



Article

Sovereign Debt Crisis and Fiscal Devolution

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Abstract: How is the probability of a sovereign debt crisis affected by fiscal devolution? Using annual cross-country panel data from 82 advanced and developing countries, the association between fiscal decentralization and the sovereign debt crisis is investigated. We adopt an instrumental variable probit model to address potential endogeneity. The research distinguishes between tax policies and spending policies. The results reveal that local tax autonomy reduces the probability of a sovereign debt crisis. In contrast, expenditure devolution is found to increase the probability of a sovereign debt crisis. These favorable and unfavorable effects of fiscal devolution are more evident in the case of decentralization to local governments than in the case of decentralization to subnational governments. In terms of relative magnitudes, our discrete choice analysis demonstrates that the undesirable effects of expenditure decentralization are greater than the desirable effects of tax revenue decentralization. Therefore, countries should be cautious about the risks associated with fiscal devolution, particularly the contrasting impact of tax revenue and spending decentralization on the likelihood that sovereign debt crises occur.

Keywords: sovereign debt crisis; tax revenue decentralization; expenditure decentralization



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1. Introduction

Many countries have multiple tiers of government, and various public goods are provided by different levels of government. Many public services are decentralized to subnational governments, with intergovernmental transfers from the central government occurring worldwide. Fiscal decentralization is also a policy change in developing countries that is frequently advocated for by international agencies and bilateral donors (Bahl and Linn 1994). The decentralization of fiscal operations could affect the efficiency of public service delivery and fiscal sustainability by changing fiscal discipline (Neyapti 2013; Akin et al. 2016; Jia et al. 2021). For example, Rodríguez-Pose and Bwire (2004) found that fiscal devolution could be linked to lower economic efficiency. Jia et al. (2021) found that a higher vertical fiscal imbalance induces fiscal indiscipline through a reduction in tax collection efforts by local governments. The vertical fiscal imbalance captures the difference between own spending and own revenue at the local government level. If a country exhibits highly decentralized government expenditure, while the government revenue collection is still mostly centralized, then the vertical fiscal imbalance is high. Akin et al. (2016) found that fiscal decentralization leads to greater fiscal discipline in terms of greater tax collection efforts, but only if local governments face a balanced budget constraint. However, studies on how the intergovernmental relationship associated with fiscal devolution affects fiscal sustainability are relatively scarce, although sustainable fiscal operations are one of the main objectives of the government. Therefore, this research studies how fiscal devolution influences the probability of a sovereign debt crisis.

It is necessary to understand how sovereign debt crises are defined in this article. We use the data on sovereign debt crises built by Moreno Badia et al. (2022), who extended the period of the database originally constructed by Medas et al. (2018). Sovereign debt crises are identified in any given year if credit events that include sovereign default, restructuring, or rescheduling of substantial size (larger than 0.5 percent of GDP), and substantial nominal growth of the defaulted amount (by 10 percent) are realized. The purpose of defining the

sovereign debt crisis in such a way is to avoid the inclusion of technical defaults, which do not reflect fiscal distress, and this is in line with the sovereign debt literature ([Chakrabarti and Zeaiter 2014](#)). Note that sovereign debt crises are one type of fiscal crisis.

In contrast, fiscal crises include not only sovereign debt crises but also: (1) episodes in which the country receives exceptionally large official financing from the IMF or the European Union (EU); (2) implicit domestic public debt default, such as (i) periods of high inflation (higher than 35 percent in advanced countries and 100 percent in developing countries); or (ii) a steep increase in domestic arrears (by at least 1 percentage point of GDP); and (3) episodes associated with extreme market pressures that include (i) loss of market access (i.e., bond issuance coming to a halt); or (ii) very large borrowing costs (level of spread higher than 1000 bps) or sovereign yield spikes (annual change in spreads higher than 300 bps in advanced countries and 650 bps in developing countries).

