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# Can fiscal rules improve financial market access for developing countries?

Pegdéwendé Nestor SAWADOGO<sup>#</sup>

## Abstract:

A number of countries have introduced fiscal rules to deter fiscal profligacy, enhance the credibility of fiscal policy, and reduce borrowing costs. In this paper, we examine the outcome of fiscal rules in terms of improving financial market access for developing countries. We use entropy balancing and various propensity score matching. We find that the adoption of fiscal rules reduces sovereign bond spreads and increases sovereign debt ratings for a sample of 36 developing countries, which are part of the JP Morgan Emerging Markets Bond Index Global (EMBIG), for the period 1993-2014. We explain this finding by the effect of fiscal rules on the credibility of a country's fiscal policy: more credible governments are rewarded in the international financial markets by low sovereign bond spreads and high sovereign debt ratings. These results are robust to a wide set of alternative specifications. We also show that this favorable effect is sensitive to several country structural characteristics. Our findings confirm that the adoption and sound implementation of fiscal rules is an instrument for policy makers to improve developing countries' financial market access.

**JEL Classification :** H11. F34. G15

**Keywords:** Fiscal rules; Bond spreads; Sovereign debt ratings; Entropy balancing.

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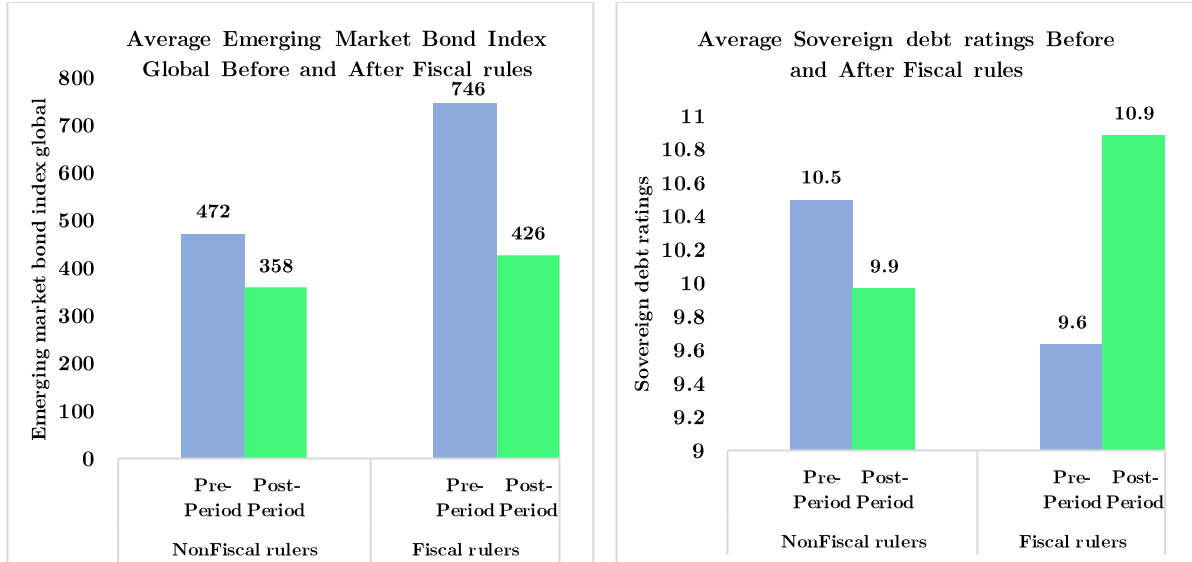
## 1. Introduction

Fiscal policy is an important instrument which Developing Countries (DCs) can utilize to accelerate their development process by reducing inequalities (Azzimonti et al., 2014; Larch and Turrini, 2010; Milasi, 2013), improving economic growth (Stiglitz, 2015; Summers, 2014), and improving well-being (Bom and Ligthart, 2014; Ganelli and Tervala, 2016). To be more effective in addressing these development challenges, any fiscal policy must be sound (Dabla-Norris et al., 2010; Hameed, 2005; Prakash and Cabezón, 2008, etc.). Mastering debt and sound public finances are key factors in mobilizing financial resources in developing countries (Reinhart et al., 2003; Reinhart and Rogoff, 2010, etc.).

The role of fiscal rules in improving fiscal outcomes has been stressed in the literature (Corbacho and Schwartz, 2007; Debrun et al., 2008; Debrun and Kumar, 2007; Deroose et al., 2006; Guerguil et al., 2017; Kopits, 2004; Schaechter et al., 2012; Tapsoba, 2012). However, few studies have shed light on the link between fiscal rules and financial market access in DCs: examples include (Afonso and Jalles, 2013), and (Thornton and Vasilakis, 2017) who investigate the effects of fiscal rules on risk premiums in a mixed sample of advanced and developing countries. The effects of fiscal rules might be different depending on the type of economy. The originality of our paper is that it extends the literature by exploring both the heterogeneity and the interactive effects of various types of fiscal rules on financial market access in developing countries. It then shows the differences between balanced budget rules, debt rules, expenditure rules, and shows their interactions. It also tackles the self-selection problem by using an effective empirical methodology, namely entropy balancing, and alternative matching.

We consider two measures of financial market access in this paper - sovereign bond spread and sovereign debt rating. Sovereign debt rating is an assessment of credit risk i.e. the possibility that the debtor will not fulfil its obligations in full and on time (Ferrucci, 2003). For sovereign debt the risk of default depends on the fundamental characteristics of the issuer, and the ability of the lender to enforce the contract. Bond spread reflects market risk (the possibility that secondary market bond prices may move against the bondholder), and liquidity risk (the risk that investors will not be able to liquidate their portfolios without depressing secondary market prices). The proponents of the efficient market hypothesis argue that investors are rational and able to exploit all the available information to discriminate among borrowers. (Edwards, 1984) highlights that asset prices always reflect the information publicly available, as

evidenced by the yield differential on bonds issued by sovereign borrowers with different credit ratings and macroeconomic characteristics. If the efficient market hypothesis holds, investors and rating agencies share the same interpretation of the body of public information pertaining to sovereign risks (Cantor and Packer, 1996). However, the opponents of this hypothesis emphasize that market failures and imperfect information lead to distortions in asset pricing (Calvo and Mendoza, 1996; Chari and Kehoe, 1997).



**Figure 1: Emerging market bond spreads and sovereign debt rating before and after fiscal rules adoption**

Better financial market access leads to lower bond spreads and higher sovereign debt rating. Figure 1 illustrates the change in the average bond spreads and debt ratings, for countries which have adopted FR compared to Non-FR<sup>1</sup> countries. The evidence is clear, adopting fiscal rules is associated with lower bond spreads and higher debt rating in developing countries.

Our estimates for a panel of 36 emerging markets economies for the period 1993 to 2014 show that the adoption of FR matters for financial market access in DCs. Indeed, countries which have implemented FR show a lower sovereign bond spread and a higher sovereign debt rating. Regarding the types of fiscal rules, we find that Budget Balanced rules (BBR) and Debt Rules (DR) significantly improve financial market access, but Expenditures Rules (ER) do not improve this access. However, the combination of ER and multi-year expenditure ceilings (MEC) improve financial market access. These

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<sup>1</sup> The cut-off date for Non-FR countries is defined as the mid-year period between the first time that a country adopts a fiscal rule (1993 in our case) and the last sample year (2014) (see Minea and Tapsoba, 2014; Mishkin and Schmidt-Hebbel, 2007). 2003 is the date which separates the pre- and post-fiscal rule periods in the group of Non-FR countries. The cut-off dates for FR countries are the year of adoption of FR.

results are robust to a wide set of alternative specifications of the entropy balancing method, and the alternative matching method.

Our findings suggest that DCs could improve their financial market access by adopting fiscal rules. More specifically they should give more importance to BBR and DR because they are valued by financial markets in terms of lower bond spreads and higher debt rating. For countries aiming at adopting ER, sound PFM systems (including multi-year expenditure ceilings) are needed to enhance their effectiveness and improve financial market access.

The remainder of the paper is structured as followed. [Section 2](#) discusses the related literature. [Section 3](#) describes the data, provides some stylized facts and details the underlying method. [Section 4](#) summarizes the main econometric results. [Section 5](#) explores their sensitivity. [Section 6](#) concludes with some policy recommendations.

## 2. Related literature

A fiscal policy rule is a permanent constraint on fiscal policy, expressed as a summary indicator of fiscal performance – for example government budget deficit, borrowing, debt, or a major component thereof ([Kopits and Symansky, 1998](#)). ([Kopits and Symansky, 1998](#)) identify various rationales for the adoption of fiscal policy rules. Fiscal rules aim to (i) foster macroeconomic stability, (ii) support other financial policies, (iii) maintain fiscal sustainability, (iv) avoid negative spillovers within a currency union<sup>2</sup>, (v) ensure the credibility of government policies over time.

([Schaechter et al., 2012](#)) put the emphasis on fiscal responsibility and debt sustainability by arguing that rules aim to correct distorted incentives and control pressures to overspend in good times. Short-term focused governments ([Rogoff, 1987](#)) run large budgetary deficits. Also, as noted by ([Debrun and Kumar, 2007](#)), the “common pool problem<sup>3</sup>” also leads to large deficits. Overspending in good times could result from a “voracity effect” ([Tornell and Lane, 1999](#)) and undermine countercyclical fiscal policy. In currency unions, ([Kumar et al., 2009](#)) state that supranational rules are aimed at internalizing the regional costs of fiscal indiscipline and establish a framework for better coordination of the monetary/fiscal policy mix. Moreover, the political economy insight is that political decision-makers’ focus on re-election thereby potentially undermining fiscal discipline to the detriment of future generations ([Beetsma and Debrun, 2004](#); [Ribeiro and Beetsma, 2008](#)), and the negative impact on

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<sup>2</sup> See also ([Antonakakis and Vergos, 2013](#)) for more evidence.

<sup>3</sup> Since special interest groups or “constituencies” do not internalize the overall budgetary impact of their competing demands.

growth of fiscal burden (Panizza and Presbitero, 2014) could increase deficits and hamper fiscal responsibility. The proliferation of FR is due to the fact that rising public debt ratios since the 1970s cannot go on indefinitely without raising concerns about the government's capacity to face its obligations in full (i.e. government solvency). From the point of view of (Eyraud et al., 2018), fiscal rules can help to improve the government's fiscal credibility in three possible ways: (i) by tying politicians' hands, (ii) by signaling an intrinsic commitment to fiscal responsibility, (iii) by crystallizing political consensus on a specific standard of fiscal responsibility across political parties. Successful rules reassure economic agents, reduce borrowing costs for policymakers, and provide resources to buffer the economy against shocks or to finance policies which promote long-term growth. Capping government deficits, debts, or expenditure is viewed as a way to deter fiscal profligacy (Eyraud et al., 2018). Fiscal rules aim to obligate the government to be cautious about its finance and prevent policy mistakes that could jeopardize solvency. (Hausmann, 2004) observes that emerging market economies would benefit from fiscal rules that aim not only to eliminate deficits and reduce debt ratios, but also, more importantly, to contain risk in the composition of the debt.

Like in the most comprehensive previous analyses (Debrun et al., 2008; Debrun and Kumar, 2007; Deroose et al., 2006; Schaechter et al., 2012; etc.), we focus in this paper on national fiscal rules. The rationale of this choice is the limited changes in supranational rules over the last two decades, and the bigger role played by national rules. What are the macroeconomic effects of adopting fiscal rules? According to (Kopits and Symansky, 1998), the economic effects of fiscal policy rules are multiple. They influence the level and composition of government expenditure and taxation, inflation, external debt, and economic growth. There is much empirical literature which finds a positive effect of FR on fiscal outcomes, economic growth, and lower interest rates (Afonso and Jalles, 2013; Badinger and Reuter, 2017; Bayoumi et al., 1995; Caselli et al., 2018; Dahan and Strawczynski, 2013; Eyraud et al., 2018; Fabrizio and Mody, 2006; Fatás and Mihov, 2006; Feld et al., 2017; Hallerberg et al., 2009; Heinemann et al., 2018; Iara and Wolff, 2014; Johnson and Kriz, 2005; Kopits, 2004; Kumar et al., 2009; Kydland and Prescott, 1977; Neyapti, 2013; Perry, 2004; Poterba and Rueben, 1999; Tapsoba, 2012; Thornton and Vasilakis, 2017; etc.). For instance, (Badinger and Reuter, 2017) provide evidence that stringent fiscal rules enhance fiscal policy outcomes in terms of lower deficits, lower interest rate and lower output volatility. In the same vein, (Debrun et al., 2008) study the effect of fiscal rules on fiscal policy outcomes

(overall and cyclically adjusted primary fiscal balance, and debt level). They use the lagged fiscal rule index and a dummy for the type of fiscal governance (centralized vs. decentralized) as instruments for fiscal rules. They find that FRs significantly increase fiscal performance, and this effect is the same for the least squares and instrumental variable estimates. (Perry, 2004) argues that Latin American economies, which are subject to high macroeconomic volatility, often aggravated by the procyclical stance adopted under various fiscal adjustment programs, ought to follow a rule that incorporates a countercyclical stance through a structural balance target or a stabilization fund.

