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Preventing Fiscal Crises under Decentralization

Intergovernmental Policies and Institutions

Ryota Nakatani

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Preventing Fiscal Crises under Decentralization: Intergovernmental Policies and Institutions

Prepared by Ryota Nakatani*

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ABSTRACT: What instruments can governments deploy to prevent fiscal crises in decentralized fiscal systems? This analysis reveals that good public sector institutions, controls by the central government over local fiscal balances and borrowing, and intergovernmental transfers could be effective instruments for reducing the probability of a crisis. Strengthening good institutions mitigates the unwanted effects of devolution on fiscal unsustainability by inhibiting allocative inefficiencies caused by the moral hazard of governments. Expenditure decentralization to local governments increases the probability of a crisis only when local governments run large budget deficits, indicating that controls by the center over the local budget balance or borrowing ability may help to avoid overspending and the resulting excessive indebtedness. Subnational fiscal rules and administrative constraints also reduce the probability of a crisis. Intergovernmental transfers are associated with a lower probability of a fiscal crisis because they can play a role in interregional risk sharing among subnational governments.

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Author’s E-Mail Address:	rnakatani@IMF.org

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WORKING PAPERS

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Contents

Introduction

Many public services are provided by subnational governments worldwide because they know local needs better than the central government does. However, this may come at a cost to fiscal sustainability since local governments do not internalize the effect of their actions on the country-wide fiscal position. Indeed, recent studies find that fiscal decentralization may increase sovereign risk (Eichler and Hofmann 2013) and raise the probability of a fiscal crisis (Nakatani 2023a, 2024ab). This raises questions about how fiscal sustainability can be maintained when revenue and spending responsibilities are decentralized. Specifically, how can countries prevent fiscal crises in fiscally decentralized systems? Such prevention is critical for policymakers, as fiscal crises hurt people's daily lives, while fiscal decentralization is ubiquitous across countries.

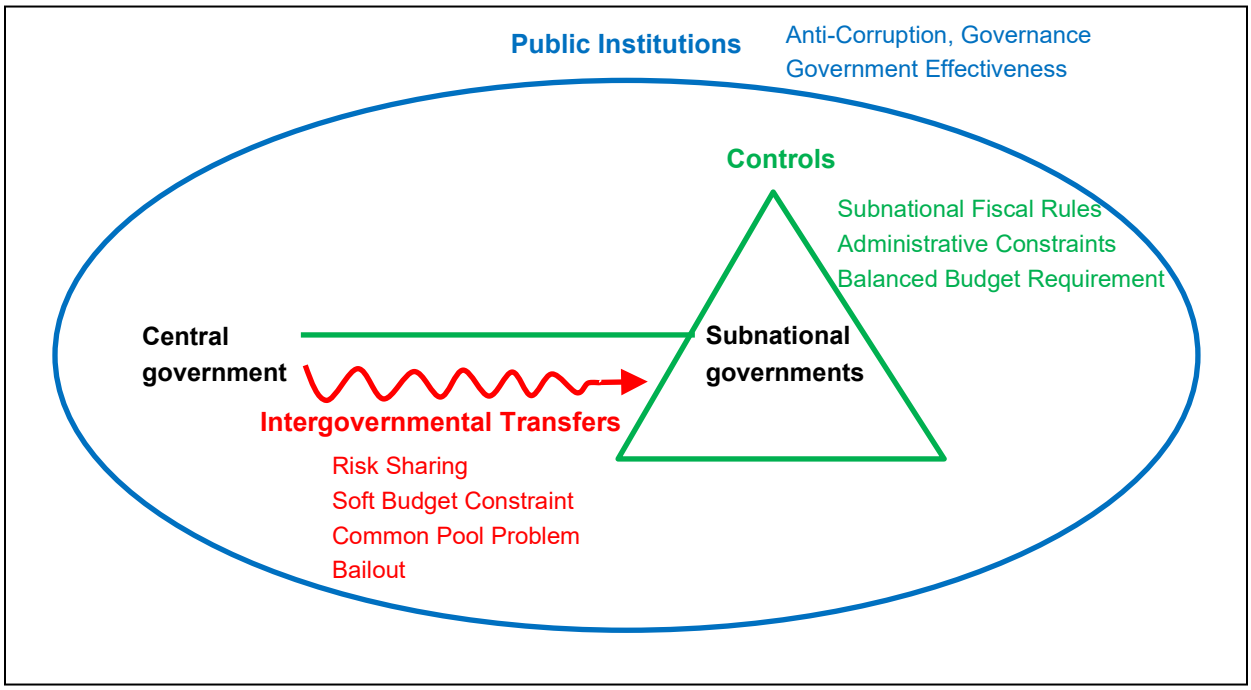
In this paper, we study policy and institutional tools to prevent fiscal crises under decentralization. These tools include intergovernmental transfers, controls by the central government (i.e., subnational fiscal rules and administrative constraints), and institutional governance (Figure 1). The extant literature has studied related policy topics, but, to the best of our knowledge, no studies have quantitatively investigated their effects on the occurrence of fiscal crises. Saxena (2022) discussed policies such as controls on subnational borrowing and the fiscal management framework to manage fiscal risks from subnational governments, although there was no quantitative analysis to examine their effectiveness.[1] Plekhanov and Singh (2006) studied the effects of policy instruments on subnational fiscal balances, but they did not cover general government or fiscal crises at the national level. It is important for countries to empirically analyze the effectiveness of policies and institutions on fiscal sustainability at the general government level because the central government may have to bail out subnational governments. Martinez-Vazquez and Vulovic (2017) studied the effects of subnational borrowing regulations on general or subnational government primary balance, but the authors did not analyze their relationship with fiscal crisis or decentralization. To fill this gap, we use the latest cross-country panel dataset concerning fiscal decentralization, which is published by the International Monetary Fund (IMF),[2] and employ binary choice models (probit and logit models). By doing so, we empirically confirm the existing knowledge about policy instruments and institutions that could help countries avoid fiscal crises brought by issues with fiscal decentralization.

Our results show that the good quality of institutions in the public sector is associated with a lower probability of a fiscal crisis in decentralized fiscal systems. This is because, in countries with good governance and less corruption, local governments are less likely to overspend and cause moral hazard under fiscal decentralization. If effective government institutions prevail in both the central government and subnational governments in these countries, there may be no need to bail out local governments through intergovernmental transfers or control subnational governments via rules and constraints. Conversely, if governance is weak and corruption is high, no degree of centralization may help enforce fiscal discipline at the local level.

[1] Other policy tools to mitigate the materialization of subnational fiscal risks, which are outside the scope of our paper, include establishing an intergovernmental relations unit in the central Ministry of Finance to track early warning indicators and to prepare periodic reports on fiscal risks from subnational governments (Saxena 2022). In addition, an establishment of a subnational insolvency framework for debt restructuring and timebound fiscal adjustment program helps limit the moral hazard of subnational governments.

[2] The IMF's Fiscal Decentralization Dataset contains information on indicators widely used by academics and policymakers to assess the degree to which the revenue and expenditure functions of the general government are carried out by subnational governments. The dataset covers all economies that have reported fiscal data to the IMF's Government Finance Statistics Database for at least one subnational government level (https://data.imf.org/?sk=1C28EBFB-62B3-4B0C-AED3-048EEEBB684F).

Figure 1. Policy Tools and Institutions to Prevent Fiscal Crises under Decentralization



Source: IMF staff.

We find that another policy tool that is effectively associated with lower crisis probability is central government's controls, such as administrative constraints on subnational borrowing or local government balances and subnational fiscal rules. A caveat of imposing various restrictions is that it could reduce the flexibility in the fiscal system, especially in times of strain.

A third policy option is the use of intergovernmental transfers from the central government to local governments in order to stabilize the national economy as an inter-regional insurance against local shocks. Namely, the central government can transfer more resources to localities facing adverse fiscal conditions. However, intergovernmental transfers come with unwanted side effects, causing moral hazard in subnational governments stemming from the so-called common pool problem (see below) and soft budget constraints. Our results also underscore the importance of revenue centralization, which could entail scale economies for revenue administration and avoid externalities caused by tax competition.

The remainder of this paper is organized as follows. We present the literature survey in the next section. After that, we explain our data and methodology and discuss the results. Finally, we derive policy implications and conclude.

Literature Review

Fiscal decentralization could change fiscal discipline at the national level. This is because fiscal decentralization is accompanied by a variety of advantages and disadvantages and entails multiple intergovernmental policy instruments. In this section, we discuss the theoretical and empirical literature on related topics.

Fiscal Federalism

Tiebout (1956) and Oates (1972) laid the foundation of local public finance, demonstrating that subnational governments can efficiently provide public goods through better preference matching. Boetti et al. (2012) reported that fiscally autonomous municipalities tend to spend more efficiently. The modern fiscal federalism literature emphasizes expenditure decentralization, revenue centralization, and intergovernmental transfers as built-in stabilization tools against regional shocks (Boadway and Tremblay 2012), as central governments are better at raising revenue, whereas local governments excel at service provision (Sato and Yamashige 2000).

Asymmetric Information

Additionally, fiscal decentralization helps overcome informational asymmetries between governments and service providers, enabling more effective policymaking based on local economic conditions (Boadway 2001), and can prevent agency problems caused by hidden information on the costs of building and operating local schools, hospitals, and welfare delivery agencies (Boadway et al. 1999).

Political Accountability

Fiscal decentralization also influences rent-seeking behavior and accountability. Sato (2003) showed that fiscal decentralization can reduce rent-seeking behavior because decentralization leads to more intensive tax competition and increases the marginal cost of public funds (MCPF) at the local level, thereby diminishing local public expenditures and making rent-seeking activities less profitable. On the other hand, the cost of fiscal decentralization is exacerbated by the under-provision of public services since fiscal decentralization raises MCPF. Fiscal decentralization improves accountability because, under decentralized provision, decision-makers are responsible for more specialized public services delivered to one state (Persson and Tabellini 2002).

Moral Hazard

Common pool/soft budget constraint problems are the main reasons that fiscal decentralization could cause moral hazard in local governments and weaken their fiscal discipline. [3] Guo et al. (2022) developed a model with vertical fiscal imbalances[4] and demonstrated that when the central government cannot pre-commit to the future amount of transfers to local governments, local governments have overborrowing incentives, as transfers create a common pool problem. Saxena (2022) reported that federal countries, which tend to be more fiscally decentralized, are likely to have more subnational debt than unitary countries. In contrast, Schaltegger and Torgler (2007) empirically reported that Swiss cantons in which voters participate directly in the political process through initiatives and public referenda have lower levels of indebtedness.

[3] The common pool problem of public finances refers to the situation in which central and subnational government revenues are pooled together from the same sources, while each government body wants to maximize its share of the common revenue pool, resulting in the collective outcome of excessive public spending and unsustainable deficits (Tang et al. 2014). This collective action problem arises from the incompletely internalized cost of subnational fiscal actions owing to the subnational government's tendency to overuse common revenue sources.

[4] Vertical fiscal imbalances occur when spending decentralization outpaces revenue decentralization so that subnational governments have to rely on central government transfers and borrow to finance local expenditures (Mitra and Chymis 2022). The larger the vertical fiscal imbalance is, the more inclined local politicians are to behave opportunistically by increasing public outlays (Meloni 2016).