In this article, we focus on sovereign debt crises (not fiscal crises) because the particular association between the probability of a sovereign debt crisis and fiscal devolution has not been explored thus far, although studies have analyzed the link between the probability of a fiscal crisis and decentralization, as we explain below. Also, it would be useful to distinguish between sovereign debt crises and other types of fiscal crises such as high inflation periods and IMF/EU lending, because the mechanisms and reasons leading to sovereign debt crises (e.g., overborrowing), those of hyperinflation (e.g., misalignment of exchange rate), and asking for financial resources from international donors (e.g., development purpose) might be very different. To the best of our knowledge, there are two papers that study how fiscal devolution affects fiscal crises. [Nakatani \(2023a\)](#) recently studied the effects of fiscal decentralization on fiscal crises and fiscal indiscipline. He found that (i) spending decentralization to local governments increases the probability of a fiscal crisis, worsening local fiscal discipline; (ii) such an adverse decentralization effect on fiscal crisis probability is mitigated by a stronger rule of law (i.e., higher legal justice); and (iii) vertical fiscal imbalance is negatively associated with fiscal crises. In another paper, [Nakatani \(2023b\)](#) found that countries are more likely to face a fiscal crisis when approximately 16 percent of general government revenues are collected at the local level.

However, these papers have several caveats. First, a potential endogeneity concern is not fully addressed. Endogeneity is a major concern in the field of fiscal decentralization according to empirical analysis ([Martinez-Vazquez et al. 2017](#); [Canavire-Bacarreza et al. 2020](#); [Alfada 2019](#); [Digdowiseiso 2022](#)). Second, the author only studied the effects of fiscal decentralization to local governments (e.g., municipalities), but did not study the effects of decentralization to subnational governments (e.g., states, provinces). Third, these studies analyzed the effects of broad definitions of fiscal crises, which include credit events, large official financing, implicit domestic defaults, and loss of market confidence, as we explained in greater detail in the previous three paragraphs. However, no research has analyzed the effects of fiscal decentralization solely on sovereign debt crises. To overcome these three caveats, this paper studies the effects of multiple stages of fiscal decentralization on the probability of a sovereign debt crisis, utilizing an instrumental variable (IV) probit model to address the endogeneity problem.

The extant literature has identified several drivers of sovereign debt crises. For example, several factors can lower or increase the probability of a crisis. Higher GDP growth could generate enough income to repay sovereign debt, and hence reduce the probability of a crisis. Countries with higher per capita income tend to have better sovereign debt management strategies, and they tend to be less prone to sovereign debt crises. In fact, [Honda et al. \(2022\)](#) found that stronger GDP growth and higher income are associated with a lower probability of a crisis. In addition, external factors such as an appreciation of exchange rates and a stronger current account balance could also reduce the probability of a sovereign debt crisis, because the former can reduce the amount of foreign currency-denominated debt when evaluated in national currency, and the latter could increase foreign exchange, which is used as a source of repayment of foreign currency debt ([Dawood et al. 2017](#)). Moreover, [Gärtner et al. \(2011\)](#) found that inflation is also associated

with the sovereign debt crisis. In addition to economic factors, fiscal factors such as interest costs and government debt levels influence the accumulation of sovereign debt and its spread (László 2022; Mpapalika and Malikane 2019). Therefore, all of these economic and fiscal factors are included as control variables in our analysis.

As our contributions to the literature, our results reveal that tax revenue decentralization is associated with a lower probability of a sovereign debt crisis. In contrast, expenditure decentralization is found to increase the probability of a sovereign debt crisis. These favorable effects of tax revenue decentralization and unfavorable effects of expenditure decentralization on sovereign debt crises are more evident in the case of decentralization to local governments relative to that to subnational governments. Therefore, countries should be cautious about the risks associated with fiscal devolution, particularly the contrasting impact of tax revenue and expenditure decentralization on the likelihood that sovereign debt crises will occur.

