credit risk during peacetime, which helps explain why Dutch yields were low for much of the 18\textsuperscript{th} century. In the 1790s, the threat of French attack became serious. By this time, however, the fiscal chaos created by divided fiscal authority was compounded to the point that the central government could not raise enough in funds to support a proper defense against the French military. This suggests that, during wartime, the ability to efficiently collect tax revenues through a centralized fiscal system becomes all the more important.

\textsuperscript{44} 19\textsuperscript{th} century political transformations like fiscal centralization and the rise of limited government are more difficult to date with precision in Portugal and Spain. As discussed, Napoleon did little to implement fiscal and legal reforms on the Iberian Peninsula. Similarly, by 1870 limited government was not consolidated in Portugal and Spain to the same degree as it was in other Continental states. Thus, I have not included Portugal and Spain in my panel, though I have collected data for them from the \textit{Moniteur Universel} and the \textit{Economist}. Note that if I do run the regressions in sections 4.3.c and 4.3.d after incorporating the Portuguese and Spanish data, then the result that limited government was associated with a significant reduction in sovereign credit risk only becomes stronger.

\textsuperscript{45} See yield data appendix at www.bol.ucla.edu/~mdincecc/ for all sources.
constructed the panel dataset by conjoining all of the yield data for each state and categorizing it by political regime, among other variables.46

4.3.b Specification

Ideally, one would like to randomly assign different political regimes to each sample state and then compare mean yields across them to discover how sovereign creditworthiness varied from one to the other. This random designation, however, is not feasible. If we observe the Netherlands in 1820 as a centralized and absolutist regime, for instance, then we cannot observe it under the same circumstances as a centralized and limited one. To measure creditworthiness, though, I am able to exploit the sequence by which European states moved through political regimes, using between-state differences in the timing of political transformations to control for changes in capital markets and other financial conditions.

In particular, I estimate various specifications of the following OLS regression model:

$$Y_{it} = \beta_1 + \beta_2 \text{REGIME}_{CAit} + \beta_3 \text{REGIME}_{FLit} + \beta_4 \text{REGIME}_{CLit} + \beta_5 \text{PERIOD}_t + \beta_6 \text{STATE}_i + \epsilon_{it}$$

Here $Y_{it}$ is the government bond yield for sample state $i$ at time $t$, $\text{REGIME}_{CAit}$ is a dummy variable for centralized and absolutist regimes, $\text{REGIME}_{FLit}$ is a dummy variable for the fragmented and limited one, and $\text{REGIME}_{CLit}$ is a dummy variable for centralized and limited ones. The $\text{PERIOD}_t$ dummies, which run every five years from 1750 to 1870, capture the yield effects of common European military, political, and

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46 The result of Im, Pesaran, and Shin’s test (2003) for (i.e., heterogeneous) yield panels indicates that there is no unit root problem in the data set.
technological events. The STATE$_i$ dummies capture characteristics particular to each state.$^{47}$

This approach would be problematic if political reforms were endogenous with respect to government bond yields. Institutional transformations, though, were typically exogenous. Fiscal centralization was largely an involuntary consequence of French invasion (i.e., outside of France, at least). Similarly, limited government generally occurred as result of popular demands for individual political and economic rights.$^{48}$

At the same time, transition costs between political regimes may have caused yields to surge, generating higher means. Fiscal centralization, which took place during the Napoleonic Wars, was particularly tumultuous, with French armies providing either the muscle for change (e.g., as in the Netherlands) or the military threat that prompted change (e.g., as in Prussia). Consequently, lenders may have worried whether centralization would persist over time. Moreover, many countries were in dire financial straits when Napoleon finally lost power in 1815. Both France and the Netherlands, for instance, had reneged on a large part of their debt, leaving them with poor credit reputations. As a result, it is possible that it took many years for lenders to determine the true creditworthiness of centralized but absolutist political regimes, suggesting that mean yields associated with them represent an upper rather than lower bound. I address this

$^{47}$ Though it would appear desirable to incorporate 18$^{\text{th}}$ and 19$^{\text{th}}$ century revenue, expenditure, and debt figures into the econometric specification, systematic data of this sort does not exist. Even with the relevant data, however, estimation of this model would be impossible, because such variables are endogenous with respect to government bond yields.

$^{48}$ If endogenous, limited government transformations took place to improve the sovereign’s poor credit reputation, meaning that just following limited government I would capture a series of high yields that actually corresponded with the previous (i.e., fiscally centralized but absolutist) regime. In turn, yields associated with limited government would be higher than their true values, making my results more robust if I find that limited government still reduced them.
issue in detail in section 6. Lastly, transition costs associated with limited government appeared only as short-lived spikes and are, therefore, less cause for concern.