Scale Advantages

Low economies of scale (Bikker and Linde 2016) and risk pooling can also cause inefficient public service provision, which fiscal decentralization could make worse. Counteracting that, central government tax-transfer programs implicitly provide extensive insurance to regions as risk sharing against regional shocks (Boadway 2001). Additionally, unemployment insurance is often a central responsibility since it is an instrument by which the central government can share shocks with regional labor markets. Furthermore, central governments are better off retaining a steering role where local governments are unable to fulfill the center's priorities in areas such as health, education, and infrastructure (Gilley and Laochankham 2024).

Revenue Centralization

Revenue centralization is often preferred over decentralization. Revenue decentralization can create economic distortions from taxing highly mobile tax bases, especially capital (Gordon 1983; Inman and Rubinfeld 1996). It can also result in tax exporting, where jurisdictions pass tax burdens onto residents of other jurisdictions, incentivizing inefficient budget expansions (McLure 1967). If spillovers of such externalities are high, then a centralized revenue system produces good policy outcomes (Besley and Coate 2003) since it avoids externalities caused by tax competition (Brulhart and Jemetti 2006). Moreover, revenue decentralization may weaken local fiscal discipline due to expectations of the central government bailouts,[5] leading to inefficient local taxation and excessive spending (Sanguinetti and Tommasi 2004). Notably, revenue centralization occurs during great recessions, as seen in the U.S. during the Great Depression, when local property taxes declined and revenue shifted to retail sales taxes (Coen-Pirani and Wooley 2018).

The coordination of fiscal policies under revenue centralization could bring some benefits through the following mechanisms. Revenue centralization combined with intergovernmental transfers serves as a mechanism for sharing risk against regional shocks (Lockwood 1999). Additionally, revenue collection by the central agency could utilize economies of scale[6] by having a large revenue administration capacity to achieve tax compliance. Empirically, Dincecco (2009) reported that centralized regimes yield higher government revenues than fragmented regimes in Europe.

Local Tax Autonomy

Foremny (2014) indicated that higher tax autonomy, as implicit restrictions, can harden budget constraints, constrain excessive spending, and limit subnational deficits across 15 EU countries. Asatryan et al. (2015) also reported that revenue decentralization improves subnational budget balances in OECD countries. Bucci et al. (2023), Arespa and González-Alegre (2022), and Bukowska and Siwińska-Gorzelak (2019) revealed that local tax autonomy enhances municipal efficiency in Italy, alleviates soft budget constraints in Spain, and promotes fiscal prudence in Poland, respectively. However, these studies share three limitations: they focused solely on OECD or EU countries, overlooked the impact on general government budgets, and did not study the effect on the likelihood of a fiscal crisis.

[5] This is what has been called a soft budget constraint (Kornai 1986).

[6] Economies of scale imply that an increase in the size of operations can lead to an improvement in productivity by lowering fixed costs (Nakatani 2023b).

Benefit Principle

Local governments supply several services that need to be paid for by users, and this part of local government spending needs to be financed locally, for example, the upkeep of local roads, the provision of water/sanitary services or even primary education in some countries. In other words, where the individual's location is directly connected to benefits, local governments may be better able to fund those services and collect user fees, with an appropriate mechanism in place to take care of vulnerable households. This benefit principle often makes the case for property taxes collected by local governments for urban development (Liberati 2010). Property taxes, by being locally collected and spent, might be politically less challenging to raise than broader national tax hikes. By funding public services directly and creating a clear link between local taxes and local spending, property taxes increase accountability and enable municipalities to capitalize on wealth created through urban development.

Intergovernmental Transfers

Intergovernmental transfers are crucial for economic stabilization by protecting against local economic shocks. They act as a countercyclical policy since central government spending is less procyclical than subnational one (Abbott and Jones 2012) and facilitates interstate risk-sharing (Buettner 2002). A system of intergovernmental assistance that is sensitive to local shocks can provide much needed assistance to jurisdictions experiencing negative shocks to their economic/fiscal well-being (Persson and Tabellini 1996). Furthermore, intergovernmental grants help local governments raise more revenues (Masaki 2018) and improve their tax collection efforts (Miyazaki 2020). When transfers increase, local tax collection tends to rise as well because these funds increase local governments' capacity to finance public services (Saptono and Mahmud 2023). Local tax authorities often lack effective tax collection capacity, making it more efficient for the central government to collect taxes and then redistribute revenues via intergovernmental transfers (Bird and Smart 2002).

On the other hand, the creation of a grant system requires a bureaucracy to monitor the distribution and disposition of the grants, which could lead to administrative costs (Bahl and Linn 1994). Excessive reliance on intergovernmental transfers may render local governments less accountable to their constituents and inefficient in collecting local taxes and providing public services. This is called the "flypaper effect" (Deller and Maher 2005; Mehiriz and Marceau 2014). These administrative costs and flypaper effects are negative aspects of transfers.

Subnational Fiscal Controls

The public administration literature emphasizes that fiscal controls by the upper level of government (central or state government) could influence the fiscal discipline of local governments by controlling their fiscal positions. For instance, Park et al. (2022) analyzed how local governments respond to such fiscal controls. They found that in response to state fiscal controls such as state preemptions (the use of state law to nullify a municipal ordinance or authority in certain policy areas), local governments can choose either to cut public services or find ways to reduce the costs of those services. Local politicians may find the latter option more attractive, as their residents want them to continue providing the same level of local public service, regardless of the municipal fiscal status.

Administrative constraints such as central government approval of subnational borrowing or subnational fiscal rules on the budget balance, debt, and spending can be viable policy options to prevent local fiscal

mismanagement (Saxena 2022). In fact, Bröthaler et al. (2015) reported that municipal debt limits closely monitored and supervised by upper-level governments effectively stabilized local government debt and improved municipal primary surplus in response to rising public debt. Plekhanov and Singh (2006) reported that centrally imposed borrowing rules became more impactful when vertical fiscal imbalances widened. Martinez-Vazquez and Vulovic (2017) found that administrative constraints and centrally imposed fiscal rules improve the general government primary balance. Dove (2016) noted that outright prohibitions on debt accumulation and hard budget constraints reduced the risk of municipal defaults in the U.S. Additionally, Park (2018) indicated that balanced budget requirements and debt limitations could help municipalities avoid excessive debt. Akin et al. (2016) concluded that fiscal decentralization promoted better tax collection only if local governments must adhere to balanced budgets; otherwise, it worsened fiscal discipline if persistent local budget deficits occurred due to shared resources. On the other hand, when balanced budget constraints are in place, local governments must cut expenditures and lay off workers during recessions, undermining fiscal policy countercyclicality.

Fiscal Crisis

Nakatani (2023a) studied the effects of devolution on fiscal crises. He found that (i) tax revenue decentralization jeopardizes the tax collection efforts of local governments and worsens local fiscal discipline; (ii) an adverse decentralization effect on fiscal crisis probability is mitigated by a stronger rule of law; and (iii) a vertical fiscal imbalance is negatively associated with fiscal crises. Additionally, Nakatani (2024a) found that over a threshold when approximately 16 percent of general government revenues are collected at the local level, countries are more likely to face a fiscal crisis. Furthermore, Nakatani (2024b) reported that the effects of fiscal devolution to local governments on the likelihood of a sovereign debt crisis are greater than those to regional governments.

This paper differs from Nakatani (2023a, 2024a, 2024b) in several aspects. First, we address possible endogeneity in the econometric estimation by using an instrumental variable (IV) probit estimation with lagged decentralization variables as instruments. Second, we empirically study the effects of central government controls over subnational borrowing on national fiscal crises. Third, we analyze the state-dependent effects of spending decentralization by comparing how decentralization affects crisis probability in countries with local budget deficits and surpluses. Fourth, we study the role of intergovernmental transfers in relation to fiscal crisis in decentralized fiscal systems. Fifth, we also study how public sector institutions mitigate the undesirable effects of devolution on fiscal sustainability. Sixth, we include more control variables, such as commodity terms of trade, to control for fiscal pressures stemming from commodity price fluctuations.

Data

The data sample in this study covers 59 advanced, emerging market, and developing countries from 1980 to 2019, as listed in Table 1.[7] The sources and definitions of the variables are summarized in Table 2. Fiscal decentralization data are taken from the IMF's Fiscal Decentralization Dataset. Macroeconomic variables are taken from the IMF's World Economic Outlook Database. The dates of fiscal crises are taken from Moreno Badia et al. (2022), who defined fiscal crises as credit events, exceptionally large official financing, implicit

[7] We include countries with data in all the datasets.

domestic defaults, or loss of market confidence.[8] They extended the fiscal crisis database originally constructed by Medas et al. (2018). The dummy variables for banking crises and currency crises are taken from Nguyen et al. (2022). The commodity terms of trade index are taken from the IMF's Commodity Terms of Trade Index.

We use the spending share of local governments in the general government to measure the degree of fiscal decentralization, where subscript i is a country and t is a year.

$$Spending\ Decentralization_{i,t} = \frac{Expenditure_{i,t}^{Local\ Government}}{Expenditure_{i,t}^{General\ Government}} \quad (1)$$

The intergovernmental net transfer ratio is defined as the ratio of net transfers (i.e., transfers received from other levels of government less transfers paid to other levels of government) to the own revenue of local governments.

$$Transfer\ Dependency\ Ratio_{i,t} = \frac{Net\ Transfers_{i,t}^{Local\ Government}}{Own\ Revenue_{i,t}^{Local\ Government}} \quad (2)$$

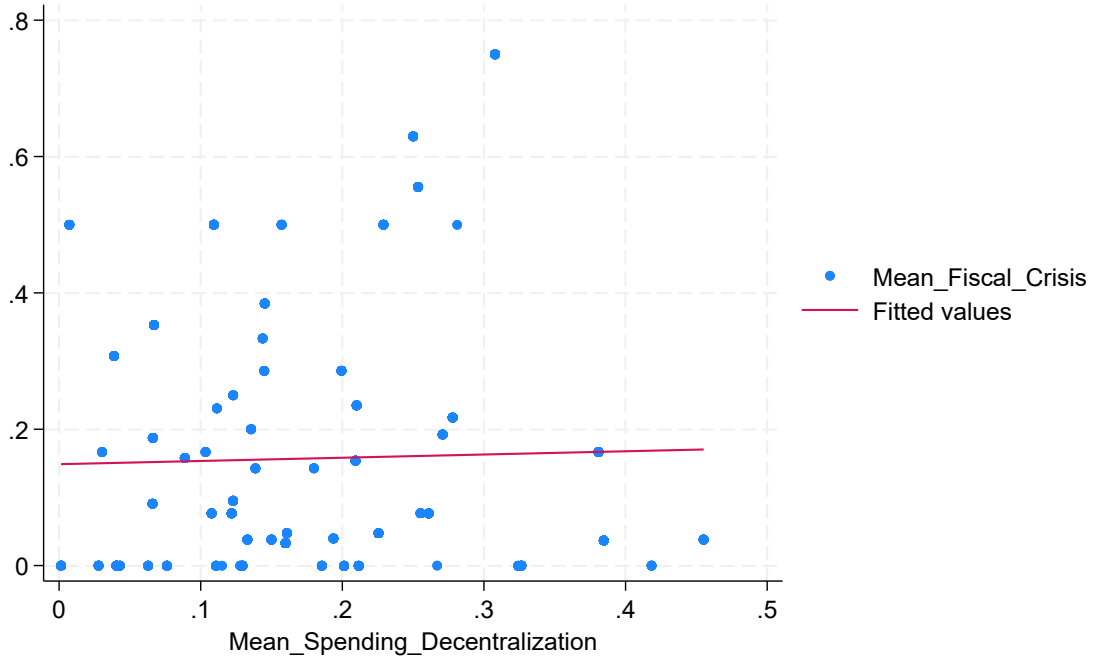
Revenue decentralization is defined as the ratio of revenue collected by local governments to revenue collected by the general government.

$$Revenue\ Decentralization_{i,t} = \frac{Revenue_{i,t}^{Local\ Government}}{Revenue_{i,t}^{General\ Government}} \quad (3)$$

To understand some stylized facts about the relationship between fiscal decentralization and fiscal crises, Figure 2 shows the simple correlation between these two variables across countries (by taking the mean of each variable over the sample period). The figure shows a slightly positive relationship between spending decentralization and the relative frequency of a fiscal crisis, implying a possible unfavorable influence of decentralization. To further motivate our research, Figure 3 shows how the situation of local public finance influences this relationship. Specifically, we restrict the sample data to countries where local governments run budget deficits. As expected, the unfavorable effects of decentralization on crises become more acute (i.e., a steeper positive correlation), suggesting a state-dependent relationship between decentralization and fiscal crisis. Finally, to see how the intergovernmental fiscal framework affects the association between decentralization and fiscal crises, Figure 4 restricts the sample to countries that lack control over subnational borrowing by the central government. We can see that the steepness of the line representing the correlation in Figure 4 becomes more evident than that in the previous figures. These stylized facts highlight the importance of the state dependency of local public finance and intergovernmental control over subnational borrowing to prevent fiscal crises under decentralization, which we will econometrically investigate in this paper.