2. Materials and Methods

Our data cover 82 countries from 1998 to 2019. The dependent variable is a dummy variable for the sovereign debt crisis, taken from Moreno Badia et al. (2022). The explanatory variables include fiscal decentralization (tax revenue decentralization or expenditure decentralization) to subnational governments or local governments, GDP growth, current account balance (as a percentage of GDP), exchange rates, government debt, interest costs, per capita income, inflation, the banking crisis dummy variable, and the currency crisis dummy variable. Fiscal decentralization data are taken from the IMF's Fiscal Decentralization Dataset. The tax revenue decentralization variable is defined as the ratio of subnational or local governments' tax revenues to the general government's tax revenue. Similarly, expenditure decentralization is defined as the ratio of subnational or local governments' expenditure to the general government's expenditure. Economic variables are taken from the IMF's World Economic Outlook Database. The GDP growth rate is an annual percent change in constant price GDP. Exchange rates are expressed as depreciation rates of exchange rates, defined as national currency per current international dollar. Government debt is defined as general government gross debt as a percentage of GDP. Interest costs are the net interest expenses of the general government as a percentage of GDP. Income per capita is calculated as the natural logarithm of GDP in a constant price of one thousand international dollars per person. Inflation is the annual percentage change in average consumer prices. The dummy variables for banking and currency crises are taken from Nguyen et al. (2022). Following Laeven and Valencia (2020), they defined a systemic banking crisis as an event that meets two conditions: (1) significant signs of financial distress in the banking system, as reflected by significant bank runs, losses in the banking system, and/or bank liquidations; and (2) significant government policy interventions in response to significant losses in the banking sector. They defined a currency crisis as the nominal depreciation of a domestic currency against the US dollar, occurring at a minimum of 30 percent per year and higher than the previous year's change by at least 10 percent.

We use the IV probit model to address potential endogeneity. We examine two instruments, political stability and the size of the land area, both of which are correlated with fiscal decentralization but exogenous to the sovereign debt crisis. For instance, when countries have large land areas, they tend to decentralize fiscal operations due to various transportation costs. In addition, it is easier for countries to decentralize fiscal operations when their political situation is stable. These data on instruments are collected from the World Development Indicators and Polity data series. The summary statistics of the data are shown in Table 1. The correlation matrix is shown in Table 2, which reveals that the correlation between a sovereign debt crisis and a banking crisis is 0.07, and that between a sovereign debt crisis and a currency crisis is 0.11.

Table 1. Descriptive Statistics.

Variable	Mean	Standard Deviation	Minimum	Maximum
Sovereign debt crisis	0.0449	0.2073	0	1
Tax revenue decentralization to local governments	0.1116	0.1058	0	0.4613
Tax revenue decentralization to subnational governments	0.1783	0.1731	0	0.5828
Expenditure decentralization to local governments	0.1892	0.1054	0.0011	0.4920
Expenditure decentralization to subnational governments	0.2771	0.1654	0.0018	0.6891
Polity	4.8468	14.6993	−88	10
Land area	1216.554	2883.265	2.03	16,381.39
GDP growth	3.2265	3.3075	−15.1	20.585
Current account balance	−1.2925	7.5848	−43.825	63.39
Exchange rates	0.0262	0.0575	−0.2181	0.5159
Government debt	51.2610	33.4599	3.221	233.528
Interest cost	1.8063	1.3927	0.0050	8.369
Income per capita	2.9699	0.7956	0.4770	4.2535
Inflation	4.3650	5.3665	−6.811	59.218
Banking crisis	0.0859	0.2804	0	1
Currency crisis	0.0291	0.1681	0	1

Table 2. Correlation Matrix.

