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SOVEREIGN DEFAULTS: EVIDENCE ON THE IMPORTANCE OF GOVERNMENT EFFECTIVENESS

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On 3 May 2018, the OECD Council invited Lithuania to become a Member. At the time of preparation, the deposit of Lithuania's instrument of accession to the OECD Convention was pending and therefore Lithuania does not appear in the list of OECD Members and is not included in the OECD zone aggregates.

On 25 May 2018, the OECD Council invited Colombia to become a Member. At the time of preparation, the deposit of Colombia's instrument of accession to the OECD Convention was pending and therefore Colombia does not appear in the list of OECD Members and is not included in the OECD zone aggregates.

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ABSTRACT/RÉSUMÉ

Sovereign defaults:
Evidence on the importance of government effectiveness

This paper provides robust empirical evidence that government effectiveness is a key determinant of sovereign defaults. Government effectiveness is measured by a broad-based perception index of the Worldwide Governance Indicators database (WGI) disseminated by the World Bank. Public debt and sovereign default data cover both external and internal government debt. In a systematic and demanding robustness check with any possible sub-sample of a large set of control variables, the effect of government effectiveness is almost always robust. In addition, the effects of the five other main indicators of the WGI database on default risk are also investigated, showing that the rule of law, regulatory quality, control of corruption and voice and accountability are also robustly linked with default risk. Regressions with the mortality of settlers as an instrument indicate a causal effect from government effectiveness to sovereign default.

Keywords: public debt, sovereign default, government effectiveness, institutions

JEL Classification: E62 ; H63 ; F34

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Défauts souverains:
Preuves de l'importance de l'efficacité du gouvernement

Cet article fournit des preuves empiriques de l'effet robuste de l'efficacité du gouvernement sur les défauts souverains. L'efficacité du gouvernement est mesurée ici par un indice global de perception de l'efficacité des pouvoirs publics disponible dans la base de données des Indicateurs Mondiaux de Gouvernance *(Worldwide Governance Indicators,* WGI) disséminée par la Banque Mondiale. Les données de dette publique ainsi que celles sur les défauts souverains couvrent à la fois la dette publique domestique et la dette publique externe. Le lien entre efficacité du gouvernement et défauts souverains est robuste à un examen approfondi et systématique de tous les sous-échantillons possibles parmi un large éventail de contrôles. L'effet des cinq autres dimensions couvertes par la base de données WGI a aussi été exploré et montre que les variables mesurant l'état de droit, la qualité de la régulation, la maîtrise de la corruption ainsi que le degré de liberté d'expression et de transparence politique sont aussi corrélées de manière robuste au risque souverain. Par ailleurs l'utilisation du taux de mortalité des colons dans les anciennes colonies comme instrument suggère un effet causal de l'efficacité du gouvernement sur la probabilité de défauts souverains.

Mots clés : dette publique, défaut souverain, efficacité du gouvernement, institutions

Classification JEL : E62 ; H63 ; F34

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SOVEREIGN DEFAULTS: EVIDENCE ON THE IMPORTANCE OF GOVERNMENT EFFECTIVENESS

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1. Introduction

1. The recent euro area crisis and the rising debt both in developing and developed countries have raised concerns about the possibility of sovereign defaults. Unsustainable public debt developments, fiscal stress and sovereign defaults came as a surprise for developed economies but have happened in developing countries. However, defaults can come as a surprise because major default episodes are typically spaced over some years or decades apart, creating an illusion that "this time is different" (Reinhart and Rogoff, 2009). Each wave of defaults fuelled the literature on the causes and consequences of such episodes and remedies to avoid them.

2. In this context, this paper provides robust empirical evidence that government effectiveness is a major determinant of sovereign defaults. Such a link is intuitive and has been typically documented in a qualitative manner in the literature. Governments working effectively are governments providing a better quality of services, with good policy formulation and implementation, and a credible commitment. Such governments are more likely to spur growth and hence to be able to repay debt. In other words, governments that spend wisely are indeed more likely to stimulate economic activity. For instance, a better public spending and tax mix (Arnold et al., 2011, Gemmell et al., 2016, Fournier and Johansson, 2016 and Akgun et al., 2017a) and higher public investment effectiveness (Abiad et al., 2016) can increase GDP. More broadly, better institutions can spur growth, as they determine incentives and constraints that shape economic outcomes (Acemoglu et al., 2005). Furthermore, government effectiveness can increase the capacity of governments to collect taxes, reflecting tax administration effectiveness and a higher public acceptance to pay taxes (Akgun et al., 2017b). In addition, a higher perception of government effectiveness can reduce the risk of self-fulfilling liquidity crises (see for instance Cole and Kehoe, 2000; Ghosh et al., 2013 or Fournier and Fall, 2017 for models with multiple equilibria). All this is in line with Reinhart and Rogoff (2009), who highlight the important role of institutions for understanding the occurrence of sovereign defaults.

3. The main contribution of this paper is to provide robust empirical evidence of the link between the perception of government effectiveness and sovereign defaults. This goes beyond the existing literature, which provides qualitative discussions on the link between institutions and sovereign defaults (see in particular Reinhart and Rogoff, 2009 or Panizza et al., 2009) or uses broad-based indicators of institutions. Kraay and Nehru (2006) provide evidence of the link between sovereign external debt risk and

1. Jean-Marc Fournier and Manuel Bétin were both members of the OECD Economics Department when this document was prepared. They thank Sónia Araújo, Sebastian Barnes, Tim Bulman, Boris Cournède, Vitor Gaspar, Peter Hoeller, Isabelle Joumard, Paulo Mauro, Angel Melguizo, Andrea Papadia , the participants in an internal Economics Department seminar and the participants of the Second European Macrohistory Workshop held in the University of York for helpful comments and suggestions. Additionally, they thank Celia Rutkoski for excellent assistance in preparing the document.

the CPIA (Country Policy and Institution Assessment). This broad indicator covers both institutions and policies, including the conduct of fiscal policy or efficiency of revenue mobilisation, in an attempt to show the extent to which a country's public sector can transform resources into development outcomes. Building on this work, the IMF – World Bank Debt Sustainability Framework for Low-Income Countries is making use of the CPIA (IMF and World Bank, 2012). Using a definition of default that slightly differs from Kraay and Nehru (2006) for a sample of 120 countries, Cohen and Valadier (2011) also find evidence that the CPIA is a major determinant of default. Afonso et al. (2011) find evidence on a link between government effectiveness and sovereign debt credit ratings. As institutions are difficult to observe, Manasse et al. (2003) use outcomes as proxies. For instance, inflation stability can reflect sound monetary institutions. Kohlscheen (2007) finds evidence that an explanation for the serial defaults lies in the constitution: parliamentary democracies default less. Alberola-Ila et al. (2016) show that fiscal rules can reduce macroeconomic instability as they are associated with a more stability-oriented fiscal policy. The new evidence gathered here goes beyond these findings, taking advantage of recent improvements in data collection that allows the use of a broader debt concept encompassing external and internal government debt and to look at specific institutional aspects.

