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Balanced Budget Rules and Fiscal Outcomes: Evidence from Historical Constitutions

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Abstract

This paper studies the reduced-form effects of constitutional-level balanced budget rules (BBRs) on fiscal outcomes. Using historical data for a large set of countries dating back to the nineteenth century and applying an event study design we find that the introduction of a constitutional BBR leads to a reduced probability of experiencing a sovereign debt crisis. We estimate that debt-to-GDP ratio decreases by around eleven percentage points on average, parts of these consolidation being explained by decreased expenditures and increased tax revenues. These adjustments occur within five years of reform and are not reversed afterwards. Additional estimates gained from applying the synthetic control method on nine selected case study countries in Africa, Europe, and Latin America are consistent with the main findings, but also highlight the importance of country specific circumstances when evaluating the success of BBRs.

JEL codes: H60, K10, N40

Keywords: Economic effects of constitutions, fiscal rules, historical public finances, sovereign debt crises

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1 Introduction

Average government debt-to-GDP and spending-to-GDP ratios around the world roughly doubled in the fifty years after WWII. Compared to the few data points that we have from the late nineteenth century, the spending-to-GDP ratio has roughly quadrupled. In a long and heated debate, both academics and policy makers have questioned the reasons for the problem of running persistent deficits and thereby accumulating debt. The global economic and financial crisis of 2008-9 quickly evolved into a sovereign-debt crisis in many countries, once again bringing the issue of sustainable public finances to the forefront of policy priorities and motivating policy makers to find effective and credible institutional solutions. In particular, fiscal rules have become a popular instrument to constrain fiscal policy and are currently promoted by national governments and international organizations such as the IMF and the EU.

However, the use of fiscal rules is not a new idea, as illustrated by US states and the Maastricht Treaty in Europe, and the global financial crisis gave prominence to the fact that governments often fail to comply with these rules.[1] As a response to the crisis and motivated by the Fiscal Compact Treaty in Europe, a recent trend has been to strengthen the credibility of these fiscal rules by enshrining them at the highest level of law: national constitutions.[2] Austria, Denmark, Italy, and Spain are some of the countries that have passed such legislation in the post-crisis era,[3] joining Switzerland[4] and Germany[5] which are the two exceptions among advanced countries that already

[1]For example, in the European Union, more than half of member states exceeded the three percent maximum budget deficit specified in the Stability and Growth Pact.

[2]The Fiscal Compact – or formally the Treaty on Stability, Coordination and Governance in the Economic and Monetary Union – requires the member states to enshrine structurally balanced budget rules into domestic law.

[3]Others include: Georgia, Hungary, Latvia, Malta, Serbia, Slovakia, and Slovenia, with further ongoing processes in all of the European countries that have signed the Fiscal Compact.

[4]Switzerland introduced a BBR constraining structurally adjusted balances that has been in effect since 2003. For a quantitative case study on Switzerland see section 3.

[5]Germany first introduced a fiscal rule into its constitution in 1871 (rein-stating it in 1949). In 2009, a major amendment came ("Schuldenbremse": Article 109.3) that caps the level of the federal government's structural deficits at 0.35 percent of GDP effective in 2016 (and the states' level at zero, binding from 2020). The pre-2009 "golden rule" limited net borrowing to the level of gross public investment, which, along with further and very general escape clauses, made the rule less effective (see Feld 2010, Ciaglia and Heinemann 2012, Heinemann, Janeba, Schröder, and Streif 2016). Germany's reform kicked off

had such constitutional rules.[6] Other countries have hotly debated but not implemented constitutional fiscal rules. For instance, in the United States, the House of Representatives approved a balanced budget amendment in 1995 that fell short by one vote in the Senate. A similar attempt failed in 2011 (Azzimonti 2013).[7]

On the other hand, about forty-five countries in the world – particularly in Africa, Central America, and South America – have had balanced budget rules (BBR) in their constitutions.[8] Some of these provisions date back to the end of the nineteenth century but most were introduced in the first and second halves of the twentieth century in the Americas and Africa, respectively, and in Europe following the crisis of 2008-9. In this paper we present the first historical evidence on the fiscal effects of these constitutional fiscal rules. Studying the effect of BBRs in these countries is appealing because provisions written in a country's constitution might be more binding than sub-constitutional laws.[9] This expectation has been an explicit assumption made by many policy makers, such as when designing the Fiscal Compact Treaty, but for which no empirical evidence exists.

This paper contributes to the existing literature on the effects of fiscal rules by: (a) studying the fiscal effect of BBRs that are enshrined in national constitutions; (b) analyzing historical data dating back to WWII (as our preferred sample) but also to the nineteenth century (as our largest sample); (c) studying the effects of BBRs on government debt, expenditures and taxes, but also on the incidence of sovereign debt crises; and (d) thriving to advance the identification of causal effects of fiscal rules with the use of

a debate on whether the eurozone countries should insert a German-style BBR into their constitutions (Janeba 2012).

[6]Portugal had a rule in the 1820s, but it was short-lived. Also, Poland (Article 216.5) and Singapore (Article 114) have had certain constitutional limitations on borrowing since 1997 and 1965, respectively, but it is controversial whether these should be considered as BBRs (Lienert 2010).

[7]See Schultze (1995) and Seto (1997) for a discussion of the 1995 proposal, and Azzimonti, Battaglini, and Coate (2016) for a welfare analysis of a 2011-type BBR with a model calibrated to the US economy. The debate on introducing a balanced budget amendment continues today with around half of state legislatures having passed resolutions calling for such an amendment.

[8]See Figure 4 and Table B1 in the online appendix for a map and list of these countries.

[9]For example, in the United States, expenditure and balanced budget rules in the '80s and '90s were phased out or abandoned as corresponding laws were rewritten. Further, supranational deficit caps in the European Union as defined by the Maastricht Treaty of 1992 and the original Stability and Growth Pact of 1997 were also often exceeded which eventually led to significant reforms of the Pact (for example, Six Pack, Two Pack, Fiscal Compact, and further ongoing reforms).

event study, difference-and-difference designs, and synthetic control methods for several case studies.

Identifying the effect of (non-randomly distributed) fiscal rules on fiscal outcomes is challenging for several reasons. First, there exists the possibility of selection bias such that past fiscal outcomes might influence the probability that a government implements a fiscal rule. Second, biased estimates may arise from the failure to account for shocks which simultaneously drive the implementation of fiscal rules and correlate with fiscal outcomes. Third, the adoption of constitutional BBRs by definition involves a change in the constitution either through amendments or the adoption of a new constitution. Thus the independent effects on fiscal outcomes due to any additional changes in constitutions, that occurred at the same time as the introduction of BBRs, must be ruled out.

We start our analysis with quantitative case studies for nine countries in Africa (Cape Verde, Gabon, and Rwanda), Europe (Switzerland and Ukraine), and Latin America (Brazil, Chile, Panama, and Peru) employing the synthetic control method (Abadie and Gardeazabal 2003, Abadie, Diamond, and Hainmueller 2010).[10] For each of these countries we estimate the counterfactual levels of fiscal policy variables after introducing or abolishing a BBR; that is, the fiscal outcomes in a hypothetical country with or without a BBR. These counterfactual outcomes are then compared to the actual fiscal variables. In the majority of cases, the synthetic control approach provides first evidence that BBRs constrain the levels of government debt and expenditures.

However, the case studies also highlight the complex endogeneity issues associated with the adoption of these rules. The Swiss case described in Section 3 is illustrative in that the debt brake introduced in 2003 led to a significant episode of fiscal consolidation which, according to our estimates from the synthetic control method, amounts to a reduction of the debt-to-GDP ratio by about 30 percentage points. However, as sug-

[10]Related to fiscal rules, Eliason and Lutz (2015) study the effects of a fiscal rule in one US state, and Köhler and König (2015) study the effect of the Stability and Growth Pact in euro-area countries using the synthetic control method. Asatryan (2015) presents case study evidence on constitutional changes, and Metelska-Szaniawska (2016) applies the method to the analysis of constitutional changes in post Soviet countries.

gested by the case study of Figure 1, the adoption of the debt brake followed or perhaps was a reaction to a period of steady increase of government debt in Switzerland. This case would speak in favor of some bias coming from the selection of already indebted Switzerland into adopting a BBR. Other case studies discussed in Section C of the online appendix highlight a second concern which is the presence of other fundamental changes around the time of treatment. For example, the introduction of the BBR in Chile went hand-in-hand with the consolidation of power by its dictator, and the one in Panama marked the start of a military dictatorship.

This exercise leads us to adopt an event study design for our baseline estimates. Instead of comparing average pre and post treatment effects, we model the exact timing of the introduction of a BBR and test its effects on fiscal variables in some window around the introduction date. Our results show that in the years leading to the adoption of BBRs the differences in outcome variables between treatment and control countries is, on average, close to zero. This absence of pre-trends suggests no systematic bias coming from selection as long as the selection effect is: i) captured by the observables, and ii) homogenous across countries so that the average effect on the pre-trends does not mask potentially offsetting trends. The use of a set of country and continent-specific year fixed effects enables us to control for unobservable factors that do not vary within countries or within continents in given years. We also control for country-specific parametric time-trends and capture the effect of several time-varying observable variables such as the quality of democratic institutions, but are not able to fully account for unobservable factors with unknown parametric functions. The case studies also suggest that the majority of BBRs were implemented by introducing a new constitution, which may be a confounding event. However, by using placebo event-studies we do not find evidence that constitutional changes alone generally matter for our outcome variables.

Using our preferred sample of 132 countries from 1945 to 2015[11] we show that; *first*, the introduction of a BBR is associated with a reduction in the likelihood of experiencing a sovereign debt crises as defined by Reinhart and Rogoff (2011). This finding shows that not only the level of debt matters but also whether debt will eventually reach unsustainable levels. To our knowledge this link between BBRs and debt crises has not been previously established. *Second*, we estimate that BBRs are associated with an average reduction of the debt-to-GDP ratio by around eleven percentage points. Specifically, we show that this large fiscal consolidation can be explained partly by decreased expenditures and partly by increased tax revenues. These adjustments occur within five years after BBRs are implemented, and we do not find evidence that they are reversed in the direction of pre-reform levels. This paper is, however, uninformative on the total welfare effects of BBRs such as the potential costs associated with the reduced discretion to implement optimal fiscal policy over the long-run. In that sense the parameters that we estimate represent "reduced-form" effects.

The remainder of this paper is structured as follows. After a brief overview of the previous literature in Section 2, Section 3 presents a quantitative case study on the Swiss debt brake with eight further case studies discussed in Section C of the online appendix. Section 4 presents the data on constitutions and historical public finances, and describes our empirical strategy. Sections 5.1 and 5.2 present the main results for the effect of constitutional BBRs on the occurrence of crises and on government finances, followed by several robustness tests in section 5.3. Section 6 concludes.

2 Previous Literature

The literature on the political economy of government spending and debt is vast. It studies the question of why governments persistently spend and borrow at levels that

[11] In other specification our largest sample goes back to 1800 and covers at most 224 countries. While our estimates are robust across these specifications, BBRs vary little in the early years of our sample and, therefore, we focus on the more recent data as our preferred sample.

may deviate from the prescriptions of optimal fiscal policies, and focuses on the set of incentives shaping policy makers' behavior (Persson and Tabellini 2000, Drazen 2000). Early work (Buchanan and Tullock 1962, Brennan and Buchanan 1980) put forward the hypothesis of fiscal illusion to explain the reason behind persistent government deficits. This hypothesis states that voters overvalue current spending relative to the cost of future taxation, thus violating the intertemporal budget constraint and giving rise to a persistent deficit bias. But even if voters put sufficient weight on the cost of future taxation, politicians may still overspend; for example, due to political business cycles. Systematic overspending may also arise when agents can free-ride on the common pool of tax contributions. This phenomenon may perhaps be most salient in federal settings such as in Europe. In a recent paper, Alesina and Passalacqua (2015) provide a review of the theoretical literature on persistent deficits.

One of the main policy actions aimed at preventing governments from running persistent deficits and ensuring fiscal sustainability has been the use of fiscal rules.[12] Researchers have debated the theory of the fiscal and economic effects of fiscal rules. In models of fiscal policy with a benevolent planner, fiscal rules may prevent the planner from running optimal fiscal policies (Chari, Christiano, and Kehoe 1994, Stockman 2001). This could happen if these rules constrain the policy tools for running countercyclical fiscal policy, inducing suboptimal levels of public-goods provision and public investment. Additionally, fiscal rules could give rise to the use of "creative accounting" in national statistics (see for example, Milesi-Ferretti 2004, Von Hagen and Wolff 2006). In practice, however, governments do not always maximize social welfare as a benevolent planner would. Governments' actions result from various political constraints and incentives that induce deviations from optimal policies.

[12]We understand fiscal rules as constraints on fiscal policy through numerical limits or explicit commitments on budgetary aggregates such as budget deficits or government debt (Schaechter, Kinda, Budina, and Weber 2012). This definition does not include procedural rules, also called fiscal institutions, which regulate the drafting, approval, implementation, and surveillance of the budget (Von Hagen 1992, Poterba and von Hagen 1999, Fabrizio and Mody 2006, Hallerberg, Strauch, and Von Hagen 2007, Debrun, Hauner, and Kumar 2009). For a comparative discussion of these two approaches, see Wyplosz (2005, 2013).

When such deviations are large, imperfect or second-best fiscal rules may increase welfare by acting as an institutional check against the government's bias of running persistent deficits. Thus, there exists a trade-off between the potential costs and benefits of fiscal rules. The general welfare implications of this trade-off have been modeled by several recent theoretical papers on the optimality of fiscal rules which do also take account of political economy considerations. Besley and Smart (2007) build a political agency model with moral hazard and adverse selection, and show that the desirability of fiscal restraints is linked to how benevolent governments are. Battaglini and Coate (2008) show that constitutional BBRs can improve citizen welfare depending on the relative size of an economy's tax base compared to the size of spending. Azzimonti et al. (2016) extend this model including to a quantitative calibration. They find that BBRs reduce debt by increasing the expected cost of taxation, but raise the costs of less responsive public good provision in the future. The optimality of such discretion in policy making is also studied by Halac and Yared (2014) using a dynamic mechanism design approach. Barseghyan and Battaglini (2016) develop a theory of endogenous growth which also has ceilings on fiscal policy. Martin (2017) additionally considers monetary rules.[13]

The existence and relative size of these potential costs and benefits is essentially an empirical question, and a large empirical literature attempts to estimate these opposite effects. On the cost side, for example, Levinson (1998), Fatas and Mihov (2006), and Clemens and Miran (2012) study the effect of fiscal rules on the cyclicality of fiscal policy and whether they ultimately affect business cycles. What the empirical literature is most concerned with, however, is whether fiscal rules are effective, and if so, the size of their effect on various fiscal outcomes such as government debt, budget balances, expenditure, or revenue.[14]

[13]The following papers discuss the political economy of BBRs: Brennan and Buchanan (1980), Niskanen (1992), Buchanan (1995), and Rose (2010). They do not provide frameworks in which to evaluate the costs and benefits of rules.

[14]A related strand studies the constraining effect of fiscal rules that operate through market mechanisms (see for example, Poterba and Rueben 2001, Kelemen and Teo 2014). The argument is that fiscal rules do not necessarily depend on a credible threat of judicial enforcement, but may function through the punishment of sovereigns by bond markets when debt or deficits exceed some focal point specified in the fiscal rule. Relatedly, (Hatchondo, Martinez, and Roch 2015) use a sovereign default model to

The effectiveness of fiscal rules has been studied extensively on both subnational (see Poterba (1994, 1996) for the United States; Feld and Kirchgässner (2008) for Switzerland; and Grembi, Nannicini, and Troiano (2016) for Italy), national (see Dahan and Strawczynski (2013) and Tapsoba (2012) for OECD and developing countries), and also supranational levels (particularly in Europe, see Hallerberg et al. 2007, Debrun, Moulin, Turrini, i Casals, and Kumar 2008, Hallerberg, Strauch, and Von Hagen 2009, Blume and Voigt 2013). These are only a few examples from this abundant literature which still contains disagreements on whether fiscal rules effectively constrain fiscal policy, as well as on which types of rules prevail most often and in which institutional environments. Heinemann, Moessinger, and Yeter (2016) provide a meta-analysis of this literature and find some support for the hypothesis that fiscal rules constrain fiscal policies. However, after controlling for the quality of the identification strategies used in these studies, the statistical significance of the average result vanishes. Moreover, as discussed above, the effectiveness of BBRs that are enshrined in national constitutions has not yet been studied.[15]

3 A Synthetic Case Study for Switzerland

This section uses the synthetic control method to analyze the case of Switzerland's adoption of a constitutional BBR in 2001 through a referendum.[16] The remaining eight case studies along with a more thorough discussion of the method are presented in Section C of the online appendix.

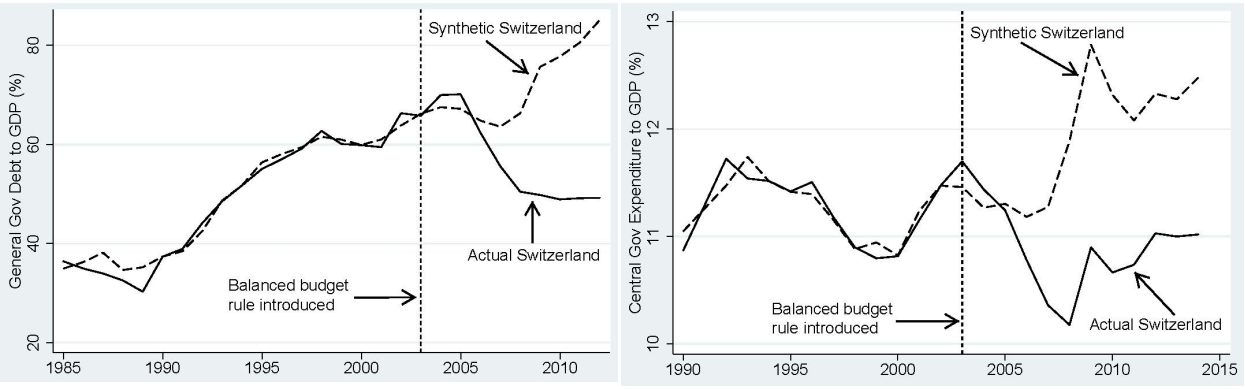
show that in such settings limiting rules on debt spreads can generate larger welfare gains than more conventional rules on debt levels.

