The Political Economy of Financial Good Housekeeping in Historical Perspective

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Abstract: This paper uses a new panel or time-series cross-section (TCSC) data set to perform a statistical analysis of political regimes and financial rectitude in Europe from 1650 to 1913. Though Old Regime polities typically suffered from fiscal fragmentation and absolutist rule, many such countries had centralized institutions and limited government by the start of World War I. Panel regressions indicate that centralized and/or limited regimes were associated with significant improvements in financial housekeeping relative to fragmented and absolutist ones. Structural breaks tests also reveal close relationships between major changes in financial rectitude and political transformations. The findings suggest that better housekeeping was an important mechanism through which political reforms reduced sovereign credit risk.

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1. Introduction

The literature that examines the effects of political structures on sovereign credit risk often overlooks their direct impact on government finances.[1] One exception is Dincecco (2008), who studies institutional arrangements and public revenues in Europe from 1650 to 1913. He argues that political transformations led to creditworthiness gains by enabling governments to raise greater tax amounts. This paper incorporates expenditures as a necessary counterpart. Analysis of public outflows with respect to inflows reveals an additional mechanism by which political reforms influence credit risk.

There is a natural link between optimal macroeconomic policy and political commitment. Barro (1979, 1987, 1989), Mankiw (1989), Aiyagari, Marcet, Sargent, and Seppala (2002), and others describe circumstances under which governments should finance large temporary increases in spending such as wars with loans funded by peacetime surpluses in order to minimize supply-side disincentives caused by sudden changes in taxation. Governments that cannot keep promises to execute plans in time-consistent ways face risk premiums that raise the costs of financing deficits.[2] North and Weingast (1989) argue that the Glorious Revolution of 1688 in England allowed the monarch to make just this sort of reliable pledge.[3] In particular, the new constitution gave parliament the regular right to monitor executive decisions over spending. Many scholars

[1] Works that study the relationship between political institutions and public debt include North and Weingast (1989), Frey and Kucher (2000), Sussman and Yafeh (2000, 2006), Quinn (2001), Stasavage (2003, 2005), Summerhill (2004), and Dincecco (2007).
[2] Also see Kydland and Prescott (1977) and Lucas and Stokey (1983).
[3] Also see Dickson (1967), 3-14, Jones (1972), 3-17, 311-331, Stone (1979), 1-17, and Hill (1980), 191-207, 235-248. It is debatable whether political reforms associated with the Glorious Revolution actually improved property rights protections. Clark (1996) argues that secure property rights existed in England from 1600 while O'Brien (2001) claims that England implemented key constitutional and administrative structures in the 1640s.

use the notion of credible commitment to help explain differences in British and French macroeconomic policies over the 1700s.[4]

Epstein (2000), however, argues that institutional fragmentation within countries and not fiscal abuse by rulers was the principal cause of public finance distortions prior to 1800.[5] In fragmented polities, there was a close relationship between local tax control and political autonomy. Elites thus had strong incentives to oppose fiscal reforms that threatened traditional rights. Since each locality attempted to free ride on the tax contributions of others, the result was a classic public goods problem. Dincecco (2008) finds that per-capita revenues collected by fragmented sovereignties remained low. This lack of resources made it difficult for national governments to accumulate peacetime surpluses and pursue tax-smoothing programs. Note that England was the exception to this rule since it was centralized from medieval times.[6]

To assess the relationship between political regimes and optimal policies, it would be ideal to build upon the sort of analysis found in Barro (1987), who evaluates the effects of changes in government spending on interest rates, money supply, price levels, and budget deficits in the United Kingdom from 1701 to 1918. Alas, Barro himself notes that the British data presents an unmatched opportunity. White (1989, 1995), Bordo and White (1991), Velde and Weir (1992), and Sargent and Velde (1995) also perform detailed macro-historical studies. Those investigations are limited to certain countries (i.e. Britain and France) and particular periods (i.e. the French Revolution and Napoleonic Wars), however.

[4] See for instance Mathias and O'Brien (1976), Brewer (1989), Weir (1989), White (1989, 1995), Bordo and White (1991), Velde and Weir (1992), Hoffman and Norberg (1994), Sargent and Velde (1995), Rosenthal (1998), O'Brien (2001), and White (2002).
[5] Many of the authors cited in the previous footnote also discuss fragmentation. See Hoffman and Rosenthal (1997) as well.
[6] Brewer (1989), 3-7, Sacks (1994), 14-23, Epstein (2000), 1-37, and O'Brien (2001), 14-24.

A systematic analysis both within and across European polities thus complements the case studies accomplished so far. It also sheds light on the debate over arguments for executive limits à la North and Weingast and those for fiscal centralization à la Epstein. Indeed, I argue that improvements in government finances were the result of both political transformations and not just one or the other. The chosen period from 1650 to 1913 captures a clear pattern of economic and political transformations as countries moved from fragmented and absolutist regimes to centralized and limited ones.

Our variable of interest must fulfill two requirements. First, it should be viable given the lack of recorded fiscal data prior to the 1870s.[7] Second, it should provide a succinct measure of financial rectitude that is comparable over a variety of countries. Budgetary figures are one unique source of data that satisfy both conditions. Ferguson and Schularick (2006) claim that contemporaries had trouble making accurate comparisons of fundamental resources among countries.[8] The main problem was thus the denominator rather than the numerator of economic ratios. There was no clear correlation between population size and performance. Direct measures of national production, meanwhile, were still in their infancy. Since current reconstructions of historic GDP levels resemble educated guesses at best, particularly before the 1820s, many recent works employ urbanization rates to proxy for output.[9] National figures such as De Vries (1984) are only available at 50-year intervals, however. Data limitations also preclude the use of export earnings or wage series as deflators.

[7] See Ferguson (2006), 77-79.
[8] See pages 292-293.
[9] Observations are also few. Maddison's (2003) estimates come at 100-year intervals through 1820, for example.

Sophisticated analyses of government finances typically employed public revenues to scale estimates across time. Cain and Hopkins (1993) argue that 19th century investors relied heavily upon budget deficit-to-revenue ratios to evaluate macroeconomic policies.[10] In accordance with the "gentlemanly capitalists" of London, I claim that the variable is an effective summary statistic of financial rectitude.[11] Ceteris paribus, I interpret low deficit ratios over time as signs of good housekeeping and high ones as signs of poor housekeeping.[12]

I construct a new panel or time-series cross-section (TSCS) data set on public expenditures for eleven European countries. Long annual data series characterize the first group, which includes the largest and/or most important players in Europe at the time: England, France, the Netherlands, Prussia, and Spain. The second group (Austria, Belgium, Denmark, Italy, Portugal, and Sweden) has shorter data runs. To compute deficit ratios, I incorporate a similar TSCS data set on public revenues from Dincecco (2008). I also classify political regimes according to him. The transformation from fragmented to centralized fiscal institutions was typically the result of French conquest from 1789 to 1815. The shift from absolutist to limited structures often took place decades after centralization during the 1800s.

The statistical framework that I use is innovative in that it consists of two components not often employed together: regressions on the TSCS data set and structural breaks tests. The regressions incorporate a relevant set of control variables such as wars to test for the effects of political regimes on budget deficit-to-revenue ratios. The political

[10] See chapters 4 and 7. Also see Davis and Huttenback (1987) and Flandreau and Zumer (2004).
[11] The "housekeeping" term originates with Bordo and Rockoff (1996). They argue that adherence to the classic gold standard enabled governments to make credible commitments to time-consistent fiscal and monetary policies. The gold standard thus worked as a "good housekeeping seal of approval."
[12] Note that the qualitative findings described in section 6 were generally robust to the use of population, GDP, or urbanization rates as denominators.

transformations correspond with exogenously given historical events but are endogenous in the sense that I use Dincecco's dates to mark regimes as centralized and/or limited. For robustness, I employ structural breaks tests that assume no a priori knowledge of major turning points. The statistical analysis supports the argument that political transformations towards centralized and limited regimes were associated with significant reductions in deficit ratios, that is, with improvements in financial rectitude.

The rest of the paper proceeds as follows. Section 2 examines the relationship between political regimes and financial housekeeping. Section 3 describes the data and sample countries. Section 4 studies the French and Dutch cases. Section 5 discusses the statistical framework. Section 6 presents the statistical results. Section 7 concludes with some lessons from history.

2. Political Regimes and Financial Good Housekeeping

Figure 1, which plots annual budget deficit-to-revenue ratios in grams of gold in England from 1692 to 1913, resembles a Barro (1979) tax-smoothing simulation.[13] Hoffman and Rosenthal (1997) argue that the one true goal of early modern kings was to wage war for royal glory and/or homeland defense. The effect of military conflict on English public finances cannot be overstated. Deficit ratios increased during the War of the Grand Alliance (1688-1697), the War of the Spanish Succession (1701-1714), the War of the Austrian Succession (1740-1748), the Seven Years' War (1756-1763), the War of American Independence (1775-1783), and the French Revolutionary and Napoleonic Wars (1789-1815). In each case, deficit ratios fell shortly after conflict's end. The amount of wars decreased during the era of British preeminence known as Pax Britannica (1816-

[13] As noted by Sargent and Velde (1995), 482. I describe the English data sources in section 3 as well as appendix 1.

1913). Though deficit ratios rose as expected during the Crimean War (1853-1856) and Boer War (1899-1902), budget balance was standard for England in this time of relative peace.

Recall from the introduction that England possessed a centralized fiscal structure by medieval times and an effective parliament by 1688. What if the English regime had been fragmented and/or absolutist? I now examine the relationship between institutional arrangements and optimal macroeconomic policies. I classify political regimes according to Dincecco (2008). He defines fiscal centralization to have occurred the year that the national government began to secure revenues by way of a tax system with uniform rates throughout the country. Limited government emerged the year in which parliament gained the stable constitutional right to control the national budget on an annual basis. For stability, parliament's power of the purse had to hold for at least two consecutive decades.

Tables 1 and 2 reproduce Dincecco's dates for fiscal centralization and limited government.[14] The first table indicates that fiscal centralization took place swiftly and permanently throughout much of the Continent from 1789 onwards. The National Assembly transformed the tax system in France by eliminating traditional privileges and exemptions. Napoleon completed the centralization process after his coup in 1799. French conquest of Austria, Belgium, the Dutch Republic, and various Italian polities led to significant administrative reforms including tax rationalization. Prussia also made substantial fiscal and legal changes after defeat in battle by France in 1806. The second table indicates that limited government reforms began several decades after centralization during the 1830s and 1840s in Belgium, the Netherlands, and Prussia. Another wave

[14] For additional details, please refer directly to that text.

occurred in the 1860s and 1870s in Italy, Sweden, and France. Note that Austria and Denmark did not establish stable constitutional monarchies before World War I, however.