Variable	SC	TL	TS	EL	ES	Pol	LA	GG
Sovereign debt crisis (SC)	1							
Tax revenue decentralization to local governments (TL)	0.011	1						
Tax revenue decentralization to subnational governments (TS)	−0.071	0.654	1					
Expenditure decentralization to local governments (EL)	0.005	0.712	0.374	1				
Expenditure decentralization to subnational governments (ES)	−0.093	0.416	0.734	0.531	1			
Polity (Pol)	−0.052	0.053	0.141	0.182	0.282	1		
Land area (LA)	−0.057	−0.091	0.399	−0.080	0.411	0.049	1	
GDP growth (GG)	0.007	−0.106	−0.203	−0.090	−0.211	−0.129	−0.040	1
Current account balance (CA)	−0.021	0.120	0.198	0.086	0.150	−0.104	0.032	−0.118
Exchange rates (ER)	0.132	0.079	−0.070	0.030	−0.131	−0.121	0.079	0.172
Government debt (GD)	−0.046	0.341	0.334	0.176	0.244	0.177	−0.046	−0.280
Interest cost (IC)	−0.022	−0.179	−0.023	−0.215	0.004	0.146	0.009	−0.127
Income per capita (IPC)	−0.317	0.310	0.500	0.365	0.594	0.358	0.135	0.322
Inflation (Inf)	0.128	0.063	−0.068	0.003	−0.141	−0.105	0.052	0.081
Banking crisis (BC)	0.069	0.127	0.077	0.123	0.090	0.074	−0.042	−0.295
Currency crisis (CC)	0.113	0.049	0.020	0.049	0.024	−0.042	0.076	−0.187
Variable	CA	ER	GD	IC	IPC	Inf	BC	CC
Current account balance (CA)	1							
Exchange rates (ER)	−0.143	1						
Government debt (GD)	0.062	−0.303	1					
Interest cost (IC)	−0.188	−0.023	0.407	1				
Income per capita (IPC)	0.288	−0.297	0.325	−0.028	1			
Inflation (Inf)	−0.189	0.844	−0.247	0.058	−0.305	1		
Banking crisis (BC)	0.015	0.039	0.131	0.092	0.089	0.124	1	
Currency crisis (CC)	−0.051	0.275	−0.052	0.036	−0.061	0.318	0.091	1

3. Results

Table 3 shows the baseline estimation results obtained using the IV probit model with the polity variable as an instrument. The area under the receiver operating characteristic (ROC) curve is greater than 0.9, demonstrating outstanding discrimination of our empirical model.

The negative coefficients of tax revenue decentralization are statistically significant at the one percent level for both cases: decentralization to local governments and to subnational governments. This result indicates that local and subnational tax autonomy reduces the probability of a sovereign debt crisis by improving local fiscal discipline. In contrast, the coefficients of expenditure decentralization to local governments and to subnational governments are positive and statistically significant at the one percent level.

This finding indicates that fiscal devolution on the expenditure side is associated with a greater probability of a sovereign debt crisis. The result of expenditure decentralization is in stark contrast to that of tax revenue decentralization.

Table 3. Baseline Results.

Decentralized Government Level	Local	Subnational	Local	Subnational
Tax revenue decentralization	−10.1570 *** (0.4492)	−6.2877 *** (0.6126)	- -	- -
Expenditure decentralization	- -	- -	10.7513 *** (0.5340)	7.9495 *** (0.3415)
GDP growth	0.0081 (0.0135)	−0.0195 (0.0156)	−0.0445 ** (0.0192)	−0.0150 (0.0152)
Current account balance	0.0197 *** (0.0047)	0.0264 *** (0.0053)	0.0111 * (0.0064)	0.0024 (0.0053)
Exchange rates	3.1840 ** (1.2709)	3.9836 *** (1.5317)	−1.5436 (1.9677)	−0.7542 (1.5295)
Government debt	0.0147 *** (0.0017)	0.0110 *** (0.0019)	−0.0059 ** (0.0027)	−0.0003 (0.0019)
Interest cost	−0.2514 *** (0.0220)	−0.1324 *** (0.0291)	0.1870 *** (0.0528)	−0.0102 (0.0356)
Income per capita	0.1132 (0.2048)	0.0597 (0.2636)	−1.0640 *** (0.2767)	−1.2452 *** (0.2138)
Inflation	0.0201 * (0.0120)	−0.0029 (0.0143)	−0.0202 (0.0176)	0.0030 (0.0145)
Banking crisis	0.1976 (0.1210)	0.1143 (0.1553)	−0.1067 (0.2418)	0.0058 (0.1775)
Currency crisis	0.3056 (0.2275)	0.4290 * (0.2567)	−0.0362 (0.3123)	−0.3141 (0.2553)
Number of observations	1378	1383	858	872
Area under ROC curve	0.9310	0.9329	0.9468	0.9473
Log likelihood	1145.90	581.69	666.47	434.72
Wald chi (10)	2074.04 ***	580.88 ***	428.49 ***	854.92 ***
Wald test of exogeneity	4.41 **	9.00 ***	8.22 ***	8.36 ***