4.3.c Regression Results

Various specifications of the OLS model clearly show that fiscal centralization did not reduce sovereign credit risk but that limited government did so (see table 12). The first specification regresses yield $Y_{it}$ on the $\text{REGIME}_{CA_{it}}$, $\text{REGIME}_{FL_{it}}$, and $\text{REGIME}_{CL_{it}}$ dummies, revealing that fiscally centralized and absolutist regimes (i.e., $\text{REGIME}_{CA_{it}}$) were associated with a slight decrease in yields relative to fragmented and absolutist ones and that limited government regimes (i.e., $\text{REGIME}_{FL_{it}}$ and $\text{REGIME}_{CL_{it}}$) were associated with approximately a 2 percent relative yield decrease. The $\text{REGIME}_{FL_{it}}$ and $\text{REGIME}_{CL_{it}}$ coefficients are significant at the one percent level.

Specification (2) adds in the $\text{STATE}_{i}$ dummies. Fiscally centralized and absolutist regimes (i.e., $\text{REGIME}_{CA_{it}}$) remain insignificant, though they are now associated with a small increase in yields relative to fragmented and absolutist ones. Limited regimes (i.e., $\text{REGIME}_{FL_{it}}$ and $\text{REGIME}_{CL_{it}}$) remain significant at the one percent level and are associated with 1.297 percent and 1.71 percent decreases in yields relative to fragmented and absolutist ones, respectively. $\text{STATE}_{i}$ dummies for Belgium, France, Piedmont, and Prussia are associated with significantly higher yields than British benchmark ones. This suggests that Britain’s stable, enduring form of limited government generated an additional creditworthiness benefit, in contrast to the less resilient Continental varieties.

Specification (3) adds in the $\text{PERIOD}_{t}$ dummies. None of the previous results change in terms of sign or significance from the previous specification. Most importantly,
limited regimes (i.e., \textsc{regime}_{FL_{it}} and \textsc{regime}_{CL_{it}}) continue to be associated with more than a 1.5 percent decrease in yields relative to fragmented and absolutist ones. The \textsc{period}_{t} dummies for 1805 and 1810, coming at the height of the Napoleonic era, and for 1845, during the time of Continent-wide revolutionary tensions, are also significant at the one or five percent levels. I discuss the importance of the Napoleonic \textsc{period}_{t} dummies in section 6.49.

Two caveats deserve mention here. First, recall that the strong state argument implies that centralization aggravated the problem of fiscal abuse by the ruler, who expanded the debt in a manner that more than offset the increase in tax revenues, causing sovereign creditworthiness to fall. The regression results do not indicate that fiscal centralization was in fact associated with a significant increase in yield levels, however, suggesting that this element of the strong state argument falls short. Indeed, whether 49 These findings are robust to several other specifications. The sign and significance of the \textsc{regime}_{it} variables do not change from specification (3) when I replace the dependent variable \textit{yield}_{it} with a variable that measures the annual difference between Continental yields and British ones or when I include a time trend (i.e., \textit{year} and \textit{year}^2) rather than \textsc{period}_{t} dummies. The specification (3) results remain as well when I incorporate \textit{year}, dummies for each year from 1750 to 1870 rather than for every five years, though \textsc{regime}_{CA_{it}} is now associated with an insignificant decrease (i.e., rather than increase) in yields. In addition, the improvement in sovereign creditworthiness that we observe following limited government may have been caused by defaults that raised mean yields in pre-limited government regimes. The sign and significance of the \textsc{regime}_{it} variables do not change after periods of French and Dutch defaults are omitted, however, indicating that high mean yields prior to limited government were not just a result of periods of default (in France, the omitted default years are: 1759-1753 and 1770-1774; in the Netherlands, 1810; note that I do not have Dutch yield data for 1811-1813). Since the yield data is in nominal rather than real terms, I have also estimated a model that controls for inflation (see yield data appendix at www.bol.ucla.edu/~mdincecc/ for a detailed explanation of this procedure). To avoid over-weighting observations under limited government, I test a 25-year window for \textsc{regime}_{CL_{it}} as well, rather than letting it run until 1870 (this means that Bavarian yield data runs from 1815-1842, Belgian yield data from 1831-1854, and French yield data from 1746-1854). A window of this length continues to provide a time frame long enough to assess investor reactions to limited government, while distributing observations more equally across political regimes. To avoid over-weighting \textsc{regime}_{FA_{it}} relative to the others, I have also used a 25-year window for France, truncating the yield data to begin in 1775 rather than 1746. Within this framework I have let the French yield data run through 1870 and have tried a 25-year window for \textsc{regime}_{CL_{it}}. Regardless of these variations, the \textsc{regime}_{CL_{it}} coefficient does not change in sign or significance from specification (3), indicating again that limited government mattered to sovereign creditworthiness.
fiscal centralization actually harmed sovereign creditworthiness remains an open question.