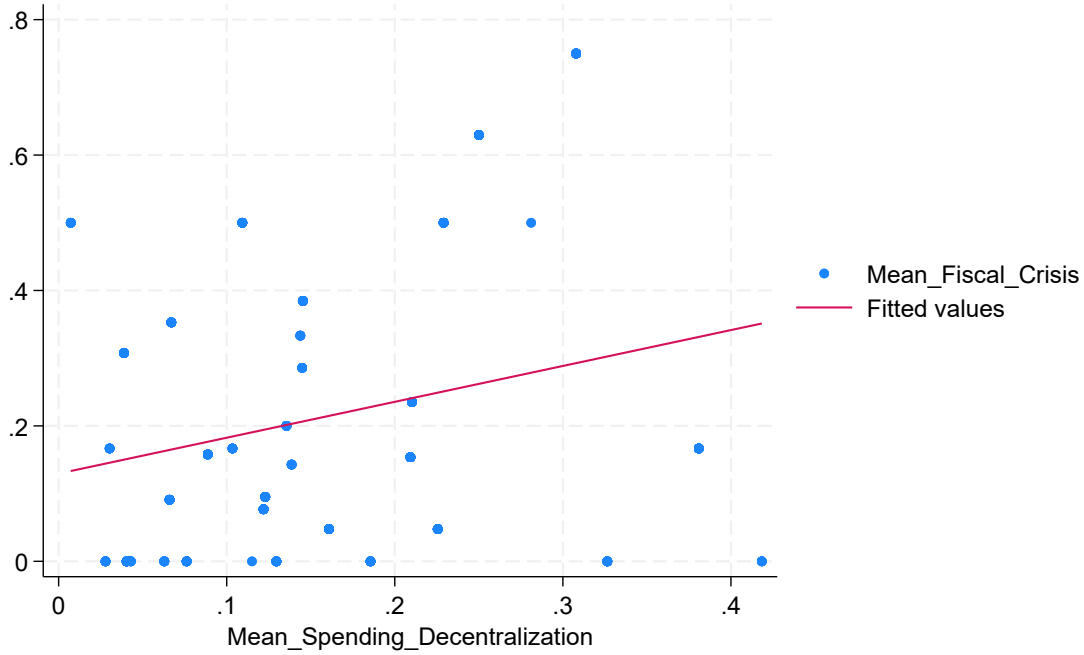
[8] Fiscal crises are identified in any given year if any of the following four criteria are met: (1) credit events that include sovereign default, restructuring, or rescheduling of substantial size (larger than 0.5 percent of GDP) and substantial nominal growth of the defaulted amount (by 10 percent); (2) episodes where the country receives exceptionally large official financing from the IMF with fiscal adjustment objectives in place (high-access IMF financial arrangement, which is larger than 100 percent of quota) or financial support from the European Union (the EU program); (3) 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), usually associated with monetary financing of the budget; or (ii) a steep increase in domestic arrears (by at least 1 percentage point of GDP); and (4) episodes associated with extreme market pressures that include (i) loss of market access, capturing sovereign defaults or bond issuance coming to a halt; or (ii) very large borrowing costs (level of spread higher than 1,000 bps) or sovereign yield spikes (annual change in spreads higher than 300 bps in advanced countries and 650 bps in developing countries).

Figure 2. Fiscal Crisis and Spending Decentralization



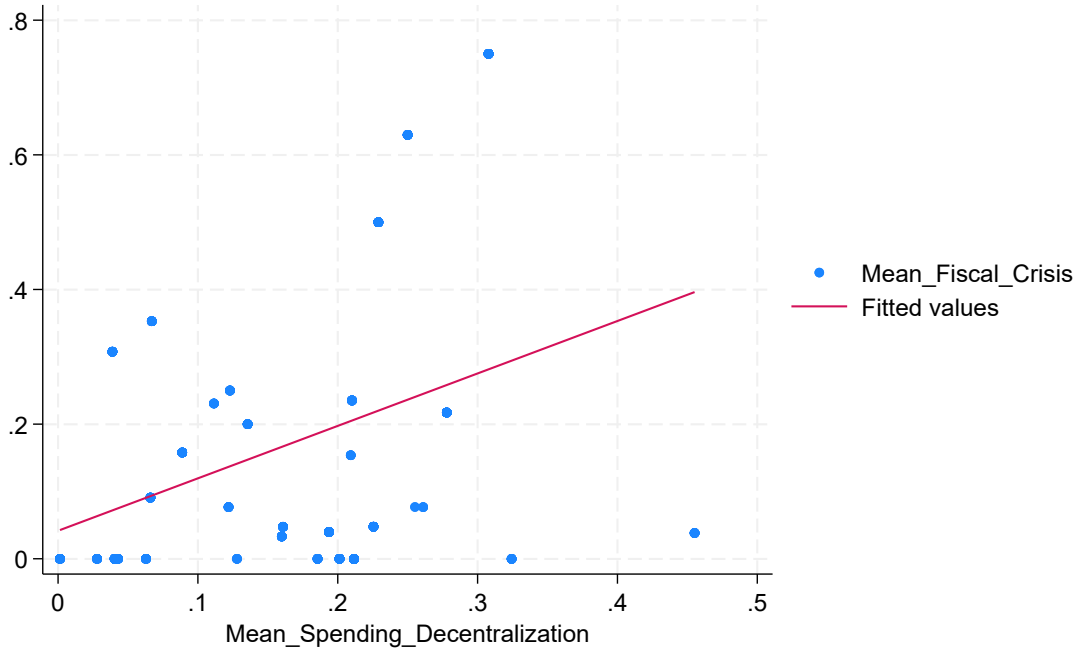
Source: IMF staff.

Figure 3. Fiscal Crisis and Spending Decentralization in Countries with Local Budget Deficits



Source: IMF staff.

Figure 4. Fiscal Crisis and Spending Decentralization in Countries without Control by Center



Source: IMF staff.

Methodology

Fiscal crises can occur through several mechanisms. For example, if decentralized fiscal operations loosen fiscal discipline sufficiently, the probability of a sovereign debt crisis in such a country would increase. Not only fiscal factors but also macroeconomic conditions can affect the probability of a fiscal crisis (Medas et al. 2018). Stronger economic activity and higher income[9] could reduce the probability of a crisis. Thus, we include both GDP growth rates and income per capita to capture such factors. External imbalances could also trigger sovereign debt crises, as receipts from exports of goods and services can be a source for the repayment of sovereign debt denominated in foreign currency. Therefore, we include the current account balance to control for such external vulnerability. Furthermore, higher government debt and interest rate costs could also lead to a fiscal crisis. Thus, we also include the level of debt and interest costs of the general government as control variables.

Following the methods of Nakatani (2018a, 2020) and Cerovic et al. (2018), who studied the probability of a currency crisis, a banking crisis, and a fiscal crisis, respectively, we use a probit model to estimate the probability of a fiscal crisis. The regression equation is as follows:

[9] High income is usually a reflection of more effective policy institutions, so we can assume that income level is a proxy for institutional quality. In fact, if we use per-capita income as an alternative proxy for institutions such as what we did in Table 6, we find that the impact of decentralization is less pronounced in higher-income countries.

$$\Pr\left(y_{i,t}=1\middle|x_{i,t}\right)=\Phi\left(\boldsymbol{x_{i,t}}'\boldsymbol{\beta}\right)+\varepsilon_{i,t} \quad (4)$$

where $\Pr$ is the probability; the subscript i denotes the country, while t denotes the year; y is a dummy variable that takes a value of one if a fiscal crisis occurs and zero if not; $\boldsymbol{x}$ is the set of independent variables; Φ is the normal cumulative distribution; $\boldsymbol{\beta}$ is a vector of the maximum likelihood estimates; and ε is an error term. As stated above, the explanatory variables include fiscal decentralization, the transfer dependency ratio, the government debt level, interest cost, inflation, the GDP growth rate, the natural logarithm of income per capita, the current account balance, the depreciation rate of the exchange rate, a banking crisis dummy, a currency crisis dummy, and a commodity terms of trade index. The last regressor is included because commodity price shocks can lead to a twin balance of payments and fiscal crisis (Nakatani 2017, 2018b). We do not include both spending decentralization and revenue decentralization at the same time in the regressions because the correlation value of these variables is high at 0.8, so we should avoid a multicollinearity problem.

One common concern in econometric work is potential omitted variable bias. However, this bias is generally less problematic in probit models. Wooldridge (2002) has proven that this bias does not carry over to the effect of the remaining regressors on the outcome. Cramer (2007) confirmed that this also holds for the logit model. Marginal effects do not suffer because they are unaffected by omitted covariates. Therefore, in our analysis, it is fair to say that the potential omitted variables do not affect either the statistical significance or the size of our estimated regression coefficients, although they could still affect the overall goodness of fit (e.g., the percentage of correctly predicted outcomes).

Another potential concern is the endogeneity of the explanatory variables. That is, the fiscal crisis itself can affect the contemporaneous fiscal and macroeconomic variables, imparting bias in the estimated coefficients. To address this concern, we conduct an IV probit estimation using relevant lagged explanatory variables as instruments for fiscal (decentralization, transfers), economic (GDP growth, income per capita, current account balance), and financial (exchange rate) variables that are likely to be subject to potential endogeneity. We employ the lagged variables as instruments because these variables appear strongly correlated with the current variables and exogenous in the sense that they are predetermined before the fiscal crisis occurs in the current period.[10] Stock variables such as the level of debt and its interest cost are primarily determined by the past accumulation of debt, so they are less likely to suffer from endogeneity. The banking and currency crisis dummy variables are by themselves (unpredictable) shocks to the economy, and there are no good candidates for exogenous instruments. Please note that early warning indicators for such financial crises are already included in our regression equation as control variables (e.g., debt, GDP, interest costs, exchange rates). The instantaneous effects of import price inflation are captured by the exchange rate variable. Having said that, our robustness check later demonstrates that an endogeneity problem does not present a significant issue in our analysis.