The positive effect of FRs on fiscal performance need to be interpreted with some caution since it could reflect the effect of omitted variables (Schaechter et al., 2012). The political commitment to fiscal discipline is a potential omitted variable in the sense that it would trigger both the adoption of fiscal policy rules and better fiscal performance.

In addition, strict application of fiscal rules may be counter-productive in cases where economic policy measures may improve the fiscal stance in the long-term, the short-term fiscal burden notwithstanding. This applies particularly to two instances: First, public investment may stimulate growth and thus improve debt-to-GDP, while giving rise to numerous issues, such as nature, size, and crowding-out (Mourougane et al., 2016). Second, structural reforms are widely claimed to be necessary in order to foster growth (Fiori et al., 2012; Griffith et al., 2007; Griffith and Harisson, 2004), but less attention has been given to the fiscal implications of structural reforms. The reputational cost of breaching rules matters more than the threat of illusory financial sanctions (Eyraud et al., 2018) because: (i) sanctions exacerbate the financial difficulties of already distressed governments, limiting the appropriateness of such sanctions and their credibility in bad times; (ii) markets would be expected to reward, with lower yields, the ability of rules to shape both current and future fiscal behavior (e.g. by the activation of formal enforcement procedures). (Milesi-Ferretti, 2004) investigates the issue of whether fiscal rules lead to genuine fiscal adjustments or simply encourage the use of "creative accounting" (that is to say that compliance with a fiscal rule is just an illusion). To do so, he develops a model in which fiscal rules are imposed on "measured" fiscal variables, which can differ from "true" variables. He finds that rules which are imposed when the budget is not transparent lead to more creative accounting and less fiscal adjustment. Furthermore, fiscal rules may impose severe constraints on governments willing to undertake structural reforms with associated up-



front costs. (Beetsma and Debrun, 2004) analyze the trade-off between short-term stabilization and long-term growth in the context of the Euro area's Stability and Growth Pact. They find that sometimes fiscal rules may need to be relaxed for countries which are actively pursuing much-needed structural reforms. In the same vein, (Sajedi and Steinbach, 2019) quantify the short-term costs and long-term fiscal benefits of reforms and find that short-term output losses are alleviated by long-term output gains. They suggest a good design and interpretation of legal fiscal regimes which account for the interdependency between fiscal policy and structural reforms are necessary. Indeed, they argue that institutional arrangements should accept that enforcement of fiscal adherence should not be pursued as a short-term objective *per se*, but rather incorporate the positive long-term fiscal effects associated with sound structural policies.

The role of compliance has been the subject of many studies. (Schaechter et al., 2012) stress that poor fiscal outcomes can co-exist with the presence of fiscal rules if the rules are not soundly implemented. (Drazen, 2004) examines how properly designed fiscal rules can be a useful means for building reputation and can serve as a disciplining device, if they are accompanied by various procedural rules, including those which prevent creative accounting practices. (Schick, 2004) emphasizes the critical role of political will in the success of any fiscal rule, when supported by appropriate procedural rules. He notes that the literature on fiscal institutions and budgetary processes ignores political will and fails to distinguish between formal rules and informal practices.

### 3. Data and methodology

#### 3.1.1. Data

We use a panel of 36 emerging market economies which are part of the JP Morgan Emerging Markets Bond Index Global. Our study, dictated by data availability, covers the period 1993-2014. The dependent variables in this study comprise bond spreads and sovereign debt rating<sup>4</sup>. Bond spread data are derived from DataStream, and sovereign debt ratings are derived from (Kose et al., 2017). The data on control variables originate from the World Bank's World Development Indicators, (Chinn and Ito, 2006), (Reinhart and Rogoff, 2008), (Ilzetzki et al., 2017), (Dreher et al., 2010,

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<sup>4</sup> This variable is an annual average of foreign currency long-term sovereign debt ratings by the three most important agencies-Standards and Poor's, Moody's and Fitch Ratings, which are available in Bloomberg on a daily basis (Kose et al., 2017). These ratings are converted to a numerical scaled index. Higher value of the index indicates better rating.



2008), (Batini et al., 2006), (Balima et al., 2017a), (Roger, 2009), (Rose, 2007), (Minea and Tapsoba, 2014), (Sturm and De Haan, 2001) and (Debrun et al., 2017).

Our treatment variable is a dummy which is set to 1 if a country has adopted a fiscal rule, and 0 otherwise, as per (Schaechter et al., 2012). Our sample has 232 country-year observations with fiscal rules in place (units of analysis or treated units) and 560 country-year observations without fiscal rules in place (units of control). The potential Non-FR control group is 2 times larger than the FR treatment group, which allows us to obtain a weighted control group for our treatment group.

Drawing on the extensive literature about the adoption of fiscal rules and the determinants of bond spreads (Akitoby and Stratmann, 2008; Badinger and Reuter, 2017; Baldacci et al., 2008; Balima et al., 2017a; Bayoumi et al., 1995; Bellas et al., 2010; Edwards, 1984; Eichengreen and Mody, 1998; Eichler, 2014; Feld et al., 2017; Heinemann et al., 2018; Iara and Wolff, 2014; Johnson and Kriz, 2005; Kopits and Symansky, 1998; Kumar et al., 2009; Min, 1998; Poterba and Rueben, 1999; Tapsoba, 2012; etc.) we utilize a group of matching variables which capture factors that influence simultaneously the probability of adopting fiscal rule and bond spreads:

(i) Growth rate of gross domestic product - which controls the economic cycle and monetary conditions. This variable is assumed to have a negative effect on spreads. Indeed, economies with high GDP growth rate can more easily repay their borrowing than countries with low GDP growth rate.

(ii) Inflation rate - which is the basic indicator of macroeconomic stability. It positively affects spreads, because for example, monetary financing of the budget deficit can lead to high levels of inflation, which increases the cost of capital (equipment, etc.).

(iii) Ratio of debt to gross domestic product. It is recognized that as debt ratio increases, all other things being equal, the risk of default and therefore the spreads increase. This can be explained by the fact that a country which is heavily indebted will spend more money on debt service payments<sup>5</sup>.

(iv) Payment defaults. This is a dummy variable which is given the value of 1 if a country has failed or restructured its debt (which disadvantages investors) in a given year, and 0 otherwise. According to (Reinhart et al., 2003) a country may be the victim of "debt intolerance"<sup>6</sup> when it defaults on its debt at least once in its history (i.e. a serial defaulter). The lack of payment further weakens its institutions (budgetary and

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<sup>5</sup> Debt service is the total government expenditure on debt repayment (principal + interest), often expressed as a percentage of GDP.

<sup>6</sup> Debt intolerance is the inability of emerging markets to manage levels of external debt that would be manageable for developed countries under the same circumstances (Reinhart et al., 2003).

financial institutions) and makes them less able to cope with possible debt problems and future defaults. A country can sustainably emerge from debt intolerance if it reduces both its public and external (public and private) debt (Reinhart and Rogoff, 2008). Defaulting countries are penalized in financial markets by high spreads.

(v) Total of currency reserves expressed as months of imports. This variable is a good indicator of short-term distress for developing economies (Cantor and Packer, 1996). For instance, it is used by the IMF as an appropriate indicator for reserve needs for countries with limited access to capital markets. This variable is expected to negatively affect bond spreads. It measures the country's ability to repay foreign debt denominated in foreign currencies. The higher the ratio of reserves in months of imports is, the lower are bond spreads, *ceteris paribus*.

(vi) FDI net inflows as share of GDP - which measures the capacity of a given country to attract foreign investors. Theoretically, this variable negatively affects sovereign spreads insofar as private investment helps to improve macroeconomic indicators such as employment, growth, and to some extent balance of payments.

(vii) Political risk - which captures governance quality. It is a composite measure of the quality of governance, and is a simple average of ICRG political variables (Arezki et al., 2016). A good score for this variable is assumed to reduce sovereign bond spreads, because sound institutions reinforce investors' confidence in a country.

(viii) Capital openness - which captures the degree of financial openness. The expected effect of this variable is ambiguous. Increased openness could favor market access if it heightens economic growth (Chinn and Ito, 2006). On the contrary, capital openness, by increasing income inequality (Furceri and Loungani, 2018), could reduce financial market access for developing countries. Moreover, capital account openness could make developing countries more shock-prone.

(ix) Migrant remittances - following the recent literature on the determinants of bond spreads (Balima and Combes, 2019), we expect this variable to reduce bond spreads given that it plays an important role in overcoming poverty and improving standards of living in developing countries.

(x) Overall fiscal balance - which is the difference between general government revenue (including grants) and expenditure, as a percentage of GDP. It is expected to reduce bonds spreads when financial markets reward the ability of government to meet its announced fiscal targets.

(xi) Political elections - which captures the electoral cycle. This variable is expected to increase bond spreads in accordance with the literature on political budget cycles (Alesina and Tabellini, 1990; Franzese, 2000; Shi and Svensson, 2006).

(xii) IMF-supported program - which includes a mix of stabilization and structural reform measures aimed at restoring a sustainable balance between aggregate demand and supply, while simultaneously expanding the production of tradables (Wong et al., 2002). This variable is expected to increase bond spreads since these programs are introduced in distressed countries.

(xiii) Fixed exchange rate regime – which could promote trade openness and foster trade integration (Frankel and Rose, 2002). We expect this variable to reduce bond spreads in developing countries.

Tables A1, A2, and A3 in the appendix summarize the different variables used in this paper and lists all the countries studied.



Figure 2 : Changes in bond spreads for FR and Non-FR groups (1993-2014)



Figure 3 : Changes in debt rating for FR and Non-FR groups (1993-2014)

Figure 2 and Figure 3 show the change in bond spreads and debt rating both in our FR and Non-FR groups<sup>7</sup>. A downward trend of bond spreads (upward trend of debt rating) is observed in the FR group over the sample period. A close look at Figure 2 clearly shows that countries with fiscal rules in place faced high bond spreads until 2006. Bond spreads are similar for both groups between 2006 and 2010. However, Fiscal rule countries have a lower bond spreads than Non-fiscal rule countries from 2010 onwards. Indeed, fiscal rule adoption could have a negative effect (positive effect) on bond spreads (sovereign debt rating).

The introduction of fiscal rules has increased since 2000. The number of fiscal rule countries increased by 15 between 2000 and 2010. In our sample, budget balanced rules are more widespread, followed by debt rules and expenditures rules (Figure 4).

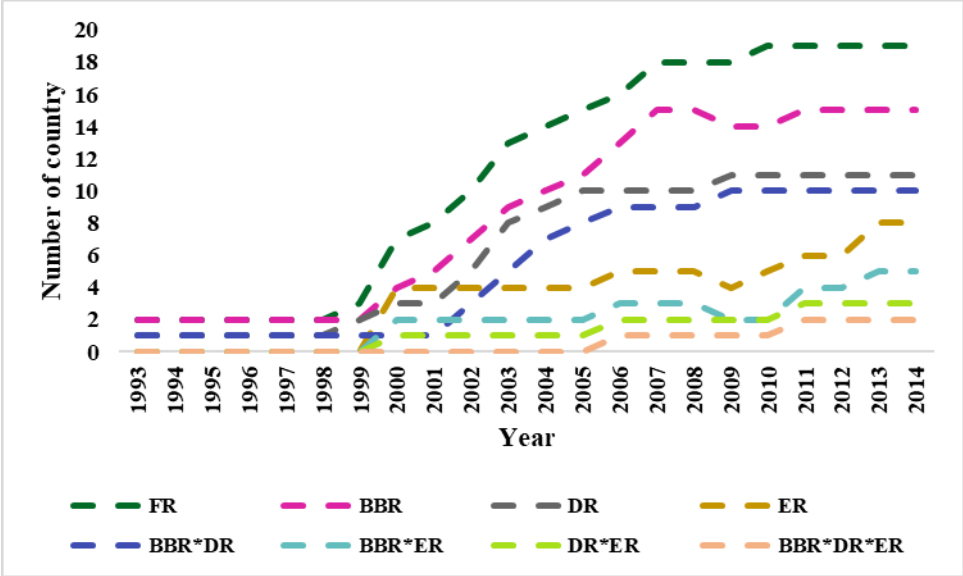


Figure 4 : number of fiscal ruler countries by year

### 3.1.2. Underlying method

Our objective is to analyze whether the adoption of fiscal rules improves financial market access in developing countries. Financial market access is accounted for in this paper by two alternative variables: sovereign bond spreads and sovereign debt rating.