Second, recall from the discussion of Dutch political regimes that fiscal centralization may have been a necessary condition (though not sufficient) to improve sovereign creditworthiness. The regression results do not contradict this claim. Fiscal centralization becomes implicit in the $\text{REGIME}_CL_{it}$ coefficient that measures the creditworthiness effect of limited government, since it preceded limited government in time. In such cases, it is impossible to disentangle the “pure” creditworthiness effect of limited government from the “bundled” creditworthiness effect of centralized and limited political regimes. Hence, we ought to interpret the reduction in sovereign credit risk associated with centralized and limited regimes relative to fragmented and absolutist ones as a result of both fiscal centralization and limited government, rather than just limited government.\(^{50}\)

### 4.3.d Alternate Specification

I also estimate the following alternate OLS model:

$$Y_{it} = \beta_1 + \beta_2 \text{CENTRALIZED}_{it} + \beta_3 \text{LIMITED}_{it} + \beta_4 \text{PERIOD}_t + \beta_5 \text{STATE}_i + \varepsilon_{it}$$

In this specification, I break political regimes up into their two separate components. CENTRALIZED\(_{it}\) is a dummy variable that measures whether a political regime is fragmented or centralized. LIMITED\(_{it}\) is a dummy variable that measures whether a political regime is absolutist or limited. The other variables remain as defined in section 4.3.b.

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\(^{50}\) As mentioned in section 4.2, the Dutch Republic (1584-1795) was unique in that it was fragmented and limited. Thus, it sheds light on the “pure” creditworthiness effect of limited government, which the $\text{REGIME}_FL_{it}$ coefficient in table 12 indicates was positive.
Be aware that this specification assumes that fiscal centralization and limited
government had independent creditworthiness effects. As discussed in section 4.3.c,
however, it is impossible to truly disentangle the creditworthiness effects of the two
political reforms due to the particular sequence in which they occurred. In any case, the
regression results shown in table 13 resemble those of the previous model. Fiscal
centralization (i.e., CENTRALIZED) did not significantly improve sovereign credit risk
relative to fragmentation. Limited government (i.e., LIMITED), however, was
associated with a 1.44 percent decrease in yields relative to autocracy.\textsuperscript{51}

5. Napoleonic Wars and Financial Innovations

War engulfed Europe from the early 1790s until Napoleon’s final downfall at
Waterloo in 1815.\textsuperscript{52} Fiscal centralization, however, also proceeded throughout many
Continental states over the same period.\textsuperscript{53} To what extent did warfare affect yields
following this political reform? In specification (3) of table 12 I have incorporated
PERIOD\textsubscript{t} dummies every five years to capture yield variations caused by common
European military events. If the REGIME\_CA\textsubscript{it} coefficient mistakenly picked up high
yields associated with war, then we would expect it to fall in value once period fixed
effects were included. Though I do find that 1805 and 1810 were associated with 2 to 3
percent yield increases, the REGIME\_CA\textsubscript{it} variable continues to be associated with a
small increase rather than decrease in yields. This result supports the notion that, even

\textsuperscript{51} With the exception of the case of the Dutch Republic, the creditworthiness effect of fiscal centralization
is implicit in the LIMITED\textsubscript{i} coefficient, since fiscal centralization occurred prior to limited government.
This means that the LIMITED\textsubscript{i} coefficient resembles the REGIME\_CL\textsubscript{it} coefficient in that it really captures
the creditworthiness effect of political regimes that were both centralized and limited. In turn, these results
reinforce those of the previous model indicating that centralized and limited political regimes were
associated with a significant reduction in sovereign credit risk relative to fragmented and absolutist ones.
\textsuperscript{52} Winks and Kaiser (2004), 155-181.
\textsuperscript{53} As table 11 indicates, France, the Netherlands, and Britain are the only countries for which I possess
yield data that covers the Napoleonic era, however.
after accounting for warfare, resolution of the weak state problem through fiscal centralization was not enough to improve sovereign creditworthiness.

I also take a closer look at French yields from 1800 to 1815, since fiscal centralization in France overlapped with the turbulent Napoleonic era. Indeed, France and Britain fought almost non-stop from 1793 to 1815, suggesting that, ceteris paribus, we ought to observe higher, more volatile French and British yields as a result of war-induced investor uncertainty. I find, however, that British yields were a great deal lower and more stable than French yields during this period, which is significant because Britain possessed limited government at the time. In particular, the French mean from 1800 to 1815 was 7.58, compared with 4.79 for Britain, and the French standard deviation was 1.51, compared with 0.28 for Britain, implying that warfare by itself cannot fully explain high French yields after fiscal centralization, since the British were also in battle over the same years. Institutional differences between the two countries such as limited government mattered as well.