4. The focus on institutions reveals that the correlation between economic development and sovereign defaults is unlikely to be causation: they are rather common consequences of institutions. This finding can help to refine the interpretation of the debt intolerance phenomenon (Reinhart et al., 2003), namely the loss of market access that some countries experience at low debt levels. Reinhart and Rogoff (2009) associate this with emerging markets, while advanced countries can sustain high external debt levels. This is in line with the solid correlation between GDP per capita and sovereign defaults reported by Reinhart and Rogoff (2004). But also the quality of institutions and income levels are closely linked, as institutions can be a strong driver of growth (Acemoglu et al., 2005). The data suggest that GDP per capita is negatively correlated with default risk because it is a proxy for good institutions such as government effectiveness, rather than because of a robust direct effect.

5. The present empirical investigation is also used to explore the relative importance of several institutional determinants. The comparisons need to be interpreted with great care because of the strong correlation among the indicators. However, there is tentative evidence that government effectiveness, the rule of law, regulatory quality, control of corruption and voice and accountability are more tightly linked with default risk than political stability and absence of violence. This suggests that political stability reduces default risk indirectly as it can induce better government effectiveness or regulatory quality for instance, so that the effect is better identified in regressions with these outcomes.

6. The paper is structured as follows. Section 2 provides a literature review, section 3 discusses the data on sovereign defaults and the government effectiveness indicator, section 4 provides descriptive statistics of all the variables used in the empirical work, section 5 discusses the estimation results, section 6 provides robustness checks, section 7 instrumental variable estimates and section 8 concludes.

2. Literature review

7. The recurrence of default episodes among emerging countries led to a wide-ranging literature, both theoretical and empirical, on why countries default, when they default and what sovereign default implies (see Villemot (2012) for a comprehensive literature review on defaults).

8. Sovereign defaults can have important costs both for the lender and for the borrowing countries. Moody's (2008), Benjamin and Wright (2009) and Cruces and Trebesch (2011) all document that following a default, the average recovery rate was about 60% between 1970 and 2010. This suggests that, most of the time, defaults are negotiated with nonetheless significant losses for the lenders. Regarding the defaulting countries the major costs are related to losses in terms of GDP growth after a sovereign default.

Chuan and Sturzenegger (2005) or Borensztein and Panizza (2009) provide empirical evidence that default episodes reduce growth. Estimations vary across studies but most of them find short-lived costs in terms of growth losses and show that those costs mainly come from the exclusion from international financial markets (Gelos et al., 2011), reputational costs, direct sanctions from creditors and domestic political and financing costs. Higher perceptions of sovereign default risk can also lead to pro-cyclical fiscal policy (Alberola and Montero, 2006).

9. Because defaults are costly, finding key indicators that predict defaults has been an important research question. A small set of economic and financial variables appears to significantly affect the probability of default, and this holds regardless of the definition of default, the sample of countries and the econometric methods. The major determinants are: the foreign reserve assets to import ratio, the total external debt to GDP ratio (Reinhart et al., 2003; Manasse et al., 2003; Catão and Kapur, 2004, Cohen and Valadier, 2011), the total debt service to export ratio (Viennot, 2017), GDP growth, output shocks (Panizza et al., 2009), the current account balance to GDP ratio, terms of trade volatility (Hilscher and Nosbusch, 2010), inflation (Reinhart and Rogoff 2009), exchange rate overvaluation and the structure of debt (Manasse et al., 2003).

10. Among economic indicators, two of them have been given particular attention: the debt burden and the dynamics of economic activity.

- Most studies find evidence that an increasing debt burden increases the likelihood of crises even if most episodes of default occur at relatively low levels of debt (Reinhart and Rogoff, 2009).

- Regarding the role of the economic cycle, structural models of sovereign default have focused on recessions as the main trigger of debt distress: Arellano (2008) shows that negative shocks to productivity lead the country to prefer defaulting rather than rolling over its debt. Aguiar and Gopinath (2006) show that a model with temporary shocks around a trend fails to explain the high number of defaults, while a model with a volatile stochastic trend matches the data better. Accordingly, Cohen and Villemot (2015) showed that default events are triggered by two discontinuities: a discontinuity in the GDP level, brought by exogenous shocks and a first order discontinuity brought about by a switch in the growth trend.

11. Refining these findings, Viennot (2017) also shows that defaults occur when a country experiences a discontinuous growth shock: the large majority of defaults (60%) occurs in a downturn and 70% of them occur in tandem with another crisis (banking, currency or twin), which act as a discontinuity on the debt to GDP ratio. This suggests that deep structural features (institutions, financial regulation…) are likely to be among the main drivers of sovereign defaults.

12. Several papers have highlighted that the quality of governance is an important determinant of sovereign defaults. Weak institutions, that is, unstable governments, weak rule of law or low private property enforcement are largely taken into account by most qualitative studies or general assessments of fiscal sustainability (Standard & Poor's Global Rating, 2013). The bottom line is that for a similar set of financial ratios and macroeconomic performance, two countries with differences in government effectiveness have a very different risk profile. Qualitative evidence of the importance of institution is provided by Reinhart and Rogoff (2009) and Reinhart et al. (2003) when studying the determinants of "debt intolerance".

3. The default and government effectiveness data

13. The sovereign default data provided by Reinhart and Rogoff (2009) combine external and internal government defaults (Table 1). They define an external debt crisis as "the failure of a government to meet a principal or interest payment on the due date (or within the specified grace period). These episodes include instances in which rescheduled debt is ultimately extinguished in terms less favourable than the original obligations. […] External default is here referring to default on a payment to credit or a loan issued under another country's jurisdiction, typically (but not always) denominated in a foreign currency, and typically mostly held by foreign creditors". Regarding domestic government debt crises, the same definition applies but also includes events that involve the freezing of bank deposits and/or forcible conversions of such deposits from dollars to local currencies. Other definitions of default have been used in the literature and some researchers take a broader view of sovereign debt crises and include, for instance, the loss of market access associated with dissuasive interest rates. As illustrated in the review by Panizza et al. (2009), there are several ways to define the features of a sovereign debt crisis.