The main challenge in our empirical investigation is to determine a causal relationship between the adoption of FR and the conditions by which developing countries access financial market. The motives for which DCs implement FR (i.e. fiscal profligacy, political risk, lack of liquidity, etc), could be associated with a country’s macroeconomic conditions and its political situation. We address this existing

<sup>7</sup> The econometric analysis does not show a significant difference between FR and Non-FR for the period 1997-2006.

endogeneity by using a matching approach (because classical linear regressions are not as reliable).

In our analysis, countries which have adopted FR (fiscal rule countries hereafter) are the treated group. The units of analysis are country-year observations, observations with FR in place constitute the treatment group while observations without FR represent the control group. The average treatment effect on the treated (ATT) is given by:

$$ATT = E[(Y_{it} - Y_{i0}) | FR=1] = E[Y_{it} | FR=1] - E[Y_{i0} | FR=1] \quad \text{Equation (1)}$$

where FR is the FR dummy variable in country  $i$ ,  $Y_{it}$  is the value of spreads (debt rating) when country  $i$  has Non-FR and  $Y_{i0}$  if it adopt FR,  $Y_{i0} | FR=1$  is the spreads (debt rating) value that would have been observed if a Non-FR country had adopted FR and,  $Y_{it} | FR=1$  the spreads (debt rating) actually observed for the same Non-FR country.

**Equation (1)** means that the comparison between spreads (debt rating) observed in Non-FR countries and spreads (debt rating) observed in the same countries if they had adopted FR would give us an unbiased estimate of the ATT. However, the main difficulty here is that this second term on the right side of this equation is unobservable. We cannot observe spreads or debt rating of a Non-FR country had it adopted FR.

With a random choice of Non-FR, we can simply compare the sample mean of the Non-FR countries and that of FR countries to bypass this difficulty. However, the choice of adopting FR may be dictated by some observable factors (political institutions, macroeconomic conditions, etc.) which also determine spreads and debt rating. This can lead to self-selection. Comparing the mean value of spreads and debt rating between the two samples can generate a “selection on observables” problem, biasing linear regression method (Lin and Ye, 2007).

The estimate of the ATT under unconfoundedness<sup>8</sup> (or conditional independence) is defined as follows:

$$ATT = E[Y_{it} | FR=1, X_i] - E[Y_{i0} | FR=0, X_i] \quad \text{Equation (2)}$$

where  $E[Y_{i0} | FR=1, X_i]$  is replaced by  $E[Y_{i0} | FR=0, X_i]$

Following the recent literature on impact evaluation, we use entropy balancing which was originated by (Hainmueller, 2012) and implemented by (Neuenkirch and Neumeier, 2016) and (Balima, 2017). Entropy balancing consists of two principal steps.

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<sup>8</sup> Unconfoundedness implies that all factors that influence the treatment and the outcome have to be observed by the researcher (Caliendo and Kopeinig, 2008).

The first step requires computation of weights which are assigned to the control units (in this case Non-fiscal rule countries). In the second step, the weights obtained in the first step are used in a regression analysis with the treatment variable (Fiscal rule countries) as explanatory variable<sup>9</sup>. We then balance Fiscal rule countries and Non-fiscal rule countries based on observable characteristics. Thus, the average difference in bond spreads and debt ratings between fiscal rule countries and the “closest” Non-fiscal rule countries should be explained by the adoption of rules.

Entropy balancing has several advantages over other treatment effect estimators because it combines matching and regression analysis. It outperforms the classical regression-based approach and matching on the propensity scores methods given that it is non-parametric (there are no concerns regarding mis-specification of the functional form of the model which could bias the results). It also rules out multicollinearity issues as the reweighting mechanism makes the treatment variable orthogonal with respect to the covariates.

In sum, entropy balancing is more effective than other matching methods in balancing the covariate between the treatment group and the control group. For example, in propensity score matching methods, the control group is comprised only of a subset of the units that are not subject to treatment<sup>10</sup> (Diamond and Sekhon, 2013; Hainmueller, 2012; Neuenkirch and Neumeier, 2016). Each untreated unit either receives a weight equal to 0 if it does not represent a best match for a treated unit, or equal to 1 if it represents a best match for one treated unit (Neuenkirch and Neumeier, 2016)<sup>11</sup>. Thus, low covariate balance could bias the treatment effects estimates. However, in the case of entropy balancing, the vector of weights assigned to the units not exposed to treatment can contain any nonnegative values. In this later situation, the constructed control group adequately reflects the treated group<sup>12</sup>.

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<sup>9</sup> It is also possible to include additional control variables used to compute the weights in the first step. As indicated by (Hainmueller, 2012) and (Neuenkirch and Neumeier, 2016), this is similar to including control variables in a randomized experiment and increases estimation efficiency.

<sup>10</sup> For example, with propensity score matching (nearest neighbor matching for example), each treated unit is matched with the one untreated unit that is closest in terms of a metric balancing score.

<sup>11</sup> Note that propensity score matching allows for replacement, meaning that an untreated unit can be used multiple times as a match. It then allows for weights equal to any non-negative integer. However, (Caliendo and Kopeinig, 2008) underscore that matching with replacement improves the quality of the matching in terms of covariate balance, but reduce its efficiency given that the number of observations used to estimate the ATT decreases.

<sup>12</sup> Entropy balancing is viewed as a generalization of conventional matching methods (Neuenkirch and Neumeier, 2016). Using Monte Carlo simulations and empirical applications (Hainmueller, 2012), shows

In sum, entropy balancing addresses the panel structure of our data by combining a reweighting scheme with a regression analysis (Neuenkirch and Neumeier, 2016). It is also possible to control for both country- and time-fixed effects in the regression analysis<sup>13</sup>. Including country-fixed effects helps to account for potential unobserved heterogeneity across Non-fiscal rule countries and fiscal rule countries. Fiscal rule countries and Non-fiscal rule countries may differ (beyond the set of factors used to balance them) in terms of their specific structural characteristics. The inclusion of country-fixed effects allows the accounting for of country-specific time-invariant factors that explain differences in terms of financial market access in developing countries.

## 4. Empirical results

### 4.1. Results

In Table 1, we show the sample means of all matching variables both for FR (column 1) and Non-FR groups (column 2). The differences in means between these groups and the related t-statistics and p-values are shown in column 3.

The figures reveal that times during which fiscal rules are in place differ from times during which there are no fiscal rules in place. This is valid for almost all relevant pretreatment factors. The political situation and macroeconomic conditions are better in countries with fiscal rules in place than in countries without fiscal rules. Fiscal rule countries experience low inflation, low default, high FDI inflows, and high capital account openness.

Given these descriptive statistics it is crucial to select an adequate control group before estimating the treatment effect when we use matching approach. Otherwise, the estimated treatment effect of fiscal rule on financial market access might be biased.

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that entropy balancing outperforms other matching methods (e.g. propensity score matching, nearest neighbor matching, and genetic matching), in terms of estimation bias and mean square error.

<sup>13</sup> This is the second step of the entropy balancing method.



**Table 1: Descriptive statistics**

	[1]	[2]	[3]=[1] - [2]		
	Non-FR	FR	Difference	t_value	p_value
Lag GDP/growth	4.043	4.128	-0.085	-0.25	0.798
Lag Debt	45.638	50.621	-4.984	-2.1	0.035
Lag FDI/inflows	3.212	4.021	-0.808	-2.5	0.013
Lag Inflation	37.529	5.798	31.732	1.9	0.06
Lag Reserves/months	5.058	5.21	-0.154	-0.55	0.594
Lag Capital openness	-152	0.555	-0.707	-6.65	0.000
Lag Remittances/GDP	4.023	2.481	1.542	4.25	0.000
Political risk	65.141	64.59	0.551	0.8	0.429
Lag Default	.127	0.073	0.054	2.1	0.033
Lag Fiscal balance	-3.33	-1.579	-1.752	-5.1	0.000
Lag IMF program	0.379	0.405	-0.026	-0.7	0.5
Lag Elections	0.146	0.177	-0.031	-1.35	0.173
Lag Fix regime	0.796	0.87	-0.073	-2.4	0.017
<b>No. of Observations</b>	<b>386</b>	<b>216</b>			

**Notes:** This Table presents the pre-weighting sample means of the matching covariates for country-year observations where FR were in place (the treatment group) in column [2] and country-year observations where no FR were in place (the potential control group) in column [1]. Column [3] reports the differences in means between treated and control group, and the corresponding t-test statistics and p-values.

In [Table 2](#), we construct a synthetic control group (column 4) and compare the sample means of all matching covariates across the treatment group (column 2) and that synthetic control group. The differences in means between these two groups are statistically insignificant. As a matter of fact, entropy balancing allows to obtain a perfect control group for our treated units.

**Table 2: Covariate balancing**

	[1]	[2]	[3]=[1] - [2]		
	Non-FR	FR	Difference	t_value	p_value
Lag GDP/growth	4.162	4.128	0.034	0.02	0.983
Lag Debt	51.640	50.621	1.019	0.00	1.000
Lag FDI/inflows	3.990	4.021	-0.031	0.01	0.990
Lag Inflation	6.012	5.798	0.214	-0.09	0.927
Lag Reserves/months	5.160	5.21	-0.05	0.02	0.987
Lag Capital openness	0.610	.555	0.055	0.03	0.974
Lag Remittances/GDP	2.529	2.481	0.048	-0.00	0.998
Political risk	64.474	64.59	-0.116	0.01	0.988
Lag Default	0.074	0.073	0.001	-0.01	0.995
Lag Fiscal balance	-1.842	-1.579	-0.263	0.02	0.984
Lag IMF program	0.408	0.405	0.003	-0.02	0.986
Lag Elections	.1797	0.177	0.0027	0.00	0.998
Lag Fix regime	0.898	0.87	0.028	0.01	0.991
<b>No. of Observations</b>	<b>216</b>	<b>216</b>			

**Notes:** This Table presents the sample means matching covariates after weighting across the treated group in column [2] and the synthetic control group obtained from entropy balancing in column [4]. Column [5] shows the differences in means, the t-test statistics and the associated p-values.

Based on the synthetic control group from [Table 2](#), we estimate the effect of fiscal rule adoption on financial market access using weighted least square regressions. We use different specifications and report the results in [Table 3](#). In [Table 3](#) the average treatment effect on the FR countries for sovereign bond spreads obtained from various sets of treatment effect estimates are presented. First, we present in columns 1-4 baseline results highlighting the effect of adopting a fiscal rule on bond spread. Second, we add country fixed effect, time fixed effect and country-time fixed effects. In columns 5-8, we include all control variables in our equation. The adoption of fiscal rule significantly reduces sovereign bond spreads. The effect of fiscal rule adoption on financial markets access is favorable since fiscal rule countries show lower bond spreads.

When fiscal rule is in place, the bond spread varies up to more than 1.5% lower than country-observations without fiscal rule in place (these two groups of countries are similar in terms of pretreatment factors). This effect is statistically significant at 1%, especially when we include control factors.