Some exceptions bear mention. At one extreme, England had centralized institutions and parliamentary government long before most Continental regimes. At the other, the French failed in their attempts to make administrative changes on the Iberian Peninsula. Fiscal centralization in Portugal and Spain did not occur until 1832 and 1844, respectively. Since political risks dominated Iberia during the 19th century, "liberal" regimes there also fit less well with traditional notions of limited government. I adhere to Dincecco's dating of a limited regime in Portugal to 1851 and in Spain to 1876, however.

Limited government established parliament's power of the purse. Parliamentary control of national budgets reduced the likelihood of poor spending choices by executives. Hence, limited government should have led to an increase in financial rectitude – as expressed by a reduction in deficit-to-revenue ratios – relative to absolutist regimes.[15] The relationship between fiscal centralization and financial housekeeping is less clear. On one hand, centralization generated a significant increase in per-capita revenues and made it easier for crowns to follow sound fiscal policies. In turn, deficit ratios should have fallen. On the other, consolidation of fiscal powers into the hands of monarchs may have aggravated problems of executive control. There was always the danger that executives would waste new revenues on items such as ill-advised wars. If so, then deficit ratios should have increased after centralization.

Table 3 provides a summary of the deficit ratio characteristics of the four possible political regimes: fragmented and absolutist, centralized and limited, fragmented and limited, or centralized and limited. Note that there was only one example of the fragmented

[15] I discuss all of the theoretical predictions in ceteris paribus terms.

and limited regime among sample countries.[16] Deficit ratios under centralized and limited regimes should have been lower than under fragmented and absolutist ones. Fiscal centralization implied an increase in public funds over fragmentation because it eliminated local free riding. At the same time, limited government established executive spending constraints. The combination of greater revenues and parliamentary control should have improved financial housekeeping. By this logic, deficit ratios should have also been lower under fragmented and limited regimes than under fragmented and absolutist ones since limited government had occurred in the first case. Theory cannot predict if there was an improvement in housekeeping under centralized and absolutist regimes relative to fragmented and absolutist ones. This result depends on whether executives used additional funds to balance budgets or spent them recklessly. Finally, deficit ratios under centralized and limited regimes should have decreased relative to centralized and absolutist or fragmented and limited ones since both sorts of fiscal problems had been resolved.

3. Data and Sample Countries

I constructed a database on annual expenditures from many secondary sources. Chief among them were Bonney's (1995) *European State Finance Database* for the 17th and 18th centuries and Mitchell's (2003) *International Historical Statistics* for the 19th and early 20th ones. Appendix 1 documents the data sources and construction methods for each sample country.

Bonney (1995a) discusses the limitations of the historical data.[17] European countries did not maintain detailed financial records during the 17th and 18th centuries. With that in mind, I calculated expenditures as total spending by national governments

[16] This was the Dutch Republic (1572-1795). For additional details, please see section 4.
[17] See pages 423-506. Also see Bonney (1999).

including debt service. Loan amounts were incorporated as feasible. Linkages between tax bases and expenditures were uncertain, particularly during warfare. Hence, I did not interpolate missing observations. The expenditure data also came in different currencies. To make calculations comparable across countries, I transformed all units into grams of gold. A "sister" TSCS data set on public revenues from Dincecco (2008) was incorporated to compute budget deficit-to-revenue ratios. To determine total revenues, he added ordinary and extraordinary figures together and subtracted loan income.

I divided the sample into two groups based on data availability and historical importance. Annual published series of nearly 150 years or more for expenditures as well as a variety of controls exist for the five polities (England, France, the Netherlands, Prussia, and Spain) that comprise the first set. Group 1 countries were among the largest and/or most powerful players in Western Europe at the time. Data were also available over different sorts of political regimes.

Shorter published time series exist for the six countries (Austria, Belgium, Denmark, Italy, Portugal, and Sweden) in the second group. Expenditure data for Belgium and Italy began after they were founded as constitutional monarchies in 1831 and 1861, respectively. Annual series for Portugal and Sweden did not start until after the establishment of centralized and limited regimes during the 1800s.[18] Neither Austria nor Denmark achieved stable forms of limited government by 1913. The two countries thus functioned as additional "absolutist" controls in the regressions.[19] Data prior to political

[18] The Portuguese expenditure series became available in 1852 and the Swedish one in 1881. While the *European State Finance Database* lists Swedish revenue data from 1722-1809, corresponding expenditure series were not available.

[19] Though the *European State Finance Database* lists expenditure data for Austria for the 18th century, the population figures did not become available until 1818. The database also lists expenditures for Denmark from 1710-1806, but there were no series available from 1807-1853.

transformations were not available for the second set of countries. Their inclusion enriches the sample by expanding the range of institutional experiences, however.

4. Case Studies

Before moving on to the statistical analysis, it is worthwhile to study France and the Netherlands, two sample polities for which long runs of data are available. Figure 2 plots annual budget deficit-to-revenue ratios in grams of gold over political regimes in France from 1650 to 1913. Several observations from the 18th century are missing. Unlike England, France did not appear to follow an effective tax-smoothing program before 1800.[20] French deficit ratios during the War of the Spanish Succession (1701-1714) were considerably less than English ones. Moreover, France did not run deficits during the War of the Grand Alliance (1689-1697) or the War of the Austrian Succession (1740-1748).

Differences in political arrangements help explain this divergence in macroeconomic policies. Whereas England was centralized and limited from 1688 onwards, France remained fragmented and absolutist through the French Revolution (1789-1799). Figure 2 suggests that French deficit ratios decreased with political transformations. Ratios associated with the fragmented and absolutist regime were large and volatile. In the 1650s, for instance, they came close to three grams of gold. Both the magnitudes and variances of deficit ratios became smaller in the decades that followed fiscal centralization (1790), even during the Napoleonic Wars (1799-1815). Bordo and White (1991) claim that the Revolution cost France its reputation to repay debts. They point to large-scale reforms such as centralization that generated enough in new revenues to fund military efforts without major borrowing. The Napoleonic era ended with the

[20] As noted by Sargent and Velde (1995), 482.

restoration of the Bourbon monarchy in 1815. The next several decades saw fierce battles between royal and liberal forces. The July Revolution of 1830 established a short-lived constitutional regime (1830-1847).[21] We observe a small increase in deficit ratios near the Year of Revolutions in 1848 and subsequent coup by Napoleon III in 1851, who reigned as emperor through the 1860s. Budget balance became standard with the establishment of a centralized and limited regime in 1870.[22]

The Dutch case contrasts with the French and English ones. In particular, it suggests that fiscal centralization exacerbated problems of absolute control. Figure 3 plots annual budget deficit-to-revenue ratios in grams of gold over political regimes in the Netherlands from 1720 to 1913. I follow Dincecco's (2008) classification of the political regime in the Dutch Republic (1572-1795) as fragmented and limited. Deficit ratios in the Republic remained small and stable through the 1780s, though they did rise during the War of the Austrian Succession (1740-1748). In the 1790s, ratios increased once more because of failed Dutch military attempts to prevent French takeover.

King Willem I came to power at the end of the Napoleonic era. The 1815 constitution granted him absolutist powers. Parliamentary authority came at 10-year intervals, thus rendering it ineffective. Though fiscal centralization almost doubled the size of the Dutch tax base and Europe was politically stable, Willem could not balance the national accounts. The king spent heavily on military, infrastructure, and monarchy itself. The rapid growth in deficits from 1815 onwards reflects the reckless policies that Willem

[21] Dincecco (2008) does not classify the 1830 regime as limited because it endured for less than two decades. It was categorized as such for one of the robustness checks in section 6, however.
[22] Jackson (1974), 143-144, 150-151, and Price (1993), 157-165, 177-179, 188-191.

pursued.[23] [24] Dutch fiscal troubles did not become public until 1839. In response, parliament vetoed the upcoming decadal budget. Deficit ratios remained high through the abdication of Willem in 1840. The revolutions of 1848 saw the establishment of a centralized and limited regime in the Netherlands. In turn, deficit ratios gradually fell to levels reminiscent of those under the limited regime in the Republic during the previous century.[25]

To supplement the case studies, it is also useful to take a brief look at the rest of the data. Figures 4 and 5 plot annual budget deficit-to-revenue ratios over political regimes for Spain and Prussia, the two group 1 countries not yet mentioned. Spain resembles France in the sense that both the magnitudes and variances of deficit ratios became smaller in the decades that followed fiscal centralization in 1844 as well as limited government in 1876.[26] There are few Prussian observations after 1806. Surprisingly, Prussia remained in the black over the tumultuous 1700s, even for most of the Great Northern War (1700-1721), the War of the Austrian Succession (1740-1748), and the Seven Years' War (1756-1763). Prussian deficit ratios prior to 1800 appear to reflect a combination of low fiscal capacity and remarkable fiscal discipline.[27] However, the fact that the Prussian government made serious reforms after defeat by France in the Battle of Jena-Auerstedt in 1806 suggests that it was well aware of the shortcomings of its system of public finance. Ferguson (1998),

[23] In this regard, Willem resembled pre-1688 English monarchs such as Charles I (1625-1649). See among others Ashton (1960), 31-67, 154-184, Stone (1979), Hirst (1986), 126-159, Cust (1987), 39-71, 99-149, and North and Weingast (1989), 809-812.
[24] The loss of tax revenues from southern provinces like Belgium, which declared independence in 1831, also aggravated deficits. See Fritschy, t'Hart, and Horlings (2001), 20-22.
[25] Fritschy and Van Der Voort (1997), 64-66, 70-81, 85-87, 92, t'Hart (1997), 17-27, Fritschy, t'Hart, and Horlings (2001), 2-4, 20-24, Van Zanden and Van Riel (2004), 32-51, 85-90, 96-110, 171-178, Van Zanden and Prak (2006), 129-135, and Fritschy (2007).
[26] Tortella (2000), 173-192, claims that public finance was a key problem in Spain during the 1800s that required fundamental reforms to solve.
[27] Indeed, Kiser and Schneider (1994) claim that the Prussian tax system one of the most efficient in Europe at the time.

moreover, claims that Rothschild lenders implored King Frederick William II (1786-1797) to implement constitutional reforms in order to raise greater loan amounts.[28]

Table 4 displays the summary statistics for the deficit ratio panel for group 1 countries. In total, there are 881 observations, 243 for fragmented and absolutist regimes, 176 for centralized and absolutist ones, and 388 for centralized and limited ones. 74 observations characterize the lone fragmented and limited regime. The data indicate that average deficit ratios associated with centralized and absolutist regimes (0.267 grams of gold) were larger than those of fragmented and absolutist ones (0.145 grams of gold). This piece of evidence suggests that centralization exacerbated deficit ratios. Average ratios for centralized and limited regimes were smaller (0.139 grams of gold), however. Per-capita revenues associated with the fragmented and limited regime (0.119 grams of gold) were also lower.