[15]Related to constitutional studies, there exists a fairly large literature on the economic effects of constitutions (for example, Mueller 2003), and work that attempts to empirically identify these effects (see Persson and Tabellini 2003, Voigt 2011, Ardanaz and Scartascini 2014). Our paper is relevant to this literature in that it presents evidence on direct policy effects of constitutional provisions.

[16]Pfeil and Feld (2016) also present a synthetic control analysis of the Swiss BBR and, similar to our results, find that the introduction of the BBR improved budget balances by 3.6 percentage points on average in a post-intervention period covering five years.

Figure 1: Fiscal Effects of the Swiss Constitutional Balanced Budget Rule of 2003: A Synthetic Control Method

(a) Debt/GDP (%) **(b)** Expenditure/GDP (%)



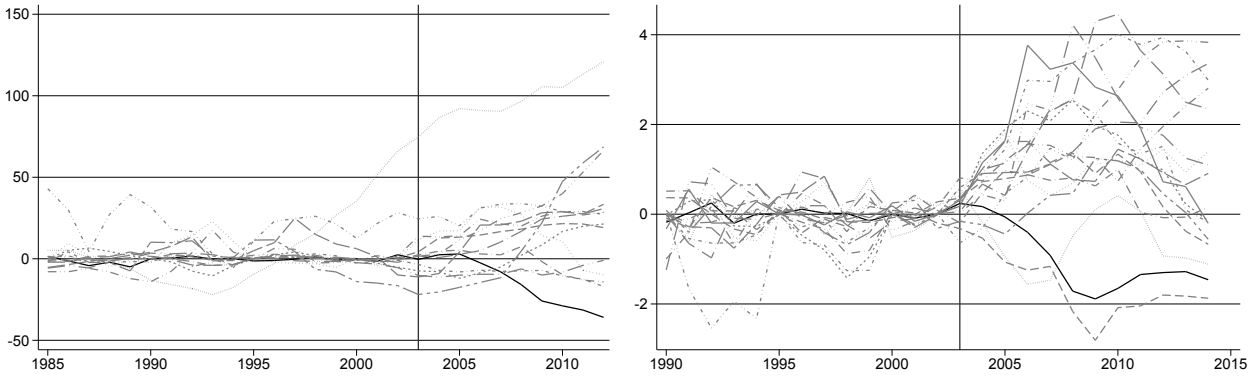
Notes: The graph plots debt (a) and expenditure (b) as a percentage of GDP for real Switzerland vs. synthetic Switzerland. The vertical line denotes the year when the BBR was introduced. Table C1 reports the covariates used for matching, and their means for the treated and synthetic units. Donor countries (weights) for graph (a) are France (0.6), Papua New Guinea (0.151), Finland (0.129), Japan (0.078) and South Korea (0.042). The RMSPE is 1.93. Donor countries (weights) for graph (b) are Bangladesh (0.264), Luxembourg (0.205), Uruguay (0.19), Ireland (0.181), Mexico (0.081), Dominican Republic (0.044) and Albania (0.035). The RMSPE is 0.12. For further analysis on Switzerland, see figure 2.

The constitutional amendment in Switzerland came in 2001, with 85 percent approval in a referendum. The amendment became effective in 2003, with two additional years reserved for a transition period. The Swiss rule states that the budget must be in balance after adjusting for economic conditions. Thus, the rule calls for a structural balance in the short-run and absolute balance over the course of a business cycle (see Table B3 of the online appendix for Article 126 describing the BBR. For further discussion of the Swiss debt brake see Danninger 2002, Geier 2011, Pfeil and Feld 2016).

Figure 1 shows that following the introduction of the BBR, actual levels of both debt and expenditure have been substantially lower and have diverged increasingly from their counterfactual levels; that is, the hypothetical levels of debt and expenditure had Switzerland not passed such an amendment. Given that the assumptions of this method hold, these findings imply that the effect of introducing a BBR in Switzerland, at its peak, was a decrease in the debt-to-GDP ratio of around 30 percentage points and a two percentage points decrease in the government expenditure-to-GDP ratio.

Figure 2: Switzerland: Introduction of BBR in 2003 – Placebo Tests

(a) Debt/GDP (%) **(b)** Expenditure/GDP (%)



Notes: The graph plots government debt (a) and expenditure (b) gaps for Switzerland (dark line) and placebo gaps for other control countries (gray lines). Placebo gaps are constructed for other developed countries in the pool of controls: United States, United Kingdom, France, Italy, Netherlands, Norway, Canada, Japan, Finland, Ireland, Portugal, Australia, and Israel. See also figure 1

Figure 2 extends the analysis by restricting the pool of donor countries to developed countries only and by generating placebo tests for each of these donors (similar to Abadie et al. 2010). The dark lines in panels (a) and (b) represent the gap in government debt and expenditures, respectively, between Switzerland and its synthetic control. The gray lines represent gaps in government debt and expenditures for other developed countries and their corresponding synthetic controls. Notice that the gap for Switzerland is unusually large relative to the ones observed for the rest of the sample, which lends support to our hypothesis that the gap for Switzerland was partially caused by the introduction of the BBR in 2003.

The Swiss case presented above suggests a strong and sizable association between BBRs and fiscal outcomes. However, it may also be seen as an illustrative example of the hypothesis that the introduction of fiscal rules may be triggered by deteriorating fiscal positions, such as the increasing levels of debt in Switzerland in response to the unexpectedly protracted low growth following a severe financial crisis in the early 1990s. In this context, the Swiss debt brake serves as a symbol of the political resolve as driven by the conservative fiscal preferences of the population. This inherent endogeneity of

constitutions casts doubts on whether the synthetic case studies can identify strictly independent effects of fiscal rules.

Regarding the remainder of the case studies presented in Section C of the online appendix, seven out of nine broadly support the hypothesis that BBRs are negatively associated with government debt and expenditures, while the remaining two cases do not provide a clear-cut picture. These effects are substantial in size, but vary among countries from roughly ten to thirty percent for reductions in debt ratios, and from one to seven percent for reductions in expenditure ratios ten years after introducing a BBR.

4 Data and Empirical Design

4.1 Constitutional Data

Sample of constitutions: This paper exploits a novel data set that contains information on the characteristics of the national constitutions of all independent states from 1789 to the present. The data set was collected by the Comparative Constitutions Project (CCP) (Elkins, Ginsburg, and Melton 2014) and has been recently used in the political science and law literatures. For instance, see Elkins (2010), Cheibub, Elkins, and Ginsburg (2013), Ginsburg and Versteeg (2014), Melton and Ginsburg (2014), Blöchliger and Kantorowicz (2015), Bjørnskov and Voigt (2015).[17]

The left panel of Figure 3 shows that the share of sovereign states with constitutions increased steadily from 1816 until 1980. After 1980, almost all countries had some form of constitution.[18] The figure also shows the share of countries that have constitutions and make data available on central-government debt or expenditures. After 1970 the

[17]CCP defines a document as a constitution if it meets at least one of the following conditions: (a) the document is explicitly referred to as the constitution, fundamental law, or basic law; (b) the document contains explicit provisions that establish its contents to be the highest level of law, either because the document is entrenched or it limits future law; or (c) the document changes the basic pattern of authority by establishing or suspending an executive or legislative branch of government.

[18]The data on the number of independent states over time are taken from the 2013 updated data set of Gleditsch and Ward (1999).

share of countries with this information increases substantially because most government financial statistics from the IMF go as far back as 1970.

Figure 3: Evolution of Constitutional Balanced Budget Rules over Time

Notes: Own calculations based on data from the Comparative Constitutions Project and Gleditsch and Ward (1999).

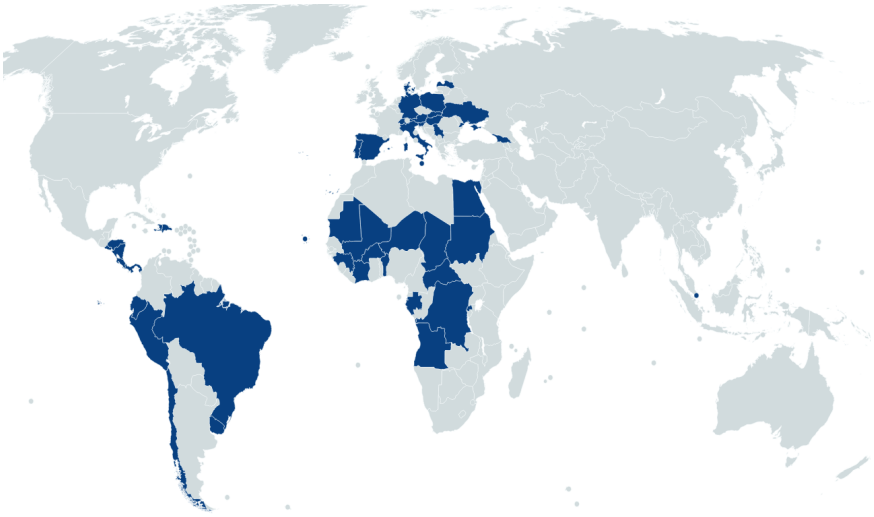
Balanced budget rules: The CCP divides countries into three categories according to whether the constitution includes a provision for a balanced budget. The first category refers to countries with a constitution that does not allow for any type of legislation related to the budget; the second category refers to countries whose constitutions allow for legislation related to the budget but do not have a BBR; the third category includes countries with constitutions that allow for legislation related to the budget and have a BBR. The last category is used to identify the BBRs.[19]

Overall, forty-five countries in our sample at some point had a BBR in their constitution. The right-hand panel of Figure 3 reports the share of countries with constitutions that have a BBR. These countries appear in the map of Figure 4, while Figure 5 presents the historical time line of BBR adoptions. In addition, Table B1 of the online appendix lists these countries along with the periods when a BBR was in place (column 3). The table also lists the periods when data on government debt are available (column 4).[20]

[19]The CCP defines legislation related to the budget as legislation that lays out revenues and expenditures for some period of time.

[20]Of our outcome variables, the richer data set is the one on general government debt. If we look at periods with BBRs and at data on government expenditures, the sample is smaller than the one depicted in the last column of Table B1.

Figure 4: Constitutional Balanced Budget Rules around the World



Notes: Shaded areas represent the countries (45 in total) that had a balanced budget rule sometime between 1800 and 2016. List of these countries by region (year BBR first introduced in parentheses):
Africa: Angola (2010), Benin (1960), Burkina Faso (1960), Cape Verde (1980), Central African Republic (1959), Chad (1960), Cote d'Ivoire (1960), Republic of the Congo (1967), Egypt (2007), Gabon (1975), Guinea (1983), Mali (1960), Mauritania (1961), Niger (1964), Rwanda (1962), Sudan (1973);
Asia: Singapore (1965);
Central America: Costa Rica (1949), Dominican Republic (1955), El Salvador (1939), Haiti (1983), Honduras (1873), Nicaragua (1905), Panama (1983);
South America: Brazil (1946), Chile (1980), Ecuador (1906), Uruguay (1942), Peru (1979);
Europe: Austria (2008), Denmark (2014), Germany (1871), Georgia (2013), Hungary (2011), Italy (2014), Latvia (2013), Malta (2014), Poland (1999), Portugal (1822), Serbia (2006), Spain (2011), Slovakia (2012), Slovenia (2016), Switzerland (1999), Ukraine (1996).
Source: Own compilation based on data from the CCP (Elkins et al. 2014) and the IMF fiscal-rules database (Budina, Kinda, Schaechter, and Weber 2012, Bova, Kinda, Muthoora, and Toscani 2015). See also tables B1 and B3.

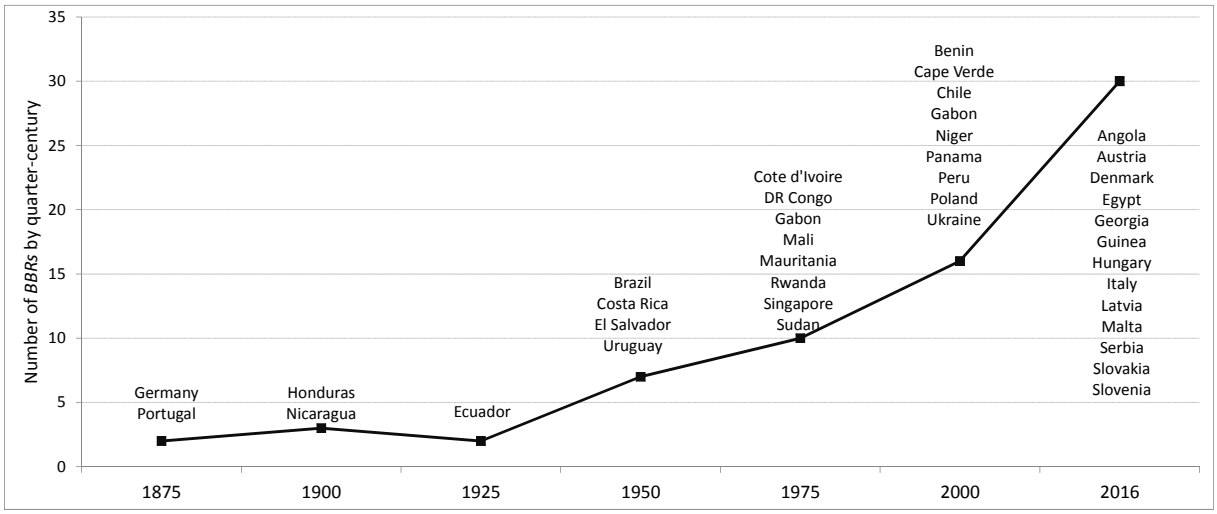
The relevant articles or excerpts of constitutions containing BBRs are reported in Table B3 of the online appendix.[21]

4.2 Outcome Variables and Controls

Crises and public finance data: Our objective is to identify whether there is an association between a country's fiscal performance and constitutional balanced budget provisions. Specifically, we focus on the occurrence of sovereign debt crises using the data from Reinhart and Rogoff (2011). A debt crisis is defined as a failure by the government to meet an interest or principal payment on the due date, and also includes episodes involving the freezing of bank deposits and/or forcibly converting such deposits from foreign to local currency.

[21]These articles were taken from a sub-set of recent constitutions for which the Constitute Project provides English translations; see, https://www.constituteproject.org/search?lang=en.

Figure 5: Time Line of Balanced Budget Rule Introductions since 1850



Notes: Figure plots the (noncumulative) number of BBRs by quarter century since 1850. Data labels indicate the countries that have introduced a BBR for the first time within the period.
Source: Own compilation based on data from the CCP (Elkins et al. 2014) and the IMF fiscal rules database (Budina et al. 2012, Bova et al. 2015).

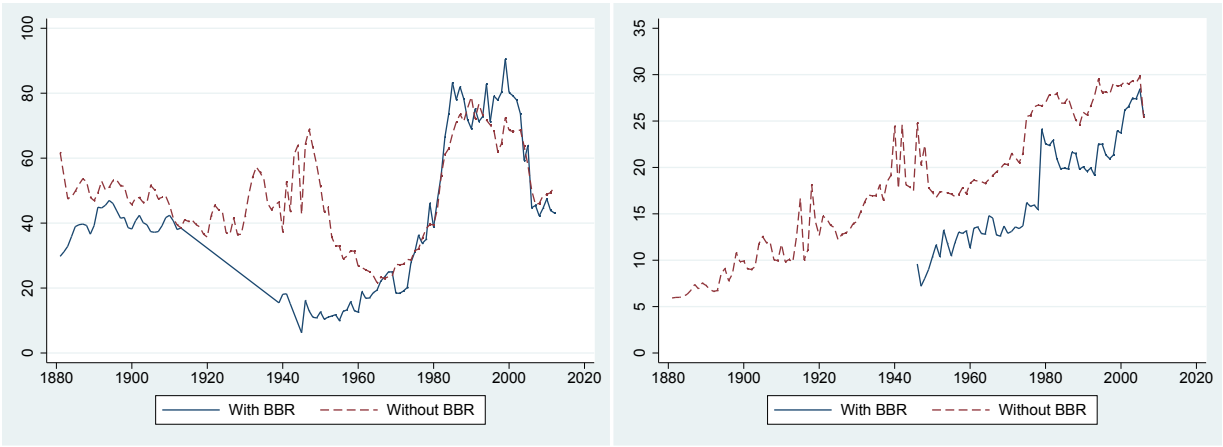
In addition, we study government's debt, expenditure, and tax revenue (as shares of GDP) as measures of a country's fiscal performance. Historical data on government expenditure and tax revenue come from Cagé and Gadenne (2014), and data on general government debt come from Abbas, Belhocine, Ganainy, and Horton (2010).[22] Both of these studies compile historical information from different sources and are to the best of our knowledge the most extensive records available. Cagé and Gadenne (2014) collect information on government expenditures as far back as 1830, and Abbas et al. (2010) report data on government debt from 1880 onward.

Figure 6 plots the evolution of average levels of government debt (subfigure a) and expenditure (subfigure b), as a percentage of GDP, for countries with and without BBRs. As we will show later in the paper, these averages hide a considerable amount of heterogeneity across both time and countries. However, this first piece of evidence suggests

[22] Abbas et al. (2010) define the general government sector as "all government units and all non market nonprofit institutions that are controlled and mainly financed by government units, comprising the central, state, and local governments. The general government sector does not include public corporations or quasi-corporations." However, due to data limitations for the earlier years in their sample, they use central government debt whenever general government debt was not available.