**Table 3 : The effects of fiscal rules on sovereign bond spreads**

Log(EMBIG)	[1] Baseline	[2] Adding Country/FE	[3] Adding Time/FE	[4] Adding Country/Time/FE	[5] Adding Controls	[6] Adding Country/FE	[7] Adding Time/FE	[8] Adding Country/Time/FE
FR dummy	-0.261*** (0.0738)	-0.446*** (0.0951)	-0.128* (0.0683)	-0.120 (0.0838)	-0.285*** (0.0549)	-0.341*** (0.0894)	-0.205*** (0.0486)	-0.310*** (0.0720)
Lag GDP/growth					-0.0367*** (0.00795)	-0.0321*** (0.00735)	-0.0246*** (0.00761)	-0.0246*** (0.00641)
Lag Debt					0.00383*** (0.00112)	0.00594*** (0.00125)	0.00421*** (0.000945)	0.00605*** (0.000976)
Lag FDI/inflows					-0.00538 (0.00613)	0.00492 (0.00526)	-0.0137*** (0.00523)	-0.00473 (0.00411)
Lag Inflation					0.0319*** (0.00616)	0.0190*** (0.00645)	0.0221*** (0.00537)	0.0114** (0.00516)
Lag Reserves/months					-0.0391*** (0.00784)	-0.0805*** (0.0144)	-0.0336*** (0.00670)	-0.0612*** (0.0120)
Lag Capital/openness					-0.0120 (0.0220)	-0.0747** (0.0344)	0.0137 (0.0184)	-0.0790*** (0.0275)
Lag Remittances/GDP					0.00244 (0.00867)	-0.108*** (0.0232)	0.0125* (0.00729)	-0.0378** (0.0187)
Political/risk					-0.0352*** (0.00374)	-0.0375*** (0.00754)	-0.0359*** (0.00323)	-0.0387*** (0.00623)
Lag Default					0.676*** (0.148)	0.104 (0.134)	1.115*** (0.136)	0.449*** (0.111)
Lag Fiscal balance					0.0168* (0.00957)	0.0145 (0.0104)	0.000276 (0.00845)	-0.00348 (0.00904)
Lag IMF program					0.350*** (0.0595)	0.249*** (0.0564)	0.268*** (0.0516)	0.204*** (0.0461)
Lag Elections					0.232** (0.0974)	0.148* (0.0806)	0.316*** (0.0817)	0.201*** (0.0618)
Lag Fix regime					0.0711 (0.130)	0.0743 (0.208)	0.138 (0.110)	0.180 (0.171)
Constant	5.861*** (0.0532)	7.302*** (0.143)	6.866*** (1.112)	7.710*** (0.710)	7.964*** (0.293)	9.699*** (0.591)	8.313*** (0.831)	9.875*** (0.763)
N	485	485	485	485	485	485	485	485
R2	0.025	0.546	0.281	0.738	0.486	0.723	0.675	0.853

**Notes:** This Table presents the effect of fiscal rule adoption on sovereign bond spreads obtained by weighted least squares regressions. The treatment variable is fiscal rule dummy. The outcome variable is sovereign bond spread. The control variables include the lagged values of the growth rate of GDP, external debt, FDI inflows, inflation rate, total reserves in months of imports, capital openness, remittances, the history of payment defaults, and political risk, Overall fiscal balance, IMF program, Electoral cycle, Exchange rate regime. Standard errors are in parentheses. \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01.

## 4.2. Robustness checks

To test the robustness of our results we use (1) an alternative measure of financial market access - sovereign debt rating, (2) an alternative matching method - propensity score matching. First, regarding sovereign debt ratings, the adoption of fiscal rule seems to significantly increase bond ratings (Table 4). For instance, the Average Treatment effect on the Treated (ATT) of fiscal rule adoption is up to 1 grade. This effect is highly significant at the 1% level and holds when we add country fixed effects, time fixed effects, both country and time fixed effects and covariates used to balance the two samples of countries. Second, we check the robustness of our results by using various propensity score matching (i.e. nearest neighbor matching, radius matching, local linear regression and kernel matching). As shown in Table 5, the adoption of fiscal rules significantly reduces bond spreads while their effect on sovereign debt ratings is significantly positive. When it comes to the different types of fiscal policy rules, we find that debt rules and balanced budget rules have an added effect on debt ratings

and bond spreads while expenditure rules downgrade sovereign ratings in developing countries. However, the combination of expenditure rules and multi-year expenditure ceilings (MEC) improve sovereign ratings (Table 4 & 5).

**Table 4 : The effects of fiscal rules on sovereign debt ratings**

SOVEREIGN RATING	[1] Baseline	[2] Adding Country/FE	[3] Adding Time/FE	[4] Adding Country/Time/FE	[5] Adding Controls	[6] Adding Country/FE	[7] Adding Time/FE	[8] Adding Country/Time/FE
<b>FR dummy</b>	0.906*** (0.285)	0.674*** (0.246)	0.750** (0.293)	0.119 (0.244)	1.547*** (0.188)	1.003*** (0.202)	1.581*** (0.194)	0.866*** (0.193)
N	550	550	550	550	550	550	550	550
R2	0.018	0.808	0.071	0.852	0.609	0.907	0.647	0.929
<b>BBR dummy</b>	1.286*** (0.288)	0.961*** (0.238)	0.979*** (0.297)	0.397* (0.233)	2.064*** (0.188)	1.148*** (0.203)	2.007*** (0.193)	1.009*** (0.193)
N	550	550	550	550	550	550	550	550
R2	0.035	0.823	0.101	0.864	0.635	0.912	0.685	0.934
<b>DR dummy</b>	1.406*** (0.295)	1.333*** (0.229)	1.443*** (0.306)	0.742*** (0.240)	1.428*** (0.164)	1.437*** (0.195)	1.466*** (0.170)	1.255*** (0.192)
N	550	550	550	550	550	550	550	550
R2	0.040	0.816	0.099	0.862	0.724	0.914	0.753	0.931
<b>ER dummy</b>	-0.168 (0.300)	-0.402 (0.254)	-1.071*** (0.282)	-0.806*** (0.226)	-0.100 (0.201)	0.178 (0.166)	-0.699*** (0.203)	-0.0626 (0.152)
N	550	550	550	550	550	550	550	550
R2	0.001	0.785	0.307	0.885	0.572	0.927	0.680	0.955
<b>BBR*DR</b>	2.059*** (0.301)	1.462*** (0.206)	2.223*** (0.316)	0.999*** (0.209)	2.026*** (0.144)	1.478*** (0.163)	2.176*** (0.155)	1.264*** (0.173)
N	550	550	550	550	550	550	550	550
R2	0.079	0.834	0.208	0.899	0.804	0.931	0.833	0.946
<b>ER*MEC</b>	2.296*** (0.188)	1.826*** (0.188)	1.337*** (0.234)	0.974*** (0.192)	2.258*** (0.130)	1.568*** (0.165)	1.285*** (0.165)	0.836*** (0.186)
N	550	550	550	550	550	550	550	550
R2	0.214	0.836	0.347	0.885	0.633	0.903	0.731	0.930
<b>Covariates</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>YES</b>	<b>YES</b>	<b>YES</b>	<b>YES</b>
<b>Time FE</b>	<b>NO</b>	<b>NO</b>	<b>YES</b>	<b>YES</b>	<b>NO</b>	<b>NO</b>	<b>YES</b>	<b>YES</b>
<b>Country FE</b>	<b>NO</b>	<b>YES</b>	<b>NO</b>	<b>YES</b>	<b>NO</b>	<b>YES</b>	<b>NO</b>	<b>YES</b>

**Notes:** This Table presents the effect of fiscal rule adoption on sovereign debt ratings obtained by weighted least squares regressions (using entropy balancing). The treatment variable is fiscal rule dummy. The outcome variable is sovereign debt rating. The control variables include the lagged values of the growth rate of GDP, external debt, FDI inflows, inflation rate, total reserves in months of imports, capital openness, remittances, the history of payment defaults, and political risk, Overall fiscal balance, IMF program, Electoral cycle, Exchange rate regime. Standard errors are in parentheses. \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01.

The positive effect of debt rules and balanced budget rules are consistent with the extensive empirical literature which highlights that fiscal rules improve fiscal outcomes. Better fiscal outcomes reassure financial markets and investors, reducing borrowing costs for developing countries. Regarding the negative effect of expenditure rules on financial market access, a possible explanation is that the mere adoption of an ER is not enough to reduce the cost of sovereign borrowing in developing countries. However, simultaneously adopting an ER and establishing a multi-year expenditure ceiling (MEC)<sup>14</sup> is associated with low bond spreads (and high debt rating) in the developing world. This finding lend support to (Cordes et al., 2015) who examine the effectiveness of expenditure rules in terms of achieving long-term debt sustainability and find that expenditure rules are more effective than other types of FR if sound PFM systems<sup>15</sup> are in place. It also corroborates (Reuter, 2019) who explores the determinants of a country's compliance with its national numerical fiscal rules and

<sup>14</sup> We thank an anonymous Referee for suggesting this investigation.

<sup>15</sup> Expenditure rules are associated with lower levels of public investment in emerging market economies, where weaker PFM systems may be less effective in preventing policymakers to defer high-quality discretionary spending for the sake of complying with the rule (Cordes et al., 2015).

shows that compliance with rules, set out in coalitional agreements, as well as rules covering larger parts of general government finances is significantly higher<sup>16</sup>. In accordance with the literature on political budget cycles<sup>17</sup>, he also reveals that compliance is lower in elections years. The interaction of fiscal rules is highly beneficial in terms of low borrowing costs. Countries that adopt both BBR and DR rules can more easily access financial markets than others (Table 5)<sup>18</sup>.

The standardized bias and its associated p-value (see Caliendo and Kopeinig, 2008; Lechner, 2001; Sianesi, 2004 for more details) confirm that the conditional independence assumption holds. Indeed, for this assumption to hold, the p-value associated with the standardized bias should be above the critical value of 10% (Rosenbaum and Rubin, 1985). Our control variables are also relevant in explaining the probability of adopting a fiscal rule given the “fairly low” value of the pseudo R2 after matching (Caliendo and Kopeinig, 2008; Sianesi, 2004). Finally, our results do not suffer from a hidden bias as confirmed by the (Rosenbaum, 2002) sensitivity test. Our results are robust to the use of alternative measure of financial markets access and the use of alternative econometric method.

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<sup>16</sup> By the same token, (Cordes et al., 2015) claim that expenditure rules are more often complied with than other types of fiscal rules, especially if they are set out in coalition agreements or statutory law and entail specific nominal targets.

<sup>17</sup> This literature shows that government fiscal deficit increases in election years (Shi and Svensson, 2006).

<sup>18</sup> The interaction between expenditure rules (ER) and other types of rules yields insignificant results. These results are available upon request.

Table 5 : ATT of fiscal rule adoption using propensity score matching<sup>19</sup>