The evidence presented so far indicates that political transformations were associated with changes in public finances. It is not definitive, however. Figure 6, which plots annual budget deficit-to-revenue ratios for group 2 countries from 1800 to 1913, highlights the importance of controls for factors besides political regime. The largest deficit ratios through the 1860s were associated with the absolutist regime in Austria whereas the smallest were associated with the limited one in Belgium. It is difficult to distinguish among regimes from the 1870s onwards, though. To account for economic, geographic, institutional, and political effects, I now turn to a more rigorous quantitative analysis.

[28] See pages 123-124.

5. Statistical Tests

5.1 Panel Regressions

Estimations of panel or time-series cross-section (TSCS) data increase informative content by combining variations across time as well as country. Two common econometric techniques for this sort of data are feasible generalized least squares (FGLS) and ordinary least squares with "panel-corrected" standard errors (PCSE). FGLS is "feasible" because it employs an estimate of an unknown error process. Beck and Katz (1995) show that this approach often leads to poor estimates of standard errors, however.[29] They suggest the use of PCSE instead. I followed their advice and employed PCSE that corrects for contemporaneously correlated errors and panel heteroskedasticity. The fact that OLS is less efficient than FGLS means that the results of the regressions will be stronger if we still find significant coefficients associated with the variables of interest. Note that FGLS delivered results that were statistically similar to those reported in section 6, though.

The basic fixed effects regression specification is

$$Def_{it} = \beta_0 + \beta_1 \text{ CA regime}_{it} + \beta_2 \text{ FL regime}_{it} + \beta_3 \text{ CL regime}_{it} + \gamma X_{it} + \text{Country}_i + \varepsilon_{it} \quad (1)$$

where Def_{it} is the budget deficit-to-revenue ratio in grams of gold for country *i* in year *t*, X is a vector of control variables to be described, and ε_{it} is the disturbance term. I used dummy variables for centralized and absolutist (CA), fragmented and limited (FL), and centralized and limited (CL) regimes relative to fragmented and absolutist ones as a clear and simple method to measure the effect of political arrangements on financial housekeeping.

[29] Time frames such as mine that are very long relative to the number of sample countries should offset the poor statistical properties of FGLS.

Beck (2006) claims that well-specified models often do not require fixed effects by unit or time. Ideally, one wishes to explain effects in terms of substantive variables rather than conclude that deficit ratios were larger in say France simply because it was France. I still chose to include country fixed effects that captured constant but unmeasured economic, geographic, institutional, or political features of individual sovereignties, however. The TSCS data set is unique in that the average number of yearly observations for group 1 countries exceeded 150. Green (2000) and Wooldridge (2003) argue that the large cost in terms of lost degrees of freedom makes it difficult to justify annual fixed effects in such cases. Indeed, Wooldridge notes that time dummies are best employed when the ratio of observations across year *T* for each country *i* is small relative to the total number of countries *N*. Here the *T* to *N* ratio for group 1 countries typically exceeded 30, though. I thus elected to implement time controls that captured widespread shocks à la Beck such as warfare and changes in the cumulative world stock of gold.

As described in section 2, Hoffman and Rosenthal (1997) claim that early modern monarchs placed warfare above all else. For the 1800s, Ferguson (2006) argues that political events were more important to investors than economic ones since there was a greater amount of regular information available about them.[30] Optimal policy suggests that deficit ratios increased during conflicts themselves as governments spent greater amounts but fell just afterwards. The previous authors claim that the total effect of warfare on public finances was negative due to the destruction that it caused. Over the long run, Kindleberger (1984), Tilly (1990), Hoffman and Norberg (1994), Epstein (2000), O'Brien (2001), Rosenthal and Wong (2007) and others argue that military competition fostered financial

[30] Sussman and Yafeh (2000, 2006) also find that investors responded quickly to civil unrest and wars in 18th century Britain and Meiji-era Japan.

innovations that allowed sovereigns to raise and spend larger sums, however. Whether a country won or lost a conflict also influenced deficit ratios. So long as the defeated country took more casualties, then the reduction in its tax base would have been more severe.

Not all conflicts were created equal. Two important characteristics were the strength of the enemy and the scope of the war. To evaluate the impact of warfare on public revenues, I used the data set based on Clodfelter (2002) and assembled by Dincecco (2008). Appendix 2 documents the details. Dincecco includes all conflicts between sample countries found in Clodfelter's sections on Western Europe (as well as those found in sections on Eastern Europe so long as they involved at least one sample country) from 1650 to 1913. He uses coalition populations as simple measures of opponent strength that avoid endogeneity problems.[31] Dincecco computes totals as sums of available populations of coalition sample countries in the years that conflicts began. To gauge the scope of war, he calculates average military deaths per conflict year. In certain years sample countries were involved in two or more wars. Both (i.e. non-overlapping) coalition totals and average deaths were summed in such cases. To round out this analysis, I also included an interaction term between average military deaths and coalition population.

Table 5 summarizes the control variables. The average conflict involved coalition populations of more than 25 million and 50,000 military deaths per year. The smallest coalition (2.15 million) was comprised of Portugal alone during the Portuguese-Spanish War from 1661 to 1668. The largest (82.5 million) was comprised of the combined populations for Austria, France, and Spain during the First Italian War of Independence from 1848 to 1849. The least deadly conflict was the Spanish War from 1727 to 1729 with

[31] Revenue, expenditure, and debt figures also provide useful measures of the effects of warfare on public finances. Unfortunately, they suffer from endogeneity with respect to deficit ratios.

269 military deaths per annum. The deadliest single year occurred in 1809 when military deaths for the Peninsular and Austrian fronts of the Napoleonic Wars totaled 600,000.

We must also consider the impact of domestic turmoil. One may expect that internal chaos caused disruptions that increased deficit ratios. To measure the effect of domestic turbulence, I included a dummy variable that identified all civil wars, coups, and revolutions that occurred within sample countries from 1650 to 1913. Appendix 3 provides the details.

We may suppose as well that economic growth increased tax bases and enabled sovereign governments to reduce deficit ratios. Reliable GDP figures are difficult to come by before 1820. Many studies of the late 19th century thus employ measures of foreign trade as approximates of national output.[32] Systematic trade deficit and export series from the 1600s onwards were not available, however. Hohenberg and Lees (1985), Bairoch (1988), and Acemoglu, Johnson, and Robinson (2002, 2005) argue that there was a close relationship between urbanization rates and income growth. To proxy for per-capita GDP, I included a variable that calculated urban populations as percentages of total populations for each country for each year. Appendix 3 describes the details.[33] Note that controls for national income also helped account for different rates of technological innovation and adoption across polities.[34] Table 5 indicates that on average urban populations comprised 16 percent of total populations. The lowest urbanization rates were 4 percent for Prussia during the 1700s. The largest were over 40 percent for Britain from the 1870s onwards.

[32] See for instance Mauro, Sussman and Yafeh (2002), Obstfeld and Taylor (2003), and Ferguson and Schularick (2006).
[33] Maddison's (2003) per-capita GDP figures were used as a robustness check.
[34] See Mokyr (1998, 1999).

Country size may have also influenced public finances. Alesina and Wacziarg's (1998) analysis suggests that an increase in size had two effects. Economies of scale in the provision of public services meant that governments in smaller polities spent greater relative amounts. Yet the opposite effect occurred if individuals wished to consume greater total amounts of public services in response to scale reductions in per-capita costs. Hence, there would be a positive rather than negative relationship between largeness and deficit ratios. To measure country size, I included a population variable for sample polities for each available year from 1650 to 1913. I also incorporated an interaction term between urbanization rates and sample country populations. Table 5 indicates that the average polity had almost 14 million inhabitants. The smallest populations were 1.2 million for Prussia near the end of the 1600s. The largest were over 45 million for the United Kingdom near the start of World War I.

One may wish to consider monetary policy as well. Bordo and Rockoff (1996), Obstfeld and Taylor (2003), and others claim that adherence to the classic gold standard was a valuable signal of financial integrity. I included a dummy variable that took a value of one for each year that a country was on gold from the 1870s to the start of World War I. Coding for gold was at times subjective. Polities like Spain "shadowed" the standard while never making an official commitment. I relied on Meissner's (2002) dates at which a currency became *de facto* and *de jure* convertible into gold. Appendix 3 documents the details.

Recall from section 3 that I converted currency units into gold grams. This transformation should have reduced any effects of inflation. Though the world stock of gold remained stable through the start of the 19th century, large discoveries in California in

1848 and in Australia in 1851 had a dramatic effect on output.[35] I employed data from Velde and Weber (2000) to account for annual changes in the cumulative gold stock from 1650 to 1913. Table 5 indicates that on average the gold stock increased by 2.7 million troy ounces per year. The smallest single year changes (270 million troy ounces) occurred in the 1650s. The biggest single year change (227 million troy ounces) occurred between 1911 and 1912.

The econometric set-up assumes that it is in fact possible to disentangle political regimes from factors such as violent conflicts and economic fundamentals. Yet political arrangements influenced all of these characteristics. In turn, coefficients on the control variables rather than those on the regime ones themselves may capture some of the positive effects of institutional reforms. Regime coefficients should thus be interpreted as downward estimates of the total impact of political arrangements on deficit ratios.

5.2 Structural Breaks Tests

Structural breaks tests assume no a priori knowledge of major turning points in the budget deficit-to-revenue series for group 1 countries but let the data "speak" for themselves. They therefore present a useful alternative to standard regression analysis.[36] I use the methodology proposed by Bai and Perron (2003) that identifies multiple structural changes in means while allowing for serial correlation. It thus improves upon the "moving windows" technique that relies upon sequential single structural change methods.

The procedure considers the following regression for each sample country

$$ln\ \mathrm{Def}_t = \beta_0 + \sum_{l=1,\ldots,L} \beta_l\ ln\ \mathrm{Def}_{t-l} + \varepsilon_t \qquad (2)$$

[35] Morys (2006), 30-32.
[36] For historical applications, see among others Willard, Guinnane, and Rosen (1996), Brown and Burdekin (2000), Sussman and Yafeh (2000), Mauro, Sussman, and Yafeh (2002), and Dincecco (2008).

where Def_{it} is the budget deficit-to-revenue ratio in grams of gold in year t, β_0 and β_1 through β_L are parameters to be estimated, and ε_t is the disturbance term. I allowed up to five significant yearly lags l of the dependent variable ($L = 5$). For a sample of size T, let m denote the number of breaks and $S_{T,\,m}$ the sum of squared residuals associated with each m-partition. Break points T_1 through T_m are explicitly considered unknown. The computation of estimates for β, ε, and $S_{T,\,m}$ $(T_1,\ldots,T_m)$ was accomplished by applying OLS partition by partition without constraints among them. After $S_{T,\,m}$ $(T_1,\ldots,T_m)$ was calculated and stored, a dynamic programming algorithm evaluated which final partitioning of the time series data achieved a global minimization of the overall sum of squared residuals. Essentially, it proceeded by way of a sequential examination of optimal one-break partitions to create a single optimal m breaks partition.