Figure 6: Evolution of Average Debt and Expenditure with and without Balanced Budget Rules, 1880-2012

(a) Debt/GDP (%) **(b)** Expenditure/GDP (%)



Notes: Own calculations based on constitutional data from the CCP (Elkins et al. 2014) and fiscal data from Cagé and Gadenne (2014) and Abbas et al. (2010). The sample includes countries with population over 1.5 million and excludes outliers at top and bottom 1 percent. For a description of the sample, see section 4.

lower levels of debt (until 1970s) and expenditure when constitutions include explicit fiscal provisions for balanced budgets.

Other data: As control variables in our analysis we also include population size, per capita income, and quality of democracy. We proxy the quality of a country's democracy using the Polity scores from the Center for Systemic Peace. The scores originally ranged from -10 to 10, from complete autocracy to complete democracy, but for exposition we normalize the score to range between zero and one. The population and income data come from the Maddison Project database, with per capita income measured in 1990 international dollars.[23]

Table 1 reports information about the central variables in our sample. The table shows the number of countries for each variable, as well as summary statistics and the sources of these variables.

[23]The Maddison-Project, http://www.ggdc.net/maddison/maddison-project/home.htm, 2013 version. International dollars refers to the Geary-Khamis dollar, which is a fictional currency set to have the same purchasing power parity as the US dollar.

Table 1: Summary Statistics, Sample Coverage, and Data Sources

Variable	Countries	Obs.	Mean	St.D.	10th pct.	90th pct.	Source
Balanced budget rule	193	6,689	0.11	0.32	0.0	1.0	CCP (Elkins et al. 2014)
Gen. gov. debt (% of GDP)	177	7,011	56.3	60.3	12.6	105.5	Abbas et al. (2010)
Central gov. expenditure (% of GDP)	128	4,068	25.5	13.1	12.0	41.8	Cagé and Gadenne (2014)
Central gov. tax revenue(% of GDP)	130	4,157	18.0	9.3	8.2	31.7	Cagé and Gadenne (2014)
Debt crisis	70	14,132	0.12	0.33	0.0	1.0	Reinhart and Rogoff (2011)
Population (million)	193	11,880	23.6	92	0.1	46	The Maddison Project
Per capita GDP (ths. USD)	157	8,643	4.8	5.7	0.7	12.8	The Maddison Project
Polity score (normalized)	187	9,249	0.5	0.4	0.1	1.0	Center for Systemic Peace

4.3 Estimation

Event study design: In our baseline estimates we use a conventional event study design (Sandler and Sandler 2014) and, in additional estimations, use a standard difference-in-differences specification (St Clair and Cook 2007). We primarily rely on the event study design because it provides yearly estimates of the effect of the event – the adoption of a BBR – on the dynamics in the outcome variables – the probability of debt crises and government finance variables – within a window before and after the event. Examining the trend in the outcome variables in the periods leading to the event sheds light on whether the adoption of a BBR was associated with changes in the outcome variable, which is a critical test of our identification. Examining changes in the outcome variables in the periods after the event provides estimates of the size and the dynamics of the treatment effect.[24]

The event study design is implemented using the following specification:

$$y_{it} = \beta_0 + \sum_{j=-5, j\neq -1}^{5} \delta_j \mathbf{1}(t - c^i = j) + \mathbf{X_{it}}\boldsymbol{\beta} + \tau_t + \lambda_i + \nu_d \times \mu_c + \delta_{it} + \varepsilon_{it} \qquad (1)$$

[24]For applications of event study designs see for example, Asatryan and Havlik (2017), Asatryan and Peichl (2016), Fuest, Peichl, and Siegloch (2017), Hoynes, Page, and Stevens (2011), Jacobson, LaLonde, and Sullivan (1993).

where i indicates countries and t indicates years. The dependent variable y_{it} is either a dummy for crisis years or a continuous variable measuring the annual growth in government debt, expenditure, or tax revenue as a percentage of GDP. The variable c^i corresponds to the year in which a BBR was adopted in country i. Indicator variables are included for the years before and after the implementation of the BBR within a five year window. These eleven event dummies are our main variables of interest. The year prior to the implementation of the rule, $t-1$, is used as the reference year. The window ends $t-5$ and $t+5$ are the cumulative sum of all events happening, respectively, before and after that point in time (McCrary 2007). The vector $\mathbf{X_{it}}$ includes controls for population size, per capita GDP, quality of democracy (Polity score normalized to be between 0 and 1), and an indicator variable for years when the constitution was amended or a new constitution was drafted.[25] We also control for country-specific linear time trends (δ), country fixed effects (λ), year fixed effects (τ), and for decade specific continent fixed effects ($\nu \times \mu$).[26] For inference, we cluster the standard errors at the level of countries.

Difference-in-differences design: In addition to the event study we also implement a standard difference-in-differences model to estimate the average treatment effect of BBRs. This average treatment effect is equivalent to the average difference of the post-treatment event study coefficients relative to the pre-treatment coefficients. The model is:

$$y_{it} = \beta_0 + \beta_1 D_{it} + \mathbf{X_{it}}\boldsymbol{\beta} + \tau_t + \lambda_i + \nu_d \times \mu_c + \delta_{it} + \varepsilon_{it} \tag{2}$$

where all variables have the same definition as in Equation 1. The indicator variable D_{it} equals one when the constitution specifies a BBR and zero otherwise. Thus, the

[25]The robustness tests of Table A2 in the online appendix additionally control for the occurrence of civil wars.

[26]In several robustness tests we include year specific continent fixed effects (instead of $\nu \times \mu$), but because the estimation of these many dummies is computationally prohibitive in the baseline regressions we use the decade dummies.

indicators coded as zero include country-year observations where a country's constitution allowed for legislation related to the budget but did not include a BBR.[27]

Identification: Identifying the causal effect of fiscal rules on fiscal outcomes is generally not straightforward because the adoption of such rules is likely to be endogenous. One source of endogeneity may come from selection bias; for example, if past fiscal performance influences the probability that a country implements a rule. Second, selection bias could also arise from the failure to account for omitted variables that simultaneously drive the implementation of fiscal rules and correlate with fiscal outcomes. Third, because the introduction of a constitutional BBR by definition involves a change in the constitution, either through amendments or through the introduction of a new constitution, the potential independent effects of these additional changes on fiscal outcomes must be ruled out.

Using the event study design of equation 1 we estimate that our control and treatment groups on average follow common trends in the pre-treatment period. The absence of average pre-trends suggests no systematic bias coming from selection subject to two assumptions. First, it assumes that selection is correlated with the observable variables on fiscal outcomes. Second, this test is informative only for the average difference between the treatment and control groups which may in principle mask potentially offsetting trends. The pre-trends that are statistically indistinguishable from zero are estimated with a reasonable precision. Therefore it is unlikely but not fully excludable that this average effect hides potentially offsetting effects.

Our estimates would still be biased if shocks that are omitted from our specification systematically affect both fiscal rules and fiscal outcomes. For this reason, we control for observable variables such as the quality of democratic institutions. However, a central

[27]We omit country-year observations with constitutions that did not allow for any type of legislation related to the budget. This is because the subset of constitutions that allow for legislation on the budget is more comparable. In section 5.3 we show that our results are robust to including all constitutions in the analysis.

unobservable candidate which we cannot control for are the voters' fiscal preferences.[28] To partially address this concern of omitted variable bias, we include country fixed effects and country-specific parametric time trends. These fixed effects are likely to be effective with omitted unobservable factors that are fairly constant over time, such as fiscal preferences. But we cannot fully rule out this possibility. Given the geographic heterogeneity of our sample, we also include continent-specific decade (or year) fixed effects. To the degree that these two-way fixed effects do not capture other time and within-continent varying unobservable factors in Section 5.3 we perform the selection-on-unobservables test proposed by Altonji, Elder, and Taber (2005).

In order to control for the simultaneity between constitutional BBRs and other changes to the constitution, we introduce indicator variables for the occurrence of constitutional reforms to partial out changes in fiscal outcomes at the time of such events. In addition, in Section 5.3 we run placebo event-studies on the effects of all constitutional changes and amendments on our outcome variables, and do not find evidence that these changes generally matter for our variables of interest.

5 Results

5.1 Probability of Sovereign Debt Crises

We first study the effect of BBRs on the occurrence of sovereign debt crises using the data collected by Reinhart and Rogoff (2011). Figure 7 presents the results from the event study design, where sub-figures (a) and (b) show the estimated probabilities of observing, respectively, any crises and separately external or domestic crises around a five year window of introducing a BBR. The underlying regressions control for per capita GDP, population, quality of democracy, constitutional change, country specific time trends, and include country, year, and continent times decade fixed effects.

[28] In an attempt to untangle the endogenous relation between fiscal rules and fiscal performance, Heinemann, Osterloh, and Kalb (2014) and Krogstrup and Wälti (2008) develop proxies for voter preferences.

Figure 7(a) shows that in the first two years after introducing a BBR the likelihood of a crises drops by about 30% compared to the pre-introduction year. This effect is statistically significant at the 99% level. Importantly, the estimates for the years leading to the introduction of a BBR do not show evidence of statistically significant pre-trends on average. Figure 7(b) additionally shows that these effects are driven by a reduced likelihood of external rather than domestic crises.

Table 2 collects the difference-in-difference estimates. Consistent with the results of the event study design, having a BBR in a constitution is associated with a reduced probability of observing debt crises. The magnitude of this average effect is 16.7%, which increases when controlling for the level of government debt-to-GDP ratio in even numbered columns. The direction of these effect are robust when controlling for continent times year specific effects in columns 3-4, and when estimating the specification with a poisson model in columns 5-6 instead of the linear OLS model.

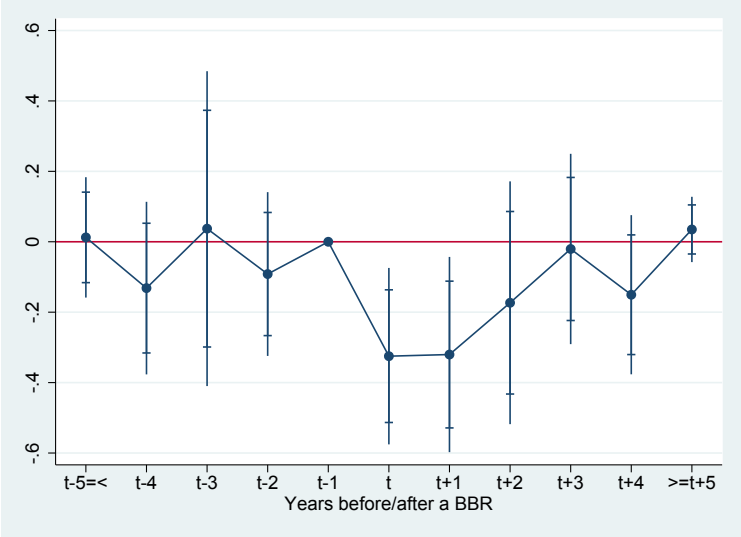
5.2 Debt, Expenditure, and Tax Revenue

We now turn to the variables capturing government's fiscal decisions: annual growth rates in the ratio of debt, expenditure, and tax revenue to GDP. We apply the event study design of Section 5.1 with the same set of controls and fixed effects. Figure 8(a) shows a statistically significant reduction in the growth rate of debt two and four years after introducing a BBR by about 9% and 14% compared to the pre-treatment year. Figure 8(b) suggests that this reduction in debt might be achieved by a decrease in expenditures and an increase in tax revenues. As in the last sub-section, the effect of BBRs on fiscal variables in years leading to their introduction is not significantly different from zero for any of the three dependent variables.

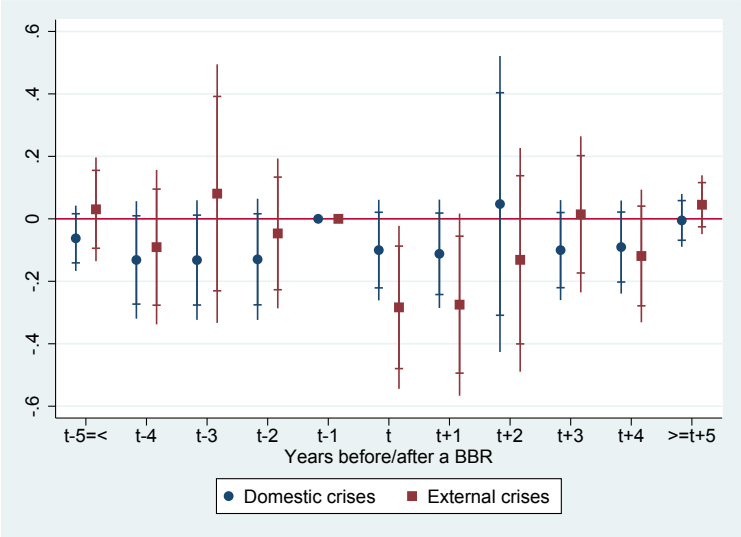
Table 3 reports the difference-in-difference estimates. Columns 1-3 and 4-6 report the regressions on, respectively, levels and growth rates of the three fiscal variables of interest. Depending on data availability of the dependent variable, the sample size varies across specifications, from 110 to 132 countries. Given the historical nature of the data

Figure 7: Event study design: Probability of debt crises

(a) All crises



(b) Domestic or external crises



Notes: Figures plot point estimates of the event study design of the effect of BBR introduction in year t on the probability of (a) all crises and (b) separately for domestic or external crises. Point estimates are relative to the baseline of $t-1$. Vertical lines denote the 95% and 99% confidence intervals (the former denoted by a horizontal line). Each sub-figure represents one regression on post-1945 data. All regressions control for log per capita GDP, log population, polity score of democracy, constitutional change, country specific time trends, and include country, year, and continent times decade fixed effects. Standard errors are clustered by country.

with potential measurement errors involved, we estimate the equations by trimming the outliers of the dependent variables at 1%.[29]

[29]For example, the maximum (99-percentile) value of debt in our sample exceeds 2,000% (240%) of GDP; the corresponding statistics for expenditure and tax revenue ratios are, respectively, 219% (60%)

Table 2: Difference-in-difference: Probability of debt crises

	(1)	(2)	(3)	(4)	(5)	(6)
Sample:	Post-1945					
VARIABLES	Domestic and/or external debt crises					
Method:	OLS		OLS		Poisson	
Balanced budget rule	-0.156***	-0.192***	-0.184***	-0.273***	-1.074**	-1.276**
	(0.041)	(0.047)	(0.033)	(0.046)	(0.426)	(0.553)
Ln per capita GDP	-0.256***	-0.243***	-0.401***	-0.494***	-2.195***	-1.843***
	(0.071)	(0.083)	(0.106)	(0.147)	(0.338)	(0.491)
Ln population	0.380***	0.216**	0.407**	0.384	3.978***	3.669***
	(0.116)	(0.102)	(0.195)	(0.324)	(0.556)	(0.863)
Polity2 (normalized)	-0.001	0.086	0.094*	0.145***	-0.040	0.124
	(0.065)	(0.058)	(0.055)	(0.054)	(0.289)	(0.325)
Constitutional change	0.000	-0.000	0.007	0.011	-0.058	-0.064
	(0.016)	(0.020)	(0.016)	(0.018)	(0.128)	(0.143)
Debt / GDP		0.002***		0.002**		0.007***
		(0.001)		(0.001)		(0.002)
Continent x Year FE			Yes	Yes		
Observations	2,795	2,276	2,855	2,288	1,822	1,367
(Pseudo)R-squared	0.220	0.231	0.420	0.436		
Wald Chi2					260.1	194.7
Number of countries	57	57	58	58	38	36

*** p<0.01, ** p<0.05, * p<0.1

Notes: Dependent variable is a dummy taken from Reinhart and Rogoff (2011) for domestic or external debt crisis. All regressions include country and year fixed effects (not reported). Standard errors are clustered by country.

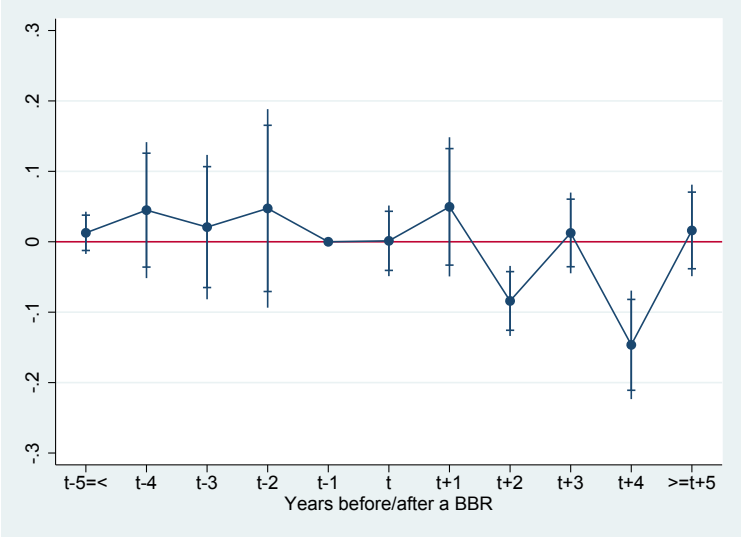
The main result of Table 3 is a negative, statistically significant, and economically large association between constitutional-level BBRs and government debt and expenditure, but a no statistically significant effect on tax revenues. These results hold both for the specification in levels and growth rates. Regarding the magnitude, the introduction of a BBR in a constitution is associated with an average decrease of debt-to-GDP and expenditure-to-GDP ratios of about eleven and three percentage points, respectively (columns 1-2). These results are consistent with those of the event study design with the exception of tax revenues which, in the difference-in-difference estimations, is not statistically distinguishable from zero.