Treatment Variable	1-Nearest Neighbour Matching	2-Nearest Neighbour Matching	3-Nearest Neighbour Matching	Radius Matching			Local Linear Regression Matching	Kernel Matching
				r=0.005	r=0.01	r=0.05		
				DEPENDENT VARIABLE: LOG (EMBIG)				
<b>FR Dummy</b>	-0.254**	-0.199*	-0.211**	-0.194	-0.204*	-0.225***	-0.235***	-0.222***
<b>ATT</b>	(0.118)	(0.111)	(0.106)	(0.120)	(0.105)	(0.0797)	(0.0812)	(0.0857)
Observations/Treated/Control	501/195/306	501/195/306	501/195/306	501/195/306	501/195/306	501/195/306	501/195/306	501/195/306
Rosenbaum bounds sensitivity	1.6	1.4	1.5	1.3	1.4	1.6	1.6	1.6
Standardized bias	0.07	0.05	0.06	0.06	0.06	0.05	0.07	0.05
Standardized bias (p-value)	0.006	0.20	0.006	0.72	0.81	0.92	0.006	0.93
Pseudo R2	0.05	0.03	0.01	0.02	0.02	0.01	0.05	0.01
<b>BBR Dummy</b>	-0.447***	-0.422***	-0.375***	-0.434***	-0.400***	-0.324***	-0.330***	-0.327***
<b>ATT</b>	(0.134)	(0.125)	(0.115)	(0.129)	(0.119)	(0.0881)	(0.0973)	(0.0958)
Observations Treated/Control	501/154/347	501/154/347	501/154/347	501/154/347	501/154/347	501/154/347	501/154/347	501/154/347
Rosenbaum bounds sensitivity	2.1	2.1	2	2.1	2	2	2	2
Standardized bias	0.09	0.09	0.08	0.07	0.06	0.08	0.09	0.08
Standardized bias (p-value)	0.33	0.30	0.33	0.78	0.93	0.58	0.33	0.60
Pseudo R2	0.03	0.03	0.03	0.02	0.01	0.02	0.03	0.02
<b>DR Dummy</b>	-0.488***	-0.371***	-0.305**	-0.245**	-0.216*	-0.251**	-0.258***	-0.243**
<b>ATT</b>	(0.151)	(0.138)	(0.150)	(0.124)	(0.117)	(0.0983)	(0.0975)	(0.0952)
Observations/Treated/Control	501/122/379	501/122/379	501/122/379	501/122/379	501/122/379	501/122/379	501/122/379	501/122/379
Rosenbaum bounds sensitivity	1.8	1.8	1.5	1.3	1.2	1.4	1.4	1.4
Standardized bias	0.1	0.06	0.05	0.04	0.03	0.04	0.1	0.04
Standardized bias (p-value)	0.57	0.89	0.97	0.99	0.99	0.99	0.57	0.99
Pseudo R2	0.03	0.02	0.01	0.01	0.006	0.005	0.03	0.006
<b>ER Dummy</b>	0.0951	0.0414	-0.0512	0.0794	0.0471	-0.0665	-0.0803	-0.0633
<b>ATT</b>	(0.179)	(0.159)	(0.158)	(0.192)	(0.159)	(0.128)	(0.124)	(0.130)
Observations/Treated/Control	501/76/425	501/76/425	501/76/425	501/76/425	501/76/425	501/76/425	501/76/425	501/76/425
Rosenbaum bounds sensitivity	1	1	1.1	1	1	1.1	1.1	1.1
Standardized bias	0.14	0.09	0.04	0.1	0.07	0.08	0.14	0.07
Standardized bias (p-value)	0.12	0.88	0.98	0.94	0.99	0.98	0.12	0.99
Pseudo R2	0.08	0.03	0.01	0.04	0.01	0.02	0.08	0.01
<b>BBR*DR Dummy</b>	-0.407**	-0.438***	-0.450***	-0.283*	-0.252*	-0.322***	-0.406***	-0.309***
<b>ATT</b>	(0.164)	(0.158)	(0.153)	(0.164)	(0.136)	(0.110)	(0.114)	(0.114)
Observations/ Treated/Control	501/99/402	501/99/402	501/99/402	501/99/402	501/99/402	501/99/402	501/99/402	501/99/402
Rosenbaum bounds sensitivity	1.6	1.7	1.8	1.3	1.3	1.6	1.8	1.5
Standardized bias	0.14	0.12	0.12	0.07	0.06	0.06	0.14	0.06
Standardized bias (p-value)	0.004	0.15	0.19	0.98	0.97	0.98	0.004	0.97
Pseudo R2	0.11	0.06	0.06	0.02	0.02	0.01	0.11	0.01
<b>ER*MEC Dummy</b>	-0.603*	-0.545*	-0.636**	-0.625*	-0.652**	-0.718***	-0.726***	-0.719***
<b>ATT</b>	(0.339)	(0.289)	(0.270)	(0.351)	(0.291)	(0.226)	(0.221)	(0.215)
Treated/Control/Total obs.	14/441/445	14/441/445	14/441/445	14/441/445	14/441/445	14/441/445	14/441/445	14/441/445
Rosenbaum bounds sensitivity	2.6	3.9	4.7	3	3.5	5.2	6.7	5.8
Standardized bias	0.22	0.13	0.11	0.09	0.09	0.12	0.22	0.12
Standardized biases (p-value)	0.91	0.97	0.99	0.99	0.99	0.99	0.91	0.99
Pseudo R2	0.13	0.09	0.06	0.06	0.04	0.04	0.13	0.03

Treatment Variable	1-Nearest Neighbour Matching	2-Nearest Neighbour Matching	3-Nearest Neighbour Matching	Radius Matching			Local Linear Regression Matching	Kernel Matching
				r=0.005	r=0.01	r=0.05		
				DEPENDENT VARIABLE: SOVEREIGN DEBT RATINGS				
	0.884*	1.048**	0.927**	0.985**	1.087***	1.022***	1.041***	1.036***
	(0.453)	(0.417)	(0.400)	(0.460)	(0.375)	(0.315)	(0.296)	(0.298)
Observations/Treated/Control	572/214/358	572/214/358	572/214/358	572/214/358	572/214/358	572/214/358	572/214/358	572/214/358
Rosenbaum bounds sensitivity	1.3	1.5	1.4	1.4	1.5	1.6	1.6	1.6
Standardized bias	0.1	0.08	0.08	0.05	0.03	0.06	0.1	0.06
Standardized bias (p-value)	0.011	0.10	0.15	0.92	0.99	0.62	0.011	0.60
Pseudo R2	0.04	0.03	0.03	0.01	0.006	0.01	0.04	0.01
	1.621***	1.661***	1.670***	1.695***	1.701***	1.354***	1.347***	1.326***
	(0.512)	(0.464)	(0.432)	(0.500)	(0.419)	(0.361)	(0.350)	(0.358)
Observations/Treated/Control	572/173/399	572/173/399	572/173/399	572/173/399	572/173/399	572/173/399	572/173/399	572/173/399
Rosenbaum bounds sensitivity	1.7	1.8	1.9	1.8	1.9	1.7	1.7	1.7
Standardized bias	0.09	0.09	0.09	0.03	0.04	0.07	0.09	0.08
Standardized bias (p-value)	0.08	0.12	0.12	0.99	0.98	0.43	0.08	0.28
Pseudo R2	0.04	0.04	0.04	0.01	0.01	0.02	0.04	0.03
	1.475***	1.364***	1.213***	0.584	0.705*	1.104***	1.220***	1.067***
	(0.540)	(0.478)	(0.445)	(0.457)	(0.395)	(0.351)	(0.345)	(0.340)
Observations/Treated/Control	572/127/425	572/127/425	572/127/425	572/127/425	572/127/425	572/127/425	572/127/425	572/127/425
Rosenbaum bounds sensitivity	1.6	1.6	1.6	1	1.2	1.5	1.5	1.5
Standardized bias	0.09	0.07	0.07	0.03	0.02	0.05	0.09	0.05
Standardized bias (p-value)	0.16	0.83	0.93	0.99	0.99	0.99	0.16	0.98
Pseudo R2	0.05	0.02	0.01	0.008	0.004	0.01	0.05	0.01
	0.392	0.192	0.180	-0.780	-0.389	-0.125	-0.169	-0.138
	(0.799)	(0.758)	(0.688)	(0.747)	(0.713)	(0.519)	(0.539)	(0.565)
Observations/Treated/Control	572/104/468	572/104/468	572/104/468	572/104/468	572/104/468	572/104/468	572/104/468	572/104/468
Rosenbaum bounds sensitivity	1	1	1	1	1	1	1	1
Standardized bias	0.1	0.08	0.08	0.06	0.05	0.04	0.1	0.04
Standardized bias (p-value)	0.078	0.71	0.82	0.99	0.99	0.99	0.078	0.99
Pseudo R2	0.09	0.04	0.03	0.01	0.01	0.01	0.09	0.01
<b>BBR*DR Dummy</b>	1.444***	1.429***	1.589***	0.895	0.986**	1.198***	1.590***	1.215***
<b>ATT</b>	(0.562)	(0.551)	(0.507)	(0.547)	(0.461)	(0.390)	(0.375)	(0.382)
Observations/ Treated/Control	572/104/468	572/104/468	572/104/468	572/104/468	572/104/468	572/104/468	572/104/468	572/104/468
Rosenbaum bounds sensitivity	1.5	1.6	1.8	1.2	1.3	1.5	1.8	1.5
Standardized bias	0.12	0.1	0.12	0.09	0.05	0.06	0.12	0.06
Standardized bias (p-value)	0.13	0.40	0.33	0.61	0.98	0.94	0.13	0.96
Pseudo R2	0.06	0.04	0.05	0.04	0.01	0.02	0.06	0.02
	2.963**	2.610**	2.393**	2.328*	2.960***	2.952***	2.921***	3.036***
	(1.328)	(1.071)	(0.929)	(1.246)	(0.923)	(0.659)	(0.624)	(0.673)
Observations/Treated/Control	14/489/503	14/489/503	14/489/503	14/489/503	14/489/503	14/489/503	14/489/503	14/489/503
Rosenbaum bounds sensitivity	3.2	5.2	6.7	5.3	6.2	6.7	6.7	6.7
Standardized bias	0.30	0.17	0.13	0.09	0.12	0.14	0.30	0.14
Standardized biases (p-value)	0.24	0.78	0.96	0.97	0.91	0.99	0.24	0.99
Pseudo R2	0.35	0.18	0.10	0.12	0.14	0.04	0.35	0.06

**Notes:** This table presents the average treatment effect of the treated (ATT) of fiscal rule adoption on sovereign bond spreads (left panel of Table 5) and sovereign debt ratings (right panel of Table 5) using propensity scores matching method. Bootstrapped standard errors based on 500 replications are reported in brackets. Standard errors are in parentheses. \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01.

<sup>19</sup> See Table A14 & A15 for additional robustness check (when altering the sample). We check the robustness of the ATT with respect to the exclusion of the crisis year (2009 global recession), former USSR countries, high indebtedness, high inflation episodes and countries belonging to monetary unions.

## 5. Sensitivity analysis: the role of structural factors

Considering heterogeneities in the macroeconomic conditions and the political situations in developing countries which are highlighted in the empirical literature (Acemoglu et al., 2019, 2014, 2003, 2001; Balima et al., 2017b; Easterly, 2002; Hameed, 2005; Lin and Ye, 2009; Minea and Tapsoba, 2014; Wei, 2006; etc.), we explore the sensitivity of our results with regards to these factors.

The idea here is that structural factors can magnify or alleviate the effect of FR on financial market access. We follow the literature on impact evaluation (Guerguil et al., 2017; Lin and Ye, 2009; Tapsoba, 2012; etc.) and assess the effects of such heterogeneities. We report the results for bond spreads in Table 6a & 6b below<sup>20</sup>. Column 1 and 2 show the results of a simple OLS linking FR adoption to sovereign bond spreads while accounting for the estimated propensity score. A statistically significant coefficient of the propensity score means that there is self-selectivity in the model. The variable named FR dummy catches the mean difference in bond spreads between countries with FR and those without. This coefficient is negative in all columns. However, the coefficient is not significant when some structural factors are controlled for. Columns 3 and 4 introduce in the OLS regressions the mean propensity score and the time length since a fiscal rule adoption. The next columns show the coefficients of the interactive term between a FR and a given structural factor<sup>21</sup>.

Potential sources of heterogeneity from a macroeconomic perspective include the position in the business cycle (captured by a dummy for which equals 1 if GDP growth is above its mean value and 0 otherwise), the fiscal policy stance (dummy equals 1 if the ratio of external debt stocks to GDP is above its mean value and 0 otherwise), macroeconomic stability (standard deviation of the output gap), FDI inflows, government size, human capital (captured by the level of education), international trade and capital account openness, inflation targeting, central bank independence, and exchange rate regime. The results indicate that FRs are more effective in reducing bond spreads in countries which have them, especially when: (i) FDI inflows are high, (ii) trade openness is high, (iii) macroeconomic stability is low, (iv) the level of education is high, (v) natural resources are abundant. More specifically, the effect of FR in reducing spreads is higher for resource-rich countries. Fiscal behavior is fundamentally

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<sup>20</sup> See Table A12 & A13 in the appendix for the results regarding sovereign debt ratings.

<sup>21</sup> We introduce (in equation related to Table 6a & 6b) each structural factor in isolation (without interacting with FR) on top of the interactive terms. However, we do not report these coefficients here for the sake of space.



different in resource-rich developing countries than their non-resource peers<sup>22</sup>. As highlighted in the literature on natural resource curse (James and Aadland, 2011; Papyrakis and Gerlagh, 2007; Sachs and Warner, 1999, 2001, 1995), high levels of natural resource rents can trigger loose fiscal and monetary policies, impeding economic growth. Adopting fiscal rules allows these countries to deter fiscal profligacy, enhance the credibility of fiscal policy, and reduce borrowing costs.

The impact of fiscal rules on bond spreads appears to be insignificant when we account for the other types of macroeconomic factors. This suggests that the effects of fiscal rules on bond spreads are sensitive, to some extent, to the macroeconomic conditions.

From the political standpoint, we account for government stability, internal and external conflict, corruption, investment profile, law and order, and ethnic tensions. Apart from the investment profile and law and order variables, the impact of fiscal rules on bond spreads is insignificant with respect to the political factors. Indeed, the effects of fiscal rules on bond spreads are unclear in countries which show an apparent government instability, higher level of conflict (internal and external), higher level of corruption, and higher ethnic tensions.