Table 1. Sovereign debt crises

1996-2010

Countries	Dates of defaults
AGO	1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003
ARG	2001,2002,2003,2004,2005,2007,2008,2009,2010
BOL	1996,1997
BRA	2002
CAF	1996,1997,1998,1999,2000,2001,2002,2003,2004,2005,2006,2007,2008,2009,2010
DOM	1996,1997,1998,1999,2000,2001,2005
DZA	1996
ECU	1999,2000,2008
HND	1996,1997,1998,1999,2000,2001,2002,2003,2004,2005,2006,2007,2008,2009,2010
IDN	1997,1998,1999,2000,2002
KEN	1996,1997,1998,1999,2000,2001,2002,2003
LKA	1996
MMR	2002,2003,2004,2005,2006,2007,2008,2009,2010
NGA	2001,2004,2005
NIC	1996,1997,1998,1999,2000,2001,2002,2003,2004,2005,2006,2007,2008,2009,2010
PAN	1996
PER	1996,1997
PRY	2003,2004
RUS	1996,1997,1998,1999,2000
TUR	2001
URY	2003
VEN	1998,2004,2005
ZWE	2000,2001,2002,2003,2005,2006,2007,2008,2009

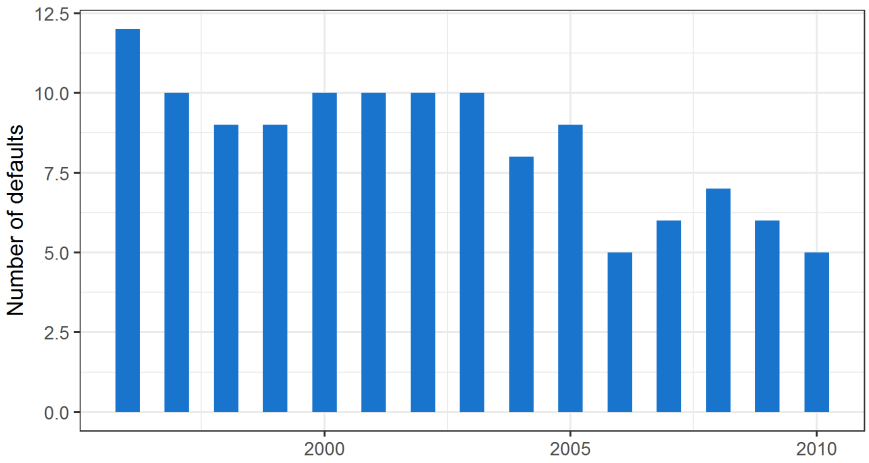
Note: Countries that have not defaulted between 1996 and 2010 are not reported in this table. Sovereign defaults include outright defaults and debt rescheduling and/or renegotiation on either external or domestic public debt. See Table A.1.4 and A.1.5 for details on domestic and external defaults.

Source: Reinhart and Rogoff (2009).

14. The government effectiveness indicator of the WGI "captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressure, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies" (Kaufmann, 2011). This indicator aims at capturing the capacity of the government to effectively formulate and implement sound policies and is available annually since 1996 for a set of 200 countries and territories.[2] The indicator ranges from -2.5 to 2.5 with higher values indicating greater government effectiveness. The data are normalised so that a negative value indicates below average effectiveness. It is an aggregate indicator constructed as a weighted average of a broad set of source variables, and is disseminated along with five other indicators summarising five other dimensions of governance (Table A1.3).

15. The default episodes in Figure 1 and Table 1 include both domestic and external defaults in the sample used for the empirical analysis. Due to data availability on government effectiveness, only default episodes after 1996 are included, so that the large number of sovereign debt crises of the 1980s and early 1990s are not included (see Figure A1.1). Regarding the external validity of this exercise, Fournier and Bétin (2018) find similar evidence of the role of the Worldwide Governance Indicators on the probability of default in a sub-sample of middle income countries during the period 1980-2010 with historical averages of the indicators used as explanatory variables.

Figure 1. Number of sovereign defaults: 1996-2010



Notes: Default episodes include both external and domestic defaults.

Source: Reinhart and Rogoff (2009).

16. The sample is a slightly unbalanced annual panel for the period 1996-2010 covering 68 advanced, middle income and low-income countries (Table A1.2) for which information on sovereign defaults is available. Gross public debt comes from the IMF Historical Public Debt Database following Abbas et al. (2010), most other variables come from the IMF World Economic Outlook (April 2017) (Table A1.1).

2. The years 1997 and 1999 are calculated with linear approximations as the first two editions of the indicators were published every two years only.

4. Descriptive statistics

17. Table 2 summarises the variables included in the study. It shows that the proportion of years in sovereign crises is 13%. As documented by Reinhart and Rogoff (2009), the recorded number of external defaults is much higher than the number of domestic defaults. One explanation is that domestic defaults are much more difficult to document and are less likely to be reported. Unlike external debt that is carefully monitored by external creditors (in particular by international organisations, rating agencies and the Paris Club), domestic debt and defaults are less well documented. Default episodes can last for several years, reflecting not only persistence of solvency issues but also cumbersome and lengthy litigation processes (Das et al., 2014).

Table 2. Summary statistics: 1996-2010

Variable	N	Mean	St. dev.	Min	Max
Government gross debt to GDP (%)	1 001	57.32	36.78	3.89	244.52
Government gross debt in foreign currency (%)	509	48.20	32.72	0.00	100.00
Primary balance to GDP (%)	926	0.70	3.88	-29.81	18.54
Government effectiveness index	1 001	0.46	1.06	-1.65	2.43
Real GDP growth grate (%)	1 001	3.74	3.90	-16.58	22.59
Oil and mining exports to GDP (%)	823	6.37	11.04	0.04	82.73
10 year real GDP volatility	972	0.03	0.02	0.004	0.12
Terms of trade	982	100.20	23.92	32.16	385.4
Openness ratio (%)	996	73.75	49.96	11.08	442
Financial development index	976	0.44	0.27	0.05	1
Inflation rate (%)	1 001	13.26	153.51	-24.57	4 800
Foreign reserves to imports (%)	901	43.36	40.22	0.19	331
Proportion of years in sovereign crises	1 001	0.13	0.33	0	1
Proportion of years in external sovereign crises	1 001	0.11	0.32	0	1
Proportion years in domestic sovereign crises	1 001	0.03	0.18	0	1

Source: Author's computations, see Table A1.1 for more details on the sources of variables.

18. As pointed out by Reinhart and Rogoff (2009) default episodes can occur even at a relatively low debt to GDP ratio (Table 3). Countries default on average at a debt to GDP ratio of 75%, which is only 21 percentages point higher than the average debt burden in years without default. This average hides the strong heterogeneity across countries with one default out of four occurring at debt ratios lower than 40% and one out of four at debt ratios above 90%.