Besides warfare, we must also consider the effect of technological progress in financial systems, which undoubtedly improved in efficiency over the 18th and 19th centuries. Epstein (2000) argues that sophisticated financial techniques enabled states to honor debts and attract lenders with greater ease, finding that by 1750 yields between limited government and absolutist countries had for the most part converged. If yields reflected differences in political institutions, however, then disparities should have

54 As table 11 indicates, French data is unavailable for 1794-1800.
56 Fiscal centralization occurred in the Netherlands in 1806, meaning that there are only 7 Dutch observations through 1815 (data is unavailable from 1811 to 1813). Thus, closer analysis of the Dutch case is difficult.
endured. In addition to warfare, the PERIOD, dummies that I have incorporated into specification (3) capture yield variations caused by financial innovations common to the London and Paris exchanges where government bonds where traded. The REGIME$CL_{it}$ coefficient remains significant at the one percent level, however, indicating that improvements in creditworthiness were not just a result of technological progress in fiscal systems.

Moreover, if financial innovations on the London and Paris exchanges fully explained yield variations, then we should observe downward trends in 18th and 19th century yields across all European states regardless of constitutional structure. Rather than simple decline, though, the empirical results reveal that mean yields stayed high or rose with fiscal centralization and fell with limited government. The French and Dutch figures (i.e., 3 and 5) illustrate these trends. Indeed, if financial sophistication alone determined sovereign creditworthiness, then we cannot account for the long-standing British yield premium relative to France and the Netherlands, which only diminished with the emergence of limited government in those two countries. Thus, financial innovations by themselves cannot explain 18th and 19th century yield trends. Contrary to Epstein’s (2000) claim, other factors, including limited government, also influenced sovereign credit risk.

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58 See pages 25-29, in particular, for a description of financial innovations in early modern Europe. Epstein explains that English yields decreased after 1700 because of the adoption of sophisticated Continental financial techniques, rather than constitutional change. In particular, England added a modern financial system, including consolidation of its public debt.

59 Recall as well from section 4.2 that yield levels associated with the limited government regime in the Dutch Republic (1584-1795) were actually lower than British ones through 1790, providing further proof that political institutions like limited government mattered to sovereign creditworthiness.
6. Conclusion

In this paper, I examine how strong state and weak state problems played themselves out in terms of Continental European fiscal development in the 18th and 19th centuries. Strong state problems arise when there is no political body to offset the ruler’s fiscal authority. Lack of credible commitment to financial property rights, including sovereign debt obligations, diminishes investment incentives and stifles growth. Weak state problems, on the other hand, occur if the state cannot establish uniform fiscal policies. Lack of fiscal centralization makes it difficult to raise taxes and repay debts, reducing sovereign creditworthiness and creating fiscal instability that hinders investment and growth.

My results indicate that political reforms mattered to sovereign creditworthiness. Prior to the French Revolution, Continental states faced two important institutional obstacles – fiscal fragmentation characteristic of weak states and absolute fiscal discretion characteristic of strong ones. Though fiscal centralization from 1789 to 1815 resolved the weak state problem of divided fiscal authority, it was insufficient to reduce sovereign credit risk. Beginning in the 1830s, limited government addressed the strong state problem of fiscal autocracy. In turn, sovereign credit risk improved significantly. These findings indicate that resolution of the strong state problem through limited government rather than resolution of the weak state problem through fiscal centralization was what mattered to sovereign creditworthiness, which suggests a non-trivial link between limited government institutions and financial property rights to public debt. At the same time, the evidence indicates that fiscal centralization was likely a pre-condition to reduce sovereign credit risk.
Indeed, historical analysis of strong and weak state problems in 18th and 19th century Europe reveals a general pattern of fiscal development which implies that weak state problems should be solved before strong state ones. By increasing the ruler’s discretionary powers, fiscal centralization in the absence of checks and balances leads to the other extreme. Generally speaking, limited government becomes relevant at this institutional juncture rather than before. In fact, in a fragmented fiscal environment the ruler is already constrained by local tax structures, albeit in a distortionary manner. Within a fiscally centralized state, however, limited government affords the ruler an opportunity to credibly commit to financial property rights. We lose sight of this point when studying English institutional history, which stood out among European sovereigns because of early centralization. Indeed, one may argue that England had a head start on economic development because it managed to avoid the weak state problem. With these historical lessons in mind, contemporary developing nations interested in reducing sovereign credit risk ought to look to strike an institutional balance that yields the state just enough authority to pursue uniform fiscal policies while at the same time constraining the fiscal powers of any single political player.
References


### Table 1. Four Possible Political Regimes

<table>
<thead>
<tr>
<th>Fragmented (F)</th>
<th>Absolutist (A)</th>
<th>Limited (L)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>FA (e.g., pre-1789 France)</td>
<td>FL (e.g., pre-1795 Dutch Republic)</td>
</tr>
<tr>
<td>Centralized (C)</td>
<td>CA (e.g., Netherlands, 1814-1848)</td>
<td>CL (e.g., post-1688 Britain)</td>
</tr>
</tbody>
</table>

*F* refers to a fragmented fiscal system and *C* to a centralized fiscal system. *A* refers to absolutist government and *L* to limited government. In pre-1789 France, for example, the political regime *FA* was fragmented and absolutist. See table 2 for definitions of fiscal centralization and limited government.