Regarding the control variables, both per capita GDP and population have negative signs when significant, indicating that richer and more populous countries have lower

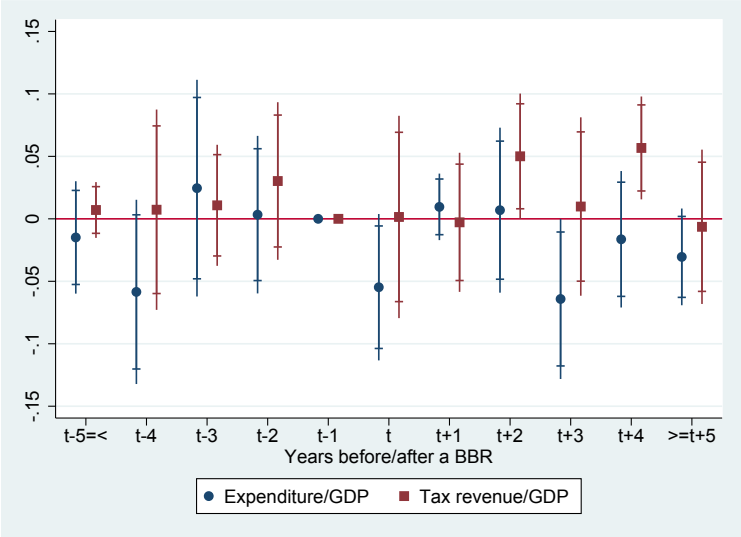
and 122% (45.19%). Table 4 presents robustness tests by averaging the data and by winsorizing the outliers.

Figure 8: Event study design: Government finances

(a) Growth in Debt/GDP



(b) Growth in Expenditure/GDP and Tax/GDP



Notes: Figures plot point estimates of the event study design of the effect of BBR introduction in year t on the annual growth rate of (a) debt/GDP and (b) expenditure/GDP and tax/GDP. Point estimates are relative to the baseline of $t-1$. Vertical lines denote the 90% and 95% confidence intervals (the former denoted by a horizontal line). Each sub-figure represents one regression on post-1945 data. All regressions control for log per capita GDP, log population, polity score of democracy, constitutional change, country specific time trends, and include country, year, and continent times decade fixed effects. Standard errors are clustered by country.

levels of government debt and expenditure. The estimated coefficients on the Polity index of democracy are statistically significant only in one specification, and the dummy for constitutional changes is never significantly different from zero.

Table 3: Difference-in-difference: Government finances

	(1)	(2)	(3)	(4)	(5)	(6)
	Levels			Growth rates		
VARIABLES	Debt	Exp	Tax	Debt	Exp	Tax
Balanced budget rule	-11.106**	-3.504***	-0.389	-0.038*	-0.035***	-0.006
	(5.222)	(0.856)	(0.974)	(0.023)	(0.012)	(0.026)
Ln per capita GDP	-23.911**	-4.177*	1.427	0.014	0.018	-0.003
	(9.673)	(2.173)	(1.226)	(0.023)	(0.012)	(0.009)
Ln population	-9.953	-20.261***	-13.516***	-0.067***	-0.003	-0.014
	(15.496)	(3.771)	(2.625)	(0.022)	(0.018)	(0.017)
Polity2 (normalized)	-5.194	0.268	-0.874	-0.003	0.012	0.038***
	(6.147)	(1.204)	(1.139)	(0.017)	(0.014)	(0.013)
Constitutional change	-1.191	0.202	0.212	0.005	0.007	0.006
	(1.095)	(0.389)	(0.212)	(0.006)	(0.005)	(0.005)
Observations	3,797	2,816	2,850	3,612	2,714	2,768
R-squared	0.365	0.407	0.393	0.136	0.051	0.040
Countries	132	110	112	132	110	112

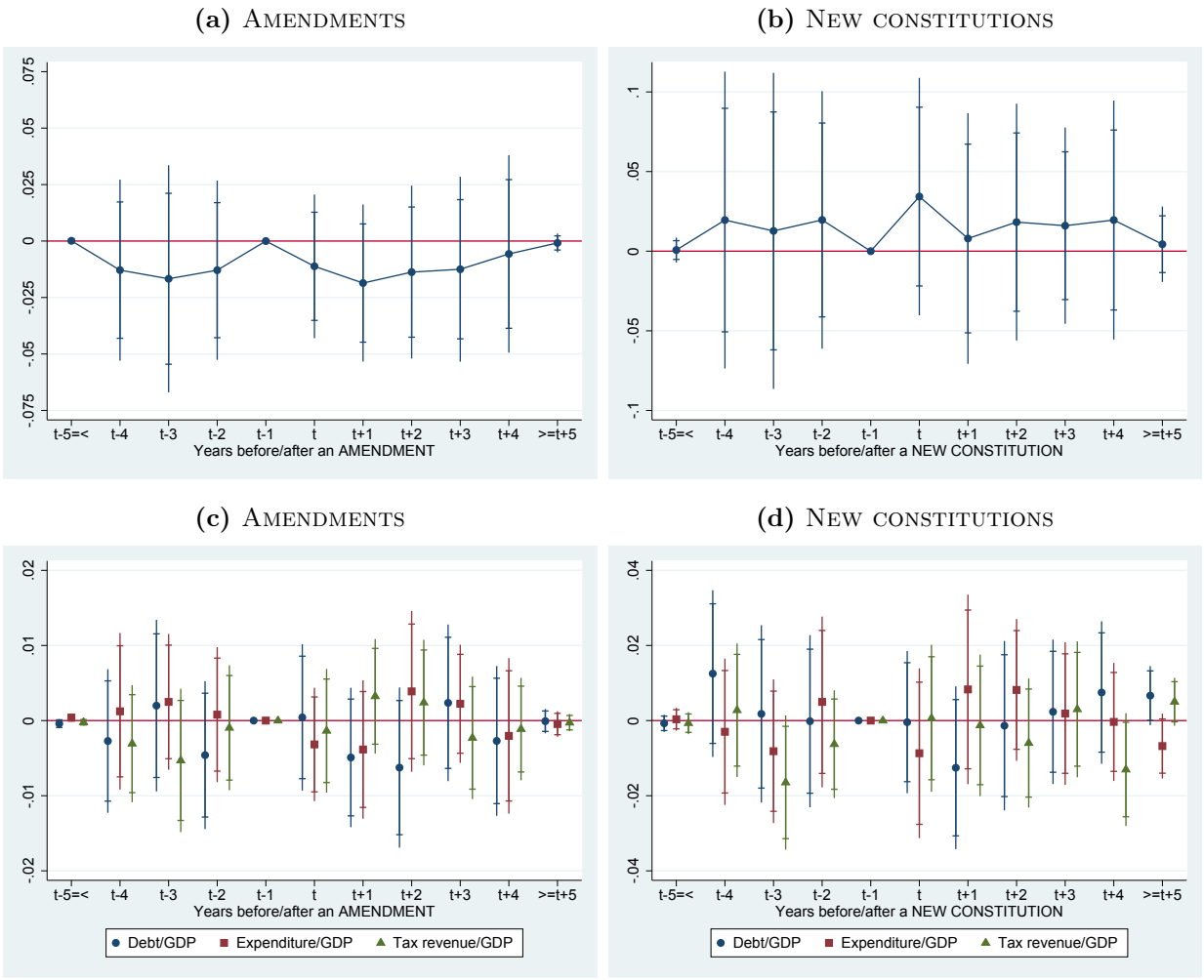
*** p<0.01, ** p<0.05, * p<0.1

Notes: The dependent variables are government debt, expenditure and tax revenue, and are measured as a share of GDP in percentage points in columns 1-3 and as annual growth rates in columns 4-6. Outliers of the dependent variables are trimmed at the top and bottom percentile of the distribution. All regressions include country and year fixed effects (not reported). Standard errors are clustered by country.

5.3 Robustness Tests

We replicate the above baseline results by testing: (a) whether confounding events around the time of treatment drive the results; (b) if the results can be replicated on the total sample going back to the year 1800; (c) the sensitivity of estimates to outliers; (d) the robustness of results to different estimation techniques; (e) the robustness of results to alternative definitions of BBRs and a wider set of control variables; and (f) for the possibility (and relative size) of selection bias. Finally we test whether the enforcement of BBRs depends on the quality of democratic institutions.

Figure 9: Placebo event study: Effect of constitutional changes on probability of crises (**a** & **b**) and government finances (**c** & **d**)



Notes: Figures plot point estimates of the event study design of the effect of constitutional amendments (a & c) and new constitutions (b & d) in year t on the probability of crises (a & b) and growth in the share of government debt, expenditure and tax revenue in GDP (c & d). The results on crises (a & b) and government finances (c & d) follow the same specifications as in Figures 7 and 8, respectively. All regressions control for log per capita GDP, log population, polity score of democracy, country specific time trends, and include country, year, and continent times decade fixed effects. Standard errors are clustered by country.

Table 4: Robustness tests: Government finances

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Specification:	Post-1800 Sample			Five-year Averages			Winsorize Outliers			Continent x Decade FE		
VARIABLES	Debt	Exp	Tax	Debt	Exp	Tax	Debt	Exp	Tax	Debt	Exp	Tax
Balanced budget rule	-7.487*	-2.614***	-0.310	-12.399**	-3.222**	-1.039	-11.387**	-3.262***	-0.255	-9.660*	-2.491**	0.762
	(4.389)	(0.923)	(0.886)	(5.757)	(1.485)	(1.234)	(5.108)	(0.723)	(0.826)	(5.392)	(0.960)	(0.927)
Ln per capita GDP	-8.553	-2.966*	-0.035	-23.886*	-4.745**	0.481	-20.223**	-3.644*	1.513	-29.126***	-2.461	3.578***
	(5.555)	(1.739)	(1.596)	(12.194)	(2.130)	(1.399)	(8.289)	(1.976)	(1.231)	(9.552)	(2.373)	(1.228)
Ln population	-3.981	-10.643***	-7.813***	-12.394	-20.499***	-16.724***	-10.580	-17.671***	-11.469***	-52.607***	-8.054**	-0.536
	(7.018)	(1.853)	(2.454)	(15.975)	(3.703)	(2.667)	(13.850)	(3.138)	(2.233)	(17.398)	(3.348)	(3.348)
Polity2 (normalized)	-0.205	1.942**	-0.132	-6.640	-0.122	-1.592	-5.199	0.882	-0.565	0.975	1.367	-0.342
	(6.012)	(0.948)	(1.024)	(6.564)	(1.611)	(1.453)	(5.668)	(1.114)	(1.088)	(6.367)	(1.143)	(0.932)
Constitutional change	-0.427	0.423	-0.136	-7.844*	0.739	0.640	-0.993	0.254	0.117	-0.964	0.114	0.041
	(1.190)	(0.288)	(0.191)	(4.406)	(1.440)	(0.886)	(1.017)	(0.340)	(0.176)	(0.953)	(0.304)	(0.147)
Observations	4,121	2,954	3,036	902	673	687	3,866	2,827	2,893	3,866	2,827	2,893
R-squared	0.367	0.523	0.473	0.375	0.395	0.517	0.404	0.410	0.398	0.484	0.484	0.508
Countries	132	111	113	131	111	113	132	110	112	132	110	112

*** p<0.01, ** p<0.05, * p<0.1

Notes: The dependent variables are government debt, expenditure and tax revenue, and are measured as a share of GDP in percentage points. Outliers of the dependent variables are trimmed at the top and bottom five percentiles of the distribution, except in columns 4-6 and 7-9. In columns 7-9 outliers are winsorized instead of dropped. All regressions include country and year fixed effects (not reported), columns 10-12 additionally include continent x decade fixed effects. Standard errors are clustered by country.

Confounding events: The introduction of a constitutional BBR by definition involves a change in the constitution. These rules are introduced either through an amendment of the existing constitution or by drafting a new constitution.[30] These confounding treatments could partially drive the baseline results if constitutional changes affect the outcome variables. Our strategy in the baseline specification was to add an *event* indicator variable for constitutional changes. In Figure 9 we further address this concern by running placebo event study regressions on the effects of amendments and new constitutions on the probability of crises and on the government finance variables. Specifically, the placebo tests in Figure 9 do not show evidence that constitutional changes have an independent effect on our fiscal outcomes of interest.

Total sample: Some countries introduced BBRs before 1945, the year when our preferred sample starts. The pre-1945 variation in constitutional BBRs is low with only five countries having introduced such rules. Columns 1-3 of Table 4 report results for the main specification when using our total sample from 1800 to 2015 and find results that are similar to the baseline.

Sensitivity to outliers: Several exercises ensure that the main results are not driven by influential outliers. Columns 4-6 of Table 4 estimate the baseline specification on data averaged over five year periods.[31] Columns 7-9 of Table 4 winsorize the outliers at the top and bottom 5% of the respective distributions. Columns 10-12 of Table 4 control for continent specific decade fixed effects to make sure unusually large continent-wide shocks do not drive the results. In addition, Table A3 of the online appendix reports re-runs of the baseline specification when dropping each of the countries in the sample one at a time and shows that the inclusion of no single country can account for the baseline results.

[30] In our sample, about ninety percent of BBRs are introduced with new constitutions.

[31] The BBR variable in these regressions is the share of years within the period that a constitution included a BBR, rather than a dummy as in the baseline case.

Robustness to estimation techniques: Table A1 of the online appendix replicates the baseline results of Table 3, first, by controlling for the lagged dependent variable, and second, by estimating the latter equation with a difference-GMM estimator. The size of the point estimates on BBR decreases in both specifications due to the downward bias introduced by the lagged dependent variable (Keele and Kelly 2006). However, the sign and statistical significance of all baseline results remain robust.

Robustness to alternative definitions of BBR and a wider set of control variables: Table A2 of the online appendix presents additional tests of the baseline results from Table 3 when: (a) including controls for the occurrence of civil wars (columns 1-2)[32]; (b) using an alternative definition of BBR (columns 3-4) that leads us to include four additional countries (see Table B1 of the online appendix for the sample of countries having a BBR according to the baseline and alternative definitions); and (c) including in the sample all country-year observations associated with constitutions that did not have a BBR and that did not allow for any type of legislation related to the budget.[33] The results from these tests are broadly consistent with our baseline results.

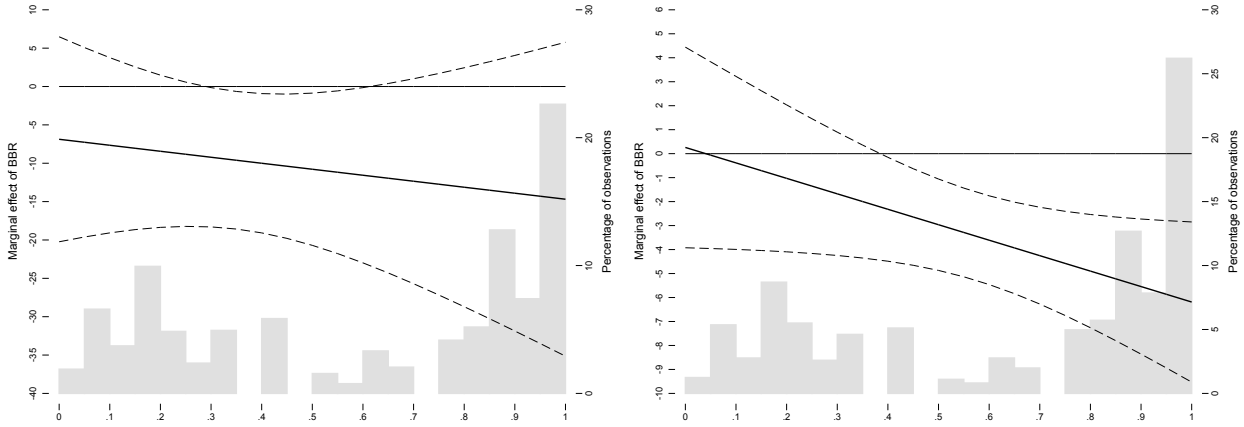
Selection on unobservables: Using the method proposed by Altonji et al. (2005), we construct a measure that allows us to estimate how much stronger the selection on unobservables has to be compared to the covariates to explain away the treatment's estimated effect (see also, Nunn and Wantchekon 2011, Oster 2015, Baskaran 2015, Hener, Rainer, and Siedler 2015). Table A4 of the online appendix reports the results from this test and shows that after controlling for country and year fixed effects, the explanatory power of unobserved variables would have to be thirty (four) times larger regarding government debt (expenditure) for the effect of BBRs to be spurious.

[32]Information on civil wars was taken from the Intra-state War data set (v.4.0) of the Correlates of War project.

[33]See our discussion about the substance of BBR in section 4.1.

Figure 10: Marginal Effects of Balanced Budget Rules Depending on Democratic Institutions

(a) Debt/GDP (%) **(b)** Expenditure/GDP (%)



Notes: Figures (a) and (b) plot the marginal effects of BBRs on debt and spending (y-axis: percentage of GDP) depending on the Polity index of democracy (x-axis: from autocracy to democracy). The histograms in the background present the distribution of the sample according to the democracy index.

The role of democratic institutions: We extend our baseline results by asking whether democratic institutions are one of the mechanisms that translate the effect of BBRs into fiscal outcomes. To test the hypothesis that the enforcement of BBRs depends on well-functioning democratic institutions, an interaction term between the BBR dummy and the Polity index of democracy is included in the baseline specification. Figure 10 plots the marginal effects. We do not find a statistically significant effect for government debt. However, for government expenditures, BBRs only reduce expenditures when democratic institutions are in place.

6 Conclusions

In this paper we estimate the reduced-form effects of constitutional balanced budget rules (BBRs) on fiscal sustainability. Using data from the nineteenth, twentieth, and twenty-first centuries for a large sample of countries, we find that the introduction of constitutional-level BBRs is, on average, associated with a seventeen percent reduction in the likelihood of experiencing a debt crisis and an eleven percentage points decrease in

the levels of government debt-to-GDP ratio. We document that this reduction in debt is achieved partly by a decrease in expenditures and partly by an increase in tax revenue. These adjustments take place in the short-run and do not reverse later.