A program created for the Regression Analysis of Time Series (RATS) software performs the Bai-Perron routine. To use it, one must select a maximum number of "best" breaks m_{max} in the time series for each country subject to a minimum number of observations h_{min} between data segments. As Willard, Guinnane, and Rosen (1996) discuss, there is always a trade-off in determining parameter values. A minimum space of two observations eliminates the chance of confounding effects but ends up analyzing blips rather than turning points.[37] Extended spans increase the likelihood of missing important shifts, however. There are also data limitations to consider. Gaps from 1789 to 1815 in the expenditure series for France and the Netherlands prevent the identification of turning points associated with fiscal centralization. It is still possible to capture post-1815 breaks for limited government, though. The same goes for Spain, since the expenditure series did not become continuous until after centralization had already occurred. Though the Prussian

[37] I did not analyze short-lived breaks since I was interested in persistent changes.

data is annual from 1688 to 1806, gaps over the 19th century mean that we cannot determine whether political transformations there were associated with turning points. After some experimentation, I selected the best three breaks with at least 15 observations (i.e. 15 years) per segment for France, the Netherlands, Prussia, and Spain.[38] A long run of data sets England apart from other group 1 countries. I thus chose the best five English breaks. Note that a gap from 1688 to 1691 prevents the identification of a turning point associated with limited government. The English and Prussian cases remain useful to study the relationship between military conflicts and deficit ratios, however.

6. Evidence

Table 6, which displays the results of regression (1), reveals that centralized and absolutist and centralized and limited regimes as well as the fragmented and limited one were associated with significant improvements in financial rectitude (as measured by significant reductions in budget deficit-to-revenue ratios) relative to fragmented and absolutist regimes. The findings held for group 1 countries only (column 1) and when group 2 countries were included (column 2).[39] Ceteris paribus, the move to a centralized and absolutist regime decreased deficit ratios by 0.065 to 0.075. This result contrasts with the summary statistics presented in table 4 and suggests that, after controlling for factors such as wars, the French case as discussed in section 4 and not the Dutch one was representative of the effect of fiscal centralization on financial housekeeping. In particular, the positive impact of new funds appears to have outweighed the negative impact of the consolidation of fiscal powers by executives. The move to a centralized and limited one

[38] I also set the maximum number of breaks to 2, 4, or 5 and the minimum number of observations to 10 or 20. The findings were generally robust to such changes in parameter values.
[39] Restricting the sample to Continental countries did not significantly affect the results, either.

decreased deficit ratios by 0.075 to 0.100 and the move to the fragmented and limited one by over 0.600. The findings were also robust to checks that used alternative regime classifications.[40]

What about the control variables? Opponent size as proxied by coalition populations as well as conflict intensity as measured by average military deaths per conflict year were associated with significant increases in deficit ratios. Domestic turmoil (i.e. civil wars, coups, and revolutions) also had a negative housekeeping effect. Economic growth as proxied by urbanization rates was associated with a significant increase in deficit ratios as well.[41] On the other hand, larger populations were associated with housekeeping improvements. Gold standard adherence as well as gold stock increases also had significant positive effects on financial rectitude. France had larger deficit ratios than England while the Netherlands, Prussia, and Spain had lower ones. Austria, Italy, and Portugal among group 2 countries also had higher deficit ratios than England. Belgium, Denmark, and Sweden had lower ones.

Table 7, which displays the results of the structural breaks tests, reveals close relationships between major turning points and political transformations that enhanced public finances. In France, the break that occurred in 1870 coincided with the establishment of limited government as well as the Franco-Prussian War (1870-1871). Budget deficit-to-revenue ratios fell by 175 percent in the 15 years that followed this change as compared to the 15 years that preceded it. Other turning points were associated with a renewed effort to conquer Algeria at the start of the 1840s and the coup d'etat and

[40] Parliaments may have required time to see how well executives would honor commitments. The first alternative allowed for uncertainty over how long new limited regimes would last by lagging their start dates by 5 or 10 years. The second alternative classified the "borderline" political regime in France (1830-1847) as centralized and limited rather than as centralized and absolutist. Also see Dincecco (2008).
[41] Use of per-capita GDP figures rather than urbanization rates did not significantly affect the findings.

subsequent establishment of an authoritarian regime by Napoleon III at the start of the 1850s. In the Netherlands, the best breaks came with the end of the Belgian War of Independence (1833), near limited government (1850), and with an unidentified event in 1867. Limited government – which occurred during the Year of Revolutions in 1848 – was associated with a decrease in deficit ratios of nearly 40 percent. In Spain, we observe turning points with the start of the Naval War against Peru (1865), near limited government (1880), and with the Spanish-American War (1898). Limited government occurred at the end of the 3rd Carlist Civil War (1872-1876). This set of events was associated with a decrease in deficit ratios of almost 50 percent.

Recall from section 5 that data gaps prevent the identification of breaks with political transformations in England or Prussia. The turning points in the English and Prussian series on deficit ratios highlight the role of military conflicts, however. In England, the top five turning points from 1692 to 1913 came near the end of the War of the Spanish Succession (1711), near the start of the War of the Austrian Succession (1737) and the Seven Years' War (1753), and near the start (1797) and end (1814) of the Napoleonic Wars. In Prussia, the best three breaks from 1688 to 1806 occurred with the Great Northern War (1712) and near the ends of the War of the Austrian Succession (1749) and the Seven Years' War (1764). In all cases, we observe increases in deficit ratios at the start of conflicts and decreases at war's end.[42]

[42] Fiscal centralization and/or limited government occurred in group 2 countries before continuous deficit ratio series became available or did not take place at all by 1913. I have thus selected the best single breaks. These were Austria, 1879; Belgium, 1871; Denmark, 1895; Italy, 1871, 1895; Portugal, 1870; and Sweden, 1898. There was a data gap for Italy from 1884-1885. I thus performed separate tests for the best turning point that occurred from 1862-1883 and 1886-1913.

7. Conclusion

Dincecco (2007) shows that fiscal centralization and limited government led to significant improvements in sovereign credit risk. Our results highlight one mechanism by which political regimes had a positive creditworthiness effect. Panel regressions indicate that centralized and/or limited regimes were associated with significant decreases in budget deficit-to-revenues ratios relative to fragmented and absolutist ones. Structural breaks tests that assume no a priori knowledge of possible turning points in the deficit ratio series support these conclusions.

The findings coincide with the evolution of political regimes and public finances from 1650 to 1913 as described by Dincecco (2008). Centralization generated an increase in per-capita revenues that made it easier for crowns to follow sound fiscal policies. Financial rectitude thus improved. Rulers could still use new revenues in foolish ways, however. By placing checks on executive spending, limited government also led to a decrease in deficit ratios.

Though today's world certainly differs from the world prior to World War I, many similar themes remain. Two lessons come to mind. First, there is a significant relationship between political arrangements and the government's ability to tax smooth over wars and other short-term shocks. Second, the countries that survive conflicts and achieve long-run prosperity are those that have put their fiscal houses in order. Political transformations such as centralization and limited government are thus important milestones in the process of economic development.

Appendix 1. Data Sources

Expenditures are total spending by national governments including debt service. Loan amounts were incorporated as feasible. For additional details, please see section 3 of the text. For revenues, please see Dincecco (2008).

Austria. EXP1 is central government expenditure, 1781-1913, from Mitchell (2003). The series covers Austria-Hungary through 1867 and Cisleithania from 1868 onwards.[43] Figures do not include expenditures on tax collection through 1863. Total yields through 1873 are for cash payments made by the Treasury. From 1874 onwards they include obligations undertaken and the change in the Treasury's cash balance. The series of Austrian central government expenditures consists of EXP1: 1818-1913.

The gulden became the general monetary unit in Austria after the War of Austrian Succession and was set at the Convention of 1753 with one gulden equal to sixty kreuzer. Austria-Hungary decimalized in 1857, adopting a system of one gulden to one hundred kreuzer. I converted Austrian expenditures into grams of gold as follows. First, expenditures in gulden were converted into expenditures into kreuzer by multiplying by 60. Second, expenditures in kreuzer were transformed into expenditures in silver by multiplying by this exchange rate, provided courtesy of Giovanni Federico. Third, expenditures in silver were transformed into expenditures in gold by dividing by the silver for gold price ratio according to Officer (2006). Lastly, I divided by the Austrian population to find per-capita Austrian expenditures in grams of gold. The kreuzer-silver exchange rate series ended in the 1850s and the kroner-pounds one began. Hence, I have converted Austrian expenditures into grams of gold from 1857 onwards as follows. First, expenditures in kronen were transformed into expenditures in pounds by multiplying by the yearly exchange rate, provided courtesy of Giovanni Federico. Second, expenditures in pounds were transformed into expenditures in grams of gold by dividing by the market price of gold in ounces. Third, expenditures in ounces of gold were transformed into expenditures in grams of gold by multiplying by 28.35. Lastly, I divided by the Austrian population to find per-capita Austrian expenditures in grams of gold.

Belgium. EXP1 is central government expenditure, 1831-1912, from Mitchell (2003). Data are unavailable for 1913. The series of Belgian central government expenditures consists of EXP1: 1831-1912.

Belgium adopted the French monetary system during French Revolutionary and Napoleonic times with one Belgian franc equal to one French franc.[44] Hence, I used the Paris market price of gold in francs per gram courtesy of Jean-Laurent Rosenthal.

Denmark. EXP1 is central government expenditure, 1854-1913, from Mitchell (2003). Figures include the Duchies of Schleswig, Holstein, and Lauenburg from 1854-1865. The series of Danish central government expenditures consists of EXP1: 1873-1913.[45]

I converted Danish expenditures into grams of gold as follows. Denmark joined the Scandinavian Monetary Union in 1872 and adopted the gold standard in 1873 at 1 Pound Sterling to 18.1595 Kroner. I first transformed kroner into pounds by dividing by 18.1595. I then transformed Danish expenditures in pounds into Danish expenditures in gold by dividing by the London market price of gold in pounds per fine ounce taken from Officer (2006).[46] Lastly, I divided by the Danish population to find per-capita Danish expenditures in grams of gold.

England (Britain). EXP1 is issues and assignments for the English exchequer, 1660-1687, from Chandaman (1975), 339-366. To calculate total expenditures, I have added issues (listed at one-half year intervals, A and B) and assignments (also listed at one-half year intervals, A and B). EXP2 is total net expenditure including debt charges for Great Britain, 1692-1801, from Mitchell (1971). EXP3 is central government expenditure for Great Britain, 1750-1801, and for the United Kingdom, 1802-1913, from Mitchell (2003). The series of British central government expenditures consists of EXP1: 1650-1687; EXP2: 1692-1749; EXP3: 1750-1913.

The British official price of gold in pounds per fine ounce, 1650-1717, and the London market price of gold in pounds per fine ounce, 1718-1913, were taken from Officer (2006).[47] With the exception of French Revolutionary and Napoleonic times, both series were nearly identical.