### Table 2. Timeline of Political Transformations for European Sovereigns

<table>
<thead>
<tr>
<th>Fiscal Centralization</th>
<th>Limited Government</th>
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<tbody>
<tr>
<td><em>(FA → CA)</em></td>
<td><em>(CA → CL)</em></td>
</tr>
<tr>
<td>Britain 1066</td>
<td>1688</td>
</tr>
<tr>
<td>Belgium 1800</td>
<td>1831</td>
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<tr>
<td>France 1799</td>
<td>1830</td>
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<tr>
<td>Piedmont 1802</td>
<td>1848</td>
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<td>Bavaria 1804</td>
<td>1818</td>
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<td>Naples 1806</td>
<td>1861</td>
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<td>1848</td>
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<tr>
<td>Prussia 1806</td>
<td>1848</td>
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<td>Papal States 1810</td>
<td>1870</td>
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<tr>
<td>Portugal 1832</td>
<td>1851</td>
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<tr>
<td>Spain 1844</td>
<td>1876</td>
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</tbody>
</table>

Within 18th and 19th century Continental European states, I document the following sequence of political regimes: (1) fragmented and absolutist (*FA*); (2) centralized and absolutist (*CA*); and (3) centralized and limited (*CL*). I define fiscal centralization to have occurred when the state’s central government secured its revenues through a tax system with uniform rates throughout the country. I define limited government to have emerged when parliament gained the constitutional right to control the national budget that lasted for at least ten consecutive years. In France, for example, fiscal centralization occurred in 1799 and limited government in 1830.

Sources: See political regimes appendix at www.bol.ucla.edu/~mdincecc/.
### Table 3. Average Fiscal Zone as Percentage Area of Sovereignty, 1700-1871

<table>
<thead>
<tr>
<th>Year</th>
<th>1700</th>
<th>1750</th>
<th>1815</th>
<th>1850</th>
<th>1871</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>France</td>
<td>8%</td>
<td>8%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>50%</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Portugal</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Spain</td>
<td>20%</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

I define a fiscal zone as a region that contained an independent set of fiscal and legal institutions. In France in 1700, for example, the size of the average fiscal zone was 8% of total sovereign area. Sources: See fiscal zones appendix at www.bol.ucla.edu/~mdincecc/.

### Table 4. Median Fiscal Zone as Percentage Area of Sovereignty, 1700-1871

<table>
<thead>
<tr>
<th>Year</th>
<th>1700</th>
<th>1750</th>
<th>1815</th>
<th>1850</th>
<th>1871</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>France</td>
<td>5%</td>
<td>5%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>50%</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Portugal</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Spain</td>
<td>7%</td>
<td>96%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

I define a fiscal zone as a region that contained an independent set of fiscal and legal institutions. In France in 1700, for example, the size of the median fiscal zone was 5% of total sovereign area. Sources: See fiscal zones appendix at www.bol.ucla.edu/~mdincecc/.

### Table 5. Largest Fiscal Zone as Percentage Area of Sovereignty, 1700-1871

<table>
<thead>
<tr>
<th>Year</th>
<th>1700</th>
<th>1750</th>
<th>1815</th>
<th>1850</th>
<th>1871</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>France</td>
<td>38%</td>
<td>38%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>79%</td>
<td>79%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Portugal</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Spain</td>
<td>75%</td>
<td>96%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

I define a fiscal zone as a region that contained an independent set of fiscal and legal institutions. In France in 1700, for example, the size of the largest fiscal zone was 38% of total sovereign area. Sources: See fiscal zones appendix at www.bol.ucla.edu/~mdincecc/.
Table 6. Average Size of Fiscal Zones (in 1,000 Sq Km), 1700-1871