Table 3. Government gross debt to GDP for defaulting countries and non-defaulting countries

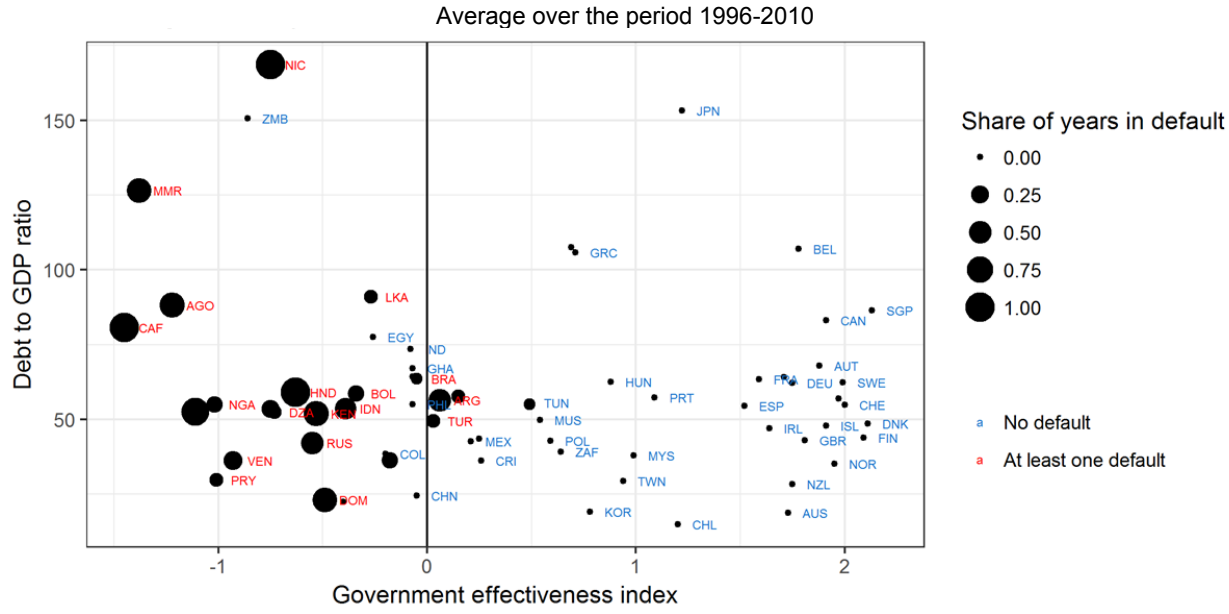
	No sovereign default	Sovereign default
Minimum	3.9 %	18.9 %
1st Qu.	33.4 %	42.3 %
Median	48.0 %	63.0 %
Mean	**54.7** %	**75.7** %
3rd Qu.	66.8 %	90.1 %
Maximum	244.5 %	236.2 %

Note: The table shows the distribution of the government debt to GDP ratio during years of default and no default.

Source: Reinhart and Rogoff (2009) and IMF Historical Public Debt database.

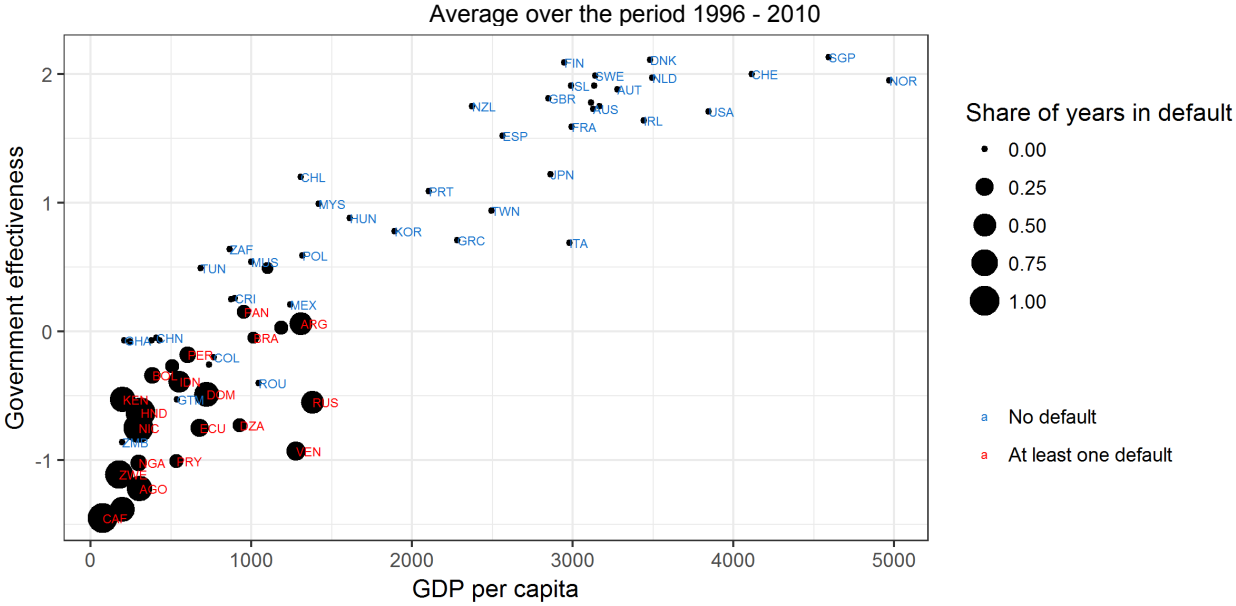
19. Default episodes generally occur in countries with a below-average perception of government effectiveness (Figure 2 and 3). The figures also show that highly effective governments appear to be in a "safe zone"; no default occurs for countries with a government effectiveness index above 0.5 (Table 4). Overall, these descriptive data suggest that default is more closely linked to government effectiveness than to the debt-to-GDP ratio (Figure 2). Figure 3 shows that serial defaulters are countries with both low government effectiveness scores and low GDP per capita. This suggests that both GDP per capita and government effectiveness may be determinants of government defaults, and that distinguishing between them is an empirical question.

Figure 2. Government effectiveness, debt to GDP ratios and share of years in default



Source: World Governance Indicators (World Bank), IMF Historical Public Debt Database and Reinhart and Rogoff (2009).

Figure 3. Government effectiveness, GDP per capita and share of years in default



Source: World Governance Indicators (World Bank), IMF World Economic Outlook (April 2017) and Reinhart and Rogoff (2009).

Table 4. Government effectiveness for defaulting and non-defaulting countries

	No sovereign default	Sovereign default
Minimum	-1.50	-1.65
1st Qu.	-0.15	-1.25
Median	0.55	-0.77
Mean	**0.65**	**-0.80**
3rd Qu.	1.67	-0.52
Maximum	2.43	0.50

Note: The table shows the distribution of the government effectiveness index during years of default and no default.
Source: World Governance Indicators (World Bank) and Reinhart and Rogoff (2009).