Results

The baseline estimation results are presented in column (1) of Table 3. The area under the receiver operating characteristic curve (AUROC) exceeded 0.8, indicating the good explanatory power of our model. The results show that spending decentralization to local governments is associated with a higher probability of a fiscal

[10] The exclusion restriction is that the instrument affects the dependent variable only through the instrumented variable. Yet, the assumption that the instruments are not correlated with the error term in the equation of interest is not testable in exactly identified models.

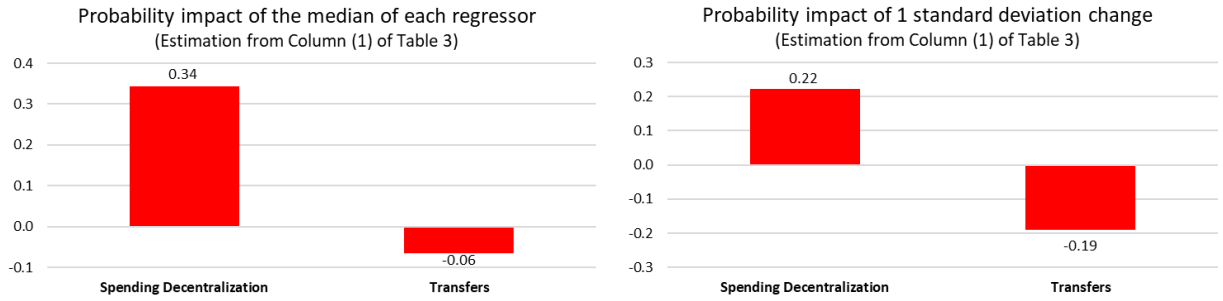
crisis. This corroborates the recent finding by Nakatani et al. (2022) that fiscal decentralization can, under certain conditions, worsen economic and social outcomes.

In contrast, the transfer dependency ratio is found to be negatively associated with the probability of a fiscal crisis. This finding underscores the importance of intergovernmental transfers as an economic stabilization tool by providing an inter-regional insurance mechanism against local shocks (in a countercyclical way). Fiscal transfers to subnational governments are part of how governments balance spending across regions. This fiscal equalization scheme could serve as risk sharing among subnational governments because the central government can transfer more resources to regions facing adverse economic shocks.

The interpretations of the control variables are as follows. We find that a stronger GDP growth rate and a higher income per capita reduce the probability of a fiscal crisis. This is consistent with economic theory because in fast-growing and richer economies, economic agents have higher incomes, making it easier for them to pay taxes; in addition, tax collection is generally stronger in richer countries. Moreover, a stronger external balance measured by a larger current account balance reduces the probability of a fiscal crisis. A positive current account balance means that domestic residents receive net income from the rest of the world, which generally correlates positively with the availability of financing for budget purposes; thus, the government will be less likely to default. The negative and statistically significant coefficient of the currency crisis dummy can be explained as follows: provided that fiscal policy is not otherwise unsustainable, a sharp depreciation of currency boosts inflation, raising nominal revenues and compressing (in real terms) expenditures, thus reducing the likelihood of a fiscal crisis.

To assess the crisis impact of each fiscal variable, in Figure 5 we calculate both (i) the impact of each regressor at its median and (ii) the effects of an increase in each regressor by one standard deviation while keeping other variables at the median values to show the sensitivity of results to various shocks and policy actions. One standard deviation change is equivalent to increase the degree of spending decentralization (intergovernmental transfers) from the median to the 79^{th} percentile (90^{th} percentile) of distribution. The left panel of Figure 5 shows the impact at the medians. For example, the median level of spending decentralization explains approximately 34 percent of the expected probability of a fiscal crisis. In contrast, the negative impact of intergovernmental transfers on the probability of a fiscal crisis is less than one-fifth of that of spending decentralization. The results of the one standard deviation shock in the right panel chart of Figure 5 show that spending decentralization increases the probability of a fiscal crisis by 22 percent. The impact of intergovernmental transfers on the probability of a fiscal crisis is somewhat smaller than that of spending decentralization.

Figure 5. Impact of Incremental Changes in Each Explanatory Variable



Source: IMF staff.

As a robustness check, we employed a logit model[11] in column (2) of Table 3. The results did not change much from the baseline probit results, except that the coefficient of the banking crisis dummy became statistically significant. This makes economic sense because a banking crisis could lead to a fiscal crisis due to the fiscal costs of government intervention, such as recapitalization, liquidity support, bailouts, deposit guarantees, and regulatory forbearance (Honohan and Klingebiel 2003).

To assess the degree of possible endogeneity, we also examined the probit model without the IV in the first column of Table 4. Our findings indicate that some coefficients change notably (those on the spending decentralization variable, GDP growth, the banking crisis dummy), while others remain close to the IV probit (e.g., those on the transfers and the current account). In addition, the banking crisis dummy has become statistically significant, mirroring the results from the logit model. We conclude that we may face mild endogeneity and thus prefer to stick with the results from the IV estimation.[12]

Furthermore, to take advantage of the panel dimension of the data, we tried a linear model including dummies to control for country fixed effects in column (2) of Table 4. The results show some changes in terms of the statistical significance of variables such as government debt, whereas the main findings concerning the adverse effects of spending decentralization and the desirable effects of intergovernmental transfers on fiscal crises remain the same. From here, we use binary choice models as the preferred estimation methods since the dependent variable is a binary choice dummy variable for a fiscal crisis.

Next, we split our data sample into countries with a budget surplus of local governments and those with a budget deficit, as shown in Table 5. Specifically, we calculate the average budget balance of local governments over the sample period for each country, and then we call them deficit or surplus countries if it is negative or non-negative, respectively. Our results confirm that spending decentralization to local governments increases the probability of a fiscal crisis with high statistical significance only in countries that allow budget deficits for local governments. Thus, the results in Table 5 corroborate the theoretical derivation of Akin et al. (2016), who showed that fiscal decentralization leads to greater fiscal discipline only if local governments face balanced budget constraints, and the findings of Li and Wu (2021), who reported that transfers from the central

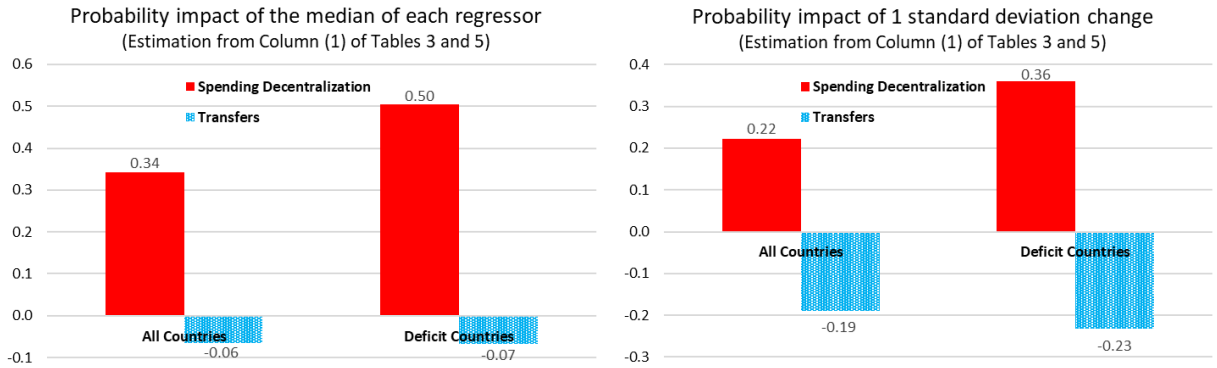
[11] The econometric package required to estimate the IV logit model is still under development because determining the appropriate bivariate distribution for the error terms in the structural equation is significantly more complex.

[12] Please note that the exclusion of potentially endogenous control variables from regressions also does not change the results of the main fiscal decentralization variables.

government have a positive effect on fiscal sustainability when the vertical fiscal imbalance is high. Therefore, one policy implication of our research is that when countries have decentralized fiscal systems, an effort not to run budget deficits at the local government level (or pursuing a balanced local budget) could help maintain fiscal sustainability because local governments have fewer financing options than central governments. At the same time, such a requirement also results in a loss of fiscal flexibility, which could exacerbate economic downturns. Policymakers would thus need to carefully weigh the pros and cons of a balanced budget requirement, taking country specifics into account.

In the left panel of Figure 6, the impacts of our fiscal decentralization variables (spending decentralization and the transfer dependency ratio) at their medians are compared between all sampled countries and countries with local budget deficits. Both the impact of decentralization, shown in the red bar, and the impact of transfers, shown in the blue bar, are larger for countries with budget deficits of local governments than for all countries. On the other hand, the impacts of one standard deviation of our fiscal decentralization variables are compared in the right panel chart. It shows that both the impact of decentralization and the impact of transfers are larger for countries with budget deficits of local governments than for all countries, underscoring the importance of the countercyclical and inter-regional insurance role of transfers for deficit countries.

Figure 6. Impact of Incremental Changes for Different Types of Countries



Source: IMF staff.

As a penultimate analysis, we study whether (i) controls over subnational borrowing by the central government, (ii) perceived levels of corruption, and (iii) public sector institutions influence local fiscal discipline so that the country can avoid fiscal crises stemming from overspending associated with expenditure decentralization. Controls by center include administrative constraints on borrowing and fiscal rules for subnational budgets controlled by the central government. The data on dummy variables for controls by center (zero for no controls and one for administrative constraints or subnational fiscal rules)[13] are constructed from various sources, as presented in Table 2. Administrative constraints include annual controls on the debt of individual subnational jurisdictions, the authorization of individual borrowing operations, and the centralization of all government borrowing with on-lending to subnational governments. Subnational fiscal rules include restrictions on subnational debt levels, budget deficits and spending. In column (1) of Table 6, these dummy variables are

[13] Saxena (2022) presents four approaches to classify control over subnational borrowing: (i) administrative controls; (ii) rule-based constraints; (iii) cooperation; and (iv) market discipline. We consider the first two types as controls by center in our analysis because compliance with cooperative arrangements is generally voluntary and the constraint only by market-enforced discipline means complete borrowing flexibility.

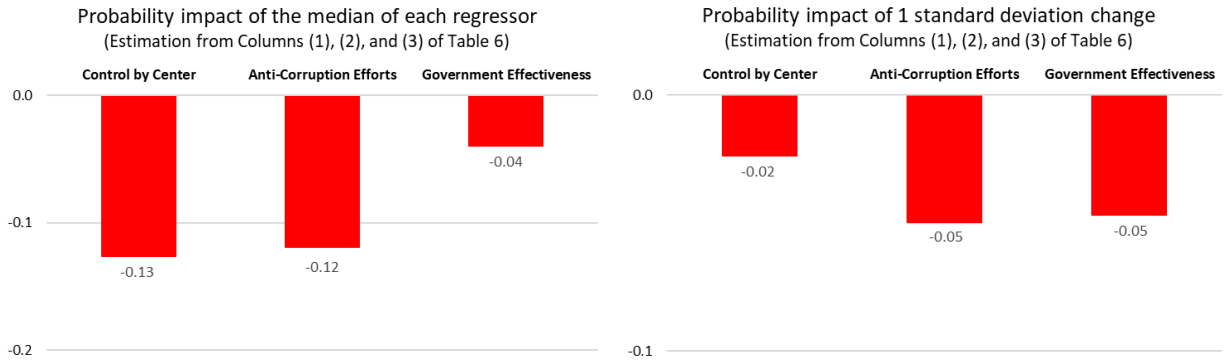
multiplied by the spending decentralization variable to examine whether such controls mitigate the undesirable effects of decentralization on the probability of a fiscal crisis. The results indicate that this is indeed the case: central government's control of subnational borrowing reduces the effects of spending decentralization to local governments on the probability of a fiscal crisis.