<table>
<thead>
<tr>
<th>Year</th>
<th>1700</th>
<th>1750</th>
<th>1815</th>
<th>1850</th>
<th>1871</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>151</td>
<td>151</td>
<td>151</td>
<td>151</td>
<td>151</td>
</tr>
<tr>
<td>France</td>
<td>44</td>
<td>44</td>
<td>544</td>
<td>544</td>
<td>544</td>
</tr>
<tr>
<td>Germany</td>
<td>22</td>
<td>22</td>
<td>22</td>
<td>71</td>
<td>357</td>
</tr>
<tr>
<td>Italian Peninsula</td>
<td>33</td>
<td>33</td>
<td>43</td>
<td>43</td>
<td>301</td>
</tr>
<tr>
<td>Netherlands</td>
<td>17</td>
<td>17</td>
<td>34</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>Portugal</td>
<td>92</td>
<td>92</td>
<td>92</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>Spain</td>
<td>100</td>
<td>249</td>
<td>498</td>
<td>498</td>
<td>498</td>
</tr>
<tr>
<td>European Average</td>
<td>58</td>
<td>87</td>
<td>219</td>
<td>226</td>
<td>304</td>
</tr>
</tbody>
</table>

I define a fiscal zone as a region that contained an independent set of fiscal and legal institutions. In France in 1700, for example, the size of the average fiscal zone was 44,000 sq km. Sources: See fiscal zones appendix at www.bol.ucla.edu/~mdincecc/.

Table 7. French Mean Yields Over Three Political Regimes, 1746-1870

<table>
<thead>
<tr>
<th>Regime</th>
<th>FA (1746-1798)</th>
<th>CA (1799-1829)</th>
<th>CL (1830-1870)</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>6.18 (1.25)</td>
<td>6.82 (1.68)</td>
<td>4.22 (0.56)</td>
</tr>
<tr>
<td>Britain</td>
<td>3.90 (0.69)</td>
<td>4.36 (0.59)</td>
<td>3.27 (0.15)</td>
</tr>
</tbody>
</table>

In France, the fragmented and absolutist regime (FA) ran from 1746-1798, the centralized and absolutist regime (CA) from 1799-1829, and the centralized and limited regime (CL) from 1830-1870. Britain, in the centralized and limited regime (CL) from 1688 onwards, provides benchmark mean yields over the same time frames. For example, the French mean yield during the fragmented and absolutist regime (FA) was 6.18, compared with the British mean yield of 3.90 for the identical period (i.e., 1746-1799).

Standard deviations are in parentheses.

Table 8. French Difference-in-Means and Difference-in-Difference Calculations Over Three Political Regimes, 1746-1870

<table>
<thead>
<tr>
<th>Difference-in-Means</th>
<th>MeanCA − MeanFA</th>
<th>MeanCL − MeanCA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.64 (1.79)</td>
<td>- 2.60* (8.02)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Difference-in-Differences</th>
<th>DiffCA − DiffFA</th>
<th>DiffCL − DiffCA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.18 (0.55)</td>
<td>- 1.51* (5.69)</td>
</tr>
</tbody>
</table>

MeanFA = Mean yield for the fragmented and absolutist regime (FA), MeanCA = Mean yield for the centralized and absolutist regime (CA), and MeanCL = Mean yield for the centralized and limited regime (CL). DiffCA − DiffFA = (MeanCA,FRA − MeanCA,BR) − (MeanFA,FRA − MeanFA,BR), and DiffCL − DiffCA = (MeanCL,FRA − MeanCL,BR) − (MeanCA,FRA − MeanCA,BR). For example, the difference-in-means calculation MeanCA − MeanFA indicates that the French mean yield rose by 0.64 after fiscal centralization. The difference-in-differences calculations repeat the difference-in-means ones after incorporating British yield trends. For example, DiffCA − DiffFD indicates that, upon accounting for changes in British means, the French mean yield rose by 0.18 with fiscal centralization.

*Significant at five percent level

T-statistics in absolute values are in parentheses.
In the Netherlands, the fragmented and limited regime \((FL)\) ran from 1780-1805, the centralized and absolutist regime \((CA)\) from 1806-1847, and the centralized and limited regime \((CL)\) from 1848-1870. Britain, in the centralized and limited regime \((CL)\) from 1688 onwards, provides benchmark mean yields over the same time frames. For example, the Dutch mean yield during the fragmented and limited regime \((FL)\) was 4.23, compared with the British mean yield of 4.49 for the identical period (i.e., 1780-1805).

Standard deviations are in parentheses.