5. Estimation results

20. The probability of default $p_{i,t+1}$ of country *i* in year *t+1* is assumed to follow a logistic model in which the risk of default is a function of lagged economic variables denoted $X_{i,t}$ and a measure of government effectiveness denoted $GE_{i,t}$

$$p_{i,t+1} = \mathrm{P}(\varepsilon_{i,t} < \beta_0 + \beta_X X_{i,t} + \beta_{GE} GE_{i,t}) = \frac{1}{1 + e^{-(\beta_0 + \beta_X X_{i,t} + \beta_{GE} GE_{i,t})}}$$

21. This paper is making use of a broad set of controls to address the risk of omitted variable bias. As mentioned by Kaufmann (2011), the estimates of the Worldwide Governance Indicators are highly persistent over time, which implies that the within country variation is very small compared to the between country variation. In the presence of country fixed effects, given this limited within country information, standard errors of the coefficient associated with institutions are too large to identify an effect. This should not come as a surprise as these fixed effects capture those deep institutional determinants that influence sovereign risk. In this paper, the omitted variable bias risk is thus addressed with a wide range of controls and continental fixed effects for Africa, Asia and Latin America. The advantage of this approach is that it allows to better control for time-varying determinants such as commodity exports or the size of economic shocks. As this approach requires quite many parameters, alternative regressions with a narrower set of controls are also considered. The causal effect is assumed to run in one direction: government effectiveness is assumed to affect sovereign defaults, and this is confirmed by instrumental variable regressions presented in this paper.

22. This approach aims at capturing structural determinants of default, ignoring short-term endogenous determinants that could be driven by these structural determinants. The market interest rate, bond underwriting fees (see Nieto-Parra, 2009, for evidence of their forward-looking property), or the maturity structure are some of those determinants that can be endogenous and hence are ignored here. For instance, average maturity can decrease when the perception of fiscal risk is high, because the country loses access to long-term bond markets: this can be the result of poor institution.

23. The estimation results show an empirical link between government effectiveness and default that is robust to different choices of control variables (Table 5). All columns include three lags of the dependent variable to capture serial correlation as sovereign defaults are rarely isolated events (the fourth lag is not included because it is not significant). The share of debt in foreign currency has not been included in these estimates, because it would have further narrowed the sample size, and checks reveal that results with this variable are affected by the sample reduction, rather than by the inclusion of this control variable per se (Table A1.6). Year fixed effects are not included in the regressions reported here because Fisher tests accept the null hypothesis of absence of year fixed effects by a very wide margin. Furthermore, a comparison of estimates with and without them suggests that their omission does not create bias.

Table 5. Estimating probability of default

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Government effectiveness	-4.91**	-1.79***	-1.57***	-1.51***	-1.49***	-1.66***	-1.54***
	(2.05)	(0.56)	(0.41)	(0.46)	(0.35)	(0.40)	(0.35)
Lag 1 Dependent	1.94**	3.17***	3.33***	3.19***	3.38***	3.42***	3.47***
variable	(0.93)	(0.63)	(0.51)	(0.48)	(0.46)	(0.46)	(0.46)
Lag 2 Dependent	1.54	0.85	-0.02	0.23	0.38	0.39	0.41
variable	(1.03)	(0.79)	(0.66)	(0.61)	(0.59)	(0.58)	(0.58)
Lag 3 Dependent	3.17**	0.80	1.22**	1.11**	0.89*	0.87*	0.86*
variable	(1.24)	(0.68)	(0.56)	(0.54)	(0.51)	(0.50)	(0.50)
Share of years in default	-1.18						
in previous 10 years	(2.03)						
Log of GDP per capita	-5.37*	0.47		0.12			
	(3.05)	(0.45)		(0.35)			
Debt to GDP ratio	-0.50	1.44**	1.12**	1.09**	0.76**		
	(1.43)	(0.59)	(0.46)	(0.48)	(0.37)		
Real GDP growth	-0.14	-0.13**	-0.10**				
	(0.13)	(0.06)	(0.04)				
GDP deflator	0.06						
	(0.05)						
Reserves to imports	-0.04	0.00					
	(0.03)	(0.01)					
Tax revenue	-10.60	-7.92*	-5.14*	-4.62*			
to GDP ratio	(12.91)	(4.30)	(2.72)	(2.54)			
Terms of trade change	3.88						
	(12.47)						
Financial development	0.80						
index	(5.57)						
Openness ratio	1.89						
	(2.32)						
Primary balance	-0.32	-0.03	0.04				
to GDP	(0.23)	(0.08)	(0.06)				
10 year GDP volatility	0.69						
	(0.49)						
Interest payments	-0.17**	-0.01					
to exports	(0.07)	(0.02)					
Current account	0.16						
to GDP ratio	(0.13)						
Commodity exports	-13.41						
to GDP	(8.70)						
Share of population	0.83*						
about 65	(0.44)						
Budget balance rule	3.23**						
	(1.46)						
Latin America	8.21**					0.82	
	(4.06)					(0.76)	
Africa	2.73					0.11	
	(4.27)					(0.82)	
Asia	-0.04					0.58	
	(4.13)					(0.87)	
Intercept	-22.34**	-3.00**	-3.21***	-3.54***	-4.50***	-4.64***	-4.08***
	(8.86)	(1.19)	(0.73)	(0.69)	(0.40)	(0.74)	(0.31)
Observations	642	781	858	885	935	950	950
Log Likelihood	-30.83	-71.80	-96.94	-104.5	-115.2	-116.6	-118.3
Akaike Inf. Crit.	111.7	167.6	211.9	225.1	242.5	249.2	246.6

Note: *p<0.1; **p<0.05; ***p<0.01. The reference region is the aggregation of Europe, North America, Australia and New Zealand. All variables are lagged one year.

24. The first specification is particularly demanding as it includes a wide set of controls to make sure that there is no omitted variable bias. Such a broad set of controls is not efficient and results should be interpreted with care: the standard error associated with government effectiveness is higher than in the other regressions, but the coefficient is still significant. With a narrower set of controls, the estimates are more precise and stable across the regressions. In column 2, several insignificant variables are dropped for the sake of parsimony. In column 3, GDP per capita is also dropped as its effect on defaults is not robust with an unstable sign. As institutions can have an effect on all other explanatory variables, the controls can capture part of the effect of government effectiveness. For instance, an effective government may have a lower primary balance. Columns 4 to 6 that include a very narrow set of controls suggest that these second round effects are moderate as the coefficient of government effectiveness does not change much. Alternative regressions with a narrower sample over a longer period of time, including some regressions with additional controls in Fournier and Bétin (2018) show that the effect of government effectiveness is robust to a change in the sample.

25. The six main indicators of the Worldwide Governance Indicator database are included one by one to compare to what extent the link with default risk varies across specific institutional features (Table 6). These indicators are included one by one because they are strongly correlated: these comparisons should be interpreted with great care as each of these indicators is to some extent a proxy for the others. Government effectiveness, the rule of law, control of corruption and voice and accountability are robust to the inclusion of many controls (specification 1). Two indicators, political stability and voice and accountability appear as relatively less robust here.