Finally, the design of fiscal rules includes the formal enforcement procedure and the monitoring process. Although the effects of fiscal rules on bond spreads is moderate, they remain significant when we account for the design of fiscal rule. The interactive effect of enforcement procedure, monitoring process, and fiscal rule is positive and not significant. Countries with high scores for enforcement procedure and monitor process show a higher borrowing cost (in terms of higher bond spreads). A possible explanation of this result is that the mere existence of FR (*de jure*) is not enough to improve access to financial markets, irrespective of the strength of its supportive implementation mechanisms<sup>23</sup>. For instance, as highlighted by (Schaechter et al., 2012), a high score of effective enforcement and accountability does not necessarily imply that it is also soundly implemented. To account for the strength of the supportive implementation mechanisms associated with FR adoption, we follow (Combes et al., 2018) and compute an Index of Fiscal Rule Strength(IFRS). It is a composite index which captures fiscal rule strength through information about the number of fiscal rules, the ratio of national to total fiscal rules, legal basis, coverage, enforcement, flexibility features, and supporting procedures for monitoring of compliance and enforcement. Our results show

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<sup>22</sup> We thank an anonymous Referee for suggesting this investigation.

<sup>23</sup> We thank an anonymous Referee for suggesting this further investigation.



that the interactive effect of FR and its strength reduces bond spreads in developing countries. This result supports (Combes et al., 2018) who show that it is not just the mere existence of a rule that matters but also whether it has been designed to tie policymakers' hands or as a pure ornament.

In total, our results are sensitive to many structural characteristics. The effect of fiscal policy rule adoption is unclear in some circumstances, mainly related to the macroeconomic conditions and the political situations.

Table 6a : Exploring the heterogeneity

Log (EMBIG)	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
FR Dummy	-0.202** (0.0834)	-0.162* (0.0913)	-0.171* (0.0958)	0.182 (0.153)	-0.164 (0.133)	-0.489*** (0.169)	-0.0795 (0.100)	0.0971 (0.108)	-0.240* (0.122)	0.0507 (0.128)	-0.0182 (0.102)	-0.130 (0.123)	-0.0495 (0.117)	-0.177* (0.0956)	-0.792** (0.352)	-0.116 (0.106)
PSCORE		-0.175 (0.192)	-0.214 (0.246)	-0.171 (0.193)	-0.217 (0.188)	-0.198 (0.191)	-0.194 (0.194)	-0.0248 (0.183)	-0.123 (0.193)	-0.136 (0.195)	-0.0558 (0.190)	-0.0738 (0.212)	-0.117 (0.184)	-0.126 (0.186)	-0.0809 (0.169)	-0.170 (0.188)
FR*PSM			0.112 (0.397)													
FR*Time Length				-0.136*** (0.0198)												
<b>Macroeconomic Factors</b>																
FR*Good/time					0.0427 (0.165)											
FR*Strong/stance						0.494*** (0.186)										
FR*Macro/instability							-0.00000743** (0.00000325)									
FR*FDI/inflows								-0.641*** (0.152)								
FR*Government/size									0.139 (0.168)							
FR*Secondary										-0.292* (0.166)						
FR*Trade											-0.548*** (0.167)					
FR*Capital/openness												-0.0871 (0.167)				
FR*IT/conservative													0.0173 (0.159)			
FR*CBI/irregular														-0.125 (0.277)		
FR*Fix/regime															0.677* (0.362)	
FR*Resource/Rich																-0.726*** (0.221)
Constant	5.810*** (0.0515)	5.861*** (0.0788)	5.872*** (0.0915)	5.840*** (0.0791)	6.110*** (0.0998)	6.193*** (0.102)	5.798*** (0.0802)	5.915*** (0.0880)	5.985*** (0.0809)	5.734*** (0.100)	5.884*** (0.0866)	5.855*** (0.0872)	5.976*** (0.0849)	5.758*** (0.0783)	6.910*** (0.133)	5.777*** (0.0780)
N/R2	494/0.012	494/0.013	494/0.013	494/0.042	494/0.065	494/0.052	494/0.033	494/0.118	494/0.033	494/0.018	494/0.069	494/0.017	494/0.092	487/0.064	494/0.101	494/0.060

Note: Bootstrapped standard errors (with 500 replications) in brackets, \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Vector X variables in isolation (without interaction with FR) are included but not reported for the sake of space.

**Table 6b : Exploring the heterogeneity cont.**

<b>Log (EMBIG)</b>	<b>[1]</b>	<b>[2]</b>	<b>[3]</b>	<b>[4]</b>	<b>[5]</b>	<b>[6]</b>	<b>[7]</b>	<b>[8]</b>	<b>[9]</b>	<b>[12]</b>
FR Dummy	-0.210*	-0.0973	-0.0733	-0.115	0.159	-0.134	-0.205	-0.256**	-0.212**	-0.435**
	(0.125)	(0.136)	(0.126)	(0.108)	(0.139)	(0.0988)	(0.125)	(0.111)	(0.103)	(0.221)
PSCORE	-0.190	-0.188	-0.163	-0.163	-0.130	-0.266	-0.162	-0.161	-0.171	-0.300
	(0.195)	(0.197)	(0.188)	(0.195)	(0.170)	(0.189)	(0.190)	(0.195)	(0.193)	(0.199)
<b>Political Factors</b>										
FR*Government/stability	0.0393									
	(0.174)									
FR*External/conflict		-0.122								
		(0.169)								
FR*Internal/conflict			-0.252							
			(0.166)							
FR*Corruption				-0.175						
				(0.180)						
FR*Investment/profile					-0.406**					
					(0.166)					
FR*Law/order						-0.293*				
						(0.160)				
FR*Ethnic/tensions							-0.0155			
							(0.178)			
<b>Design</b>										
FR*Enforcement								0.185		
								(0.133)		
FR*Monitoring									0.112	
									(0.137)	
FR*IFRSM <sup>24</sup>										-0.441*
Constant	5.962***	5.853***	6.033***	5.814***	6.138***	6.148***	5.975***	5.857***	5.860***	5.893***
	(0.101)	(0.0968)	(0.101)	(0.0853)	(0.0985)	(0.0827)	(0.103)	(0.0795)	(0.0789)	(0.0793)
N/ R2	494/0.020	494/0.014	494/0.065	494/0.017	494/0.164	494/0.128	494/0.023	494/0.017	494/0.015	494/0.054

Note: Bootstrapped standard errors (with 500 replications) in brackets, \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01. Vector X variables in isolation (without interaction with FR) are included but not reported for the sake of space.

<sup>24</sup> IFRSM is a dummy variable equal to 1 when the IFRS is greater or equal to the mean of the entire panel distribution. Indeed, combining the FR dummy with the continuous IFRS variable yields an interaction term that is highly collinear with the IFRS itself.

## 6. Conclusions and policy implications

In this paper we explore the capacity of fiscal rules to improve financial market access for developing countries via the reduction of their borrowing costs. We consider a sample of 36 countries for the period 1993 to 2014. In total, 232 country-year observations are associated with a fiscal rule in place (FR group) and 560 country-year observations are not associated with a fiscal rule in place (Non-FR group). We use the entropy balancing method to construct a weighted synthetic group for our FR group, accounting for differences in countries' macroeconomic conditions and political situation. Our results contribute to the literature in a number of ways.

First, we find a causal effect between the adoption of fiscal rules and low bond spreads and high sovereign rating. Fiscal rule adoption lowers bond spreads by up to more than 1.5% while it increases sovereign debt ranking by up to more than 1 grade.

Second, we show that the effect of fiscal rule adoption on financial market access depends on the type of rule. Budget balanced rules (BBR) and debt rules (DR) significantly improve financial market access while expenditures rules (ER) do not improve this access. Consequently, the mere adoption of an ER is not enough to reduce the cost of sovereign borrowing in developing countries. However, the combination of expenditure rules and multi-year expenditure ceilings (MEC) improve financial market access. This latter result needs to be interpreted with caution since most countries have adopted a debt rule and/or a balanced budget rule prior to the adoption of an expenditure rule. Although having multiple fiscal rules may be more binding than a single rule, it becomes difficult to isolate their impact.

Finally, we find that the interaction of fiscal rules is highly beneficial in terms of low borrowing costs. Countries that adopt both BBR and DR rules can more easily access financial markets than others.

These results are robust to a wide set of alternative specifications of the entropy balancing method, and the use of alternative matching method (namely propensity score matching).

Our findings suggest that developing countries could improve their financial market access by adopting fiscal rules. More specifically they should give more importance to balanced budget rules and debt rules because they are valued by financial markets in terms of lower bond spreads and higher debt ratings. For countries aiming at adopting ER, sound PFM systems (including multi-year expenditure ceilings) are needed to enhance their effectiveness and improve financial market access.

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## APPENDIX:

**Table A1 : Descriptive Statistics**

Variable	Obs	Mean	Std.Dev.	Min	Max
Log (EMBIG)	576	5.765	.9	-.02	8.662
Sovereign rating	679	10.319	3.282	1.333	18
FR dummy	792	.293	.455	0	1
BBR dummy	792	.241	.428	0	1
DR dummy	792	.179	.384	0	1
ER dummy	792	.096	.295	0	1
GDP growth	792	4.022	4.144	-22.934	33.736
Debt/GDP	752	47.355	29.453	.633	274.951
Political risk	765	64.974	8.861	38.79	86.58
FDI inflows	785	3.463	4.026	-15.989	50.505
Default dummy	728	.11	.313	0	1
Inflation	772	26.66	207.246	-7.114	4734.915
Reserves/months	769	5.129	3.603	.027	25.676
Capital openness	785	.065	1.379	-1.904	2.374
Remittances/GDP	741	3.568	4.522	0	26.683
IT conservative date	792	.212	.409	0	1
IT default date	792	.222	.416	0	1
CBI irregular turnover	778	.135	.342	0	1
CBI regular turnover	778	.051	.221	0	1
Trade	788	72.535	36.228	15.636	220.407
Broad money growth	764	28.092	142.974	-50.812	3280.653
Fix exchange regime	704	.922	.269	0	1
Float exchange regime	704	.067	.25	0	1
Government stability	765	8.113	1.714	3.33	12
Corruption	765	2.534	.894	1	5
Internal conflict	765	9.026	1.772	.42	12
External conflict	765	10.216	1.33	2.58	12
Law and order	765	3.387	1.084	1	6
Ethnic tensions	765	4.256	1.325	1	6
Output gap	792	0	25211.43	-289000	368000
Government size	792	13.634	4.1	4.483	32.284
Secondary education	792	6.261	.858	4	8
Enforcement	792	.116	.321	0	1
Monitoring	792	.11	.313	0	1
Time length	792	2.288	4.343	0	22
Overall fiscal balance	713	-2.784	4.266	-28.724	11.132
Elections	792	.158	.289	0	1
IMF program	792	.379	.485	0	1
Resource rich dummy	792	.222	.416	0	1
IFRS	792	.545	1.032	0	3.984
MEC	792	.021	.145	0	1