These results may have important policy implications, especially for countries that suffer chronic fiscal deficits and which risk finding themselves on the verge of sovereign debt crises. Fiscal rules have been and continue to be a popular policy instrument to solve the issue of persistent deficits. However, as the 2008 global financial crisis has shown, governments do not always comply with national or supranational fiscal rules. As one solution to this issue, the European Union - where the common-pool problems leading to large deficits can perhaps be most saliently seen - adopted the 2012 Fiscal Compact Treaty, which recommends Euro area member states to enshrine BBRs into their national constitutions. Austria, Denmark, Hungary, Italy, Spain, for example, have passed structurally balanced budget rules, joining Switzerland and Germany who had passed constitutional BBRs prior to 2012. Our evidence of a robust and sizable effect of constitutional-level rules on fiscal sustainability provides support for this ongoing agenda of policy reform.

However, BBRs may have implications beyond fiscal sustainability and it is important to understand the desirability of these fairly rigid rules by also considering general equilibrium effects. This paper is not informative about general welfare effects of BBRs, but a number of arguments brought up by related papers may be helpful when thinking about such effects. First, BBRs may induce sub-optimal levels of public investment and public goods provisions in the short-run, and in theory, these effects may outweigh the long-run benefits of consolidation (see Azzimonti et al. 2016). On the other hand, a strand of literature, which one might call "non-Keynesian" effects of fiscal adjustments (for example, Alesina, Ardagna, Perotti, and Schiantarelli 2002), suggests that some fiscal adjustments based upon spending cuts may actually positively affect expectations and stimulate the economy, for example, by removing the fear of future harsher adjustments. Rule-based inflexible fiscal policy may also reduce the desirability of BBRs if fiscal policy

is especially effective during recessions. In line with this logic, recent work shows that reduced-form short-run estimates of fiscal multipliers may be larger during recessions than in times of economic expansion (Auerbach and Gorodnichenko 2012). However, the size of the multiplier remains subject of debate. A further argument against the desirability of BBRs is that such rules may induce pro-cyclical fiscal policy (Clemens and Miran 2012). This concern is addressed by having structural components in the rules, though the uncertainty with respect to reliably forecasting the business cycle is likely to remain an obstacle.

Given the wide set of issues that BBRs are intended to address, as well as the different spillover and feedback effects that BBRs need to take into account, the design of BBRs is likely to remain fairly complicated and context-dependent. In this respect, we believe further research could advance our understating of the effect of BBRs by paying more attention to both their design and the general environment in which they operate. Another area of future research is to study how constitutional BBRs interact with sub-constitutional rules, and other institutions that govern the making of fiscal policy.

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Online Appendix for:

Balanced Budget Rules and Fiscal Outcomes:
Evidence from Historical Constitutions

by:

Zareh Asatryan César Castellón Thomas Stratmann

A Additional Robustness Tests

Table A1: Robustness to methods

	(1)	(2)	(3)	(4)	(5)	(6)
Sample:	Post-1945					
VARIABLES	Debt			Expenditure		
Method:	Baseline	Lagged dependent var.	Difference GMM	Baseline	Lagged dependent var.	Difference GMM
Balanced budget rule	-11.105**	-3.077***	-2.996***	-3.504***	-1.567***	-1.525***
	(5.216)	(1.170)	(1.159)	(0.856)	(0.478)	(0.519)
Debt/GDP (t-1)		0.843***	0.837***			
		(0.024)	(0.026)			
Expenditure/GDP (t-1)					0.629***	0.620***
					(0.118)	(0.145)
Ln per capita GDP	-23.349**	-0.891	-1.224	-4.177*	-1.377	0.887
	(9.457)	(1.754)	(1.859)	(2.173)	(0.932)	(0.726)
Ln population	-9.519	-5.395**	-5.730**	-20.261***	-7.783***	-4.491**
	(15.384)	(2.498)	(2.683)	(3.771)	(2.718)	(1.933)
Polity2 (normalized)	-5.143	-4.764***	-4.604***	0.268	0.063	0.289
	(6.170)	(1.399)	(1.473)	(1.204)	(0.554)	(0.590)
Constitutional change	-1.185	0.026	0.112	0.202	0.231	0.370*
	(1.094)	(0.498)	(0.496)	(0.389)	(0.211)	(0.218)
Observations	3,794	3,629	3,465	2,816	2,737	2,652
R-squared	0.364	0.857	0.855	0.407	0.716	0.712
Number of countries	132	132	131	110	110	107

*** p<0.01, ** p<0.05, * p<0.1

Table presents robustness tests of the baseline results (columns 7 and 9 of table 3) to estimation methods. Dependent variables are specified as a share of GDP in percentage points. All regressions include country and year fixed effects (not reported). Standard errors are clustered by country.

Table A2: Robustness to controls and alternative definitions of BBR

	(1)	(2)	(3)	(4)	(5)	(6)
Sample:	Post-1945					
VARIABLES	Debt	Expenditure	Debt	Expenditure	Debt	Expenditure
Balanced budget rule	-11.045**	-3.504***				
	(5.261)	(0.856)				
Balanced budget rule 2			-10.602**	-3.504***		
			(5.218)	(0.856)		
Balanced budget rule 3					-11.338***	-2.136
					(3.510)	(1.567)
Ln per capita GDP	-23.907**	-4.172*	-23.916**	-4.172*	-22.709***	-2.833
	(9.670)	(2.174)	(9.673)	(2.174)	(7.916)	(2.045)
Ln population	-10.256	-20.229***	-10.283	-20.229***	-7.638	-16.486***
	(15.469)	(3.767)	(15.480)	(3.767)	(13.595)	(3.263)
Polity2 (normalized)	-4.869	0.241	-4.895	0.241	1.162	-0.230
	(6.185)	(1.211)	(6.187)	(1.211)	(5.358)	(1.231)
Constitutional change	-1.186	0.202	-1.181	0.202	-1.256	0.094
	(1.092)	(0.388)	(1.092)	(0.388)	(1.074)	(0.324)
Civil war	4.948	-0.188	4.956	-0.188	6.310	-0.532
	(4.105)	(0.634)	(4.105)	(0.634)	(4.536)	(0.550)
Observations	3,797	2,816	3,797	2,816	5,274	3,946
R-squared	0.366	0.407	0.366	0.407	0.350	0.360
Number of ifs	132	110	132	110	147	124

*** p<0.01, ** p<0.05, * p<0.1

Table presents robustness tests of the baseline results (columns 7 and 9 of table 3) to the inclusion of more control variables and to alternative definition of BBR (see table B1 for the sample of countries with BBR). Dependent variables are specified as a share of GDP in percentage points. All regressions include country and year fixed effects (not reported). Standard errors are clustered by country.

Table A3: Sensitivity to influential observations

		Debt			Expenditure		
No	Dropped country	β	*s.e.*	N	β	*s.e.*	N
1	Angola	-11.385**	(5.349)	3,471	-2.818***	(0.615)	2,656
2	Benin	-12.298**	(5.960)	3,453	-3.208***	(0.618)	2,629
3	Brazil	-11.126*	(5.922)	3,435	-2.511***	(0.816)	2,604
4	Burkina Faso	-11.429**	(5.369)	3,464	-2.819***	(0.619)	2,642
5	Cape Verde	-10.296*	(5.611)	3,455	-2.818***	(0.615)	2,656
6	Central African Republic	-11.438**	(5.415)	3,454	-2.815***	(0.613)	2,640
7	Chile	-8.788*	(5.061)	3,447	-3.308***	(0.913)	2,597
8	Costa Rica	-11.479**	(5.394)	3,426	-2.824***	(0.632)	2,627
9	Democratic Republic of the Congo	-10.792*	(5.827)	3,454	-2.818***	(0.615)	2,656
10	Dominican Republic	-11.461**	(5.345)	3,443	-2.826***	(0.633)	2,624
11	Ecuador	-11.181*	(6.149)	3,430	-2.966***	(0.645)	2,628
12	Egypt	-11.759**	(5.652)	3,438	-2.823***	(0.611)	2,634
13	El Salvador	-11.409**	(5.356)	3,455	-2.817***	(0.617)	2,638
14	Gabon	-12.085**	(5.744)	3,443	-2.883***	(0.567)	2,627
15	Germany	-11.468**	(5.354)	3,424	-2.834***	(0.613)	2,610
16	Guinea	-11.463**	(5.382)	3,463	-2.823***	(0.604)	2,636
17	Haiti	-11.347**	(5.611)	3,443	-2.674***	(0.687)	2,629
18	Honduras	-11.434**	(5.457)	3,436	-2.801***	(0.641)	2,626
19	Nicaragua	-11.039**	(5.549)	3,469	-2.820***	(0.618)	2,640
20	Niger	-11.420**	(5.383)	3,463	-2.819***	(0.614)	2,646
21	Panama	-16.859***	(3.372)	3,437	-2.820***	(0.616)	2,634
22	Peru	-11.429**	(5.360)	3,453	-2.817***	(0.624)	2,630
23	Portugal	-11.417**	(5.382)	3,420	-2.819***	(0.631)	2,604
24	Rwanda	-10.465*	(5.574)	3,453	-2.512***	(0.617)	2,636
25	Sudan	-11.417**	(5.359)	3,473	-2.818***	(0.615)	2,656
26	Switzerland	-11.422**	(5.363)	3,472	-2.817***	(0.614)	2,649
27	Uruguay	-11.414**	(5.365)	3,443	-2.822***	(0.635)	2,607

*** p<0.01, ** p<0.05, * p<0.1

Table presents sensitivity-tests of the baseline results (columns 8 and 10 of table 3) to dropping, one by one, each of the countries that has ever had a balanced budget rule. Sample is the post-1945 period. Dependent variables are specified as a share of GDP in percentage points. β is the coefficient of the balanced budget rule dummy, *s.e.* is the corresponding standard error clustered by country, and N is the number of observations after dropping the country.

Table A4: Selection on unobservables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Full-model: β^f	β^r					Full-model: β^f	β^r				
VARIABLES	Debt						Expenditure					
Balanced budget rule, β	-11.105**	-8.929	-11.473*	-10.674**	-11.213**	-11.075**	-3.504***	-2.163	-2.593	-2.584	-3.494***	-3.515***
	(5.216)	(13.188)	(5.906)	(4.966)	(5.190)	(5.216)	(0.856)	(2.874)	(1.846)	(1.848)	(0.883)	(0.862)
Ln per capita GDP	-23.349**			-20.445***	-22.948**	-23.255**	-4.177*			0.236	-4.186*	-4.194*
	(9.457)			(7.732)	(9.439)	(9.481)	(2.173)			(2.781)	(2.173)	(2.175)
Ln population	-9.519				-9.449	-9.305	-20.261***				-20.250***	-20.284***
	(15.384)				(15.429)	(15.440)	(3.771)				(3.786)	(3.762)
Polity2 (normalized)	-5.143					-5.064	0.268					0.241
	(6.170)					(6.161)	(1.204)					(1.209)
Constitutional change	-1.185						0.202					
	(1.094)						(0.389)					
$\frac{\beta^f}{\beta^r - \beta^f}$		5.10	30.18	25.77	102.82	370.17		2.61	3.85	3.81	350.40	318.55
Year FE	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,794	3,794	3,794	3,794	3,794	3,794	2,816	2,816	2,816	2,816	2,816	2,816
R-squared	0.364	0.002	0.337	0.361	0.362	0.363	0.407	0.001	0.303	0.303	0.407	0.407
Countries	132	132	132	132	132	132	110	110	110	110	110	110

*** p<0.01, ** p<0.05, * p<0.1

Table presents a selection-on-unobservables test of the baseline results (columns 7 and 9 of table 3) in the spirit of Altonji et al. (2005). Dependent variables are specified as a share of GDP in percentage points. All regressions include country and year fixed effects (not reported). Standard errors are clustered by country.

B Summary of Constitutions

Table B1: Sample of countries with constitutional balanced budget rules (BBR)

No	Country	Period BBR in place	Period BBR in place *and* data on debt *or* expenditure available
Baseline sample (BBR):			
1	Angola	2010-2015	2010-2012
2	Benin	1960-1969; 1990-2015	1990-2012
3	Brazil	1946-1964; 1967-1968	1946-1964; 1967-1968
4	Burkina Faso	1960-1965; 1970-1973	N/A
5	Cape Verde	1980-1998	1981-1998
6	Chad	1960-1974	1970-1974
7	Chile	1980-2015	1980-2012
8	Costa Rica	1949-2015	1950-2012
9	Cote d'Ivoire	1960-2015	1979-2012
10	Ecuador	1906-1934; 1945-1969; 1996-1997	1945-1969; 1997
11	Egypt	2007-2015	2007-2012
12	El Salvador	1939-1944; 1950-1960; 1983-2015	1939-1960; 1983-2012
13	Central African Republic	1959-1963	N/A
14	Gabon	1975-2015	1975-2012
15	Germany	1871-1918; 1949-2015	1880-1913; 1950-2012
16	Guinea	2010-2015	2010-2012
17	Haiti	1983-1986	1983-1986
18	Honduras	1873; 1894-1903; 1924-1935	1926-1935
19	Republic of the Congo	1967-1977	1970-1977
20	Dominican Republic	1955-1962	1955
21	Mali	1960-1967; 1974-2015	1974-2012
22	Mauritania	1961-1979; 1991-2015	1991-2012
23	Nicaragua	1905-1910; 1950-1973; 1987-2015	1970-1973; 1987-2012
24	Niger	1964-1973; 1989-1990; 1996-2015	1970-1973; 1989-1990; 1996-2012
25	Panama	1983-2015	1983-2012
26	Peru	1979-2015	1979-2012
27	Portugal	1822-1822	N/A
28	Rwanda	1962-1994	1970-1994
29	Sudan	1973-1984	N/A
30	Switzerland	2003-2015	2003-2012
31	Ukraine	1996-2015	1996-2012
32	Uruguay	1942-1951	N/A
Additional sample (BBR2):			
33	Austria	2008-2015	2008-2012
34	Spain	2011-2015	2011-2012
35	Serbia	2006-2015	2006-2012
36	Hungary	2011-2015	2011-2012
Further countries according to IMF:			
37	Denmark	2014-2015	N/A
38	Georgia	2013-2015	N/A
39	Italy	2014-2015	N/A
40	Latvia	2013-2015	N/A
41	Malta	2014-2015	N/A
42	Poland	1999-2015	1986-2012
43	Singapore	1965-2015	1960-2012
44	Slovakia	2012-2015	N/A
45	Slovenia	2016-	N/A

Source: CCP data set, and IMF fiscal rules database (Budina et al. 2012, Bova et al. 2015).

Note: The CCP data set classifies some countries as actually having a BBR (*balbudgt*=1) and others as having some type of provision that is not as explicit (*balbudgt*=96) or that coders can not properly classify (*balbudgt*=97). The first thirty-two countries in the above table are classified in the CCP database as having a BBR over the indicated periods. Out of those coded as *96 or 97* we identify four additional countries as actually having a BBR (countries 33 to 36). Additionally, rows 37-45 indicate countries that have constitutional BBR according to the IMF (mostly covers recent reforms).