Notes: Standard errors are in parentheses. *** <1% level, ** <5% level, * <10% level.

To compare the magnitude of the probability impacts of subnational/local decentralization on the revenue/expenditure sides, we multiply the estimated coefficients of each type of decentralization by one standard deviation of the corresponding variable in Figure 1. We use a within-country one standard deviation approach to study practically possible changes in the degree of decentralization within the same country, rather than variations between countries. We have two main findings. First, Figure 1 shows that the adverse effects of expenditure decentralization are greater than the favorable effects of tax revenue decentralization on the probability of a sovereign debt crisis, irrespective of the level of decentralization (local/subnational level). Second, the probability impact of decentralization is always greater in the case of decentralization (tax revenue or expenditure) to local governments, rather than decentralization to subnational governments. These are new findings, and no extant literature has explored them thus far.

The results of the robustness check using the size of the land area are shown in Table 4. The robustness checks show that the coefficients of tax revenue and expenditure decentralization to local governments are highly statistically significant at the one percent level, although the coefficients of tax revenue and expenditure decentralization to subnational

governments are statistically significant only at the ten percent level, or nonsignificant. This outcome implies that fiscal devolution to local governments has significant effects on the probability of a sovereign debt crisis, while that to subnational governments may not. We will discuss the plausible reason behind these findings in the discussion section.

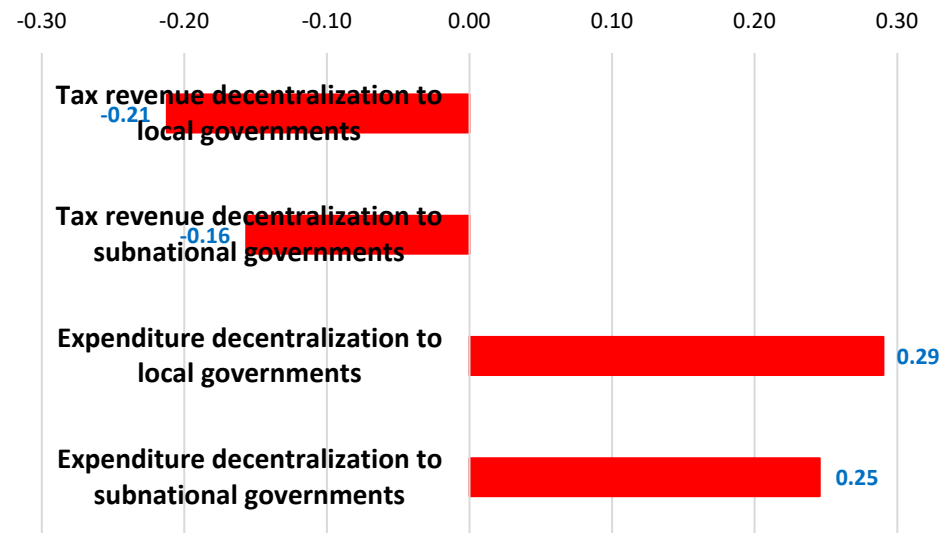


Figure 1. Probability Impact of Within-Country One Standard Deviation Changes.

Table 4. Robustness Checks.