Table 10. Dutch Difference-in-Means and Difference-in-Difference Calculations Over Three Political Regimes, 1780-1870

<table>
<thead>
<tr>
<th>Difference-in-Means</th>
<th>Mean(_CA) - Mean(_FL)</th>
<th>Mean(_CL) - Mean(_CA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.33* (3.21)</td>
<td>- 1.31* (4.62)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Difference-in-Differences</th>
<th>Diff(_CA) - Diff(_FL)</th>
<th>Diff(_CL) - Diff(_CA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.97* (5.40)</td>
<td>- 0.69* (2.96)</td>
</tr>
</tbody>
</table>

Mean\(_FL\) = Mean yield for the fragmented and limited regime \((FL)\), Mean\(_CA\) = Mean yield for the centralized and absolutist regime \((CA)\), and Mean\(_CL\) = Mean yield for the centralized and limited regime \((CL)\). Diff\(_CA\) – Diff\(_FL\) = (Mean\(_CA,NET\) – Mean\(_CA,BBR\)) – (Mean\(_FL,NET\) – Mean\(_FL,BBR\)) , and Diff\(_CL\) – Diff\(_CA\) = (Mean\(_CL,NET\) – Mean\(_CL,BBR\)) – (Mean\(_CA,NET\) – Mean\(_CA,BBR\)). For example, the difference-in-means calculation Mean\(_CA\) – Mean\(_FL\) indicates that the Dutch mean yield rose by 1.33 after fiscal centralization. The difference-in-differences calculations repeat the difference-in-means ones after incorporating British yield trends. For example, Diff\(_CA\) – Diff\(_FL\) indicates that, upon accounting for changes in British means, the Dutch mean yield rose by 1.97 with fiscal centralization.

*Significant at five percent level

T-statistics in absolute values are in parentheses.

Table 11. Summary of Annual Yield Data on Nominal Long-term Government Bonds Used in Regression Panel

<table>
<thead>
<tr>
<th>State</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bavaria</td>
<td>1820-1870</td>
</tr>
<tr>
<td>Belgium</td>
<td>1831-1870</td>
</tr>
<tr>
<td>Britain</td>
<td>1753-1870</td>
</tr>
<tr>
<td>France</td>
<td>1746-1870</td>
</tr>
<tr>
<td>Naples</td>
<td>1821-1860</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1780-1870</td>
</tr>
<tr>
<td>Papal States</td>
<td>1832-1870</td>
</tr>
<tr>
<td>Piedmont</td>
<td>1852-1862</td>
</tr>
<tr>
<td>Prussia</td>
<td>1815-1870</td>
</tr>
</tbody>
</table>

Data is unavailable during the following years: Bavaria, 1841; France, 1794-1800; Netherlands, 1811-1813; and Prussia, 1869. Sources: See yield data appendix at www.bol.ucla.edu/~mdincecc/.

42
Table 12. OLS Estimation

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>6.178**</td>
<td>5.510**</td>
<td>5.512**</td>
</tr>
<tr>
<td></td>
<td>(0.153)</td>
<td>(0.219)</td>
<td>(0.219)</td>
</tr>
<tr>
<td>REGIME_CA_{it}</td>
<td>-0.332</td>
<td>0.296</td>
<td>0.0961</td>
</tr>
<tr>
<td></td>
<td>(0.177)</td>
<td>(0.212)</td>
<td>(0.211)</td>
</tr>
<tr>
<td>REGIME_FL_{it}</td>
<td>-1.949**</td>
<td>-1.297**</td>
<td>-1.750**</td>
</tr>
<tr>
<td></td>
<td>(0.259)</td>
<td>(0.299)</td>
<td>(0.293)</td>
</tr>
<tr>
<td>REGIME_CL_{it}</td>
<td>-2.012**</td>
<td>-1.709**</td>
<td>-1.540**</td>
</tr>
<tr>
<td></td>
<td>(0.165)</td>
<td>(0.199)</td>
<td>(0.293)</td>
</tr>
<tr>
<td>Bavaria</td>
<td>0.296</td>
<td>0.368*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.167)</td>
<td>(0.162)</td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td>0.909**</td>
<td>0.997**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.181)</td>
<td>(0.175)</td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>0.668**</td>
<td>0.715**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.166)</td>
<td>(0.161)</td>
<td></td>
</tr>
<tr>
<td>Naples</td>
<td>-0.407</td>
<td>-0.147</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.254)</td>
<td>(0.249)</td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.161</td>
<td>0.186</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.191)</td>
<td>(0.186)</td>
<td></td>
</tr>
<tr>
<td>Papal States</td>
<td>0.046</td>
<td>0.254</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.258)</td>
<td>(0.254)</td>
<td></td>
</tr>
<tr>
<td>Piedmont</td>
<td>2.060**</td>
<td>2.108**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.312)</td>
<td>(0.301)</td>
<td></td>
</tr>
<tr>
<td>Prussia</td>
<td>0.451*</td>
<td>0.489*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.230)</td>
<td>(0.223)</td>
<td></td>
</tr>
<tr>
<td>PERIOD_{t}</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>522</td>
<td>522</td>
<td>522</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.390</td>
<td>0.471</td>
<td>0.516</td>
</tr>
<tr>
<td>F-statistic</td>
<td>111.98</td>
<td>43.16</td>
<td>16.44</td>
</tr>
</tbody>
</table>

The dependent variable is the annual government bond yield. REGIME\_CA_{it} represents centralized and absolutist regimes, REGIME\_FL_{it} represents fragmented and limited regimes, and REGIME\_CL_{it} represents centralized and limited regimes. In all specifications, I omit the REGIME\_FA_{it} variable for fragmented and absolutist regimes and the PERIOD\_d dummy for 1750 to prevent multi-collinearity. In regressions (2) and (3), I also omit the STATE\_i dummy for Britain. See section 4.3.b for additional details.