Table 6. Comparison between different institutional variables

Specification		Government effectiveness	Regulatory quality	Rule of law	Control of corruption	Political stability	Voice and accountability
(1)	Coefficient	-4.91**	-3.19**	-7.56***	-3.41**	-0.74	-4.68**
	Std. error	(2.05)	(1.40)	(2.93)	(1.43)	(1.19)	(2.19)
	Observations	642	642	642	642	642	642
	Akaike inf. crit.	111.7	111.7	106.5	111.6	118.5	111.4
(2)	Coefficient	-1.79***	-1.77***	-1.89***	-1.55***	-0.12	-0.65
	Std. error	(0.56)	(0.47)	(0.53)	(0.56)	(0.37)	(0.40)
	Observations	781	781	781	781	781	781
	Akaike inf. crit.	167.6	162.5	164.0	170.0	179.3	176.8
(5)	Coefficient	-1.49***	-1.27***	-1.60***	-1.66***	-0.72***	-0.90***
	Std. Error	(0.35)	(0.27)	(0.35)	(0.39)	(0.22)	(0.24)
	Observations	935	935	935	935	935	935
	Akaike inf. crit.	242.5	241.7	238.0	240.4	257.6	253.8
(6)	Coefficient	-1.66***	-1.39***	-1.68***	-1.84***	-0.75***	-1.30***
	Std. Error	(0.40)	(0.30)	(0.40)	(0.45)	(0.27)	(0.36)
	Observations	950	950	950	950	950	950
	Akaike inf. crit.	249.2	247.3	247.8	247.6	262.7	255.8

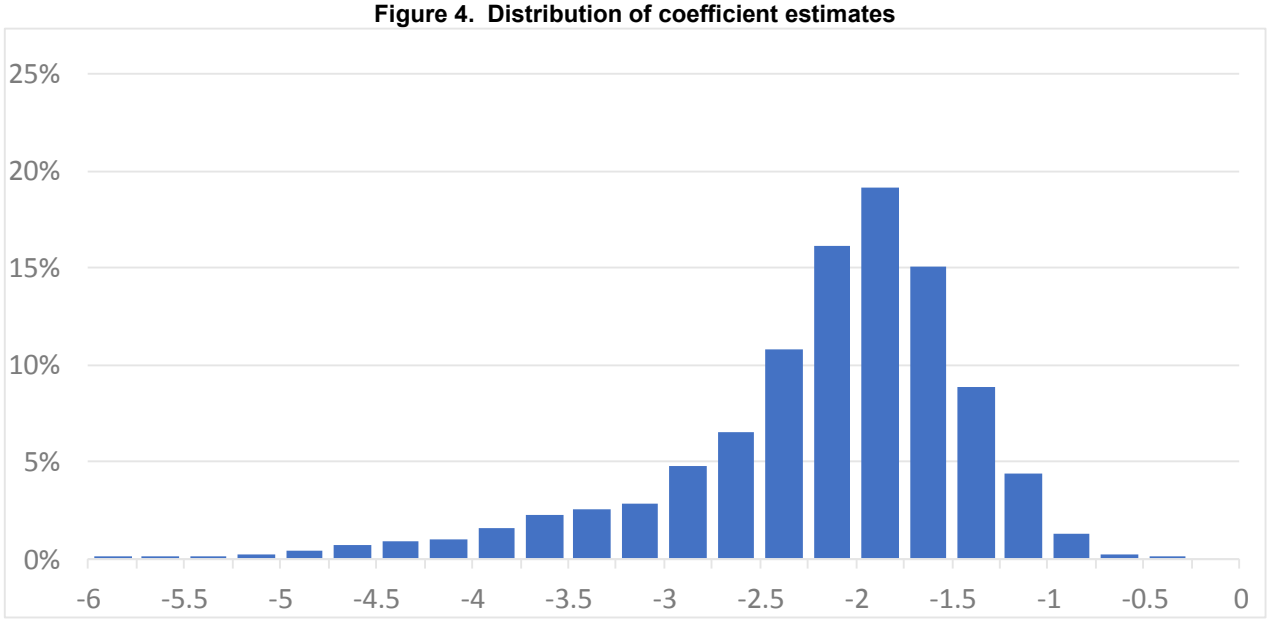
Note: The specification numbers refer to column numbers in Table 5. *p<0.1; **p<0.05; ***p<0.01.

6. Robustness check

26. In empirical work one key concern is the choice of the list of control variables. In order to show that the coefficient estimated for government effectiveness is robust to the inclusion of any alternative set of control variables, all possible specifications for the set of controls in column (1) of Table 5 are run, while keeping the three lags of the dependent variable. This represents 131 072 (2^{17}) specifications. The estimated coefficient for government effectiveness is always negative, with most estimates in a range from -1 to -3 (Figure 4). In addition, the coefficient is significant at the 10% level for more than 90% of the specifications.

27. This exercise encompasses all the different naïve possibilities, some of which may have less economic relevance. As discussed in Sala-i-Martin (1997), this approach is very demanding: when the number of regressions is high, the chance to have some of them that provide an insignificant result is also very high. We follow Sala-i-Martin (1997) and test whether the results are significant with no assumption on the right choice of variable. The results show that the link between government effectiveness and sovereign default is robust to changes in the list of control variables. In a similar test in which government effectiveness is replaced by each of the five other dimensions of the world governance indicators database one by one also reveals a robust link with the rule of law, regulatory quality, control of corruption and voice and accountability (Table 7).

Figure 4. Distribution of coefficient estimates



Note: This graph plots the distribution of coefficients estimated for all possible specifications for a sub-sample of 17 economic variables, equivalent to 131 072 different alternatives.

Table 7. Sala-i-Martin test of significance

	Average estimate	Standard error	Significance level (no normality assumption)	Significance level (normality assumption)
Government effectiveness	-1.94	0.76	0.028	0.006
Regulatory quality	-1.77	0.59	0.008	0.001
Rule of law	-2.16	0.78	0.014	0.003
Political stability	-0.52	0.45	0.298	0.121
Control of corruption	-2.05	0.75	0.021	0.003
Voice and accountability	-1.54	0.64	0.040	0.008

Note: Candidate variables are the same as in the full specification. The test includes models using all regressions with seven variables. Alternative tests with a different number of variables provide similar results. In the last column, the distribution of the estimates of the coefficient is assumed to follow a normal distribution.