In column (2) of Table 6, we show a similar exercise by including the cross term of spending decentralization and the Corruption Perceptions Index (CPI) by Transparency International. This is motivated by the fact that efforts to improve governance and reduce corruption are found to play major a catalytic role in reaping the benefits of fiscal decentralization (Nakatani et al. 2024). Our results show that in countries with lower perceptions of corruption—i.e., a higher value of the index—spending decentralization is associated with a lower probability of a fiscal crisis. Therefore, good governance could also mitigate the undesirable adverse effects of spending decentralization on crisis probability. However, we acknowledge that the perception-based indicator of institutional quality has some problems. Budsaratragoon and Jitmaneeroj (2020) cast doubt on the validity of the CPI's assumptions because individual data sources have unequal effects on the CPI and exhibit causal interrelations among one another.

Therefore, as an alternative measurement of institutional strength in the public sector, we use data on government effectiveness taken from the World Bank's Worldwide Governance Indicators. The results are presented in the last column of Table 6. As expected, better quality public-sector institutions are associated with fewer incidents of fiscal crisis under spending decentralization.

In terms of the magnitude of the institutional changes, the left panel of Figure 7 shows the impact of control by center and governance cross-terms on the probability of a fiscal crisis, evaluated at the median of each variable. The figure shows that the impact of anti-corruption efforts is similar to that of the central government's controls. Similarly, the right panel of Figure 4 shows the impact of one standard deviation move in the control by center and governance cross-terms on the probability of a crisis (from the median value to the 80th percentiles for three institutional variables). Efforts to reduce corruption and improve the effectiveness of public institutions can reduce the probability of a crisis, while the impacts are small.

Figure 7. Institutional Impact of Decentralization



Source: IMF staff.

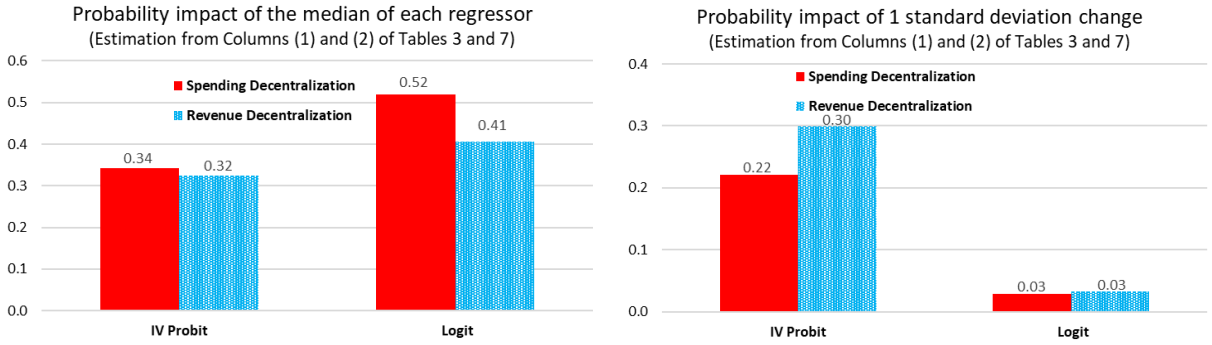
Finally, we present the results for revenue decentralization in Table 7. In column (1), we present the results of the IV probit estimation. The statistically significant positive coefficient of revenue decentralization means that revenue decentralization is associated with a greater probability of a fiscal crisis. This finding indicates that if

most government revenues are collected by the central government, a country is less prone to a fiscal crisis. Column (2) shows the results of the logit estimation, which corroborates the findings of the IV probit model. The results in both columns indicate that countries with revenue decentralization are more susceptible to fiscal crises.

This adverse effect of revenue decentralization on fiscal sustainability is consistent with the empirical findings of Aslim and Neyapti (2017), who reported that higher tax revenue collected by local governments could jeopardize tax collection efforts, leading to local fiscal indiscipline. Afonso et al. (2024) also found that tax decentralization hampers the degree of fiscal responsiveness to rising public debt by complicating efforts to maintain fiscal discipline.[14] Stone (2015) also reported that a rising share of own source revenues resulted in weaker financial conditions for municipal governments. Theoretically, the effects of revenue decentralization on revenue mobilization are ambiguous because decentralization incentivizes interregional tax competition, which in turn lowers tax revenues and restricts the efficiency of decentralization (Janeba and Wilson 2011). Additionally, our result of revenue decentralization corroborates the findings of Nakatani (2023a), who found that the undesirable effects of spending decentralization on the probability of a fiscal crisis are driven by countries whose tax revenue systems are highly decentralized to local governments.

However, our result contrasts with that of Nakatani (2024b), who reported that local and subnational tax autonomy reduces the probability of a sovereign debt crisis.[15] The main difference in terms of empirical methodology is that Nakatani (2024b) used the sovereign debt crisis, which is only one type of fiscal crisis, as a dependent variable. However, Nakatani (2024a) also found that revenue decentralization is positively associated with crisis probability when countries exceed a certain threshold of decentralization—i.e., when more than approximately 16 percent of general government revenue is decentralized to local governments.

Figure 8. Impact of Spending Decentralization versus Revenue Decentralization



Source: IMF staff.

Figure 8 compares the effects of spending decentralization and revenue decentralization on the probability of a fiscal crisis at the median and with one standard deviation (from the median to the 81st percentile of revenue

[14] Afonso et al. (2024) regressed tax revenue decentralization on the coefficient of the fiscal reaction function, which is estimated as the responsiveness of the primary balance to the debt-to-GDP ratio. The authors noted coordination challenges for policy implementation due to misaligned local and national fiscal objectives/priorities and loss of scale efficiency as potential reasons.

[15] Other contrasting evidence includes improved subnational budget deficits under revenue decentralization or subnational tax autonomy (Asatrayn et al. 2015; Foremny 2014). However, they did not study low-income countries or their effects on the general government.

decentralization), using the estimated coefficients. We see that the impact of one standard deviation of revenue decentralization is quite sizable (the right-hand side panel) for the IV probit case. In terms of policy, this implies that the benefits of revenue centralization, such as economies of scale for revenue agencies and the elimination of externalities caused by tax competition among subnational jurisdictions, could be large. This might also reflect the practice that economies of scale in revenue administration are likely to be larger than those of expenditure programs. However, this finding needs to be interpreted with the caveat that the magnitudes are much smaller for the case of logit model due to the less steep cumulative distribution function of the logit model compared to that of the probit model, although the one standard deviation impact is larger for revenue decentralization than spending decentralization in the logit model as well.

Policy Discussion

The results in the previous section indicate that it would be prudent for central governments to maintain control over subnational borrowing to maintain fiscal discipline when countries allow fiscal decentralization. To further understand the effects of detailed central fiscal controls, we ran regressions separately for subnational fiscal rules and administrative constraints in Table 8. The table does not demonstrate a clear pattern, as the interaction terms for both cases are found to be statistically insignificant. However, spending decentralization itself ceases to raise the probability of a fiscal crisis in the case of administrative constraints (regression (2) in Table 8), suggesting that local governments internalize the constraints in their spending decisions. Of course, as noted earlier, this happens at the expense of fiscal flexibility, possibly limiting local governments' ability to alleviate economic downturns. Thus, the central government needs to weigh the pros and cons of administrative constraints based on the country's fiscal situation and other specific factors.

In terms of the impacts of the various policies and institutions examined in the previous section, the ones that have the greatest impact on containing fiscal crises are intergovernmental transfers. These transfers could mitigate the probability of a fiscal crisis by 19 percentage points, as shown in the right panel charts of Figures 5 and 6, because the central government could transfer money to local governments that suffer from financial trouble and bail them out even though such transfers come with the adverse side effects of moral hazard—i.e., soft budget constraints and common pool problems. The second most powerful policy tools to prevent fiscal crises under decentralization are those that improve governance or government effectiveness and help reduce allocative inefficiencies stemming from moral hazard. The right panel chart of Figure 7 demonstrates that reducing corruption would lower the probability of a fiscal crisis by 5 percentage points, which is practically identical to that of improving government effectiveness (at all levels). Both reducing corruption and improving overall government effectiveness help reduce the risk of misappropriation of funds at the local level that may contribute to the emergence of unsustainable deficits. Finally, control of the center—either subnational fiscal rules or direct control over local government's borrowing—also reduces the probability of a fiscal crisis by preventing the emergence of persistent fiscal deficits at the local level. However, policymakers should be aware of the caveat of imposing various rules and controls because such restrictions could reduce flexibility in the fiscal system, including the countercyclicality of fiscal policy at the local government level, especially in times of strain.

Conclusion

This paper studies whether fiscal decentralization influences the probability of a fiscal crisis and how it can be prevented. Our results show that increased spending decentralization to local governments correlates with a higher likelihood of fiscal crises. The results are robust to changes in econometric methods. This result reinforces the findings of Eichler and Hofmann (2013), who reported that fiscal decentralization is associated with greater sovereign default risk measured by the sovereign bond yield spread. Conversely, we find that a high level of intergovernmental transfers is associated with a lower probability of a fiscal crisis.

Our empirical results also reveal that when local governments do not persistently run budget deficits, fiscal decentralization to local governments is not statistically associated with a higher probability of a fiscal crisis. Yet this benefit comes at the cost of reduced fiscal flexibility at the local level, calling for a careful comparison of the benefits and costs of such a legal requirement in accordance with country-specific factors.

We also find that revenue decentralization is positively associated with the probability of a fiscal crisis. This finding indicates that a country is less prone to a fiscal crisis when the central government collects most of the revenues and then transfers some of them to local governments. The results are robust to various econometric methods and endogeneity. This finding is consistent with the theoretical insight that there are economies of scale in revenue administration and in the central government's role in countercyclical fiscal policy as well as its large borrowing capacity relative to local governments. Moreover, local governments often shy away from the political costs associated with more active revenue mobilization (von Haldenwang 2017). However, the literature has found divergent effects: local tax autonomy[16] could increase fiscal prudence (Bukowska and Siwińska-Gorzelak 2019) while simultaneously enhancing interregional tax competition,[17] which restricts the efficiency of decentralization (Janeba and Wilson 2011). Revenue decentralization adversely affects fiscal sustainability by weakening local fiscal discipline (Aslim and Neyapti 2017) and complicating tax collection efforts (Afonso et al. 2024); it can lead to poorer financial conditions for municipal governments (Stone 2015) and increase the likelihood of fiscal crises in highly decentralized tax systems (Nakatani 2023a). Conversely, some evidence suggests that local tax autonomy may help local governments avoid credit events (Nakatani 2024b), indicating a complex nonlinear relationship influenced by the degree of decentralization (Nakatani 2024a).

One fiscal policy implication of this research is that in a decentralized system, local governments should run their budget operations responsibly, avoiding large and persistent budget deficits. This is because local governments usually have limited financing tools and do not have access to bond markets.[18] Moreover, intergovernmental transfers are found to be an important redistribution policy tool for ensuring that local and national economies are protected from localized shocks. Policymakers must consider a country's legal framework and competing fiscal goals in addition to the location of the fiscal risk, as there can be tension between decentralizing fiscal power to improve policy outcomes and maintaining central control to manage

[16] Given that property tax collection in developing countries is very low compared with that in advanced economies, from a policy perspective it is necessary to draw the attention of countries to the revenue potential of property taxes levied, collected, and spent by local governments (Grote et al. 2024).