Table B2: Sample of countries with constitutions

	Country	Years (1)	(2)	(3)		Country	Years (1)	(2)	(3)		Country	Years (1)	(2)	(3)
1	Abkhazia	9			76	Guatemala	178	166		151	Parma	73		
2	Afghanistan	170	75		77	Guinea	58	50	6	152	Peru	195	141	37
3	Albania	103	84		78	Guinea-Bissau	43	32		153	Philippines	76	74	
4	Algeria	69	20		79	Guyana	50	50		154	Poland	100	78	
5	Andorra	227	23		80	Haiti	200	136	4	155	Portugal	227	97	1
6	Angola	41	41	6	81	Hanover	58			156	Qatar	46	13	
7	Antigua and Barbuda	35	35		82	Hesse Electoral	66			157	Rep. of Vietnam	22	16	
8	Argentina	202	177		83	Hesse Grand Ducal	66			158	Romania	139	117	
9	Armenia	30	21		84	Honduras	179	121	23	159	Russia	227	99	
10	Australia	115	115		85	Hungary	98	68		160	Rwanda	54	46	33
11	Austria	98	96		86	Iceland	77	72		161	Saint Kitts and Nevis	33	33	
12	Austria-Hungary	130			87	India	69	67		162	Saint Lucia	38	38	
13	Azerbaijan	27	21		88	Indonesia	71	66		163	St Vincent and Grenadines	36	30	
14	Baden	83	54		89	Iran	227	110		164	Samoa	54	54	
15	Bahamas	43	43		90	Iraq	85	54		165	Sao Tome and Principe	41	41	
16	Bahrain	45	43		91	Ireland	96	94		166	Saudi Arabia	85	24	
17	Bangladesh	45	40		92	Israel	68			167	Saxony	66		
18	Barbados	50	50		93	Italy	227	82		168	Senegal	56	56	
19	Bavaria	83	64		94	Jamaica	54	54		169	Serbia	51	15	
20	Belarus	25	22		95	Japan	227	127		170	Serbia and Montenegro	3	3	
21	Belgium	186	185		96	Jordan	70	70		171	Seychelles	43	37	
22	Belize	35	35		97	Kazakhstan	25	21		172	Sierra Leone	55	49	
23	Benin	57	43	32	98	Kenya	53	53		173	Singapore	56	53	
24	Bhutan	67	11		99	Kiribati	37	37		174	Slovak Republic	24	24	
25	Bolivia	191	144		100	Korea	122			175	Slovenia	25	25	
26	Bosnia and Herz.	25	21		101	Kosovo	8	8		176	Solomon Islands	38	38	
27	Botswana	50	50		102	Kuwait	55	42		177	Somalia	55	28	
28	Brazil	194	188	21	103	Kyrgyz Rep.	25	19		178	South Africa	107	55	
29	Brunei	23	23		104	Laos	65	38		179	South Korea	68	68	
30	Bulgaria	138	122		105	Latvia	48	44		180	South Ossetia	9		
31	Burkina Faso	56	35	10	106	Lebanon	76	76		181	South Sudan	5	5	
32	Burundi	55	28		107	Lesotho	50	30		182	Spain	227	144	
33	Cambodia	64	56		108	Liberia	170	138		183	Sri Lanka	74	45	
34	Cameroon	56	56		109	Libya	83	55		184	Sudan	61	39	12
35	Canada	151	149		110	Liechtenstein	210	103		185	Suriname	41	34	
36	Cape Verde	41	36	19	111	Lithuania	50	43		186	Swaziland	49	48	
37	Central African Rep.	57	46	5	112	Luxembourg	152	148		187	Sweden	227	207	
38	Chad	57	36	15	113	Macedonia	25	25		188	Switzerland	227	74	17
39	Chile	201	184	36	114	Madagascar	138	54		189	Syria	73	50	
40	China	227	89		115	Malawi	52	52		190	Taiwan	69	69	
41	Colombia	188	174		116	Malaysia	59	59		191	Tajikistan	25	17	
42	Comoros	41	38		117	Maldives	51	18		192	Tanzania	56	37	
43	Congo	56	48		118	Mali	56	50	50	193	Thailand	227	57	
44	Costa Rica	180	75	67	119	Malta	52	52		194	Tibet	39	1	
45	Cote d'Ivoire	57	55	55	120	Marshall Isl.	31	27		195	Timor	14	14	
46	Croatia	25			121	Mauritania	57	44	44	196	Togo	56	43	
47	Cuba	115	106		122	Mauritius	48	47		197	Tonga	48	47	
48	Cyprus	56	56		123	Meckl. Schwerin	83			198	Transvaal	59		
49	Czech Republic	23	23		124	Mexico	196	110		199	Trinidad and Tobago	54	54	
50	Czechoslovakia	75	40		125	Micronesia	31	27		200	Tunisia	154	54	
51	Dem. Rep. Congo	56	46		126	Modena	73			201	Turkey	226	92	
52	Denmark	227	167		127	Moldova	26	26		202	Turkmenistan	25	24	
53	Djibouti	39	24		128	Monaco	227	99		203	Tuscany	73		
54	Dominica	38	38		129	Mongolia	95	90		204	Tuvalu	38	38	
55	Dominican Rep.c	175	143	8	130	Montenegro	59	21		205	Two Sicilies	73		
56	Ecuador	186	155	55	131	Morocco	176	54		206	Uganda	54	29	
57	Egypt	123	69	7	132	Mozambique	41	41		207	Ukraine	28	20	20
58	El Salvador	177	121	50	133	Myanmar	139	37		208	United Arab Emirates	45	45	
59	Equatorial Guinea	48	39		134	Namibia	26	26		209	United Kingdom	237	223	
60	Eritrea	23	19		135	Nauru	48	48		210	United States	228	228	
61	Estonia	49	42		136	Nepal	227	58		211	Uruguay	186	184	10
62	Ethiopia	161	72		137	Netherlands	227	201		212	Uzbekistan	25	24	
63	Fed.Rep. Central America	17	5		138	New Zealand	119	116		213	Vanuatu	37	36	
64	Fiji	46	42		139	Nicaragua	178	158	59	214	Vatican	84	1	
65	Finland	99	97		140	Niger	56	40	32	215	Venezuela	191	131	
66	France	228	103		141	Nigeria	56	32		216	Vietnam	141	56	
67	Gabon	57	56	41	142	North Korea	68	68		217	Wuerttemburg	66		
68	Gambia	53	31		143	Norway	139			218	Yemen	25	24	
69	Georgia	26	24		144	Oman	227	5		219	Yemen Arab Rep.	73	12	
70	German Dem. Rep.c	42	19		145	Orange Free State	57			220	Yemen People's Rep.	24	21	
71	Germany	224	144	115	146	Pakistan	69	27		221	Yugoslavia	85	82	
72	Ghana	64	38		147	Palau	24	2		222	Zambia	52	52	
73	Great Colombia	10			148	Panama	113	101	33	223	Zanzibar	2		
74	Greece	190	83		149	Papua New Guinea	41			224	Zimbabwe	51	17	
75	Grenada	42	30		150	Paraguay	205	172						

Source: CCP data set. Table presents the population of countries with coded constitutions. Columns 1-3 present the total number of years with (1) a constitution, (2) some fiscal provision enshrined in the constitution, and (3) a balanced budget rule in the constitution.

Table B3: Constitutional Balanced Budget Rules

Country	Definition
Angola; Constitution Issued:2010; Article 104 (par. 2)	The State Budget shall be a single budget, shall estimate the level of revenue to be obtained and shall set limits for authorized expenditure in each financial year for all services, public institutions, autonomous funds and social security, in addition to those of the local authorities, in order **ensure that all estimated expenditure is financed**.
Austria; Constitution Issued:1920 Reinstated:1945; Article 13 (par. 2)	**The Federation, the Laender, and the municipalities must aim at the securement of an overall balance and sustainable balanced budgets in the conduct of their economic affairs**. They have to coordinate their budgeting with regard to these goals.
Benin; Constitution Issued:1990; Article 110 (par. 1)	**The National Assembly shall vote a balanced budget**. If the National Assembly has not come to a decision by December 31, the provisions of the appropriations bill may be enforced by edict.
Burkina Faso; Constitution Issued:1991 Amended:2012; Article 120	The **proposals and amendments concerning the law of finance deposited by the members of the Parliament are not receivable when their adoption would have as a consequence, either a diminution of public resources, or the creation or the increase of a public expense**, unless they should be accompanied by a proposal for augmentation of receipts or of equivalent economies.
Chile; Constitution Issued:1980 Amended:2012; Article 67	The Bill of the Law of the Budgets must be presented by the President of the Republic to the National Congress at least three months prior to the date on which it must enter into force; and if the Congress has not acted on it within sixty days counted from its presentation, the Bill presented by the President of the Republic will be effective [*regir*]. **The National Congress cannot augment or diminish the estimate of the revenues; [it] can only reduce the expenditures** contained in the Bill of the Law of the Budgets, except for those established by permanent law. The estimation of the returns of the resources stated in the Law of the Budgets and of the new ones established by another initiative of law will correspond exclusively to the President, previously informed by the respective technical agencies. **The Congress cannot approve any new expenditures with [a] charge to the funds of the Nation without indicating, at the same time, the sources of the funds necessary to meet such expenditures.** **If the source of funds granted by the Congress were insufficient to finance any new expenditures that it approved, the President of the Republic**, upon promulgating the law, after a favorable report from the service or institution through which new income is collected, countersigned by the Office of the Comptroller General of the Republic, **must proportionately reduce all expenditures**, regardless of their nature.
Costa Rica; Issued:1949 Amended:2011; Article 179	**The Assembly may not augment the expenditures budgeted by the Executive Power, if the new revenues that should cover them are not specified**, [with] previous report of the Office of the Comptroller General of the Republic on the fiscal effectiveness of them.
Ivory Coast; Constitution Issue:2000 Amended:2004; Article 80	The National Assembly is seized with the bill of the Law of Finance from the opening of the October session. **The bill of the Law of Finance must provide the receipts necessary for the integral covering of expenses. The National Assembly votes the balanced budget.** If the National Assembly has not decided within a time period of seventy days, the bill of law can be put into force by ordinance. The President of the Republic seizes, for the ratification, the National Assembly convoked in extraordinary session, within a time limit of fifteen days. If the National Assembly has not voted the budget by the end of this extraordinary session, the budget is definitively established by ordinance. If the bill of the Law of Finance has not been deposited in a timely way to be promulgated before the beginning of the exercise, the President of the Republic demands of the National Assembly by urgency, the authorization to repeat the budget of the previous year by provisional twelfths.
Dominican Republic; Constitution Issue:2010; Article 233	The preparation of the Bill of the Law of the General Budget of the State corresponds to the Executive Power, which contemplates the probable incomes, the proposed expenses and the financing required, conducted within a framework of fiscal sustainability, and **assuring that the public indebtedness is compatible with the capacity for payment of the State.**
Egypt; Constitution Issue:2014; Article 124	**The state budget includes all of its revenue and expenditure without exception**. The draft budget is submitted to the House of Representatives at least 90 days before the beginning of the fiscal year. It is not considered in effect unless approved thereby, and it is put to vote on a chapter-by-chapter basis. The House may modify the expenditures in the draft budget law, except those proposed to honor a specific state liability. **Should the modification result in an increase in total expenditure, the House shall reach an agreement with the government on the means to secure revenue resources to achieve a balance between them.** The budget is issued in a law, which may include modification to any existing law to the extent necessary to realize such balance. In all cases, the budget law may not include any text that incurs new burdens on citizens. The specifics of the fiscal year, the method of budget preparation, the provisions of the budgets of institutions, public bodies, and their accounts are defined by law. The approval of the House of Representatives is necessary for the transfer of any funds from one chapter of the budget to another, as well as for any expenditure not included therein or in excess of its estimates. The approval is issued in a law.
El Salvador; Constitution Issued:1983 Amended:2003; Article 226	The Executive Organ, through the appropriate Branch, shall have the direction of the public finances, **and shall be especially bound to maintain a balanced Budget, insofar as this is compatible with the fulfillment of the purposes of the State.**
Hungary; Constitution Issued:2011; Article N	**Hungary shall enforce the principle of balanced, transparent and sustainable budget management.** Parliament and the Government shall have primary responsibility for the enforcement of the principle set out in Paragraph (1). In the course of performing their duties, the Constitutional Court, courts, local governments and other state organs shall be obliged to respect the principle set out in Paragraph (1).
Morocco; Constitution Issued:2011; Article 77	**The Parliament and the government see to the preservation of the balance of the finances of the State.** The government may oppose, in substantiated manner, the receivability [*irrecevabilite*] of any proposal or amendment formulated by the members of Parliament when their adoption could have as a consequence, in relation to the law of finance, either a diminishment of the public resources, or the creation or aggravation of a public expenditure [charge].

Table B3: Constitutional Balanced Budget Rules (cont.)

Country	Definition
Gabon, Constitution Issued:1991 Amended:1997; Article 48	All resources and obligations of the State must, for each financial exercise, be evaluated and inscribed into the annual Bill of the Law of Finance filed by the Government before the National Assembly thirty (30) days at most after the opening of the second ordinary session. **If, at the end of the budgetary session, the Parliament adjourns without having passed a balanced budget, the Government shall be authorized to repromulgate by ordinance the preceding budget.** This ordinance may in spite of this provide for, in case of necessity, any reduction of expenditures or increase in revenues. Upon the demand of the Prime Minister, Parliament is convoked in two weeks in extraordinary session for a new deliberation. If Parliament has not passed the balanced budget at the end of this extraordinary session, the budget shall be definitively established by ordinance taken in the Council of Ministers and signed by the President of the Republic. The new revenues which may be created, if they consist of direct taxes and contributions or similar taxes, become effective the first of January. The Court of Accounts assists the Parliament and the Government in the control of the execution of the Law of Finance. The bill of the law of regulation, established by the Government, accompanied by the general declaration of conformity and of general report of the Court of Accounts, must be filed before the Parliament at the latest at the beginning of the first ordinary session of the second year which follows the exercise of the execution of the budget concerned.
Mali; Constitution Issued:1992; Article 77	The National Assembly shall consider the appropriations bill at the opening of the ordinary session preceding the fiscal period. **The appropriations bill must anticipate the income necessary for completely meeting all expenditures.** If the National Assembly has not acted on this matter before the beginning of the fiscal period or if it has not passed the budget, the Government shall resubmit the proposed budget within fifteen days to the National Assembly convened in special session for this purpose. The National Assembly shall then act within eight days. If this deliberation has not resulted in a budgetary vote, it shall be automatically established by the Government on the basis of the revenues of the preceding fiscal period and after consultation with the Supreme Court.
Mauritania; Constitution Issued:1992 Amended:2012; Article 68	(Paragraph 4) If the Parliament has not voted on the budget in a time period of sixty days (60) days, **or if it did not vote it in balanced form**, the Government returns [*renvoie*] the Bill of the Law of Finance within fifteen (15) days to the National Assembly. (Paragraph 6) The Parliament controls the execution of the budget of the State and [the] annexed budgets. A statement of expenses will be provided to the Parliament at the end of each six months [*semestre*] for the previous six months. The definitive accounts of a fiscal year [exercise] are deposited during the course of the budgetary session of the following year and approved by a law.
Germany; Constitution Issued:1949 Amended:2012; Articles 109, 110, 115, 143d	(Article 109 - paragraph 3) **The budgets of the Federation and the Länder shall in principle be balanced without revenue from credits**. The Federation and Länder may introduce rules intended to take into account, symmetrically in times of upswing and downswing, the effects of market developments that deviate from normal conditions, as well as exceptions for natural disasters or unusual emergency situations beyond governmental control and substantially harmful to the state's financial capacity. For such exceptional regimes, a corresponding amortization plan must be adopted. Details for the budget of the Federation shall be governed by Article 115 with the proviso that the first sentence shall be deemed to be satisfied if revenue from credits does not exceed 0.35 percent in relation to the nominal gross domestic product. The Länder themselves shall regulate details for the budgets within the framework of their constitutional powers, the proviso being that the first sentence shall only be deemed to be satisfied if no revenue from credits is admitted. (Article 110 - paragraphs 1 & 2) **All revenues and expenditures of the Federation shall be included in the budget**; in the case of federal enterprises and special trusts, only payments to or remittances from them need be included. The budget shall be balanced with respect to revenues and expenditures. The budget for one or more fiscal years shall be set forth in a law enacted before the beginning of the first year and making separate provision for each year. The law may provide that various parts of the budget apply to different periods of time, divided by fiscal years. (Article 115 - paragraph 2) **Revenues and expenditures shall in principle be balanced without revenue from credits. This principle shall be satisfied when revenue obtained by the borrowing of funds does not exceed 0.35 percent in relation to the nominal gross domestic product.** In addition, when economic developments deviate from normal conditions, effects on the budget in periods of upswing and downswing must be taken into account symmetrically. Deviations of actual borrowing from the credit limits specified under the first to third sentences are to be recorded on a control account; debits exceeding the threshold of 1.5 percent in relation to the nominal gross domestic product are to be reduced in accordance with the economic cycle. The regulation of details, especially the adjustment of revenue and expenditures with regard to financial transactions and the procedure for the calculation of the yearly limit on net borrowing, taking into account the economic cycle on the basis of a procedure for adjusting the cycle together with the control and balancing of deviations of actual borrowing from the credit limit, requires a federal law. In cases of natural catastrophes or unusual emergency situations beyond governmental control and substantially harmful to the state's financial capacity, these credit limits may be exceeded on the basis of a decision by a majority of the Bundestag's Members. The decision has to be combined with an amortization plan. Repayment of the credits borrowed under the sixth sentence must be accomplished within an appropriate period of time. (Article 143d) Articles 109 and 115 in the version in force until 31 July 2009 shall apply for the last time to the 2010 budget. Articles 109 and 115 in the version in force as from 1 August 2009 shall apply for the first time to the 2011 budget; debit authorizations existing on 31 December 2010 for special trusts already established shall remain untouched. In the period from 1 January 2011 to 31 December 2019, the Länder may, in accordance with their applicable legal regulations, deviate from the provisions of paragraph (3) of Article 109. **The budgets of the Länder are to be planned in such a way that the 2020 budget fulfills the requirements of the fifth sentence of paragraph (3) of Article 109.** In the period from 1 January 2011 to 31 December 2015, the Federation may deviate from the provisions of the second sentence of paragraph (2) of Article 115. The reduction of the existing deficits should begin with the 2011 budget. The annual budgets are to be planned in such a way that the 2016 budget satisfies the requirement of the second sentence of paragraph (2) of Article 115; details shall be regulated by federal law.
Guinea; Constitution Issued:2010; Article 75 (par. 1)	**The National Assembly votes the budget in equilibrium**. It is referred to [the matter] of the bill of the Law of Finance by the Government no later than 15 October.
Nicaragua; Constitution Issued:1987 Amended:2005; Article 112	The General Budget Law of the Republic has annual validity and its object is to regulate the Public Administration's ordinary and extraordinary revenues and expenditures. **The law shall determine the limits of the expenditures of the State organs and shall indicate the various sources and purposes of all revenues and expenditures, which must correspond to each other.** The National Assembly may modify the Bill of the Budget sent by the President of the Republic, but **no extraordinary expenditures may be created except by law and through the creation and determination at the same time of the resources to finance it**. The Law of the Budgetary Regime shall regulate this matter. **Any modification** of the General Budget of the Republic involving an increase or decrease of credits, reduction of revenues or transfers among different institutions **shall require the approval of the National Assembly. The Annual Budget Law may not create taxes**.

Table B3: Constitutional Balanced Budget Rules (cont.)