7. Instrumental variable estimates

28. Instrumental variable regressions are used to address the reverse causality bias concern as sovereign debt crisis could modify perceived government effectiveness. A crisis can deteriorate the functioning of the government or its perception. The effect could also be positive, because of incentives to improve the functioning of the government during crisis. For instance, this positive effect can be induced by the conditionality of an IMF programme. The instrument is the mortality rate of settlers in former European colonies provided by Acemoglu et al. (2001). With a lower mortality rate of settlers, there are more settlers, who have established stronger institutions. The mortality rate is thus well correlated with institutional variables such as government effectiveness (Acemoglu et al., 2001). The instrument is valid if it has no direct effect on sovereign default, which is a reasonable assumption here. The instrument does not vary over time: the instrumental variable regressions focus on the cross-country dimension, with a linear model explaining the share of years in default. The number of countries is more limited than in the logit regressions given instrument availability and hence only parsimonious regressions are considered.

29. Instrumental variable regressions provide evidence of a causal effect of government effectiveness on sovereign default (Table 8). Results with OLS and with instrumental variables are quite close, suggesting that the reverse causality bias is small (columns 1 and 2). The results are robust to various controls (columns 3 to 6) and to a restriction to sovereign defaults observed after 1996 only (column 7). The choice of controls focuses on variables that may be correlated both with the instrument and the dependent variable, such as the English legal origin dummy: La Porta et al. (1998, 1999) have shown that former British colonies have better property rights, following von Hayek's (1960) argument on the superiority of British common law. Results are hardly changed, confirming the validity of the identification strategy. First stage regressions also confirm that the instrument is strongly linked with government effectiveness.

Table 8. Instrumental variable regressions

Dependent: share of sovereign defaults	(1) OLS	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV
Government	-0.19***	-0.20***	-0.20***	-0.30***	-0.21***	-0.19**	-0.17***
effectiveness	(0.04)	(0.05)	(0.05)	(0.09)	(0.06)	(0.08)	(0.06)
Gross government debt			0.17				
in 1980			(0.13)				
Log of GDP per capita				0.13*			
in 1980				(0.07)			
Openness					0.10		
in 1980					(0.19)		
Share of fuel exports						-0.04	
in 1980						(0.44)	
English legal origin							-0.12
dummy							(0.10)
Intercept	0.29***	0.30***	0.23***	0.17**	0.26**	0.29***	0.34***
	(0.04)	(0.04)	(0.06)	(0.07)	(0.10)	(0.06)	(0.05)
R^2	0.36	0.36	0.39	0.38	0.39	0.26	0.40
Observations	43	43	41	40	38	31	41
First stage for government effectiveness	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log European settler		-0.55***	-0.54***	-0.47***	-0.59***	-0.54***	-0.50***
mortality		(0.08)	(0.08)	(0.11)	(0.08)	(0.10)	(0.07)
Gross government debt			-0.10				
in 1980			(0.36)				
Log of GDP per capita				0.25*			
in 1980				(0.14)			
Openness					-0.59		
in 1980					(0.43)		
Share of fuel exports						0.85	
in 1980						(0.95)	
English legal origin							0.61***
dummy							(0.18)
Intercept		2.38***	2.42***	1.86***	2.85***	2.34***	2.03***
		(0.34)	(0.40)	(0.56)	(0.39)	(0.43)	(0.32)
R^2		0.53	0.52	0.63	0.62	0.53	0.69

Note: OLS = Ordinary Least Squares. IV = Instrumental Variables.

8. Conclusion

30. This paper provides empirical evidence that the quality of institutions is an important determinant of default. Countries that default do not default because they are poor, but mainly because they have institutional weaknesses that can lead to unsustainable debt developments even at relatively low levels of debt. This paper also suggests that the more robust institutional characteristics are the perception of government effectiveness, the rule of law, regulatory quality, control of corruption and voice and accountability. As each of these features are highly correlated, their effects cannot be disentangled with existing information. Programmes restoring debt sustainability are likely to be more effective when they include conditions aimed at improving these institutional determinants. The capacity of the government to effectively formulate and implement sound policies should be a key element to consider when assessing the sustainability of a country's debt.

ANNEX

Table A1.1. List of variables

Variable	Source
Sovereign defaults	Reinhart and Rogoff
Government effectiveness	Worldwide Governance Indicators
Rule of law	Worldwide Governance Indicators
Regulatory quality	Worldwide Governance Indicators
Voice and accountability	Worldwide Governance Indicators
Political stability and absence of violence	Worldwide Governance Indicators
Control of corruption	Worldwide Governance Indicators
Share of years in default in last 10 years	Reinhart and Rogoff
GDP per capita	World Economic Outlook (IMF)
Debt to GDP	IMF Historical public debt database (following Abbas et al. 2010)
Real GDP growth	World Economic Outlook (IMF)
Inflation	World Economic Outlook (IMF)
Reserves to imports	World Economic Outlook (IMF)
Terms of trade	World Economic Outlook (IMF)
Financial development index	Foreign Direct Investment (IMF)
Openness ratio	World Economic Outlook (IMF)
Primary balance to GDP	World Economic Outlook (IMF)
10 year GDP volatility	World Economic Outlook (IMF)
Interest payment to exports	World Economic Outlook (IMF)
Current account to GDP	World Economic Outlook (IMF)
Share of total debt in foreign currency	World Economic Outlook (IMF)
Commodity exports to GDP	World Trade Organization
Share of population above 65 years old	World Development Indicator (World Bank)

Table A1.2. Sample of countries

ISO Code	Name	ISO Code	Name
AGO	Angola	JPN	Japan
ARG	Argentina	KEN	Kenya
AUS	Australia	KOR	Korea
AUT	Austria	LKA	Sri Lanka
BEL	Belgium	MAR	Morocco
BOL	Bolivia	MEX	Mexico
BRA	Brazil	MMR	Myanmar
CAF	Central African Rep	MUS	Mauritius
CAN	Canada	MYS	Malaysia
CHE	Switzerland	NGA	Nigeria
CHL	Chile	NIC	Nicaragua
CHN	China	NLD	Netherlands
COL	Colombia	NOR	Norway
CRI	Costa Rica	NZL	New Zealand
DEU	Germany	PAN	Panama
DNK	Denmark	PER	Peru
DOM	Dominican Republic	PHL	Philippines
DZA	Algeria	POL	Poland
ECU	Ecuador	PRT	Portugal
EGY	Egypt	PRY	Paraguay
ESP	Spain	ROU	Romania
FIN	Finland	RUS	Russia
FRA	France	SGP	Singapore
GBR	United Kingdom	SWE	Sweden
GHA	Ghana	THA	Thailand
GRC	Greece	TUN	Tunisia
GTM	Guatemala	TUR	Turkey
HND	Honduras	TWN	Taiwan
HUN	Hungary	URY	Uruguay
IDN	Indonesia	USA	US
IND	India	VEN	Venezuela
IRL	Ireland	ZAF	South Africa
ISL	Iceland	ZMB	Zambia
ITA	Italy	ZWE	Zimbabwe

Table A1.3. World Governance Indicators

Variable	Definition
The process by which governments are selected, monitored, and replaced	
Voice and accountability	Capturing perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.
Political stability and absence of violence/terrorism	Capturing perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.
The capacity of the government to effectively formulate and implement sound policies	
Government effectiveness	Capturing perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.
Regulatory quality	Capturing perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
The respect of citizens and the state for the institutions that govern economic and social interactions among them	
Rule of law	Capturing perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
Control of corruption	Capturing perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

Source: D. Kaufmann, A. Kraay and M. Mastruzzi (2011), “The World Governance Indicators: Methodology and Analytical Issues”, *The Hague Journal of Rule of Law*.