[17] Potential tax cuts arising from tax competition may not be self-financing, as the central government may transfer intergovernmental grants to compensate for the revenue loss.

[18] In contrast to local governments, some state governments issue bonds in the open market.

fiscal risks.[19] In addition, we find that good governance is also crucial for reaping the benefits of spending decentralization without endangering fiscal sustainability. Building sound public financial management systems at the subnational government level should be an important part of any risk management strategy. Finally, our results show that controlling subnational borrowing is an effective, if not uncontroversial, policy tool for maintaining local fiscal discipline when countries decentralize fiscal operations to subnational and local governments. This finding is consistent with Cabasés et al. (2007), who found that borrowing restrictions effectively constrain the borrowing behaviors of local governments in Spain. The ability of countries to utilize central government controls on local government borrowing depends on their constitutional and legal underpinnings. This can have important implications, as it often gives rise to different approaches in federal and unitary systems.

Local governments can provide public goods and services better than the central government, but they are not better able to implement economic stabilization policies such as countercyclical fiscal policy and the redistribution of income across different regions. Moreover, Akalbeo et al. (2023) show that fiscal decentralization can affect the structural component of unemployment dynamics, but it does not affect cyclical unemployment behavior. Therefore, our results underscore the limited role of local governments in fiscally decentralized countries to fulfill some of the essential fiscal policy objectives. Local governments lose incentives to improve revenue-raising capacities, and they are caught in the trap of fiscal dependence on the central government when the expectation of bailouts by the central government has never been disproved (Hanai et al. 2000). The outcomes of our research support Ben-Bassat et al.'s (2016) empirical finding that centralizing some functions of local governments can be a solution to the soft budget constraint problem by reducing municipalities' expenditures, mainly through decreasing salary payments and increasing local property tax collection.

The main implication of this paper is that the effective policy tool to prevent fiscal crises under decentralization is to improve governance by reducing corruption and strengthening government effectiveness, in particular public financial management systems. Fedelino and Smoke (2013) argue that effective public financial management is crucial for maintaining fiscal discipline, efficient public service provision, and accountability in decentralized systems. In practice, however, such governance reforms are not easy to conduct quickly, as they entail important institutional changes. In contrast, helping local governments' financing through intergovernmental transfers is the easiest policy option for fiscal authorities, while such practices create moral hazards such as the common pool problem and soft budget constraints. If not well designed, transfers can simply shift the costs of economic shocks, risk realizations, or fiscal mismanagement from subnational governments to central government budgets without reducing the costs at the general government level. It is therefore important that transfer systems reinforce the accountability and fiscal discipline of subnational governments through transparent rule-based approaches. Impositions of administrative constraints or subnational fiscal rules are viable, if blunt, reform options that face fewer obstacles than governance reforms do, but they require more capacity from central fiscal authorities for successful implementation. In summary, countries would need to consider the benefits and costs of each policy tool and its expected reform impact, both before introduction and a few years down the road when actual information has emerged.

[19] Generally it makes sense for risks to be borne by the entity that is most able to control, mitigate and absorb them.

Annex

Table 1. List of Sample Countries (59 Countries)

Afghanistan	Germany	Nepal
Albania	Guatemala	Netherland
Armenia	Honduras	New Zealand
Australia	Hungary	North Macedonia
Austria	Iceland	Paraguay
Azerbaijan	Indonesia	Peru
Belarus	Iran	Russia
Belgium	Israel	Rwanda
Bosnia and Herzegovina	Japan	Senegal
Brazil	Kazakhstan	Serbia
Cabo Verde	Kenya	South Africa
Cambodia	Kiribati	Spain
Canada	Kyrgyzstan	Sweden
Chile	Latvia	Switzerland
Colombia	Mauritius	Thailand
Costa Rica	Mexico	Tunisia
Croatia	Moldova	Turkey
El Salvador	Mongolia	Uganda
Estonia	Myanmar	Ukraine
Georgia	Namibia	

Source: IMF staff.

Table 2. Definitions and Data Sources of the Variables

Variable Name	Definition	Data Source
Fiscal Crisis	The dummy takes the value of 1 if a country experiences fiscal crisis, 0 otherwise.	Moreno Badia et al. (2022)
Spending Decentralization	The ratio of expenditure of local governments to expenditure of general government	IMF Fiscal Decentralization Dataset, 2021 Vintage
Transfer Dependency Ratio	The ratio of net transfers to local governments to own revenue of local governments.	IMF Fiscal Decentralization Dataset, 2021 Vintage
Revenue Decentralization	The ratio of local government revenue to general government revenue	IMF Fiscal Decentralization Dataset, 2021 Vintage
Government Debt	General government gross debt as a percent of GDP	IMF World Economic Outlook Database (WEO), October 2022
Fiscal Interest Cost	Net interest expense of general government as a percentage of GDP, which is calculated as primary balance minus budget balance.	IMF WEO, October 2022
GDP Growth	Annual percent change in constant price GDP	IMF WEO, October 2022
Income Per Capita	Natural logarithm of GDP in constant price thousand international dollars per person.	IMF WEO, October 2022
Inflation	Annual percentages of average consumer prices are year-on-year changes.	IMF WEO, October 2022
Current Account Balance	Current account balance as a percent of GDP.	IMF WEO, October 2022
Exchange Rate	Depreciation rate of exchange rate defined as national currency per current international dollar.	IMF WEO, October 2022
Banking Crisis	The dummy takes the value of 1 if a country experiences banking crisis, 0 otherwise.	Nguyen et al. (2022)
Currency Crisis	The dummy takes the value of 1 if a country experiences currency crisis, 0 otherwise.	Nguyen et al. (2022)
Commodity Terms of Trade	Commodity net export price index, individual commodities weighted by ratio of net exports to GDP.	IMF Commodity Terms of Trade Index, Latest update on September 8, 2023
Corruption Perceptions Index	Higher score indicates very clean government, while lower score means highly corrupt government.	Transparency International, 2022
Government Effectiveness	The index ranges from -2.5 to 2.5 (worst and best possible outcome, respectively).	Worldwide Governance Indicators
Control over Subnational Borrowing by Central Government	The dummy takes the value of 1 if a country has administrative or rule-based control over subnational borrowing, 0 otherwise.	Ter-Minassian and Craig (1997) Dabla-Norris and Wade (2002) Plekhanov and Singh (2006) IMF Fiscal Rules Dataset (2022) De Biase and Dougherty (2022) European Committee of the Regions

Source: IMF staff.

Table 3. Baseline Estimation

Dependent Variable: Fiscal Crisis		
Binary Choice Model	(1) IV Probit	(2) Logit
Spending Decentralization	2.0702*	2.9847**
	(1.0833)	(1.2059)
Transfer Dependency Ratio	-0.0829**	-0.1412**
	(0.0324)	(0.0688)
Government Debt	-0.0011	0.0046
	(0.0073)	(0.0032)
Fiscal Interest Cost	-0.0127	0.0092
	(0.0576)	(0.0789)
GDP Growth	-0.2381***	-0.1582***
	(0.0499)	(0.0375)
Income Per Capita	-0.9465***	-1.4449***
	(0.1615)	(0.1866)
Inflation	0.0800	-0.0226
	(0.3502)	(0.0393)
Current Account Balance	-0.0370**	-0.0609***
	(0.0183)	(0.0151)
Exchange Rate	-7.4922	5.6157
	(40.7722)	(4.0421)
Banking Crises	0.1532	1.3578***
	(0.9287)	(0.3450)
Currency Crises	-1.0131**	0.0145
	(0.4570)	(0.6394)
Commodity Terms of Trade	0.0086	0.0335
	(0.0305)	(0.0326)
Constant	1.1722	-1.7282
	(3.2824)	(3.4185)
First-Stage Regression		
Lagged Spending Decentralization	0.9704***	-
	(0.0075)	-
Lagged Transfer Dependency Ratio	1.0417***	-
	(0.0103)	-
Sample Period	1980-2019	1980-2019
Wald Chi-Squared Test (12)	203.41***	122.77***
AUROC	0.8398	0.8191
Log (Pseudo)likelihood	1463.5062	-275.1102
Number of Observations	792	847

Notes: Robust standard errors in parentheses. AUROC stands for area under the receiver operating characteristic curve. *Significant at 10%, **significant at 5%, and ***significant at 1%.

Table 4. Robustness Check

Dependent Variable: Fiscal Crisis		
Estimation Model	(1) Probit	(2) OLS
Spending Decentralization	1.5910**	0.7576**
	(0.6448)	(0.3818)
Transfer Dependency Ratio	-0.0812**	-0.0338*
	(0.0334)	(0.0182)
Government Debt	0.0027	0.0033***
	(0.0018)	(0.0008)
Fiscal Interest Cost	0.0095	-0.0256*
	(0.0441)	(0.0146)
GDP Growth	-0.0854***	-0.0277***
	(0.0202)	(0.0044)
Income Per Capita	-0.8005***	-0.4189***
	(0.0978)	(0.0958)
Inflation	-0.0111	-0.0074
	(0.0215)	(0.0051)
Current Account Balance	-0.0337***	-0.0031
	(0.081)	(0.0024)
Exchange Rate	3.0565	0.4974
	(2.1752)	(0.4912)
Banking Crises	0.7734***	0.0996*
	(0.1957)	(0.0529)
Currency Crises	0.0242	0.0518
	(0.3483)	(0.0942)
Commodity Terms of Trade	0.0219	0.0001
	(0.0170)	(0.0044)
Constant	-1.3492	1.4022**
	(1.7792)	(0.5455)
Country Fixed Effects	-	Yes
Sample Period	1980-2019	1980-2019
Wald Chi-Squared Test (12)	132.47***	-
AUROC	0.8194	-
Log (Pseudo)likelihood	-274.0933	-
R-squared	-	0.3684
Number of Observations	847	847

Notes: Robust standard errors in parentheses. AUROC stands for area under the receiver operating characteristic curve. *Significant at 10%, **significant at 5%, and ***significant at 1%.

Table 5. Deficit Countries Versus Surplus Countries

Dependent Variable: Fiscal Crisis		
Budget Balance of Local Governments	(1) Deficit (<0)	(2) Surplus (≥0)
Spending Decentralization	3.4989***	2.0561*
	(0.9886)	(1.2460)
Transfer Dependency Ratio	-0.07775**	0.0201
	(0.0374)	(0.0831)
Government Debt	0.0005	-0.0000
	(0.0091)	(0.0034)
Fiscal Interest Cost	-0.0830	0.0567
	(0.0762)	(0.0880)
GDP Growth	-0.2076***	-0.2959***
	(0.0638)	(0.1111)
Income Per Capita	-0.8342**	-0.5420**
	(0.3737)	(0.2458)
Inflation	0.1198	-0.0069
	(0.1644)	(0.2139)
Current Account Balance	-0.0231	-0.0599**
	(0.0202)	(0.0263)
Exchange Rate	-14.5406	6.1383
	(19.3426)	(22.1715)
Banking Crises	0.4423	-0.3593
	(0.8696)	(0.5068)
Currency Crises	-0.7320	-
	(0.5983)	(omitted)
Commodity Terms of Trade	0.0082	0.0033
	(0.0225)	(0.0378)
Constant	0.8817	0.4447
	(2.3336)	(3.6264)
Sample Period	1980-2019	1980-2019
Wald Chi-Squared Test (12)	153.33***	99.31***
AUROC	0.8389	0.8745
Log (Pseudo)likelihood	419.4243	1434.3519
Number of Observations	403	382

Notes: The IV probit model is used. Robust standard errors in parentheses. AUROC stands for area under the receiver operating characteristic curve. *Significant at 10%, **significant at 5%, and ***significant at 1%.