Country	Definition
Niger; Constitution Issued:2010; Article 114	The National Assembly is referred to the matter of the bill of the law of finance from the opening of the budgetary session; **the bill of the law of finance must specify the receipts necessary for the complete coverage of the expenses**. **The National Assembly votes the budget in equilibrium**. If the National Assembly has not decided within sixty (60) days of the presentation of the bill, the provisions of this bill can be put into force by ordinance. The government refers the matter, for ratification, to the National Assembly convoked in extraordinary session, within a time period of fifteen (15) days. If the National Assembly has not voted the budget at the end of this extraordinary session, the budget is definitively established by ordinance. If the bill of the law of finance could not be presented in a timely fashion to be promulgated before the beginning of the fiscal year, the Prime Minister demands of urgency of the National Assembly the authorization to continue to receive the taxes and to continue with expenditures, the budget of the preceding year by provisional twelfths.
Panama; Constitution Issued:1972 Amended:2004; Article 270	In the Budget planned by the Executive Branch, **expenditures shall be balanced with revenues.**
Peru; Constitution Issued:1993 Amended:2009; Article 78	The President of the Republic sends the Budget bill to the Congress each year with a deadline expiring on August 30th. On the same date, he also sends the national debt and financial stability bills. **The Budget bill shall be effectively balanced**. Loans from the Central Reserve Bank of Peru or the Bank of the Nation are not considered fiscal revenue. **Loans shall not cover current expenditures**. The Budget shall not be passed without an appropriation for the servicing of public debt.
Serbia; Constitution Issued:2006; Article 92	**The Republic of Serbia, autonomous provinces and local self-government units shall have budgets, which must outline all receipts and expenses with which they are funding their competences.** The Law shall stipulate the deadlines within which the Budget must be adopted, as well as method of temporary funding. Realization of all budgets shall be audited by the State Audit Institution. The National Assembly shall discuss the financial statement proposal of the Budget upon the received evaluation of the State Audit Institution.
Spain; Constitution Issued:1978 Amended:2011; Section 135	1. **All public administrations will conform to the principle of budgetary stability.** 2. **The State and the Self-governing Communities may not incur a structural deficit that exceeds the limits established by the European Union for their member states.** An Organic Act shall determine the maximum structural deficit the state and the Self-governing Communities may have, in relation to its gross domestic product. Local authorities must submit a balanced budget. 3. The State and the Self-governing Communities must be authorized by Act in order to issue Public Debt bonds or to contract loans. Loans to meet payment on the interest and capital of the State?s Public Debt shall always be deemed to be included in budget expenditure and their payment shall have absolute priority. These appropriations may not be subject to amendment or modification as long as they conform to the terms of issue. **The volume of public debt of all the public administrations in relation to the State's gross domestic product may not exceed the benchmark laid down by the Treaty on the Functioning of the European Union**. 4. **The limits of the structural deficit and public debt volume may be exceeded only in case of natural disasters, economic recession or extraordinary emergency situations** that are beyond the control of the State and significantly impair either the financial situation or the economic or social sustainability of the State, as appreciated by an absolute majority of the members of the Congress of Deputies. 5. An Organic Act shall develop the principles referred to in this article, as well as participation in the respective procedures of the organs of institutional coordination between government fiscal policy and financial support. In any case, the Organic Act shall address: a. The distribution of the limits of deficit and debt among the different public administrations, the exceptional circumstances to overcome them and the manner and time in which to correct the deviations on each other. b. The methodology and procedure for calculating the structural deficit. c. The responsibility of each public administration in case of breach of budgetary stability objectives. 6. **The Self-governing Communities, in accordance with their respective laws and within the limits referred to in this article, shall take the appropriate procedures for effective implementation of the principle of stability in their rules and budgetary decisions**.
Switzerland; Constitution Issued:1999 Amended:2002; Article 126	1. **The Confederation shall keep its expenditure and receipts in balance in the long term**. 2. The maximum of the total expenditures which may be budgeted shall be determined by the expected receipts, taking into account the economic situation.
Ukraine; Constitution Issued:1996 Amended:2004; Article 95	The budgetary system of Ukraine is built on the principles of just and impartial distribution of social wealth among citizens and territorial communities. Any state expenditures for the needs of the entire society, the extent and purposes of these expenditures, are determined exclusively by the law on the State Budget of Ukraine. **The State aspires to a balanced budget of Ukraine**. Regular reports on revenues and expenditures of the State Budget of Ukraine shall be made public.

C Selected Case Studies from Europe, Latin America, and Africa

C.1 Introduction

This section discusses case studies for several countries that at some point had a BBR in their constitutions. We rely on the synthetic control method (SCM) to estimate the counterfactual levels of government debt and expenditure after treatment (i.e., either the introduction or abolishment of a BBR) for each of the case study countries and compare that to the actual levels of debt and expenditure.

This method complements our difference-in-differences results by addressing issues of extrapolation and balancedness (Abadie et al. 2010). Also, while the SCM does not directly address the issue of reverse causality, it provides a more transparent analysis of the effect of BBRs. By looking at country-specific cases, we can focus on the circumstances at the time the BBR was adopted or abandoned and judge whether the exogeneity assumption is plausible.

Following Abadie and Gardeazabal (2003), for each country that has introduced (or abolished) a BBR we construct a synthetic country without (or with) a BBR in the post-treatment period from data on countries that did not (did) have BBRs but had similar general characteristics. As matching covariates we use population size, per capita GDP, Polity score of democracy, and, when available, life expectancy and the shares of rural population, development aid in GDP, and military spending in GDP.

For further discussion of the synthetic control method we refer to Abadie and Gardeazabal (2003), Abadie et al. (2010), and Pinotti (2015) region-level applications to the analysis of, respectively, the conflict in the Basque Country, a tobacco-control program in California, and the effects of organized crime in Italy. Some country-level applications of the method include Moser (2005), Billmeier and Nannicini (2013), Cavallo, Galiani, Noy, and Pantano. (2013), and Abadie, Diamond, and Hainmueller (2015), which analyze the economic effects of, respectively, patent laws, natural disasters, economic liberalization episodes, and the German reunification. The method has also been used in the public finance literature to asses tax reforms (Kleven, Landais, and Saez 2013), costs of sovereign default (Jorra 2011), fiscal consolidation (Kleis and Moessinger 2016), and, closer to our analysis, the fiscal effects of fiscal rules US states (Eliason and Lutz 2015) and the Stability and Growth Pact in Euro-area countries (Köhler and König 2015).

Data limitations prohibit us from covering all countries in our sample with case studies. Instead we use general criteria to guide the selection of case studies.[34] Thus, for a country to be included in our sample it must meet all of the following criteria: (a) The

[34]Nevertheless, we note that the case studies are not necessarily representative, and we do not pretend so.

country must have had a BBR, and the rule must have lasted for five or more consecutive years; (b) basic data (debt or expenditure as outcomes, and population size, per capita GDP, and Polity score of democracy as covariates) must be available for at least five years before and after the introduction (or abolishment) of the BBR; (c) the country must be a non-crisis country (defined by Reinhart and Rogoff 2011) at least for some years of the analysis; and (d) whenever a country had two or more BBRs we analyze the first BBR in order to rule out any potential feedback effects from past rules. The restrictions on the donor pool of countries are: (a) that there are available data for the same period of time as the case study country, and (b) that the donor country did not (did) have a BBR in its constitution when analyzing the introduction (abolishment) of a BBR.

After applying these selection criteria, we were left with nine case study countries. In the next three subsections, we group these countries by region: two cases from Europe, four cases from Latin America, and three cases from Africa. We graphically analyze the evolution of debt and expenditure for the case study countries and their estimated counterfactuals, and briefly discuss the relevant country-specific contexts. Table C1 of the appendix shows the covariates used for matching, and their (weighted) means for the treated and synthetic groups.

C.2 Europe

As noted before, many countries in the post-crisis Europe adopted or amended BBRs, including, among others, Denmark, Germany (which reformed an existing rule), Italy, and Spain. Some time will be required to be able to analyze these recent reforms. Instead we look into Switzerland and Ukraine, which are the two cases in Europe that satisfy our selection criteria.

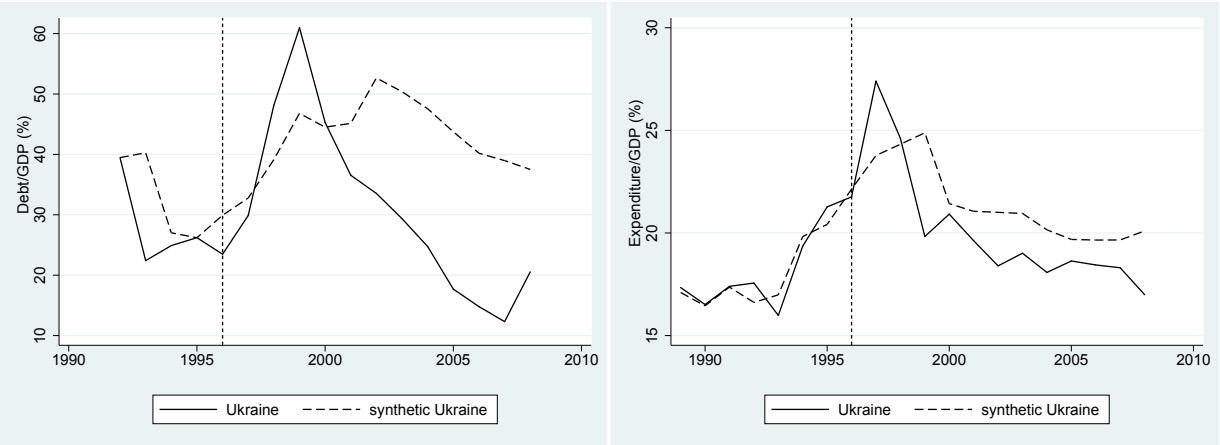
Switzerland: See section 3.

Ukraine: The first constitution of the independent Ukraine was adopted in 1996 by the parliament. The constitution includes a declaration to commit to balanced budgets (see table B3 for Article 95 describing the BBR), which is a unique feature among post-Soviet constitutions. A series of constitutional amendments in 2004, 2010 and 2014 have passed, but the BBR remains to this day.

The estimates are plotted in figure C1. The pretreatment predictions fit fairly well (in terms of RMSPEs), and the direction of the effects over the long run are as expected. The estimates show that after a decade of introducing the BBR, Ukraine's debt and expenditure as a share in GDP would have been around ten to fifteen and two to three percentage points higher, respectively, if the constitution did not include the clause. One

Figure C1: Ukraine: Introduction of BBR in 1996

(a) Debt/GDP (%) **(b)** Expenditure/GDP (%)



Notes: The graph plots debt (a) and expenditure (b) as a percentage of GDP for real Ukraine vs. synthetic Ukraine. The vertical line denotes the year when the BBR was introduced. Table C1 reports the covariates used for matching, and their means for the treated and synthetic units. Donor countries (weights) for graph (a) are Brazil (0.346), Romania (0.332), South Korea (0.14), Mongolia (0.069), Bangladesh (0.053), Argentina (0.033), and China (0.027). The RMSPE is 8.99. Donor countries (weights) for graph (b) are Colombia (0.534), Jordan (0.316), Lesotho (0.121), Botswana (0.024), and Kuwait (0.004). The RMSPE is 0.64.

should note, however, that the 1990s were a volatile period for Ukraine, characterized by economic and political transition; therefore these estimates should be treated with care.

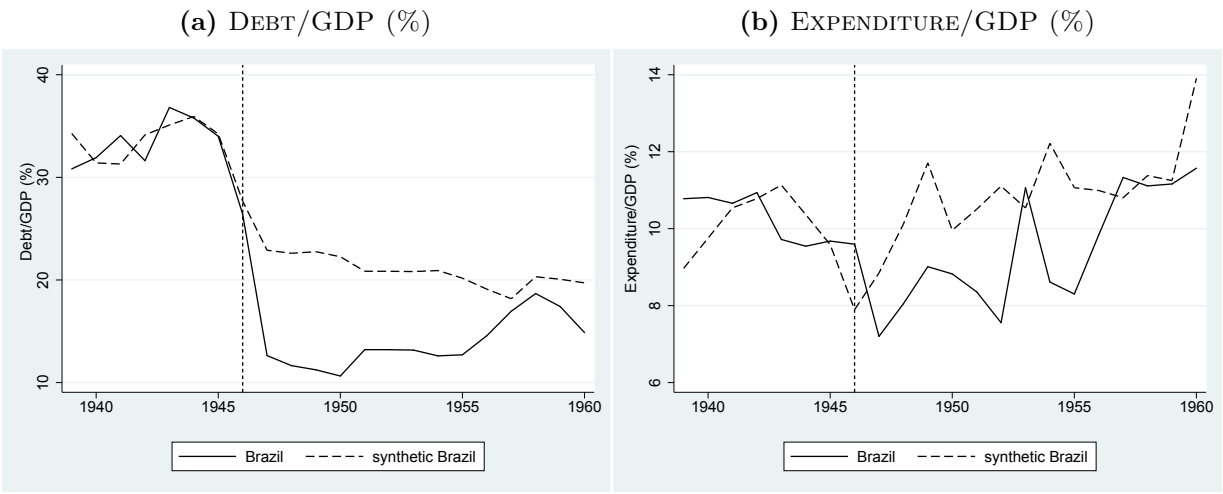
C.3 Latin America

From the CCP database we have twelve Latin American countries that have ever implemented a constitutional BBR. These are Brazil, Chile, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Haiti, Honduras, Nicaragua, Panama, Peru and Uruguay. Applying our selection criteria listed above we are left with four case study countries in the Latin-American region: Brazil, Chile, Panama and Peru.[35]

Brazil: From 1930 to 1945 Brazil was ruled by a military junta with Getulio Vargas as president. In 1937 Vargas announced a new constitution under the pretext of an alleged planned coup by communists. The new constitution provided him with extraordinary powers and eliminated the possibility that he would not be reelected in 1938. He ruled as a defacto dictator of what he called Estado Novo ("New State") until 1945, when he was forced to resign. Democratic institutions were reestablished subsequently, and the fifth constitution of Brazil was prepared by the directly elected Constitutional Congress. The

[35]For further work on fiscal sustainability in Latin America, see, for example, Alesina, Hausmann, Hommes, and Stein (1999), Voth (2011), Berganza (2012).

Figure C2: Brazil: Introduction of BBR in 1946



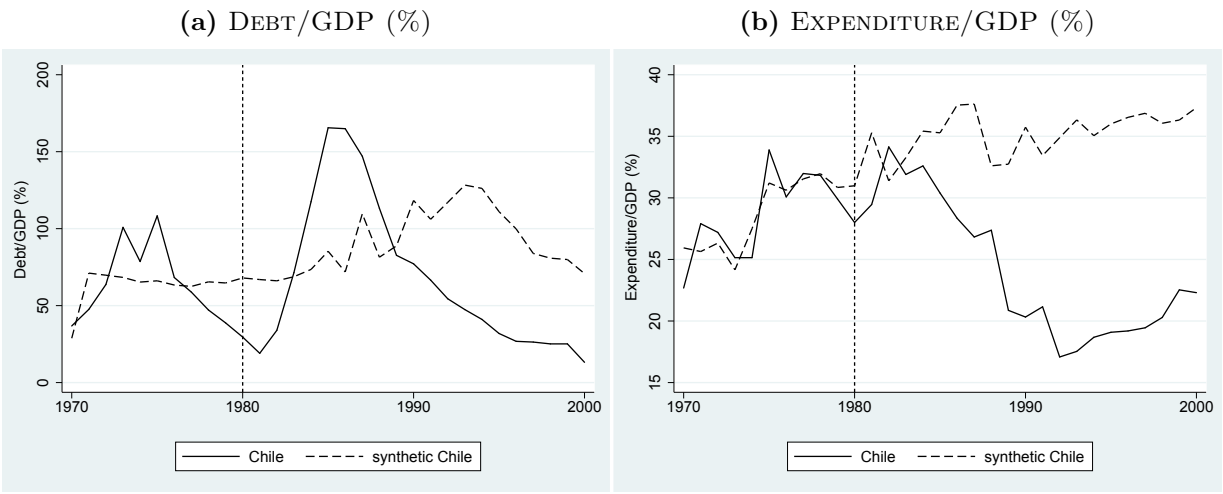
Notes: The graphs plot debt (a) and expenditure (b) as a percentage of GDP for real Brazil vs. synthetic Brazil. The vertical line denotes the year when the BBR was introduced. Table C1 reports the covariates used for matching, and their means for the treated and synthetic units. Donor countries (weights) for graph (a) are Portugal (0.824), Italy (0.148), and the United States (0.028). The RMSPE is 2.04. Donor countries (weights) for graph (b) are Mexico (0.935) and Italy (0.068). The RMSPE is 1.01.

new constitution was promulgated in 1946 and included a BBR (which lasted for around twenty years until the new constitution of 1967).

Figure C2 reports the evolution of government debt and expenditure for real Brazil (solid line) and synthetic Brazil (dashed line) around the time Brazil introduced the BBR. The synthetic control method does a fairly good job in predicting the pretreatment levels of government debt and expenditure with respective root-mean-squared prediction errors (RMSPE) of 3.29 and 1.33. In the post-treatment period, when the BBR takes effect, the observed levels of both debt and expenditure are usually lower than the counterfactual levels without a BBR. The differences peak at a maximum of around eighteen and three percentage points for debt and expenditure, respectively.

Chile: When the socialist Popular Unity coalition led by Salvador Allende won a majority of votes in the 1970 election, Chile was in an economic depression. Even though the first year of social reforms showed some success (inflation and unemployment decreased, and GDP growth increased) this trend reversed a year later when the economic crisis peaked in 1972. The economic decline destabilized the political footing of Allende and led to a brutal military coup led by Augusto Pinochet in 1973. Civil rights and democracy were quickly abolished and thousands of Chileans killed or imprisoned. To fight the economic crisis, the military junta implemented a number of market-liberalization reforms. The reforms initiated a rapid decline in inflation (from more than 500 percent to less than 50 percent within five years). In 1980 the Pinochet-regime proposed a new

Figure C3: Chile: Introduction of BBR in 1980



Notes: The graphs plot debt (a) and expenditure (b) as a percentage of GDP for real Chile vs. synthetic Chile. The vertical line denotes the year when the BBR was introduced. Table C1 reports the covariates used for matching, and their means for the treated and synthetic units. Donor countries (weights) for graph (a) are Canada (0.302) and Tanzania (0.698). The RMSPE is 21.72. Donor countries (weights) for graph (b) are Greece (0.646), Portugal (0.159), and Iran (0.194). The RMSPE is 1.78.

constitution, which was approved by two-thirds of voters in a controversial referendum and ensured Pinochet another eight years of presidency. The new constitution, other than granting extraordinary rights for the political executive, also included a BBR which remains in place until today (see table B3 for Article 67 describing the BBR).