**Table A2. Definition and sources of variables**

Variables	Descriptions	Sources
Sovereign bond spreads	It covers all sovereign foreign debt instruments issued by emerging countries, including international borrowings denominated in US dollars such as Brady bonds, loans, and Eurobonds with a face value of at least US\$ 500 million and a maturity of 12 years.	JP Morgan, Datastream
Sovereign debt rating	Foreign currency long-term sovereign debt ratings (index ranging from 1 to 21, higher value means better rating).	Kose et al. (2017)
Debt/GDP	Total external debt stocks, % of GDP (External public and private sector debt)	
Overall fiscal balance	Fiscal balance, % of GDP (government debt sustainability)	
IT default date	Binary variable taking the value 1 if in a given year a country operates informally under IT, zero otherwise. When we use the default starting dates of IT, we refer to soft IT.	Rose, 2006; Minea & Tapsoba, 2014; Roger, 2009
IT conservative date	Binary variable taking the value 1 if in a given year a country operates formally under IT, zero otherwise. When we use the conservative starting dates of IT, we refer to full-fledged IT.	
CBI regular	Central banks governor's regular turnover dummy. It is equal to 1 if the change of governor take place at the end of the official mandate and 0 otherwise. This is proxy of central bank independence.	Dreher et al., 2008, 2010; Sturm and de Haan (2001)
CBI irregular	Central banks governor's irregular turnover dummy. It is equal to 1 if the change of governor take place in an irregular manner and 0 otherwise. This is proxy of central bank independence.	
Political risk	It is a composite measure of the quality of governance. It represents a simple average of ICRG political variables. Higher value indicates low political risk.	Author calculation based on ICRG data
Debt default	Dummy equal to 1 if a country did not pay its debt or restructured it with a lost for investors, and 0 if there was no payment default or debt restructuring.	Reinhart & Rogoff (2009)
Capital openness	It captures the degree of financial openness.	Chinn-Ito (2006)
Fix regime	Dummy equal to 1 if ER_Fine is classified as fix regime and 0 if not	Author construction based on Ilzetzki et al. (2017)
Floating regime	Dummy equal to 1 if ER_Fine is classified as floating regime and 0 if not	
FR	Dummy equal to 1 if there is a fiscal rule in place and 0 if not	IMF Fiscal Rules Dataset, 2016
BBR	Dummy equal to 1 if there is a balanced budget rule in place and 0 if not	
DR	Dummy equal to 1 if there is a debt rule in place and 0 if not	
ER	Dummy equal to 1 if there is an expenditure rule in place and 0 if not	
Enforcement	Dummy which equals 1 if there is a national formal enforcement procedure in place and 0 otherwise.	
Monitoring	Dummy which equals 1 if there is a national monitoring of compliance outside government in place, 0 if no and 0.5 if non independent.	
Resource rich dummy	Dummy which equals 1 if a given country is a resource rich country and 0 otherwise	
IFRS	Composite index capturing fiscal rules strength through information regarding the number of fiscal rules, the ratio of national to total fiscal rules, legal basis, coverage, enforcement, flexibility features and supporting procedures for monitoring of compliance and enforcement	
MEC	Dummy equal to 1 if there is a multi-year expenditure ceiling in place and 0 if not.	
FDI Inflows	Net inflows (new investment inflows less disinvestment) in a given economy from foreign investors, divided by GDP.	
Trade	Sum of exports and imports of goods and services, % of GDP.	
Secondary education	Secondary duration refers to the number of grades (years) in secondary school.	
Government size	General government final consumption expenditure, % of GDP.	
Inflation rate	Annual percentage change of consumer price index	

Reserves/Months	Reserves expressed in terms of the number of months of imports of goods and services they could pay for $[\text{Reserves}/(\text{Imports}/12)]$ .	WDI
Remittances/GDP	This variable comprises personal transfers and compensation of employees. Personal transfers consist of all current transfers in cash or in kind made or received by resident households to or from nonresident households. Compensation of employees refers to the income of border, seasonal, and other short-term workers who are employed in an economy where they are not resident and of residents employed by nonresident entities.	
Broad money/GDP	Sum of currency outside banks, demand deposits other than those of the central government, the time, savings, and foreign currency deposits of resident sectors other than the central government, bank and traveler's checks, and other securities such as certificates of deposit and commercial paper, % of GDP	
GDP growth	Annual percentage growth rate of GDP	ICRG database
Investment profile	The risk to investment computed as the sum of contract viability/expropriation, profits repatriation, and payment delays. A higher value signals a lower risk.	
Government stability	This is an assessment both of the government's ability to carry out its declared program(s), and its ability to stay in office.	
Corruption	This is an assessment of corruption within the political system. Such corruption is a threat to foreign investment for several reasons: it distorts the economic and financial environment; it reduces the efficiency of government and business by enabling people to assume positions of power through patronage rather than ability; and, last but not least, introduces an inherent instability into the political process.	
Internal conflict	Political violence and its actual or potential impact on governance. The highest (lowest) score signals no armed or civil opposition to the government and the government does not indulge in arbitrary violence, direct or indirect, against its own people (a country embroiled in an on-going civil war).	
Law and order	Composed of two elements that are assessed separately, namely law (the strength and impartiality of the legal system) and order (popular observance of the law). A higher value signals high degrees of law and/or order.	
Ethnic tensions	The degree of tension within a country attributable to racial, nationality, or language divisions. Higher values signal minimal tensions.	
Time length	It captures the time length since fiscal rule adoption	
Good time	Dummy equal to 1 if the growth rate of GDP is above its mean value and 0 otherwise	Author construction
Strong stance	Dummy equal to 1 if total external debt stocks (% of GDP) is above its mean value and 0 otherwise	
Macroeconomic instability	Standard deviation of output gap	Database on Political Institutions (DPI)
Elections	Dummy which equals 1 if a presidential election held in a given year and 0 otherwise. Following MacKie and Rose (1991) and Franzese (2000), we create a variable summing to one over the year preceding an election in order to examine the electoral budget-cycles. This variable named $Elections_t = M/12$ in election year t (with M the complete months before the elections) and $(1 - M/12)$ in the year before the election.	
IMF program	Dummy which equals 1 if a country is under a IMF program and 0 otherwise	Dreher (2006)



**Table A3 : Sample of countries (all fiscal rules)**

<u>Non-FR</u>	<u>FR</u>	<u>Year of adoption</u>
Belize	Argentina	2000
China	Brazil	2000
Dominican Republic	Bulgaria	2003
Egypt	Chile	2001
El Salvador	Colombia	2000
Ghana	Ecuador	2003
Lebanon	Gabon	2002
Morocco	Hungary	2004
Philippines	Indonesia	1993
South Africa	Jamaica	2010
South Korea	Malaysia	1993
Tunisia	Mexico	2006
Turkey	Nigeria	2007
Ukraine	Pakistan	2005
Uruguay	Panama	2002
Venezuela	Peru	2000
Vietnam	Poland	1999
	Russia	2007
	Sri Lanka	2003
Total 17	Total 19	

**Table A4 : BBR**

Non-FR	FR	Year
Belize	Argentina	2000
Brazil	Bulgaria	2006
China	Chile	2001
Dominican Republic	Colombia	2011
Egypt	Ecuador	2003
El Salvador	Gabon	2002
Ghana	Hungary	2004
Lebanon	Jamaica	2010
Morocco	Mexico	2006
Philippines	Nigeria	2007
South Africa	Pakistan	2005
South Korea	Panama	2002
Tunisia	Peru	2000
Turkey	Poland	2004
Ukraine	Russia	2007
Uruguay	Sri Lanka	2003
Venezuela	Indonesia	1993
Vietnam	Malaysia	1993
Total 18	Total 18	

**Table A5: DR**

Non-FR	FR	Year
Argentina	Brazil	2000
Belize	Bulgaria	2003
Chile	Ecuador	2003
China	Gabon	2002
Colombia	Hungary	2004
Dominican Republic	Indonesia	2004
Egypt	Jamaica	2010
El Salvador	Malaysia	1993
Ghana	Pakistan	2005
Lebanon	Panama	2002
Mexico	Poland	1999
Morocco	Sri Lanka	2003
Nigeria		
Peru		
Philippines		
Russia		
South Africa		
South Korea		
Tunisia		
Turkey		
Ukraine		
Uruguay		
Venezuela		
Vietnam		
Total 24	Total 12	

**Table A6 : ER**

Non-FR	FR	Year
Belize	Argentina	2000
Chile	Brazil	2000
China	Bulgaria	2006
Dominican Republic	Colombia	2000
Egypt	Ecuador	2010
El Salvador	Hungary	2010
Gabon	Mexico	2013
Ghana	Peru	2000
Indonesia	Poland	2011
Jamaica	Russia	2013
Lebanon		
Malaysia		
Morocco		
Nigeria		
Pakistan		
Panama		
Philippines		
South Africa		
South Korea		
Sri Lanka		
Tunisia		
Turkey		
Ukraine		
Uruguay		
Venezuela		
Vietnam		
Total 26	Total 10	

**Table A7 : BBR\*DR**

Non-FR	FR	Year
Argentina	Bulgaria	2006
Belize	Ecuador	2003
Brazil	Gabon	2002
Chile	Hungary	2004
China	Indonesia	2004
Colombia	Jamaica	2010
Dominican Republic	Pakistan	2005
Egypt	Panama	2002
El Salvador	Poland	2004
Ghana	Sri Lanka	2003
Lebanon	Malaysia	1993
Mexico		
Morocco		
Nigeria		
Peru		
Philippines		
Russia		
South Africa		
South Korea		
Tunisia		
Turkey		
Ukraine		
Uruguay		
Venezuela		
Vietnam		
Total 25	Total 11	

**Table A8 : BBR\*ER**

Non-FR	FR	Year
Belize	Argentina	2000
Brazil	Bulgaria	2006
Chile	Colombia	2011
China	Hungary	2010
Dominican Republic	Mexico	2013
Ecuador	Peru	2000
Egypt	Poland	2011
El Salvador		
Gabon		
Ghana		
Indonesia		
Jamaica		
Lebanon		
Malaysia		
Morocco		
Nigeria		
Pakistan		
Panama		
Philippines		
Russia		
South Africa		
South Korea		
Sri Lanka		
Tunisia		
Turkey		
Ukraine		
Uruguay		
Venezuela		
Vietnam		
Total 29	Total 7	

**Table A9 : DR\*ER**

Non-FR	FR	Year
Argentina	Brazil	2000
Belize	Bulgaria	2006
Chile	Hungary	2010
China	Poland	2011
Colombia		
Dominican Republic		
Ecuador		
Egypt		
El Salvador		
Gabon		
Ghana		
Indonesia		
Jamaica		
Lebanon		
Malaysia		
Mexico		
Morocco		
Nigeria		
Pakistan		
Panama		
Peru		
Philippines		
Russia		
South Africa		
South Korea		
Sri Lanka		
Tunisia		
Turkey		
Ukraine		
Uruguay		
Venezuela		
Vietnam		
Total 32	Total 4	

**Table A10 : ER\*MEC**

Non-FR	FR	Year
Argentina	Bulgaria	2006
Belize	Mexico	2014
Brazil	Poland	2011
Chile	Russia	2013
China		
Colombia		
Dominican Republic		
Ecuador		
Egypt		
El Salvador		
Gabon		
Ghana		
Hungary		
Indonesia		
Jamaica		
Lebanon		
Malaysia		
Morocco		
Nigeria		
Pakistan		
Panama		
Peru		
Philippines		
South Africa		
South Korea		
Sri Lanka		
Tunisia		
Turkey		
Ukraine		
Uruguay		
Venezuela		
Vietnam		
Total 32	Total 4	



**Table A11 : BBR\*DR\*ER**

Non-FR	FR	Year
Argentina	Bulgaria	2006
Belize	Hungary	2010
Brazil	Poland	2011
Chile		
China		
Colombia		
Dominican Republic		
Ecuador		
Egypt		
El Salvador		
Gabon		
Ghana		
Indonesia		
Jamaica		
Lebanon		
Malaysia		
Mexico		
Morocco		
Nigeria		
Pakistan		
Panama		
Peru		
Philippines		
Russia		
South Africa		
South Korea		
Sri Lanka		
Tunisia		
Turkey		
Ukraine		
Uruguay		
Venezuela		
Vietnam		
Total 33	Total 3	

Table A12 : Exploring the heterogeneity

Sovereign rating	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
FR Dummy	0.773** (0.324)	0.394 (0.371)	0.428 (0.398)	-0.695 (0.453)	0.577 (0.548)	1.633** (0.641)	-0.106 (0.401)	-1.050** (0.452)	0.651 (0.509)	-0.0933 (0.509)	-0.513 (0.405)	0.103 (0.467)	-0.489 (0.452)	0.415 (0.384)	-0.562 (0.929)	0.614 (0.429)
PSCORE		1.624** (0.683)	1.813** (0.800)	1.502** (0.679)	1.665** (0.683)	1.553** (0.709)	1.838*** (0.672)	1.158* (0.659)	1.364** (0.668)	1.543** (0.705)	1.137 (0.703)	1.553** (0.773)	1.239* (0.632)	1.595** (0.664)	1.060 (0.667)	1.784*** (0.676)
FR*PSM			-0.498 (1.485)													
FR*Time Length				1.179*** (0.109)												
<b>Macroeconomic Factors</b>																
FR*Good/time					-0.356 (0.658)											
FR*Strong/stance						-										
FR*Macro/instability						1.816*** (0.702)										
FR*FDI/inflows							0.0000537*** (0.00000978)									
FR*government/size								3.629*** (0.590)								
FR*Secondary									-0.387 (0.630)							
FR*trade										0.795 (0.654)						
FR*Capital/openness											3.193*** (0.632)					
FR*IT/conservative												0.714 (0.654)				
FR*CBI/irregular													0.881 (0.610)			
FR*Fix/regime														0.733 (1.054)		
FR*Resource/Rich															1.150 (0.975)	
Constant	10.15*** (0.181)	9.693*** (0.260)	9.640*** (0.281)	9.808*** (0.259)	9.412*** (0.311)	8.768*** (0.323)	9.939*** (0.268)	9.899*** (0.276)	9.115*** (0.291)	9.451*** (0.358)	9.855*** (0.303)	9.812*** (0.284)	9.213*** (0.269)	9.979*** (0.269)	7.183*** (0.440)	9.714*** (0.261)
N/R2	484/0.013	484/0.022	484/0.022	484/0.083	484/0.025	484/0.046	484/0.054	484/0.121	484/0.054	484/0.032	484/0.094	484/0.024	484/0.176	477/0.058	484/0.082	484/0.030

Note: Bootstrapped standard errors (with 500 replications) in brackets, \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01. Vector X variables in isolation (without interaction with FR) are included but not reported for the sake of space.