**Significant at one percent level, *Significant at five percent level

Standard errors are in parentheses.
<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>5.268**</td>
<td>(0.208)</td>
</tr>
<tr>
<td>CENTRALIZED&lt;sub&gt;it&lt;/sub&gt;</td>
<td>- 0.071</td>
<td>(0.148)</td>
</tr>
<tr>
<td>LIMITED&lt;sub&gt;it&lt;/sub&gt;</td>
<td>- 1.436**</td>
<td>(0.126)</td>
</tr>
<tr>
<td>Bavaria</td>
<td>0.369*</td>
<td>(0.163)</td>
</tr>
<tr>
<td>Belgium</td>
<td>0.999**</td>
<td>(0.177)</td>
</tr>
<tr>
<td>France</td>
<td>0.913**</td>
<td>(0.158)</td>
</tr>
<tr>
<td>Naples</td>
<td>0.266</td>
<td>(0.219)</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.349*</td>
<td>(0.152)</td>
</tr>
<tr>
<td>Papal States</td>
<td>0.712**</td>
<td>(0.224)</td>
</tr>
<tr>
<td>Piedmont</td>
<td>2.104**</td>
<td>(0.304)</td>
</tr>
<tr>
<td>Prussia</td>
<td>- 0.216</td>
<td>(0.175)</td>
</tr>
<tr>
<td>PERIOD&lt;sub&gt;t&lt;/sub&gt;</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

Observations: 522  
Adjusted R<sup>2</sup>: 0.488  
F-statistic: 16.07

The dependent variable is the annual government bond yield. CENTRALIZED<sub>i</sub> is a dummy variable that measures whether a political regime is fragmented or centralized and LIMITED<sub>i</sub> is a dummy variable that measures whether a political regime is absolutist or limited. I omit the PERIOD<sub>t</sub> dummy for 1750 and the STATE<sub>i</sub> dummy for Britain to prevent multi-collinearity. See sections 4.3.b and 4.3.d for additional details.

**Significant at one percent level, *Significant at five percent level

Standard errors are in parentheses.
The Regions_1750 line plots the cumulative distribution of the sizes of fiscal zones for 46 sample regions in 1750. The States_1750 line plots the cumulative distribution of the sizes of fiscal zones for 8 sample states in 1750 that encapsulate the regional fiscal zones. The Regions_and_States_1815 line does the same for sample regions and states in 1815, which overlap. If there were no internal fiscal fragmentation in 1750, then the regions and states lines would coincide. This was not the case, however. For example, the figure reveals that 75 percent of fiscal zones, but just 52 percent of states, were less than 50,000 sq km in size. From 1750 to 1815, there was significant growth in the size of fiscal zones. For instance, only 44 percent of fiscal regions were less than 50,000 sq km in 1815, compared with 75 percent in 1750. Indeed, by 1815, the regions and states lines overlapped. Since the regions line moved greatly from 1750 to 1815, but the states line changed little, we may attribute growth in fiscal zones to centralization within sample states rather than to increases in state size. Also see figure 2.

Source: Author’s calculation. See fiscal zones appendix at www.bol.ucla.edu/~mdincecc/.
Figure 2.

The Regions_and_States_1815 line plots the cumulative distribution of the sizes of fiscal zones for 46 sample regions and 8 sample states in 1815, which overlap. The Regions_and_States_1871 line does the same for sample regions and states in 1871, which also overlap. The fact that the regions and states lines coincide in 1815 indicates that by this date there was no internal fiscal fragmentation for sample states. From 1815 to 1871, there was significant growth in the size of fiscal zones, which we may attribute to increases in state size, rather than centralization within states, since the regions and states lines moved in unison over this period. Also see figure 1.

Source: Author’s calculation. See fiscal zones appendix at www.bol.ucla.edu/~mdincecc/.
Figure 3.

ANNUAL YIELDS, FRANCE, 1746-1870

Source: See yield data appendix at www.bol.ucla.edu/~mdincecc/.

Figure 4.

DEBT AS A PERCENTAGE OF NATIONAL INCOME, NETHERLANDS, 1814-1890

Source: Author’s adaption from Fritschy and Van Der Woot (1997), 69.
Figure 5.

ANNUAL YIELDS, NETHERLANDS, 1780-1870

Source: See yield data appendix at www.bol.ucla.edu/~mdincecc/.