France. EXP1 is royal expenditure in France, 1600-1695, from Bonney (1995b). EXP2 is royal expenditure in France, 1670-1715, from Bonney (1995c). EXP3 is French ordinary expenditure, 1727-1813, from Bonney (1995d). EXP4 is expenditure of the French monarchy at various dates between 1773 and 1785 from Bonney (1995e). EXP5 is total French expenditure, 1801-1844, from Bonney (1995f). EXP6 is ordinary and extraordinary central government expenditure, 1815-1913, from Mitchell (2003). The series of French central government expenditures consists of EXP1: 1650-1656, 1662-1683; EXP2: 1684-1715; EXP3: 1727-1752, 1764-1765, 1767-1768, 1780-1781, 1788-1796; EXP4: 1785; EXP5: 1801-1814; EXP6: 1815-1913.[48]

The Paris market price of gold in francs per gram, 1650-1913, was courtesy of Jean-Laurent Rosenthal.

Italy. EXP1 is central government expenditure, 1862-1913, from Mitchell (2003). Data are unavailable for 1884-1885. The series of Italian central government expenditures consists of EXP1: 1862-1913.

[43] Lombardy is included through 1858 and Venetia through 1865.
[44] Morys (2006), 38-44.
[45] While the *European State Finance Database* lists Danish expenditure data for several years from 1710-1806, there were no series available from 1807-1853.
[46] Danish expenditures in ounces of gold were transformed into expenditures in grams of gold by multiplying by 28.35.
[47] British expenditures in ounces of gold were transformed into expenditures in grams of gold by multiplying by 28.35.
[48] Massive inflation occurred in the aftermath of the French Revolution, which resulted in calculations for (i.e. per-capita) expenditure. They were 1792, 49.24 grams of gold; 1793, 95.94 grams of gold; 1794, 170.87 grams of gold; 1795, 204.09 grams of gold; 1796, 0.07 grams of gold. By comparison, per-capita expenditures were 7.62 grams of gold in 1791 and 6.16 grams of gold in 1801 (i.e. the next available observation). I thus excluded years 1792-1796 from the analysis.

The lira was adopted as the monetary unit of Italy in 1862 with one lira equal to one French franc.[49] Hence, I used the Paris market price of gold in francs per gram courtesy of Jean-Laurent Rosenthal.

The Netherlands. EXP1 is total tax revenues in the Dutch Republic, 1572-1795, from Fritschy, van der Ent, Enthoven, Liesker, Trompetter, and Verstegen (2007).[50] The computation method was as follows. First, provincial expenditures for Drenthe, Friesland, Groningen, Holland, and Overijssel were tallied. Totals for Brabant, Gelderland, and Utrecht used the figures for Overijssel. Data for Zeeland were taken from Veenstra (2006, 2009). Total expenditures were based on total revenues. I also used total revenues to compute total expenditures for the five admiralties à la Dincecco (2008). Total expenditures for the Republic as a whole were computed as sums of the previous categories. EXP2 is expenditures in the Batavian Republic and its successors, 1803-1810, from Van Zanden and Van Riel (2004), 49. EXP3 is estimates of expenditures in the Netherlands, 1814-1913, courtesy of Jan Luiten Van Zanden. His figures exclude southern provinces like Belgium. For comparison, see Fritschy and Van Der Woort (1997), 68. The series of Dutch central government expenditures consists of EXP1: 1720-1795; EXP2: 1803-1810; EXP3: 1814-1913.

The Dutch market price of gold in guilders per gram, 1719-1913, is courtesy of W.L. Korthals Altes. Years 1749 and 1759 were missing and so were interpolated.

Portugal. EXP1 is effective central government expenditure, 1852-1913, from Mata (1993).[51] The series of Portuguese central government expenditures consists of EXP1: 1852-1913.

I converted Portuguese expenditures into grams of gold from 1852-1913 in the following way. First, expenditures in contos were transformed into mil-reis by multiplying by 1000. Second, expenditures in mil-reis were transformed into expenditures in pounds by dividing by this exchange rate. Yearly averages of monthly exchange rates were used. Third, expenditures in pounds were transformed into expenditures in grams of gold by dividing by the market price of gold in ounces. Fourth, expenditures in ounces of gold were transformed into expenditures in grams of gold by multiplying by 28.35. Lastly, I divided by the Portuguese population to find per-capita Portuguese expenditures in grams of gold.

Prussia. EXP1 is total expenditure of the Prussian state, 1688-1806, from Korner (1995). EXP2 is expenditures, 1821-1866, from Tilly (1966), 492, and Tilly (1967), 391. EXP3 is total ordinary expenditures, 1807-1913, from Mauersberg (1988), 125.[52] The series of Prussian central government expenditures consists of EXP1: 1688-1806; EXP2: 1838; 1849, 1853, 1856, 1866; EXP3: 1821, 1829, 1841, 1847, 1850, 1855, 1860, 1867, 1868, 1870, 1874, 1875, 1880, 1885, 1890, 1900, 1905, 1910.

I converted Prussian expenditures into grams of gold as follows. Thaler units were first transformed into silver ones by multiplying by 16.667.[53] I then transformed expenditures from silver units to gold ones by dividing by the silver for gold price ratio found in Officer (2006). Lastly, I divided by the Prussian population to find per-capita expenditures in grams of gold. Note that expenditures were given in marks from 1857-1913, where one mark was worth one-third of a thaler following de Vanssay (1999). Hence, for this period I transformed mark units into thaler ones by dividing by 3 before proceeding through the steps just described.

Spain. EXP1 is Gastos del Estado, 1801-1842, Carreras and Tafunell (2006), table 12.8 (category: Gasto total del Estado). EXP2 is Gastos del Estado, 1845-1913, Carreras and Tafunell (2006), table 12.13 (category: Obligaciones totales del Estado reconocidos y liquidados). The series of Spanish central government expenditures consists of EXP1: 1801-1803, 1805-1807, 1813-1817, 1819-1822, 1827-1828, 1830-1831, 1833-1839, 1841-1842; EXP2: 1845, 1849-1913.

The Spanish market price of gold or silver is not available over the 16th to 19th centuries because buying and selling bullion outside the Spanish mint was forbidden.[54] Hence, I have converted Spanish expenditures into grams of gold as follows. First, the pounds for pesos exchange rate was transformed into pounds for pesetas by multiplying by 5.[55] Second, expenditures in pesetas were transformed into expenditures in pounds by dividing by this exchange rate. Yearly averages of monthly exchange rates were used. Third, expenditures in pounds were transformed into expenditures in grams of gold by dividing by the market price of gold in ounces. Fourth, expenditures in ounces of gold were transformed into expenditures in grams of gold by multiplying by 28.35. Lastly, I divided by the Spanish population to find per-capita expenditures in grams of gold.

Sweden. EXP1 is central government expenditure, 1881-1913, from Mitchell (2003). The series of Swedish central government expenditures consists of EXP1: 1881-1913.[56]

I converted Swedish expenditures into grams of gold from 1881-1913 in the following way. As for Denmark, Sweden adopted the gold standard in 1873 as part of the Scandinavian Monetary Union with 1 Pound Sterling at 18.1595 Kronor. I first transformed kroner into pounds by dividing by 18.1595. I then transformed Swedish expenditures in pounds into Swedish expenditures in gold by dividing by the London market price of gold in pounds per fine ounce taken from Officer (2006).[57] Lastly, I divided by the Swedish population to find per-capita Swedish expenditures in grams of gold.

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[49] See the Global Financial Database.
[50] Thanks to Wantje Fritschy for her help with this remarkable data set.
[51] This data was supplied courtesy of Rui Esteves. Figures are for fiscal years 1851-1852, 1852-1853, and so on. Hence, I took an average of the two surrounding fiscal years to compute annual expenditures.
[52] This data was supplied courtesy of Mark Spoerer.
[53] Thanks to Giovanni Federico for alerting me to this conversion.
[54] Thanks to Pilar Nogues for alerting me to this fact.
[55] To do so, the London Pound for Madrid Peso (1698-1913) data set from the Global Financial Database was employed. Yearly averages of monthly exchange rates were used. Since the Spanish expenditure data are in pesetas, I made the following conversion: 1 peso = 20 reales and 1 peseta = 4 reales, meaning that 1 peso = 5 pesetas. See Vicens Vive (1969), 582-583, 713-715, and Tortella (2000), 158, for details on conversions involving pesos, reales, and pesetas.
[56] While the *European State Finance Database* lists Swedish expenditure data from 1722-1809, corresponding expenditure series were not available.
[57] Spanish expenditures in ounces of gold were transformed into expenditures in grams of gold by multiplying by 28.35.

Appendix 2. Warfare

The source of this data set is Dincecco (2008), who classified wars and war years according to Clodfelter (2002). All conflicts between sample countries found in sections on Western Europe (as well as those found in sections on Eastern Europe so long as they involved at least one sample country) from 1650 to 1913 were included. Note that Dincecco used Clodfelter's dates for war durations though in some cases formal peace treaties were not signed until years after ceasefires were implemented. In military usage, "casualty" refers to all persons lost to active military service including those killed in action or by disease, disabled by physical or mental injuries, captured, deserted, or missing. Data limitations mean that Clodfelter's figures often referred to soldiers killed and/or wounded in battle as well as deaths by disease rather than to casualties per se. Such reports became more common further back in time. Dincecco thus employed total military deaths. When such tolls were not provided, he summed deaths from major land and sea battles as well as major sieges to compute totals. In all cases, Dincecco divided totals by conflict length to determine average military deaths per year of warfare. He summed average deaths per conflict for each year that a sample state was involved in two or more wars. Dincecco calculated coalition population totals as the sums of the available populations of member sample countries in the years that conflicts began. As for military deaths, he added (i.e. non-overlapping) opposition coalition totals for each year that a sample state was involved in two or more conflicts.