Table A13 : Exploring the heterogeneity cont.

Sovereign debt rating	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[12]
FR Dummy	0.636 (0.500)	-0.134 (0.536)	-0.226 (0.465)	0.161 (0.421)	-1.755*** (0.505)	-0.150 (0.381)	-0.332 (0.497)	0.695 (0.447)	0.193 (0.414)	0.644 (0.521)
PSCORE	1.710** (0.688)	1.799** (0.697)	1.580** (0.678)	1.430** (0.668)	1.224** (0.616)	1.949*** (0.646)	1.624** (0.690)	1.576** (0.687)	1.639** (0.686)	2.515*** (0.697)
<b>Political Factors</b>										
FR*Government/stability	-0.127 (0.655)									
FR*External/conflict		0.931 (0.644)								
FR*Internal/conflict			1.525** (0.617)							
FR*Corruption				0.677 (0.693)						
FR*Investment/profile					3.213*** (0.606)					
FR*Law/order						2.455*** (0.575)				
FR*Ethnic/tensions							1.657** (0.694)			
<b>Design</b>										
FR*Enforcement								-0.593 (0.539)		
FR*Monitoring									0.446 (0.557)	
FR*IFRSM										3.725*** (0.685)
Constant	9.123*** (0.330)	9.625*** (0.351)	9.124*** (0.307)	9.659*** (0.292)	9.059*** (0.353)	8.604*** (0.281)	9.875*** (0.387)	9.707*** (0.261)	9.689*** (0.260)	9.462*** (0.257)
N/ R2	484/0.038	484/0.030	484/0.088	484/0.031	484/0.208	484/0.217	484/0.038	484/0.025	484/0.023	484/0.105

Note: Bootstrapped standard errors (with 500 replications) in brackets, \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01. Vector X variables in isolation (without interaction with FR) are included but not reported for the sake of space.

## Supplementary robustness checks

TABLE A14 :

Treatment Variable	1-Nearest	2-Nearest	3-Nearest	Radius Matching			Local	Kernel
	Neighbor	Neighbor	Neighbor	r=0.005	r=0.01	r=0.05	Linear	
FR Dummy	Matching	Matching	Matching				Regression	Matching
<b>DEPENDENT VARIABLE: LOG (EMBIG)</b>								
<b>ATT Dropping 2009</b>	-0.250* (0.129)	-0.196* (0.116)	-0.213** (0.104)	-0.114 (0.123)	-0.154 (0.111)	-0.216** (0.0926)	-0.230*** (0.0839)	-0.214** (0.0918)
Treated/Control/Total obs.	181/288/469	181/288/469	181/288/469	181/288/469	181/288/469	181/288/469	181/288/469	181/288/469
Rosenbaum bounds sensitivity	1.5	1.4	1.5	1.1	1.3	1.6	1.6	1.6
Standardized bias	0.09	0.07	0.06	0.07	0.06	0.04	0.09	0.04
Standardized bias (p-value)	0.12	0.44	0.63	0.69	0.58	0.93	0.12	0.94
Pseudo R2	0.03	0.02	0.02	0.02	0.02	0.01	0.03	0.01
<b>ATT Dropping Ex USSR</b>	-0.345*** (0.131)	-0.224* (0.115)	-0.217* (0.113)	-0.228* (0.131)	-0.238* (0.122)	-0.198** (0.0917)	-0.201** (0.0865)	-0.193** (0.0970)
Treated/Control/Total obs.	191/278/469	191/278/469	191/278/469	191/278/469	191/278/469	191/278/469	191/278/469	191/278/469
Rosenbaum bounds sensitivity	1.7	1.5	1.5	1.4	1.5	1.5	1.5	1.5
Standardized bias	0.06	0.04	0.05	0.03	0.03	0.06	0.06	0.06
Standardized bias (p-value)	0.56	0.78	0.63	0.98	0.99	0.47	0.56	0.53
Pseudo R2	0.02	0.01	0.02	0.01	0.007	0.02	0.02	0.02
<b>ATT Dropping High debt</b>	-0.342*** (0.122)	-0.246** (0.116)	-0.204* (0.110)	-0.219* (0.124)	-0.192* (0.0997)	-0.235*** (0.0843)	-0.233*** (0.0782)	-0.234*** (0.0883)
Treated/Control/Total obs.	168/302/470	168/302/470	168/302/470	168/302/470	168/302/470	168/302/470	168/302/470	168/302/470
Rosenbaum bounds sensitivity	1.8	1.6	1.5	1.5	1.5	1.7	1.7	1.7
Standardized bias	0.07	0.05	0.05	0.04	0.04	0.04	0.07	0.04
Standardized bias (p-value)	0.71	0.79	0.92	0.99	0.97	0.97	0.71	0.98
Pseudo R2	0.02	0.01	0.01	0.008	0.01	0.01	0.02	0.009
<b>ATT Dropping Hyperinflation</b>	-0.308** (0.123)	-0.223** (0.111)	-0.241** (0.0992)	-0.206 (0.128)	-0.192* (0.110)	-0.222*** (0.0828)	-0.235*** (0.0861)	-0.220*** (0.0785)
Treated/Control/Total obs.	195/293/488	195/293/488	195/293/488	195/293/488	195/293/488	195/293/488	195/293/488	195/293/488
Rosenbaum bounds sensitivity	1.6	1.5	1.6	1.3	1.4	1.6	1.6	1.6
Standardized bias	0.07	0.07	0.07	0.06	0.06	0.05	0.07	0.05
Standardized bias (p-value)	0.14	0.23	0.46	0.82	0.62	0.92	0.14	0.93
Pseudo R2	0.03	0.03	0.02	0.01	0.02	0.01	0.03	0.01
<b>ATT Dropping Monetary Unions</b>	-0.254** (0.118)	-0.199* (0.111)	-0.211** (0.106)	-0.194 (0.120)	-0.204* (0.105)	-0.225*** (0.0797)	-0.235*** (0.0812)	-0.222*** (0.0857)
Treated/Control/Total obs.	195/306/501	195/306/501	195/306/501	195/306/501	195/306/501	195/306/501	195/306/501	195/306/501
Rosenbaum bounds sensitivity	1.6	1.4	1.5	1.3	1.4	1.6	1.6	1.6
Standardized bias	0.07	0.05	0.06	0.06	0.06	0.05	0.07	0.05
Standardized bias (p-value)	0.006	0.20	0.72	0.81	0.70	0.92	0.006	0.93
Pseudo R2	0.05	0.03	0.01	0.02	0.02	0.01	0.05	0.01

Note: Bootstrapped standard errors (with 500 replications) in brackets, \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01

TABLE A15 :

Treatment Variable	1-Nearest Neighbor Matching	2-Nearest Neighbor Matching	3-Nearest Neighbor Matching	Radius Matching			Local Linear Regression Matching	Kernel Matching
				r=0.005	r=0.01	r=0.05		
<b>FR Dummy</b>								
<b>DEPENDENT VARIABLE: SOVEREIGN DEBT RATINGS</b>								
<b>ATT</b>	0.839*	0.980**	1.055***	1.131**	0.966**	0.860***	0.944***	0.874**
<b>Dropping 2009</b>	(0.479)	(0.422)	(0.408)	(0.488)	(0.387)	(0.332)	(0.312)	(0.342)
Treated/Control/Total obs.	199/339/538	199/339/538	199/339/538	199/339/538	199/339/538	199/339/538	199/339/538	199/339/538
Rosenbaum bounds sensitivity	1.3	1.5	1.6	1.6	1.4	1.4	1.5	1.4
Standardized bias	0.11	0.07	0.07	0.04	0.05	0.06	0.11	0.06
Standardized bias (p-value)	0.05	0.70	0.31	0.99	0.97	0.72	0.05	0.71
Pseudo R2	0.04	0.01	0.02	0.007	0.01	0.01	0.04	0.01
<b>ATT</b>	0.951**	1.066***	0.873**	0.939**	1.001**	1.014***	0.950***	1.018***
<b>Dropping Ex USSR</b>	(0.454)	(0.394)	(0.399)	(0.477)	(0.402)	(0.341)	(0.312)	(0.332)
Treated/Control/Total obs.	210/328/538	210/328/538	210/328/538	210/328/538	210/328/538	210/328/538	210/328/538	210/328/538
Rosenbaum bounds sensitivity	1.4	1.7	1.5	1.4	1.5	1.6	1.5	1.6
Standardized bias	0.06	0.06	0.07	0.07	0.04	0.07	0.06	0.07
Standardized bias (p-value)	0.47	0.40	0.28	0.65	0.98	0.41	0.47	0.46
Pseudo R2	0.02	0.02	0.02	0.02	0.009	0.02	0.02	0.02
<b>ATT</b>	0.866*	0.944**	0.940**	0.907*	1.034**	1.017***	1.032***	1.011***
<b>Dropping High debt</b>	(0.471)	(0.420)	(0.417)	(0.471)	(0.419)	(0.331)	(0.306)	(0.329)
Treated/Control/Total obs.	186/354/540	186/354/540	186/354/540	186/354/540	186/354/540	186/354/540	186/354/540	186/354/540
Rosenbaum bounds sensitivity	1.3	1.4	1.4	1.3	1.5	1.5	1.6	1.5
Standardized bias	0.06	0.08	0.06	0.04	0.05	0.06	0.06	0.06
Standardized bias (p-value)	0.54	0.64	0.83	0.99	0.94	0.94	0.54	0.94
Pseudo R2	0.02	0.02	0.01	0.008	0.01	0.01	0.02	0.01
<b>ATT</b>	1.128**	1.151**	1.120***	1.009**	1.104***	1.031***	1.029***	1.064***
<b>Dropping Hyperinflation</b>	(0.445)	(0.454)	(0.389)	(0.454)	(0.393)	(0.332)	(0.315)	(0.323)
Treated/Control/Total obs.	213/345/558	213/345/558	213/345/558	213/345/558	213/345/558	213/345/558	213/345/558	213/345/558
Rosenbaum bounds sensitivity	1.5	1.6	1.6	1.4	1.5	1.6	1.6	1.6
Standardized bias	0.09	0.07	0.08	0.06	0.05	0.06	0.09	0.06
Standardized bias (p-value)	0.02	0.39	0.20	0.93	0.88	0.67	0.002	0.59
Pseudo R2	0.04	0.02	0.02	0.01	0.01	0.01	0.04	0.01
<b>ATT</b>	0.884**	1.048**	0.927**	0.985**	1.087***	1.022***	1.041***	1.036***
<b>Dropping Monetary Unions</b>	(0.451)	(0.431)	(0.378)	(0.445)	(0.384)	(0.316)	(0.300)	(0.310)
Treated/Control/Total obs.	214/358/572	214/358/572	214/358/572	214/358/572	214/358/572	214/358/572	214/358/572	214/358/572
Rosenbaum bounds sensitivity	1.3	1.5	1.4	1.4	1.5	1.6	1.6	1.6
Standardized bias	0.1	0.08	0.08	0.05	0.03	0.06	0.1	0.06
Standardized bias (p-value)	0.01	0.10	0.15	0.92	0.99	0.62	0.01	0.60
Pseudo R2	0.04	0.03	0.03	0.01	0.006	0.01	0.04	0.01

Standard errors in parentheses \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$