Table 6. Effects of Control by Center, Corruption, and Public Institutions

Dependent Variable: Fiscal Crisis			
Additional Explanatory Variable	(1) Control by Center	(2) Corruption	(3) Public Institutions
Spending Decentralization (SD)	2.5105***	2.1729***	1.4072**
	(0.8008)	(0.7021)	(0.6601)
SD x Control by Center	-1.5563**		
	(0.6361)		
SD x Corruption Perceptions Index		-0.0511***	
		(0.0180)	
SD x Government Effectiveness			-1.2476**
			(0.5557)
Transfer Dependency Ratio	-0.0545*	-0.0948**	-0.0829**
	(0.0303)	(0.0393)	(0.0395)
Government Debt	0.0033	0.0044**	0.0051**
	(0.0020)	(0.0021)	(0.0022)
Fiscal Interest Cost	-0.0110	-0.0072	0.0095
	(0.0477)	(0.0453)	(0.0491)
GDP Growth	-0.0966***	-0.0918***	-0.0801***
	(0.0232)	(0.0203)	(0.0206)
Income Per Capita	-0.6978***	-0.8667***	-0.6204***
	(0.1018)	(0.1128)	(0.1118)
Inflation	-0.0121	-0.0178	-0.0210
	(0.0285)	(0.0204)	(0.0216)
Current Account Balance	-0.0420***	-0.0286***	-0.0305***
	(0.0100)	(0.0092)	(0.0087)
Exchange Rate	3.4961	2.7814	2.5397
	(2.6272)	(2.1686)	(2.2490)
Banking Crises	0.9162***	0.6759***	0.8812***
	(0.2110)	(0.2015)	(0.2066)
Currency Crises	0.0142	0.1031	0.0212
	(0.4053)	(0.3264)	(0.3745)
Commodity Terms of Trade	0.0270	0.0204	0.0229
	(0.0199)	(0.0172)	(0.0178)
Constant	-2.2085	-0.8594	-1.8911
	(2.0638)	(1.7890)	(1.8754)
Sample Period	1980-2019	1980-2019	1980-2019
Wald Chi-Squared Test (13)	128.66***	113.07***	117.51***
AUROC	0.8191	0.8245	0.8169
Log (Pseudo)likelihood	-230.1891	-254.3398	-255.1301
Number of Observations	782	786	771

Notes: The IV probit model is used. Robust standard errors in parentheses. AUROC stands for area under the receiver operating characteristic curve. *Significant at 10%, **significant at 5%, and ***significant at 1%.

Table 7. Revenue Decentralization

Dependent Variable: Fiscal Crisis		
Binary Choice Model	(1) IV Probit	(2) Logit
Revenue Decentralization	3.7735***	4.7203***
	(0.8348)	(1.6956)
Transfer Dependency Ratio	-0.0312	-0.0763*
	(0.0413)	(0.0459)
Government Debt	-0.0051	0.0009
	(0.0042)	(0.0035)
Fiscal Interest Cost	0.0007	0.0441
	(0.0498)	(0.0805)
GDP Growth	-0.2216**	-0.1405***
	(0.0922)	(0.0355)
Income Per Capita	-0.8678*	-1.3551***
	(0.4803)	(0.1780)
Inflation	0.1895	-0.0199
	(0.2637)	(0.0394)
Current Account Balance	-0.0254	-0.0545***
	(0.0297)	(0.0140)
Exchange Rate	-20.6572	5.3377
	(31.8455)	(4.0030)
Banking Crises	-0.0892	1.4511***
	(0.9149)	(0.3410)
Currency Crises	-0.9412**	0.1020
	(0.4741)	(0.6212)
Commodity Terms of Trade	0.0011	0.0402
	(0.0342)	(0.0309)
Constant	1.9266	-2.6570
	(2.9808)	(3.2541)
First-Stage Regression		
Lagged Revenue Decentralization	0.9530***	-
	(0.0075)	-
Lagged Transfer Dependency Ratio	1.0474***	-
	(0.0102)	-
Sample Period	1980-2019	1980-2019
Wald Chi-Squared Test (12)	402.71***	125.42***
AUROC	0.8298	0.8131
Log (Pseudo)likelihood	-986.4713	-281.7340
Number of Observations	806	862

Notes: Robust standard errors in parentheses. AUROC stands for area under the receiver operating characteristic curve. *Significant at 10%, **significant at 5%, and ***significant at 1%.

Table 8. Subnational Fiscal Rules versus Administrative Constraints

Dependent Variable: Fiscal Crisis		
Additional Explanatory Variable	(1) Subnational Fiscal Rules	(2) Administrative Constraints
Spending Decentralization (SD)	1.7352**	-0.2965
	(0.7249)	(1.3980)
SD x Subnational Fiscal Rules	0.0871	
	(0.7087)	
SD x Administrative Constraints		-0.2149
		(1.0091)
Transfer Dependency Ratio	-0.0685**	-0.0789
	(0.0325)	(0.0781)
Government Debt	0.0028	0.0049**
	(0.0020)	(0.0025)
Fiscal Interest Cost	0.0031	-0.0370
	(0.0470)	(0.0712)
GDP Growth	-0.0934***	-0.0622*
	(0.0230)	(0.0321)
Income Per Capita	-0.7413***	-0.7790***
	(0.1111)	(0.1988)
Inflation	-0.0097	0.0393
	(0.0279)	(0.0470)
Current Account Balance	-0.0420***	-0.0213
	(0.0100)	(0.0260)
Exchange Rate	3.7999	0.3272
	(2.6307)	(4.7000)
Banking Crises	0.8740***	1.0410***
	(0.2102)	(0.2571)
Currency Crises	-0.2415	-0.0783
	(0.3840)	(0.5995)
Commodity Terms of Trade	0.0276	0.0122
	(0.01965)	(0.0304)
Constant	-2.1643	-0.4039
	(2.0418)	(3.0742)
Sample Period	1980-2019	1980-2019
Wald Chi-Squared Test (12)	121.96***	48.46***
AUROC	0.8204	0.7976
Log (Pseudo)likelihood	-230.0521	-120.7249
Number of Observations	771	562

Notes: The IV probit model is used. Robust standard errors in parentheses. AUROC stands for area under the receiver operating characteristic curve. *Significant at 10%, **significant at 5%, and ***significant at 1%.

References

Abbott, Andrew, and Philip Jones. 2012. Intergovernmental Transfers and Procyclical Public Spending. *Economics Letters* 115: 447-451.

Afonso, António, José Alves, João Tovar Jalles, and Sofia Monteiro. 2024. Beyond the Centre: Tracing Decentralization's Influence on Time-Varying Fiscal Sustainability. *International Review of Economics and Finance* 96: 103662.

Akalbeo, Benard, Jorge Martinez-Vasquez, and Bauyrzhan Yedgenov. 2023. Fiscal Decentralization and Structural Versus Cyclical Unemployment Levels. *European Journal of Political Economy* 80: 102477.

Akin, Zafer, Zeynep B. Bulut-Cevik, and Bilin Neyapti. 2016. Does Fiscal Decentralization Promote Fiscal Discipline? *Emerging Markets Finance and Trade* 52 (3): 690-705.

Arespa, Marta, and Juan González-Alegre. 2022. Tax Autonomy Mitigates Soft Budget Constraint: Evidence from Spanish Regions. *Journal of Public Policy* 43 (1): 1-32.

Asatryan, Zareh, Lars P. Feld, and Benny Geys. 2015. Partial Fiscal Decentralization and Sub-national Government Fiscal Discipline: Empirical Evidence from OECD Countries. *Public Choice* 163: 307-320.

Aslim, Erkmen Giray, and Bilin Neyapti. 2017. Optimal Fiscal Decentralization: Redistribution and Welfare Implications. *Economic Modelling* 61: 224-234.

Bahl, Roy, and Johannes Linn. 1994. Fiscal Decentralization and Intergovernmental Transfers in Less Developed Countries. *Publius: The Journal of Federalism* 24: 1-19.

Ben-Bassat, Avi, Momi Dahan, and Esteban F. Klor. 2016. Is Centralization a Solution to the Soft Budget Constraint Problem? *European Journal of Political Economy* 45: 57-75.

Besley, Timothy, and Stephen Coate. 2003. Centralized versus Decentralized Provision of Local Public Goods: A Political Economy Approach. *Journal of Public Economics* 87: 2611-2637.

Bikker, Jacob, and Daan van der Linde. 2016. Scale Economies in Local Public Administration. *Local Government Studies* 42 (3): 441-463.

Bird, Richard, and Michael Smart. 2002. Intergovernmental Fiscal Transfers: International Lessons for Developing Countries. *World Development* 30: 899-912.

Boadway, Robin. 2001. Inter-Governmental Fiscal Relations: The Facilitator of Fiscal Decentralization. *Constitutional Political Economy* 12: 93-121.

Boadway, Robin, Isao Horiba, and Raghbendra Jha. 1999. The Provision of Public Services by Government Funded Decentralized Agencies. *Public Choice* 100: 157-184.

Boadway, Robin., and Jean-François Tremblay. 2012. Reassessment of the Tiebout Model. *Journal of Public Economics* 96: 1063-1078.

Boetti, Lorenzo, Massimiliano Piacenza, and Gilberto Turati. 2012. Decentralization and Local Governments' Performance: How Does Fiscal Autonomy Affect Spending Efficiency? *FinanzArchiv* 68 (3): 269-302.

Bröthaler, Johann, Michael Getzner, and Gottfried Haber. 2015. Sustainability of Local Government Debt: A Case Study of Austrian Municipalities. *Empirica* 42: 521–546.

Brulhart, Marius, and Mario Jametti. 2006. Vertical versus Horizontal Tax Externalities: An Empirical Test. *Journal of Public Economics* 90: 2027-2062.

Bucci, Valeria, Giancarlo Ferrara, and Giuliano Resce. 2023. Local Government Spending Efficiency and Fiscal Decentralization: Evidence from Italian Municipalities. *Applied Economics* 56 (5): 599-614.

Budsaratragoon, Pornanong, and Boonlert Jitmaneeroj. 2020. A Critique on the Corruption Perceptions Index: An Interdisciplinary Approach. *Socio-Economic Planning Sciences* 70: 100768.

Buettner, Thiess. 2002. Fiscal Federalism and Interstate Risk Sharing: Empirical Evidence from Germany. *Economics Letters* 74: 195-202.

Bukowska, Grażyna, and Joanna Siwińska-Gorzelak. 2019. Can Higher Tax Autonomy Enhance Local Fiscal Discipline? Evidence from Tax Decentralization in Poland. *Publius: The Journal of Federalism* 49 (2): 299–324.

Cabasés, Fermin, Pedro Pascual, and Jaime Vallés. 2007. The Effectiveness of Institutional Borrowing Restrictions: Empirical Evidence from Spanish Municipalities. *Public Choice* 131: 293–313.