Conflict	Years	Combatants, Coalitions, and Populations	Deaths per Year	Notes
Franco-Spanish War	1648-1659	France (18,500,000) vs. Spain (7,100.000)	725	Total military deaths from all causes
1st Anglo-Dutch War	1652-1654	England (5,240,000) vs. France, Netherlands (20,590,000)	1,730	Killed or wounded in major sea battles
1st Northern War	1655-1660	Austria, Denmark, Poland, Russia (n/a) vs. Sweden (n/a)	n/a	
Anglo-Spanish War	1655-1659	England (5,250,000) vs. Spain (7,140,000)	n/a	
Portuguese-Spanish War	1661-1668	Portugal (2,150,000) vs. Spain (7,190,000)	n/a	
Habsburg-Ottoman War	1663-1664	Austria (n/a) vs. Turkey (19,200,000)	8,500	Total military deaths from all causes
2nd Anglo-Dutch War	1665-1667	England (5,110,000) vs. Denmark, France, Netherlands (21,640,000)	4,877	Killed or wounded in major sea battles
War of Devolution	1667-1668	England, Netherlands, Spain, Sweden (14,240,000) vs. France (19,900,000)	2,000	Total military deaths from all causes
3rd Anglo-Dutch War	1672-1674	England, France (25,300,000) vs. Netherlands (1,900,000)	2,260	Killed or wounded in major sea battles
Franco-Dutch War	1672-1679	England, France, Sweden (25,300,000) vs. Denmark, Netherlands, Spain (9,180,000)	4,494	Killed and/or wounded in major land and sea battles
Habsburg-Ottoman War	1683-1689	Austria, Poland (n/a) vs. Turkey (20,200,000)	12,533	Total military deaths from all causes (major land battles and major sieges); killed and wounded (major sea battles)
French Conquest of Luxembourg	1684	France, Netherlands (23,240,000) vs. Spain (7,370,000)	2,000	Total military deaths from all causes
War of the Grand Alliance	1688-1697	Austria, England, Netherlands, Portugal, Spain (16,440,000) vs. France (21,500,000)	8,140	Killed and/or wounded in major land and sea battles
Great Northern War	1700-1721	Denmark, Prussia, Poland, Russia (29,300,000) vs. Sweden (n/a)	31,818	Total military deaths from all causes
War of the Spanish Succession	1701-1714	Austria, England, Netherlands, Portugal, Prussia (12,160,000) vs. France, Spain (27,300,000)	16,185	Killed and/or wounded in major land and sea battles and major sieges
Venetian-Austrian-Turkish War	1714-1718	Austria (n/a) vs. Turkey (21,700,000)	28,000	Killed or wounded
War of the Quadruple Alliance	1718-1720	Austria, England, France, Netherlands (28,380,000) vs. Spain (8,120,000)	15,000	Killed or wounded
Spanish War	1727-1729	England, France (27,900,000) vs. Spain (8,120,000)	269	Killed in major land battles
War of the Polish Succession	1733-1735	Austria, Russia (15,800,000) vs. France, Prussia, Spain (31,900,000)	31,333	Killed or wounded; Poland not included for either side due to civil war.
Austro-Russian-Turkish War	1735-1739	Austria, Russia (16,100,000) vs. Turkey (22,800,000)	24,000	Killed or wounded or total military deaths from all causes depending on country

Conflict	Years	Combatants, Coalitions, and Populations	Deaths per Year	Notes
War of the Austrian Succession	1740-1748	Austria, England, Netherlands, Russia (26,010,000) vs. France, Prussia, Spain (50,300,000)	28,889	Killed and/or wounded or total military deaths from all causes depending on country
Russo-Swedish War	1741-1743	Russia (17,100,000) vs. Sweden (n/a)	1,900	Killed or wounded
Seven Years' War	1756-1763	Austria, France, Russia, Spain, Sweden (55,600,000) vs. England, Portugal, Prussia (13,900,000)	85,750	Total military deaths from all causes; unweighted average of three estimates offered by Clodfelter
Corsican War	1768-1769	Corsica (n/a) vs. France (26,400,000)	5,000	Total military deaths from all causes
War of the Bavarian Succession	1778-1789	Austria (n/a) vs. Prussia (6,120,000)	1,622	Killed, missing, wounded, taken prisoner, dead of disease
Russo-Swedish War	1788-1790	Russia (24,800,000) vs. Sweden (2,170,000)	3,258	Killed or wounded
War of the 1st Coalition	1792-1797	Austria, England, Netherlands, Portugal, Prussia, Spain (23,990,000) vs. France (27,700,000)	32,450	Combat deaths
War of the 2nd Coalition	1798-1801	Austria, England, Prussia, Russia, Turkey (78,200,000) vs. France, Netherlands (34,800,000)	38,630	Combat deaths
Napoleonic Wars	1803-1815	Total military deaths from all causes; coastal and naval campaigns not included since average deaths per year were less than 1,500		
War of the 3rd Coalition	1805-1807	Austria, England, Prussia, Russia, Sweden (66,800,000) vs. France, Netherlands, Poland (44,100,000)	233,333	
Peninsular War	1807-1814	England, Portugal, Spain (25,000,000) vs. France, Netherlands (31,900,000)	300,000	
Austrian War	1809	Austria (n/a) vs. France, Netherlands (32,100,000)	300,000	Poland not included since its troops fought on both sides
Russian Campaign	1812	Austria, Denmark, Russia (43,400,000) vs. France, Netherlands, Poland (35,400,000)		
Leipzig Campaign	1813	England, Prussia, Russia, Sweden (69,400,000) vs. France, Netherlands (32,500,000)	150,000	Average military deaths per year, 1812-1814
Campaign in France	1814	England, Netherlands, Russia, Prussia, Sweden (74,200,000) vs. France (30,300,000)		
Austrian Campaign	1815	Austria (n/a) vs. France (30,300,000)		
Waterloo Campaign	1815	Austria, England, Netherlands, Portugal, Prussia, Spain (45,400,000) vs. France (30,300,000)	60,000	Total military deaths, 1815
Russo-Swedish War	1808-1809	Russia (39,700,000) vs. Sweden (2,410,000)	3,068	Killed or wounded
Riego Rebellion	1823	France (32,000,000) vs. Spain (13,200,000)	6,500	Total casualties
Belgian War of Independence	1830-1833	Belgium, England, France (61,200,000) vs. Netherlands (2,640,000)	718	Combat deaths including the 1830 Rebellion
Austro-Sardo War	1848-1849	Austria (31,400,000) vs. Sardinia (n/a)	9,975	Combat deaths
1st Italian War of Independence	1848-1849	Austria, France, Spain (82,500,000) vs. Italy (23,600,000)	5,465	Killed or wounded
1st Schleswig-Holstein War	1848-1849	Denmark, Sweden (4,800,000) vs. Prussia (16,300,000)	3,000	Total military deaths from all causes
Crimean War	1853-1856	England, France, Turkey (89,300,000) vs. Russia (70,200,000)	153,838	Total military deaths from all causes
Franco-Austrian War	1859	Austria (33,100,000) vs. France (37,200,000)	19,599	Combat deaths
2nd Italian War of Independence	1859-1861	Austria (33,100,000) vs. Italy (24,900,000)	1,010	Killed or wounded
2nd Schleswig-Holstein War	1864	Austria, Prussia (53,400,000) vs. Denmark (2,540,000)	4,208	Combat deaths, missing, presumed dead

Conflict	Years	Combatants, Coalitions, and Populations	Deaths per Year	Notes
Austro-Prussian War	1866	Austria (34,900,000) vs. Italy, Prussia (47,500,000)	16,357	Combat deaths or died of wounds
Battle of Mentana	1867	France (37,700,000) vs. Italy (26,100,000)	1,282	Killed or wounded
Franco-Prussian War	1870-1871	France (36,800,000) vs. Prussia (24,600,000)	91,826	Total military deaths from all causes

Appendix 3. Other Regression Variables

For additional details, please see sections 5 and 6 of the text. For warfare, please see appendix 2.

The dependent variable is the budget deficit-to-revenue ratio, [(expenditures-revenues) / revenues], for each sample country for each available year from 1650-1913.

The dummy variable for fragmented and absolutist political regimes takes a value of 1 for each year that a sample country possessed a fragmented and absolutist regime from 1650-1913. The dummy variable for centralized and absolutist political regimes takes a value of 1 for each year that a sample country possessed a centralized and absolutist regime from 1650-1913. The dummy variable for fragmented and limited political regimes takes a value of 1 for each year that a sample country possessed a fragmented and limited regime from 1650-1913.[58] The dummy variable for centralized and limited political regimes takes a value of 1 for each year that a sample country possessed a centralized and limited regime from 1650-1913.

The country dummy variable takes a value of 1 to identify individual sample countries.

The dummy variable for civil wars, coups, and revolutions takes a value of 1 for the year(s) during any civil war, coup, and revolution within sample countries from 1650-1913, according to Dincecco (2008), who assembled his data set based on Clodfelter (2002), Winks and Kaiser (2004), and the Encyclopedia Britannica (2007). Insurrections, massacres, riots, and uprisings were generally not included.

	Year(s)	Civil War, Coup, or Revolution
Austria	1848	Year of Revolutions
Belgium	1789-1790	Brabant Revolution
	1830	Belgian Revolution
Denmark	1848	Year of Revolutions
England	1649-1651	3rd English Civil War
	1688	Glorious Revolution
France	1789-1799	French Revolution
	1799	Coup by Napoleon I
	1815	Bourbon Restoration
	1830	July Revolution
	1848	Year of Revolutions
	1851	Coup by Napoleon III
	1870	Fall of 2nd empire
	1871	Paris Comune
Italy		No civil war, coup, or revolution from 1861-1913
Netherlands	1785	Batavian Revolution
	1814-1815	Establishment of Dutch Kingdom
	1830	Belgian Revolution
	1848	Year of Revolutions
Portugal	1808	Revolution of 1808
	1820	Revolution of 1820
	1820-1823	First Civil War of Portuguese Revolution
	1823	Coup of 1823
	1827-1828	Miguelite Insurrection
	1832-1834	Second Civil War of Portuguese Revolution
	1836	Coup of 1836
	1846-1847	Third Civil War of Portuguese Revolution
	1849	Costa Cabral Coup
	1851	Saldanha Coup
	1910	Establishment of 1st Portuguese Republic
Prussia	1848	Year of Revolutions

[58] There is only one such case among sample countries. For additional details, please see section 4.

	Year(s)	Civil War, Coup, or Revolution
Spain	1820	Coup of 1820
	1823	Restoration of 1823
	1833-1839	1st Carlist War
	1843	Moderate Coup
	1847-1849	Matiners' (2nd Carlist) War
	1854	Rebellion of 1854
	1863	Government collapse of 1863
	1868-1870	Glorious Revolution
	1872-1876	3rd Carlist War (encompasses the Restoration of 1874)
	1909	La Semana Tràgica
Sweden	1772	Coup of 1772
	1792	Assassination of Gustav III
	1809	Coup against Gustav IV

The urbanization variable calculates the urban population as a percentage of the total population for each sample country annually. All urban population figures are from De Vries (1984).[59] In particular, figures for 1650, 1700, 1750, and 1800 are from appendix 3, 305-337, and figures for 1850, 1890, and 1980 are from table 4.8, 44-47, for cities with populations of at least 10,000 inhabitants through 1850, with at least 20,000 inhabitants in 1890, and with at least 100,000 inhabitants in 1980.[60] All intermediate years were interpolated. Total populations come from Dincecco (2008).

The per-capita GDP variable, which comes from Maddison (2003), takes the natural logarithm of per-capita GDP in 1990 international Geary-Khamis dollars for sample countries from 1650-1913. Data are available for 1600, 1700, and 1820-1913. All intermediate years were interpolated.[61]

The population variable, which comes from Dincecco (2008), takes the natural logarithm of sample country populations for each available year from 1650-1913.