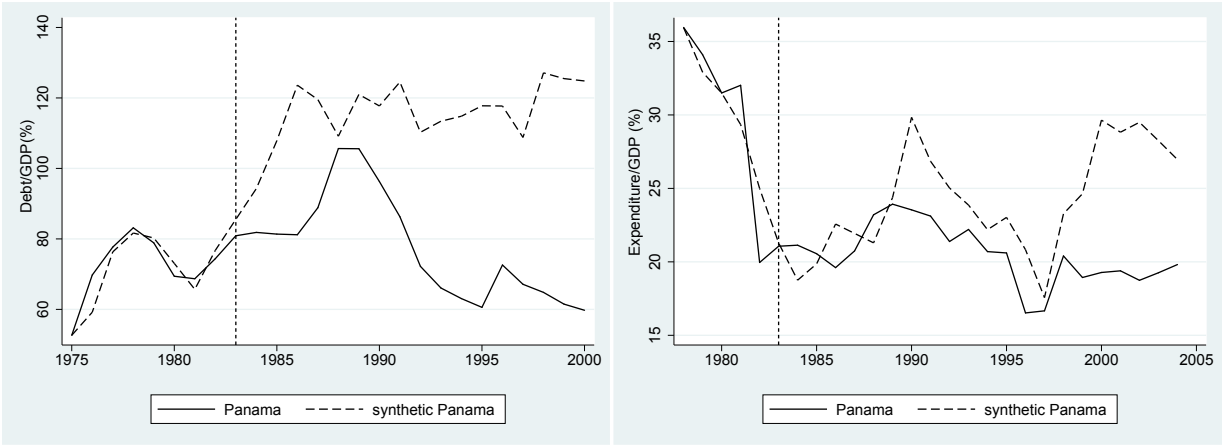
Figure C3 reports the evolution of government debt and expenditure for real Chile and synthetic Chile. We have a good match for the pretreatment levels of expenditure, but not for that of debt (the RMSPE are 1.78 and 21.72, respectively). Accordingly, the level of counterfactual expenditure is much higher than the one observed under a BBR (the difference peaking at fifteen percentage points of GDP), while the evidence for debt is not clear cut.

Panama: In 1968 Omar Torrijos, commander of Panama's national guard, successfully conducted a military coup that installed him as head of state. Under his rule Panama fell into a period of corruption, nationalism, and economic depression. The constitution promulgated by the military junta in 1972 formed the legal basis for the dictatorship and secured unrestricted power for Torrijos. To gain support, Torrijos implemented a number of populist policies that led to poor economic performance and a radical jump in the public debt. In 1978 the debt-to-GDP ratio reached a maximum of 83 percent. The death of Torrijos in an airplane crash in 1981 was followed by a period of instability until General Manuel Noriega established another military regime in 1983. Noriega's regime lasted until 1989, when he was removed from power by the United States during

the invasion of Panama. In 1983 major amendments to the constitution were adopted – approved by 87.8 percent of votes in a referendum – including a BBR that lasts to this day (see table B3 for Article 270 describing the BBR).

Figure C4: Panama: Introduction of BBR in 1983

(a) Debt/GDP (%) **(b)** Expenditure/GDP (%)



Notes: The graphs plot debt (a) and expenditure (b) as a percentage of GDP for real Panama vs. synthetic Panama. The vertical line denotes the year when the BBR was introduced. Table C1 reports the covariates used for matching, and their means for the treated and synthetic units. Donor countries (weights) for graph (a) are Paraguay (0.042), Syria (0.211), Singapore (0.54), and Zambia (0.207). The RMSPE is 4.27. Donor countries (weights) for graph (b) are Uruguay (0.084), Jordan (0.172), and Sierra Leone (0.744). The RMSPE is 2.6.

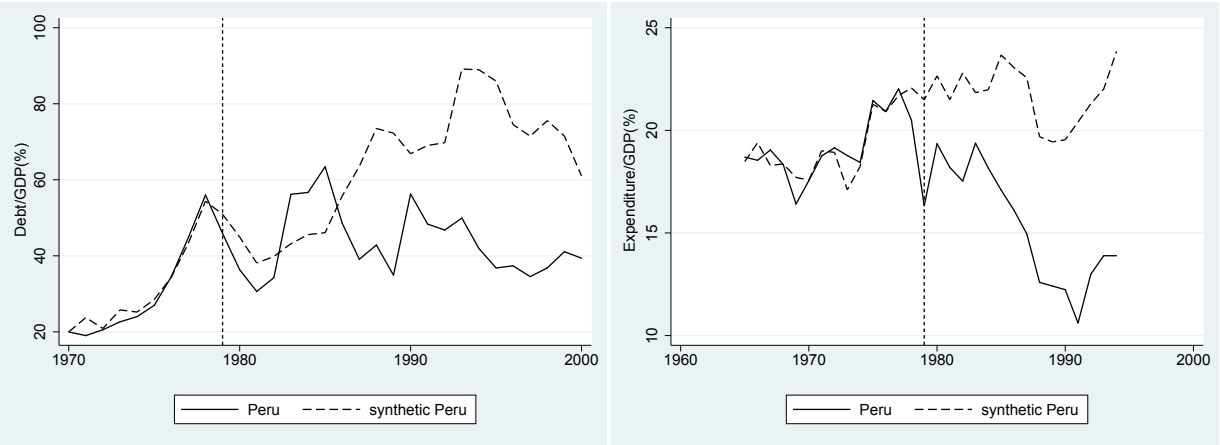
Similarly to before, the actual and counterfactual levels of debt and expenditure are plotted in figure C4. The pretreatment fits are relatively good (the RMSPEs are 4.27 for debt and 2.60 for expenditure), and the post-treatment trajectories again speak to the constraining effect of a BBR. The differences increase by time and peak at around 60 and 8 percent of GDP for debt and expenditure, respectively.

Peru: The twentieth century in Peru was dominated by frequent changes of the political ruling parties. After World War II, socialism was ascendant in Peru, although the military usually remained a powerful player often capturing the regime. In the second half of the 1970s, following public pressures and political turmoil, the military regime was forced to initiate a transition from military to civilian rule. In 1979 the Constituent Assembly voted in favor of a new constitution (with seventy-one supporting votes out of its one hundred members) to replace the suspended constitution of 1933. The new constitution included a BBR (see Article 78 in table B3) that survived the constitutional reform of 1993 and is still in place today.

The pretreatment fits between real and synthetic Peru are quite close, with RMSPEs of 2.23 for debt and 0.78 for expenditure as shown in figure C5. As expected, the in-

Figure C5: Peru: Introduction of BBR in 1979

(a) Debt/GDP (%) **(b)** Expenditure/GDP (%)



Notes: The graphs plot debt (a) and expenditure (b) in percentage of GDP for real Peru vs. synthetic Peru. The vertical line denotes the year when the BBR was introduced. Table C1 reports the covariates used for matching, and their means for the treated and synthetic units. Donor countries (weights) for graph (a) are Bolivia (0.005), Turkey (0.004), Nepal (0.274), Algeria (0.707), and Cameroon (0.009). The RMSPE is 2.23. Donor countries (weights) for graph (b) are Finland (0.188), Ireland (0.024), India (0.482), Thailand (0.131), Iran (0.09), and South Korea (0.086). The RMSPE is 0.78.

troduction of the BBR has a negative impact on both series, with the size of the effect peaking at around 30 and 6 percent of GDP for debt and expenditure, respectively.

C.4 Africa

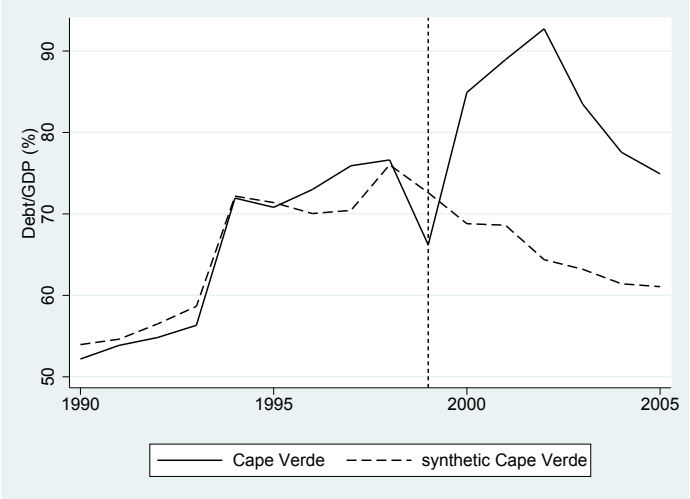
From the CCP database we have thirteen African countries that have ever implemented a constitutional BBR. These are Angola, Benin, Burkina Faso, Cape Verde, Chad, the Democratic Republic of Congo, Egypt, Gabon, Guinea, Mali, Mauritania, Niger, and Rwanda. However, after applying the selection criteria listed above we are left with three case study countries: Cape Verde, Gabon, and Rwanda.[36] [37]

Cape Verde: After gaining independence from Portugal in 1975, Cape Verde instituted a single-party government that lasted until 1990, when multi-party elections were held for the first time. It is generally considered one of the most stable democracies in Africa. The first constitution of Cape Verde was drafted in 1980 and included a BBR. It went

[36]We focus on debt only because government-expenditure data for African countries are usually not available form earlier periods. Also, the cases of Cape Verde and Rwanda concentrate on the abolishment rather than introduction of BBRs. Building counterfactuals for these cases is somewhat more challenging because of the limited pool of donor countries that had a BBRs in the same period. At the same time, this is an interesting exercise in that it allows to look into heterogeneous treatment effects coming from the introduction vs. the abolishment of a BBR.

[37]For further work on budget institutions in Africa, see, for example, Gollwitzer (2011).

Figure C6: Cape Verde: Abolishment of BBR in 1999



Notes: The graphs plot debt as a percentage of GDP for real Cape Verde vs. synthetic Cape Verde. The vertical line denotes the year when BBR was abolished. Table C1 reports the covariates used for matching, and their means for the treated and synthetic units. Donor countries (weights) are Germany (0.601), Gabon (0.259), and Mali (0.14). The RMSPE is 2.39.

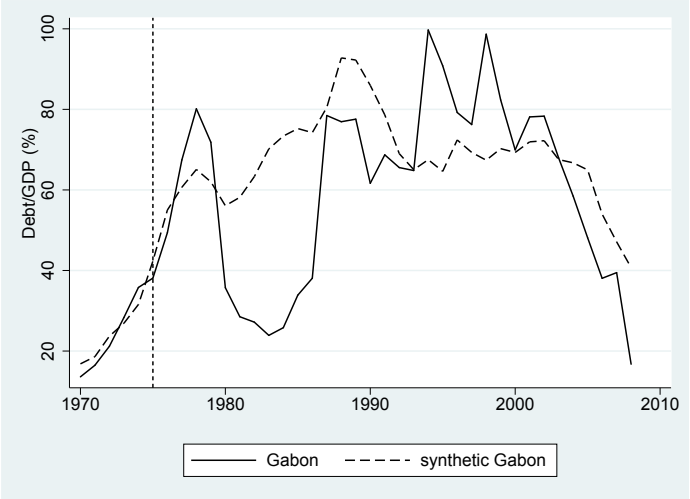
through a series of amendments in 1990, 1992, 1995, and 1999, the last of which abolished the BBR.

Figure C6 shows the level of central-government debt (as a percentage of GDP) for Cape Verde and its synthetic control. The match for the pretreatment period is quite good (RMSPE=2.38), with synthetic Cape Verde built from a combination of Germany, Gabon, and Mali. Consistent with our hypothesis, we observe a positive gap in government debt between Cape Verde and its counterfactual after the BBR was abandoned.

Gabon: After independence from France in 1960, Gabon's newly elected president Léon M'ba instituted a single-party system to secure his hold on the presidency. After M'ba's sudden death in 1967 his vice-president Omar Bongo ascended to power and remained in office until 2009, when he died of cardiac unrest. In 1975, Bongo introduced a new constitution that included a BBR. Figure C7 shows central-government debt for Gabon and its counterfactual before and after the introduction of the rule. The graph does not provide support for the hypothesis that BBRs have a negative effect on debt. In the long run, no clear difference emerges between Gabon and its synthetic control.

We can explain this result somewhat by the fact that over the period of study, Gabon was ruled by Bongo's four decade-long undemocratic regime. In particular, Gabon's BBR placed the responsibility for a balanced budget on the parliament (see table B3), which during Bongo's rule lacked any real power. Thus Gabon's case might simply illustrate that

Figure C7: Gabon: Introduction of BBR in 1975



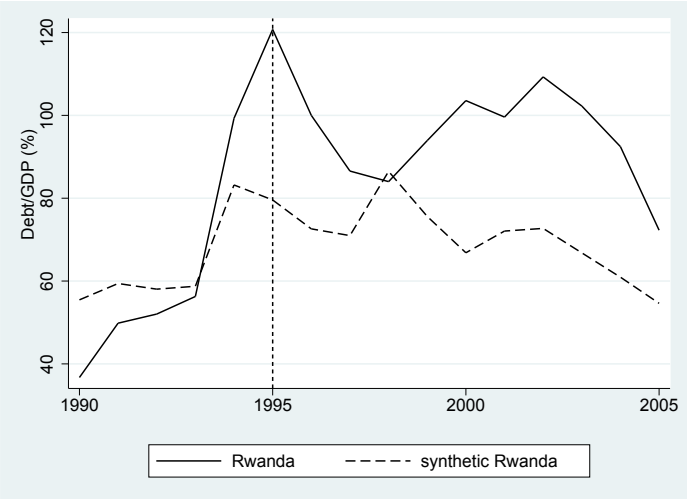
Notes: The graphs plot debt as a percentage of GDP for real Gabon vs. synthetic Gabon. The vertical line denotes the year when the BBR was introduced. Table C1 reports the covariates used for matching, and their means for the treated and synthetic units. Donor countries (weights) are Panama (0.736), Niger (0.179), and Nepal (0.085). The RMSPE is 2.87.

the effectiveness of BBRs is conditional on the institutions that can effectively monitor them.

Rwanda: Rwanda's recent history is marked by political unrest and civil conflict between its two major ethnic groups, Hutus and Tutsis. In the decades following Rwandan independence in 1962 the country was predominantly ruled by the Hutus. The first constitution included a BBR, which was abandoned with the new constitution of 1995, one year after the Rwandan genocide.

Figure C8 shows the difference between Rwanda's government debt and its counterfactual over a fifteen-year window around the removal of the BBR. Over the long run, there seems to be a persistent gap between both trends that is consistent with our hypothesis. However, we note that the pretreatment match was very poor (RMSPE of 12.20) and that Rwanda's particular circumstances (of civil war and other major volatilities around the period of analysis) cast doubts on the validity of the case study.

Figure C8: Rwanda: Abolishment of BBR in 1995



Notes: The graphs plot debt as a percentage of GDP for real Rwanda vs. synthetic Rwanda. The vertical line denotes the year when BBR was abolished. Table C1 reports the covariates used for matching, and their means for the treated and synthetic units. Donor countries (weights) are Gabon (0.681) and Germany (0.319). The RMSPE is 12.20.

Table C1: Covariates and means for treated and synthetic units

Latin America:

Debt	**Brazil (1939-1960)**		**Chile (1970-2000)**		**Panama (1975-2000)**		**Peru (1970-2000)**	
	Treated	Synthetic	Treated	Synthetic	Treated	Synthetic	Treated	Synthetic
Log population	10.67	9.3	9.22	9.78	7.55	8.23	9.60	9.59
Log GDP per capita	7.18	7,6	8.51	7.35	8.43	8.45	8.31	7.43
Polity score (normalized)	0.20	0.11	0.35	0.44	0.19	0.24	0.18	0.05
Life expectancy (years)			65.12	56.14	69.61	65.75	56.32	49.77
Rural population (%)			21.97	69.52	49.96	26.67	39.32	69.53
Development aid (%)							0.75	2.01
Military spending (%)							0.05	0.02
RMSPE		**2.04**		**21.72**		**4.27**		**2.23**

Expenditure	**Brazil (1935-1960)**		**Chile (1970-2000)**		**Panama (1978-2000)**		**Peru (1970-2000)**	
	Treated	Synthetic	Treated	Synthetic	Treated	Synthetic	Treated	Synthetic
Log population	10.88	10.26	9.22	9.36	7.58	8.03	9.53	11.37
Log GDP per capita	7.4	7.81	8.51	8.84	8.50	7.39	8.28	7.60
Polity score (normalized)	0.59	0.24	0.35	0.45	0.21	0.12	0.30	0.74
Life expectancy (years)			65.12	68.01	70.24	47.46	54.56	56.36
Rural population (%)			21.97	41.62	49.52	60.25	41.68	66.42
Military spending (%)			0.06	0.05			0.04	0.03
Development aid (%)					1.06	9.53		
RMSPE		**1.01**		**1.78**		**2.60**		**0.78**

Europe:

	Debt				**Expenditure**			
	Switzerland (1985-2012)		**Ukraine (1992-2008)**		**Switzerland (1990-2015)**		**Ukraine (1989-2008)**	
	Treated	Synthetic	Treated	Synthetic	Treated	Synthetic	Treated	Synthetic
Polity score (normalized)	1.00	0.92	0.81	0.81	1.00	0.90		
Log population			10.85	10.85			10.85	9.28
Log GDP per capita			8.23	8.23			8.42	8.25
Life expectancy (years)	79.56	75.45	68.13	68.13	78.81	71.52	68.87	67.77
Rural population (%)	27.37	32.34	33.10	36.06	26.51	39.46	33.17	35.77
Military spending (%)	0.01	0.02						
RMSPE		**1.93**		**8.99**		**0.12**		**0.64**

Africa:

Debt	**Cape Verde (1990-2005)**		**Gabon (1970-2008)**		**Rwanda (1990-2005)**	
	Treated	Synthetic	Treated	Synthetic	Treated	Synthetic
Log population	5.92	9.86	6.30	7.77	8.86	8.30
Log GDP per capita	7.17	8.98	8.87	7.86	6.60	8.87
Polity score (normalized)	0.84	0.78	0.05	0.14	0.16	0.51
Life expectancy (years)	67.25	68.21	48.31	59.08	29.27	65.82
Rural population (%)			63.72	62.41		
Development aid (%)			5.73	2.90		
RMSPE		**2.39**		**2.87**		**12.20**