Cerovic, Svetlana, Kerstin Gerling, Andrew Hodge, and Paulo A. Medas. 2018. Predicting Fiscal Crises. *IMF Working Paper* 18/181.

Coen-Pirani, Daniele, and Michael Wooley. 2018. Fiscal Centralization: Theory and Evidence from the Great Depression. *American Economic Journal: Economic Policy* 10 (2): 39-61.

Cramer, Jan Salomon. 2007. Robustness of Logit Analysis: Unobserved Heterogeneity and Mis-Specified Disturbances. *Oxford Bulletin of Economics and Statistics* 69: 545-555.

Dabla-Norris, Era, and Paul Wade. 2002. The Challenges of Fiscal Decentralization in Transition Countries. *IMF Working Paper* 02/103.

De Biase, Pietrangelo, and Sean Dougherty. 2022. The Past and Future of Subnational Fiscal Rules: An Analysis of Fiscal Rules over Time. *OECD Working Papers on Fiscal Federalism* 41.

Deller, Steven. C. and Craig S. Maher. 2005. Categorical Municipal Expenditures with a Focus on the Flypaper Effect. *Public Budgeting and Finance* 25: 73-90.

Dincecco, Mark. 2009. Fiscal Centralization, Limited Government, and Public Revenues in Europe, 1650–1913. *The Journal of Economic History* 69 (1): 48-103.

Dove, John A. 2016. Do Fiscal Constraints Prevent Default? Historical Evidence from U.S. Municipalities. *Economics of Governance* 17: 185-209.

Eichler, Stefan, and Michael Hofmann. 2013. Sovereign Default Risk and Decentralization: Evidence for Emerging Markets. *European Journal of Political Economy* 32: 113-134.

Fedelino, Annalisa, and Paul Smoke. 2013. Bridging Public Financial Management and Fiscal Decentralization Reforms in Developing Countries. In *Public Financial Management and Its Emerging Architecture*. pp.363-388.

Foremny, Dirk. 2014. Sub-national Deficits in European Countries: The Impact of Fiscal Rules and Tax Autonomy. *European Journal of Political Economy* 34: 86-110.

Gilley, Bruce, and Sirisak Laochankham. 2024. Can Fiscal Recentralization Strengthen Local Government? The Case of Thailand. *International Journal of Public Administration* 47 (4): 257-268.

Gordon, Roger. 1983. An Optimal Tax Approach to Fiscal Federalism. *Quarterly Journal of Economics* 97: 567-586.

Grote, Martin, Mario Mansour, and Jean-François Wen. 2024. How Property Taxes Can Help Low-Income Countries to Develop. *IMF Blog*, November 11, 2024.

Guo, Si, Yun Pei, and Zoe Xie. 2022. A Dynamic Model of Fiscal Decentralization and Public Debt Accumulation. *Journal of Public Economics* 212: 104692.

Hanai, Kiyohito, Eiji Tajika, and Yuji Yui. 2000. Financing Growth and Local Governments in Japan: Why Does the Government Keep Growing? *Hitotsubashi Journal of Economics* 41: 153-162.

Honohan, Patrick, and Daniela Klingebiel. 2003. The Fiscal Cost Implications of an Accommodating Approach to Banking Crises. *Journal of Banking and Finance* 27: 1539-1560.

Inman, Robert P. and Daniel L. Rubinfeld. 1996. Designing Tax Policy in Federalist Economies: An Overview. *Journal of Public Economics* 60: 307-334.

Janeba, Eckhard, and John Douglas Wilson. 2011. Optimal Fiscal Federalism in the Presence of Tax Competition. *Journal of Public Economics* 95: 1302-1311.

Kornai, Janos. 1986. The Soft Budget Constraint. *Kyklos* 39: 3-30.

Li, Tianyu, and Tongwei Du. 2021. Vertical Fiscal Imbalance, Transfer Payments, and Fiscal Sustainability of Local Governments in China. *International Review of Economics and Finance* 74: 392-404.

Liberati, Paolo. 2010. ‘‘Which Tax’’ or ‘‘Which Tax for What?’’: Tax Assignment in the Theory of Fiscal Federalism. *Public Finance Review* 39(3): 365-392.

Lockwood, Ben. 1999. Inter-Regional Insurance. *Journal of Public Economics* 72: 1-37.

Martinez-Vazquez, Jorge, and Violeta Vulovic. 2017. How Well Do Subnational Borrowing Regulations Work? In *Central and Local Government Relations in Asia*. pp.161-220.

Masaki, Takaaki. 2018. The Impact of Intergovernmental Transfers on Local Revenue Generation in Sub-Saharan Africa: Evidence from Tanzania. *World Development* 106: 173-186.

McLure, Jr., Charles. E. 1967. The Interstate Exporting of State and Local Taxes: Estimates for 1962. *National Tax Journal* 20: 49-77.

Medas, Paulo, Tigran Poghosyan, Yizhi Xu, Juan Farah-Yacoub, and Kerstin Gerling. 2018. Fiscal Crises. *Journal of International Money and Finance* 88: 191-207.

Mehiriz, Kaddour, and Richard Marceau. 2014. The Flypaper and Asymmetric Effects of Intergovernmental Grants to Quebec Municipalities. *Public Budgeting and Finance* 34: 85-102.

Meloni, Osvaldo. 2016. Electoral Opportunism and Vertical Fiscal Imbalance. *Journal of Applied Economics* 19 (1): 145-167.

Mitra, Alessio, and Athanasios Chymis. 2022. Federalism, But How? The Impact of Vertical Fiscal Imbalance on Economic Growth. Evidence from Belgium. *Economics and Politics* 34 (2): 322-350.

Miyazaki, Takeshi. 2020. Intergovernmental Fiscal Transfers and Tax Efforts: Regression-Discontinuity Analysis for Japanese Local Governments. *Regional Science and Urban Economics* 84: 103554.

Moreno Badia, Marialuz, Paulo Medas, Pranav Gupta, and Yuan Xiang. Debt Is Not Free. 2022. *Journal of International Money and Finance* 127: 102654.

Nakatani, Ryota. 2017. External Adjustment in a Resource-Rich Economy: The Case of Papua New Guinea. *IMF Working Paper* 17/267.

Nakatani, Ryota. 2018a. Real and Financial Shocks, Exchange Rate Regimes and the Probability of a Currency Crisis. *Journal of Policy Modeling* 40 (1): 60-73.

Nakatani, Ryota. 2018b. Adjustment to Negative Price Shocks by a Commodity Exporting Economy: Does Exchange Rate Flexibility Resolve a Balance of Payments Crisis? *Journal of Asian Economics* 57: 13-35.

Nakatani, Ryota. 2019. A Possible Approach to Fiscal Rules in Small Islands — Incorporating Natural Disasters and Climate Change. *IMF Working Paper* 19/186.

Nakatani, Ryota. 2020. Macroprudential Policy and the Probability of a Banking Crisis. *Journal of Policy Modeling* 42 (6): 1169-1186.

Nakatani, Ryota. 2023a. Fiscal Crises, Decentralization, and Indiscipline. *Scottish Journal of Political Economy* 70 (5): 459-478.

Nakatani, Ryota. 2023b. Productivity Drives of Infrastructure Companies: Network Industries Utilizing Economies of Scale in the Digital Era. *Annals of Public and Cooperative Economics* 94 (4): 1273-1298.

Nakatani, Ryota. 2024a. Revenue Decentralization and the Probability of a Fiscal Crisis: Is There a Tipping Point for Adverse Effects? *Public Finance Review* 52 (3): 376-396

Nakatani, Ryota. 2024b. Sovereign Debt Crisis and Fiscal Devolution. *Journal of Risk and Financial Management* 17 (1): 9.

Nakatani, Ryota, Qianqian Zhang, and Isaura Garcia Valdes. 2022. Fiscal Decentralization Improves Social Outcomes When Countries Have Good Governance. *IMF Working Paper* 22/111.

Nakatani, Ryota, Qianqian Zhang, and Isaura Garcia Valdes. 2024. Health Expenditure Decentralization and Health Outcomes: The Importance of Governance. *Publius: The Journal of Federalism* 54 (1): 59-87.

Nguyen, Thanh Cong, Vítor Castro, and Justine Wood. 2022. A New Comprehensive Database of Financial Crises: Identification, Frequency, and Duration. *Economic Modelling* 108: 105770.

Oates, Wallace E. 1972. Fiscal Federalism. Harcourt Brace Jovanovich.

Park, Sungho. 2018. The Impact of State-Imposed Fiscal Rules on Municipal Government Fiscal Outcomes: Does Institutional Configuration Matter? *State and Local Government Review* 50 (4): 230-243.

Park, Jinsol, Sung-Wook Kwon, and Donwe Choi. 2022. Local Government Responses to State Fiscal Controls: The Effects of Fiscal Preemptions on the Methods of Local Service Delivery. *Public Performance and Management Review* 45 (6): 1371-1397.

Persson, Torsten, and Guido Tabellini. 1996. Federal Fiscal Constitutions: Risk Sharing and Moral Hazard. *Econometrica* 64: 623-646.

Persson, Torsten, and Guido Tabellini. 2002. Political Economics and Public Finance. *Handbook of Public Economics* 3: 1549-1659.

Plekhanov, Alexander, and Raju Singh. 2006. How Should Subnational Government Borrowing Be Regulated? Some Cross-Country Empirical Evidence. *IMF Staff Papers* 53 (3): 426-452.

Sanguinetti, Pablo, and Mariano Tommasi. 2004. Intergovernmental Transfers and Fiscal Behavior Insurance versus Aggregate Discipline. *Journal of International Economics* 62: 149-170.

Saptono, Prianto Budi, and Gustofan Mahmud. 2023. Stimulus or Enforcement? How Intergovernmental Transfers Crowd-in Local Taxes in Indonesia. *Public Finance Review* 51 (6): 782-837.

Sato, Motohiro. 2003. Tax Competition, Rent-Seeking and Fiscal Decentralization. *European Economic Review* 47: 19-40.

Sato, Motohiro, and Shinji Yamashige. 2000. Decentralization and Economic Development in Asian Countries: An Overview. *Hitotsubashi Journal of Economics* 41: 77-84.

Saxena, Sandeep. 2022. How to Manage Fiscal Risks from Subnational Governments. *Fiscal Affairs Department How to Notes* 22/03, International Monetary Fund.

Schaltegger, Christoph A., and Benno Torgler. 2007. Government Accountability and Fiscal Discipline: A Panel Analysis Using Swiss Data. *Journal of Public Economics* 91 (1-2): 117-140.

Stone, Samuel B. 2015. The Effect of Fiscal Decentralization on the Financial Condition of Municipal Government. *International Journal of Public Administration* 38 (6): 453-460.

Tang, Shui-Yan, Richard F. Callahan, and Mark Pisano. 2014. Using Common-Pool Resource Principals to Design Local Government Fiscal Sustainability. *Public Administration Review* 74 (6): 791-803.

Ter-Minassian, Teresa, and Jon Craig. 1997. Control of Subnational Government Borrowing. In *Fiscal Federalism in Theory and Practice*. pp.156-172.

Tiebout, Charles M. 1956. A Pure Theory of Local Expenditure. *Journal of Political Economy* 64 (5): 416-424.

von Haldenwang, Christian. 2017. The Political Cost of Local Revenue Mobilization: Decentralization of the Property Tax in Indonesia. *Public Finance and Management* 17(2): 124-151.

Wooldridge, Jeffrey M. 2002. Econometric Analysis of Cross Section and Panel Data. MIT Press.

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