The gold variable dummy variable takes a value of 1 for each year that a sovereign was on gold according to Meissner (2002), 7. He employs a strict measure of gold adherence that selects the year in which a currency became *de facto* and *de jure* convertible into gold. Also see Redish (1995), 718, Flandreau (1996), 862, Jonker (1997), 95-98, Tortella (2000), 158-161, 202-205, Officer (2001), and Morys (2006), 38-44.

	Year of Gold Standard Adoption
Austria	Did not adopt before 1913
Belgium	1878
Denmark	1873
England	1821
France	1878
Italy	1884
Netherlands	1875
Portugal	1854
Prussia	1872
Spain	Did not adopt before 1913
Sweden	1873

The world gold stock variable, taken from Velde and Weber (2000), measures per-year differences in the cumulative world stock of gold in billions of troy ounces from 1650-1913.[62]

[59] Also see Hohenberg and Lees (1985) and Bairoch (1988).
[60] De Vries provides urbanization and population figures for Germany rather than for Prussia and for Scandinavia rather than for Denmark or Sweden. Urbanization and population figures for Austria include Bohemia.
[61] A lack of data has led me to substitute Maddison's (2003) German per-capita GDP figures for Prussia.
[62] These data were supplied courtesy of Francois Velde.

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Table 1. Fiscal Centralization in Europe

		Year	Event
Group 1	England	1066	Norman conquest and subsequent erosion of provincial authority
	France	1790	Administrative reforms after Revolution of 1789
	Netherlands	1806	Administrative reforms under French control (1795-1813)
	Prussia	1806	Administrative reforms after defeat by French at Jena-Auerstedt in 1806
	Spain	1844	Administrative reforms during "Moderate" decade of 1840s
Group 2	Denmark	1688	Establishment of official cadastre system
	Belgium	1795	Administrative reforms after French annexation in 1795
	Austria	1805	Administrative reforms after French conquest in 1805
	Portugal	1832	Administrative reforms during Revolutionary era (1820-1851)
	Sweden	1840	"Departmental" reforms
	Italy	1861	Establishment of Kingdom in 1861 and subsequent fiscal unification

Source: Dincecco (2008).

Table 2. Limited Government in Europe

		Year	Event
Group 1	England	1688	Establishment of constitutional monarchy à la North and Weingast (1989)
	France	1870	Establishment of stable constitutional monarchy à la North and Weingast (1989)
	Netherlands	1572	Formation of Dutch Republic (1572-1795)
		1848	Implementation of new constitution à la North and Weingast (1989)
	Prussia	1848	Establishment of constitutional monarchy à la North and Weingast (1989)
	Spain	1876	Establishment of stable constitutional monarchy à la North and Weingast (1989)
Group 2	Denmark	None	Absolutism restored (1866) after short-lived constitutional regime
	Belgium	1831	Established as a constitutional monarchy à la North and Weingast (1989)
	Austria	None	Liberal revolution failed (1848)
	Portugal	1851	Establishment of stable constitutional monarchy à la North and Weingast (1989)
	Sweden	1866	Dissolution of Diet of Estates and introduction of bicameral legislature
	Italy	1861	Established as a constitutional monarchy à la North and Weingast (1989)

Source: Dincecco (2008).

Table 3. Deficit Ratio Characteristics of Political Regimes

Regime	Deficit Ratios
Fragmented and Absolutist	**High** due to local free-riding and lack of credible commitment
Centralized and Absolutist	**Decrease** due to resolution of local free-riding *or* **Increase** due to executive consolidation of fiscal power and lack of credible commitment
Fragmented and Limited	**Decrease** due to credible commitment but still local free-riding
Centralized and Limited	**Low** due to resolution of local free-riding and credible commitment

For additional details, please see section 2 of the text.

Table 4. Summary Statistics of Deficit Ratio Data for Group 1 Countries

	Obs.	Mean	St. Dev.	Min	Max
All Regimes	881	0.165	0.390	- 0.893	2.935
Fragmented and Absolutist	243	**0.145**	0.508	- 0.893	2.766
Centralized and Absolutist	176	**0.267**	0.453	0.412	2.935
Fragmented and Limited	74	**0.119**	0.169	- 0.166	0.946
Centralized and Limited	388	**0.139**	0.284	0.406	1.924

The units are grams of gold. For additional details, please see sections 3 and 4 of the text and appendix 1.

Table 5. Summary Statistics of Control Variables

	Mean	St. Dev.	Min	Max
Enemy Coalition Population	26.43	16.31	2.15	82.50
Military Deaths per Conflict Year	50.36	89.04	0.27	600
Urbanization Rate	0.16	0.10	0.04	0.49
Per-Capita GDP	1566.23	750.26	850.50	4920.55
Population	13.99	11.75	1.21	45.65
Change in Gold Stock	0.0027	0.0047	0.0002	0.0227

Enemy coalition populations are measured in millions. Average military deaths per conflict year are measured in thousands. Per-capita GDP is measured in 1990 international Geary-Khamis dollars. Sample country populations are measured in millions. Annual changes in the cumulative world gold stock are measured in billions of troy ounces. For additional details, please see section 5 of the text and appendices 2 and 3.

Table 6. Regression Results for Political Regimes and Financial Good Housekeeping

	(1) *Group 1 Only*	(2) *Groups 1 and 2*
Centralized and Absolutist Regimes	- 0.0748***	- 0.0648***
	(2.72)	(3.21)
Fragmented and Limited Regimes	- 0.6479***	- 0.6209***
	(14.39)	(15.43)
Centralized and Limited Regimes	- 0.0760**	- 0.1067***
	(2.17)	(4.43)
Enemy Coalition Population	0.000360	0.000434***
	(1.47)	(2.46)
Military Deaths per Year	0.005251***	0.005959***
	(8.54)	(9.02)
Coalition-Death Interaction Term	- 0.000021***	- 0.000024***
	(4.07)	(6.35)
Civil Wars, Coups, Revolutions	0.2474***	0.2103***
	(5.05)	(10.19)
Urbanization Rate	2.0663***	2.0698***
	(4.98)	(4.93)
Ln (Population)	- 0.1477***	- 0.1337***
	(5.03)	(3.57)
Urbanization-Population Interaction Term	- 1.66e-08**	- 2.54e-08***
	(2.17)	(3.03)
Gold Standard	- 0.1716***	- 0.0816***
	(5.67)	(3.84)
Change in Gold Stock	- 8.2576***	- 6.1921***
	(3.04)	(5.73)
France	0.2464***	0.2217***
	(4.58)	(4.09)
Netherlands	- 0.0511	- 0.0805
	(0.65)	(1.04)
Prussia	- 0.1557***	- 0.1736***
	(3.06)	(2.87)
Spain	- 0.0548	- 0.0569
	(1.14)	(1.86)
Austria		0.4192***
		(6.43)
Belgium		- 0.1423
		(3.19)
Denmark		- 0.1056
		(1.49)
Italy		0.745***
		(7.52)
Portugal		0.2772***
		(5.61)
Sweden		- 0.0368
		(0.88)
Constant	2.3045***	2.1015***
	(5.12)	(3.55)
Observations	859	1216
R^2	0.251	0.240
Wald χ^2	842.59	6127.74

The dependent variable is the budget deficit-to-revenue ratio in grams of gold. The estimation technique is OLS with panel-corrected standard errors (PCSE). It controls for contemporaneously correlated errors and panel heteroskedasticity. Z-statistics in absolute values are in parentheses. Group 1: England, France, the Netherlands, Prussia, and Spain. Group 2: Austria, Belgium, Denmark, Italy, Portugal, and Sweden. For additional details, please see sections 5 and 6 of the text and appendices 2 and 3.

***Significant at 1 percent level, **Significant at 5 percent level

Table 7. Major Breaks in Budget Deficit-to-Revenue Series

	Year	Percent Change	Event
England (1692-1913)	1711	- 31.69 (0.55)	End of War of the Spanish Succession (1701-1714)
	1737	762.71*** (3.25)	Start of War of Austrian Succession (1740-1748)
	1753	76.79 (1.32)	Start of Seven Years' War (1756-1763)
	1797	31.04 (0.68)	Start of the Napoleonic Wars (1799-1815)
	1814	- 94.55*** (4.52)	End of the Napoleonic Wars (1799-1815)
France (1815-1913)	1839	2726.90*** (3.41)	Reinforcements of 1840 during French Conquest of Algeria (1830-1847)
	1854	- 71.90 (1.94)	Year of Revolutions (1848) / Coup by Napoleon III (1851)
	1870	-175.72 (0.72)	Limited government (1870) / Franco-Prussian War (1870-1871)
Netherlands (1815-1913)	1833	- 16.50 (1.55)	End of Belgian War of Independence (1830-1833)
	1850	- 36.83*** (4.53)	Limited government (1848) / Year of Revolutions (1848)
	1867	- 46.55*** (4.70)	???
Prussia (1688-1806)	1712	- 113.82*** (5.93)	End of Great Northern War (1700-1721)
	1749	- 33.87 (0.41)	End of War of Austrian Succession (1740-1748)
	1764	- 87.58 (1.48)	End of Seven Years' War (1756-1763)
Spain (1849-1913)	1865	20.79 (0.12)	Start of Naval War with Peru (1865-1866)
	1880	- 68.35 (0.49)	Limited government (1876) / End of 3rd Carlist War (1872-1876)
	1898	- 215.59*** (3.90)	Spanish-American War (1898)

The first column lists group 1 sample countries. The second column displays the years for the best three or five (i.e. England) structural breaks over the years shown for each polity as determined by the algorithm described in section 5 of the text. The third column reports the percentage change in average budget deficit-to-revenue ratios over the fifteen years following the break in question as compared to the fifteen years that preceded it. T-statistics in absolute values are in parentheses. The final column offers brief "explanations" for the turning points, which are elaborated upon in section 6 of the text.

***Significant at 1 percent level, **Significant at 5 percent level

Figure 1.