Decentralized Government Level	Local	Subnational	Local	Subnational
Tax revenue decentralization	−9.7135 *** (0.6656)	−3.5508 * (2.1432)	- -	- -
Expenditure decentralization	- -	- -	10.7263 *** (0.4915)	−3.0389 (4.3142)
GDP growth	0.0062 (0.0122)	−0.0320 (0.0210)	−0.0340 * (0.0190)	−0.0240 (0.0262)
Current account balance	0.0131 *** (0.0044)	0.0122 (0.0100)	0.0023 (0.0057)	−0.0015 (0.0095)
Exchange rates	3.9954 *** (1.2602)	5.3077 *** (2.0191)	−2.2482 (2.5372)	4.3927 * (2.3960)
Government debt	0.0153 *** (0.0015)	0.0129 *** (0.0021)	−0.0059 (0.0037)	0.0065 * (0.0038)
Interest cost	−0.2445 *** (0.0302)	−0.0482 (0.0645)	0.1988 *** (0.0515)	−0.0634 (0.0793)
Income per capita	0.0227 (0.1954)	−0.6237 * (0.3606)	−0.9169 * (0.4959)	−0.4402 (0.8559)
Inflation	0.0073 (0.0116)	−0.0207 (0.0199)	−0.0169 (0.0176)	−0.0250 (0.0212)
Banking crisis	0.2616 ** (0.1254)	0.3240 (0.2437)	−0.0926 (0.3217)	0.5366 (0.3339)
Currency crisis	0.2204 (0.2291)	0.4154 (0.3700)	−0.0036 (0.3360)	0.4486 (0.3798)
Number of observations	1422	1435	882	895
Area under ROC curve	0.9275	0.9283	0.9366	0.9395
Log likelihood	1179.79	768.92	682.99	513.20
Wald chi (10)	1283.77 ***	121.02 ***	627.09 ***	77.92 ***
Wald test of exogeneity	9.20 **	3.08 *	1.72	1.20

Notes: Standard errors are in parentheses. *** <1% level, ** <5% level, * <10% level.

4. Discussion

We have found three main findings in the previous section. First, we found that the probability impact of expenditure decentralization is greater than that of tax revenue decentralization. This finding is explained by the fact that expenditure decentralization to local and subnational governments could lead to the overspending of these governments when they expect bail-out by the central government, which is called the soft budget constraint problem (Kornai 1986). This overspending in turn increases the budget deficit (Rodden 2002) and hence subnational borrowing (Foremny et al. 2017), which eventually leads to higher sovereign spread (Eichler and Hofmann 2013) and a sovereign debt crisis. Our outcomes show that such effects on local fiscal indiscipline are greater than the disciplinary effects of local tax autonomy. In other words, an absence of proper commitment to taxes for spending (i.e., a higher vertical fiscal imbalance) triggers the moral hazard problem of local governments by relying on transfers financed by common pool resources (Nakatani et al. 2024).

The second finding is that the effects of fiscal devolution are larger when countries decentralize tax revenue collection or spending to local governments than when they decentralize to subnational governments. This can be attributed to the fact that local governments lack economies of scale more than subnational governments, as their size is smaller. Economies of scale occur when an increase in size leads to more efficient operation and higher productivity by lowering costs. Due to the small size of each local government, local decentralization benefits fewer economies of scale than subnational decentralization. Our results corroborate the recent findings of Nakatani et al. (2022), who found that the marginal effects of decentralizing education expenditure to subnational governments on educational outcomes are always greater than those of local decentralization.

Finally, our robustness check analysis shows that the effects of fiscal devolution are significant when fiscal operations are decentralized to local governments, while this may not be the case for decentralization to subnational governments depending on the instrument we use. Therefore, fiscal authorities should be mindful of the favorable and unfavorable effects of decentralization on crisis probability, especially when they tend to decentralize tax revenue collection and expenditure operations to the lowest levels of government.

A possible future extension of this analysis is to study how the maturity of sovereign debt influences the efficacy of fiscal decentralization. This is motivated by the recent findings of Nakatani (2023c), who found that short-term debt serves as a disciplinary device for borrowers to improve the productivity of services, while long-term debt causes moral hazard. Although we do not have maturity data on sovereign debt, it would be intriguing to study how the maturity structure of sovereign debt affects fiscal discipline in fiscally decentralized countries.

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