Table A1.4. Domestic sovereign debt crises

1996-2010

Countries	Dates of defaults
AGO	1996, 1997, 1998, 1999, 2000, 2001, 2002
ARG	2001,2002,2003,2004,2005,2007,2008,2009,2010
BRA	2002
DOM	1996,1997,1998,1999,2000,2001
ECU	1999
IDN	1997,1998,1999
LKA	1996
RUS	1998,1999
TUR	2001
VEN	1998
ZWE	2006

Note: Countries that have not defaulted between 1996 and 2010 are not reported in this table. Domestic sovereign defaults include outright defaults and debt rescheduling and/or renegotiation of domestic debt.

Source: Reinhart and Rogoff (2009).

Table A1.5. External sovereign debt crises

1996-2010

Countries	Dates of defaults
AGO	1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003
ARG	2001,2002,2003,2004,2005
BOL	1996,1997
BRA	2002
CAF	1996,1997,1998,1999,2000,2001,2002,2003,2004,2005,2006,2007,2008,2009,2010
DOM	2005
DZA	1996
ECU	1999,2000,2008
HND	1996,1997,1998,1999,2000,2001,2002,2003,2004,2005,2006,2007,2008,2009,2010
IDN	1998,1999,2000,2002
KEN	1996,1997,1998,1999,2000,2001,2002,2003
MMR	2002,2003,2004,2005,2006,2007,2008,2009,2010
NGA	2001,2004,2005
NIC	1996,1997,1998,1999,2000,2001,2002,2003,2004,2005,2006,2007,2008,2009,2010
PAN	1996
PER	1996,1997
PRY	2003,2004
RUS	1996,1997,1998,1999,2000
TUR	2001
URY	2003
VEN	2004,2005
ZWE	2000,2001,2002,2003,2005,2006,2007,2008,2009

Note: Countries that have not defaulted between 1996 and 2010 are not reported in this table. External sovereign defaults include outright defaults and debt rescheduling and/or renegotiation of external debt.

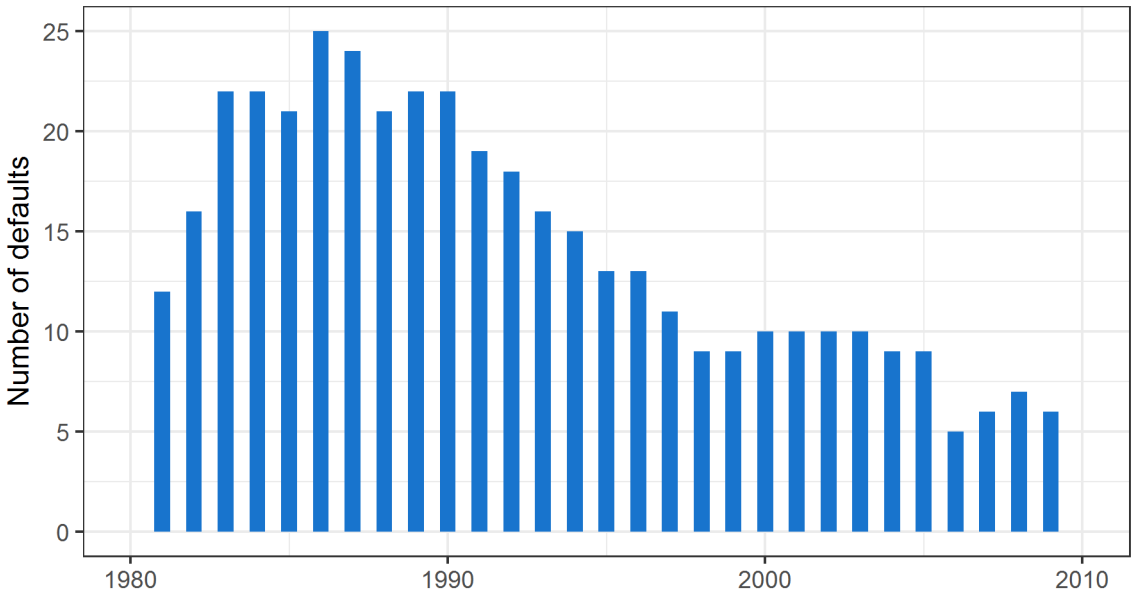
Source: Reinhart and Rogoff (2009).

Table A1.6. The effect of the share of debt in foreign currency

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Gov. effectiveness		-2.15***		-1.13**	-1.70***	-0.82*	-1.20**
		(0.35)		(0.52)	(0.36)	(0.44)	(0.53)
Lag 1 Dependent			3.94***	3.47***	3.53***	3.40***	3.35***
variable			(0.60)	(0.63)	(0.47)	(0.60)	(0.64)
Lag 2 Dependent			1.90***	1.61**	0.96**	1.46**	1.56**
variable			(0.61)	(0.64)	(0.47)	(0.62)	(0.66)
Share of debt	2.84***	0.24	-0.18	-1.50			-2.30
in foreign currency	(0.49)	(0.65)	(0.83)	(1.09)			(1.89)
Real GDP growth	-0.12***	-0.10***	-0.15***	-0.14**	-0.10***	-0.13**	-0.13**
	(0.03)	(0.03)	(0.06)	(0.05)	(0.04)	(0.05)	(0.06)
Gross debt							0.22
							(1.84)
Share of debt in foreign							1.11
currency * Gross debt							(2.44)
Intercept	-2.78***	-2.12***	-3.34***	-2.66***	-3.65***	-3.35***	-2.67**
	(0.35)	(0.41)	(0.52)	(0.60)	(0.32)	(0.39)	(1.21)
Observations	470	409	470	409	945	409	406

Note: In column 6, the sample is restricted to those observations used in column 4, so that the comparison between columns 4 and 6 reflects the implication of the inclusion of the share of debt in foreign currency as a control, and the comparison between columns 5 and 6 reflects the implication of the sample reduction.

Figure A1.1. Number of sovereign defaults, 1980-2010



Note: Default episodes include both external and domestic defaults.

Source: Reinhart and Rogoff (2009).

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