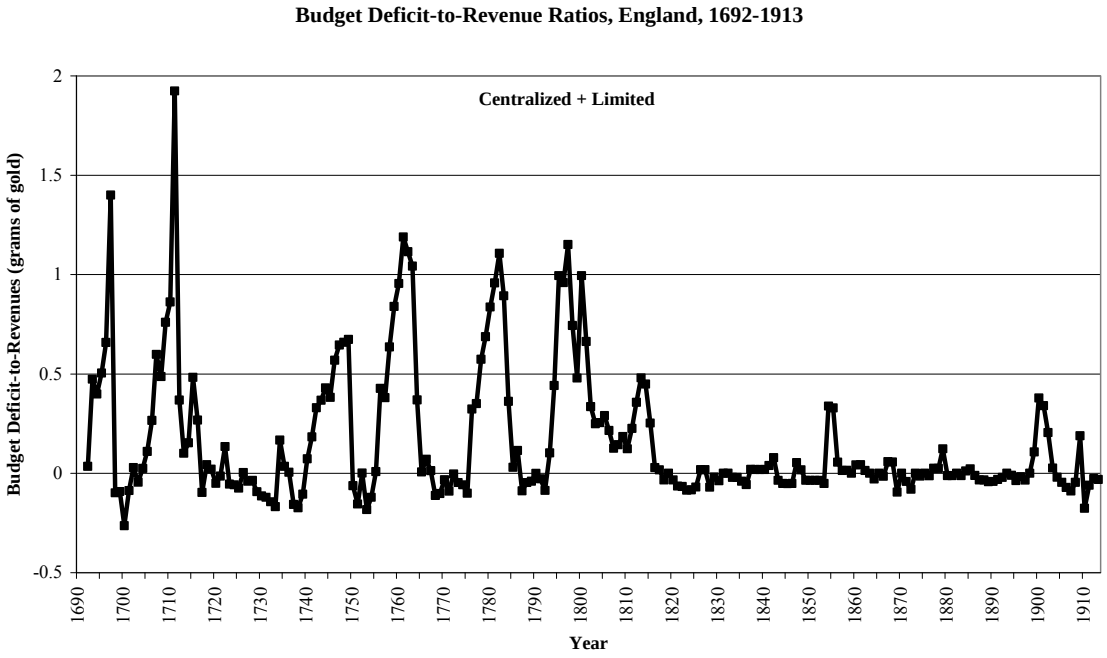


Figure 2.

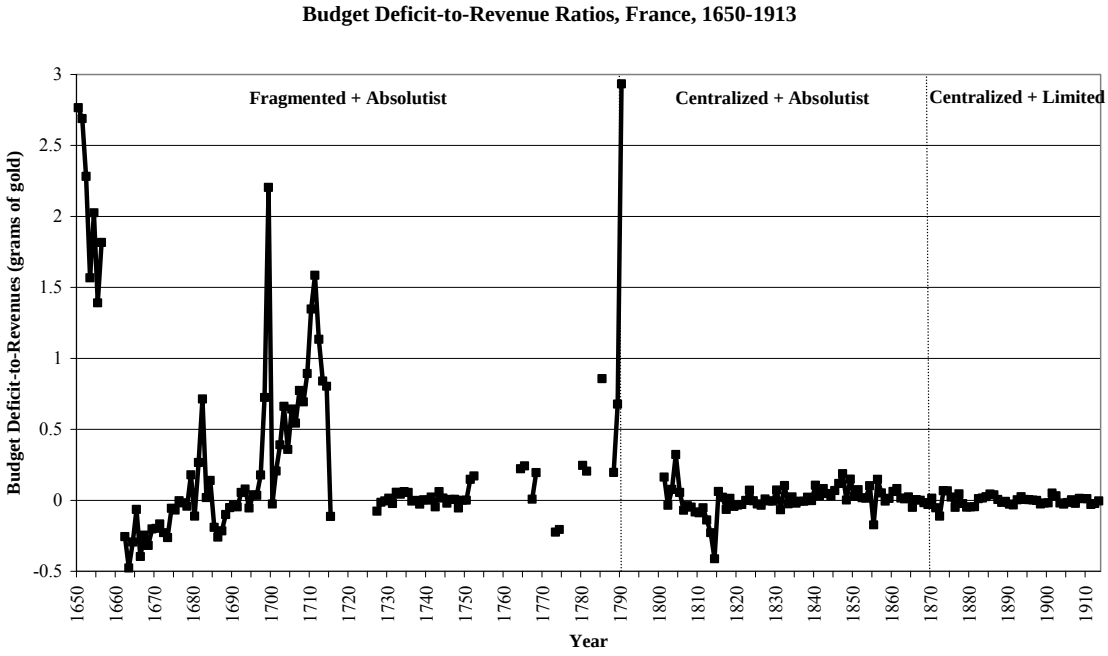


Figure 3.

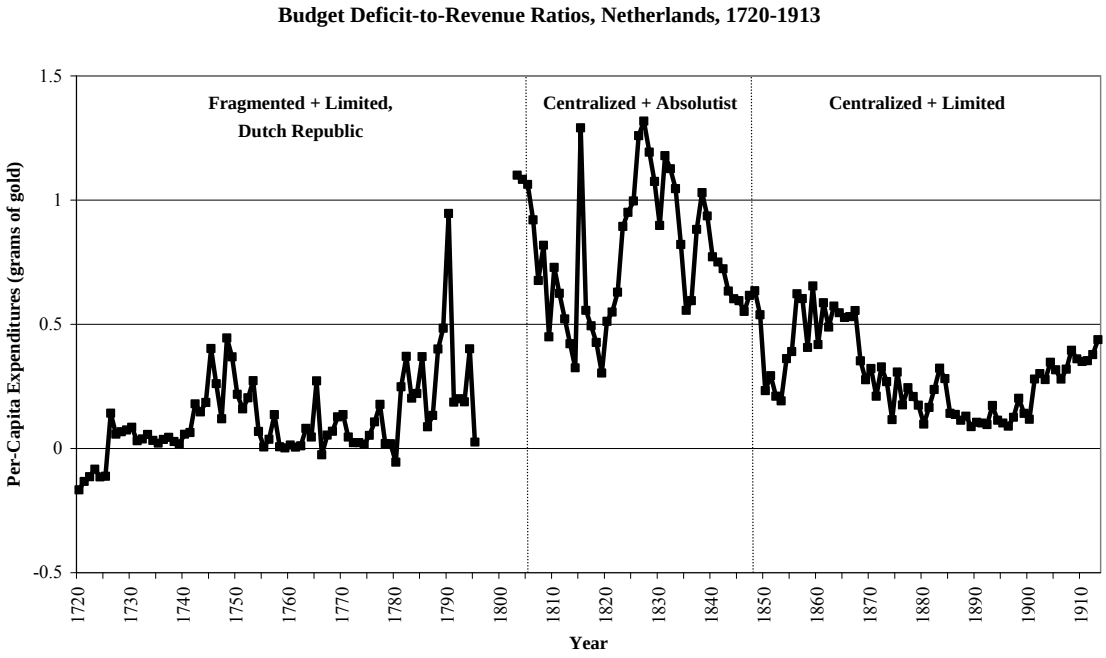


Figure 4.

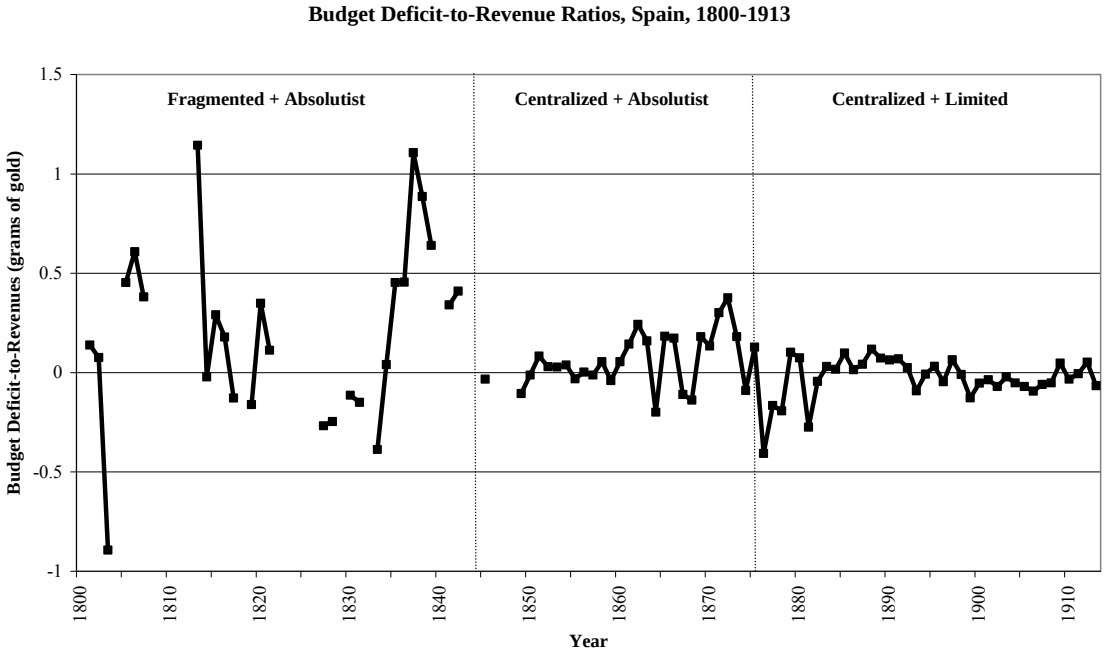
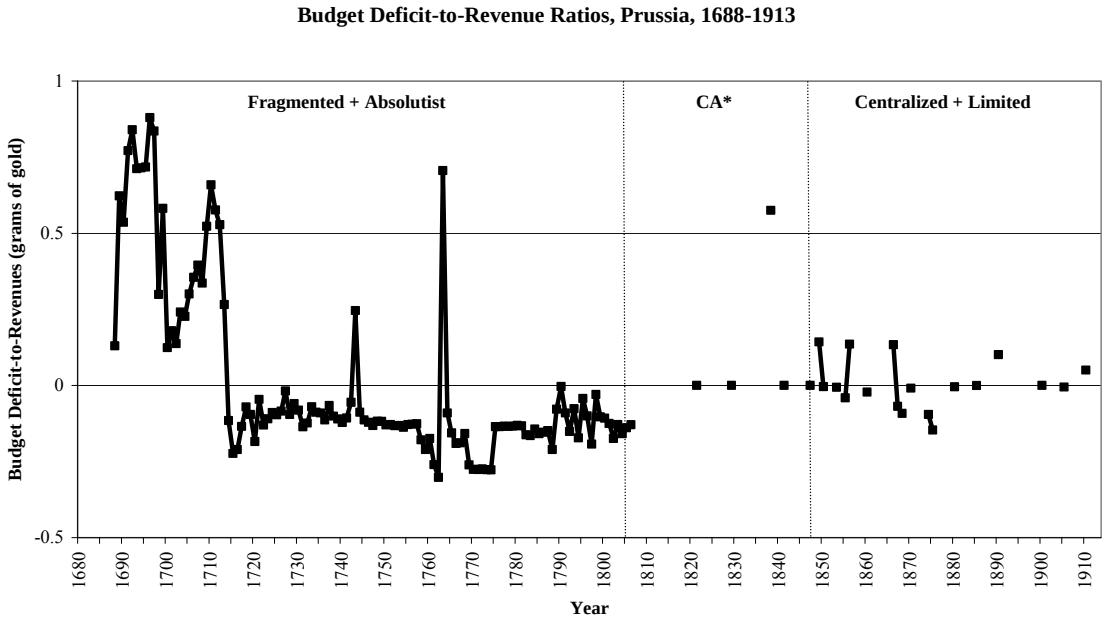


Figure 5.



*Centralized and Absolutist Regime (CA)

Figure 6.