Driving Factors of Fiscal Stress: Panel Data Analysis for Emerging Countries

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Timeline
Received: Feb 07, 2025
Revised: Mar 15, 2025
Accepted: Mar 26, 2025
Published: Jun 21, 2024

DOI
https://doi.org/10.55603/jes.v4i1.a7

Abstract

This study analyzes potential driving factors of fiscal stress for a panel of emerging countries from 2000 to 2020. It considers various factors that affect fiscal stress, such as contingent liabilities, macroeconomic shocks, fiscal shocks, non-fiscal vulnerabilities, political risk, and other factors. The study develops indices for institutional quality and fiscal and financial stress by applying principal component analysis. The authors use several static and dynamic panel data techniques to ensure the robustness of the results. The findings underscore the vital role of fiscal fundamentals in determining fiscal stress. Moreover, unsustainable public debt significantly intensifies fiscal stress. In addition, a high level of political risk and contractual contingent liabilities exert upward pressure on rollover risk in these countries. The authors propose more effective management of public debt, particularly external debt, and advocate for fiscal discipline as a critical strategy to mitigate fiscal stress. Policy coordination may serve as a potential means to reduce the impact of financial crises on escalating rollover risk. The fourth-generation theoretical models of crises inspire the extension of the fiscal monitoring framework.

Keywords: *Fiscal stress; Emerging economies; Transmission; Political risk; Fiscal sustainability*

JEL Classification: *D64, Q22, Q120*

1. Introduction

The driving factors of fiscal stress have not received attention in the empirical literature. However, recent experiences of COVID-19, the European Sovereign debt, and the global financial crisis have led to an unprecedented rise in the government's deficit and debt. Such events incurred economic costs, such as loss of output, heightened rollover risk, and concerns about fiscal sustainability. A fiscal crisis refers to disruptive events that bring permanent losses in annual production (Medas et al., 2018). These events elevate fiscal stress and, hence, rollover risk. Fiscal stress (hereafter FS) refers to the government's inability to fulfil its debt obligations and uphold fiscal sustainability (Manasse et al., 2003).

Many researchers have assessed the driving factors of FS through early warning systems since the 1970s (Badia et al., 2022). However, the focus is confined to only a narrow set of factors. For instance, some studies focus on fiscal fundamentals in determining rollover risk (Detragiache & Spilimbergo, 2001; Hemming et al., 2003). However, another recent strand of literature acknowledges the role of macroeconomic and non-fiscal imbalances, followed by the European debt crises. These imbalances impose high costs of debt, insolvency risk, and fiscal unsustainability. On one side, the public debt crisis is detrimental to economic growth. On the other side, it hampers macroeconomic stability. Non-fiscal fundamentals explain FS, besides inter-linkages between fiscal, financial, and real variables (Berti et al., 2012; Elgin & Uras, 2013; Koester, 2014).

Several studies have documented the phenomenon of twin crises. It refers to an overlap between financial and fiscal crises, particularly in turbulent times (Gerling et al., 2017; Romer & Romer, 2018; Medas et al., 2018). FS increases when governments bail out the financial sector during a financial crisis (Acharya et al., 2014). Likewise, escalated risks may spillover from the sovereign to the banking system (Alter & Beyer, 2014). The empirical literature on factors affecting FS did not account for financial stress. However, systemic financial risk is a non-contractual contingent liability in the fiscal sustainability framework (Cottarelli et al., 2014). Likewise, political factors, such as institutional quality, play a significant role in affecting FS. These factors

interfere with decision-making, especially in emerging countries (Bilson et al., 2002). Political bubbles are far more relevant in foreseeing fiscal crises than credit bubbles for these countries (Herrera et al., 2020). Lower political risk helps countries attain higher IMF program support, which lowers FS (Abiad & Ostry, 2005).

This study is unique in several ways. First, this study extends the fiscal monitoring framework proposed by Cottarelli et al. (2014) by incorporating contingent liabilities and political risk. They got motivation from the fourth-generation theoretical models of crisis. These models investigate how institutional factors are vital in determining FS. Second, the authors comprehensively inquire about the driving factors of FS in selected emerging countries. The rest of the paper is structured as follows: Section 2 documents the literature review. Section 3 discusses methodology. Section 4 presents the results. Section 5 concludes the study and draws policy implications.

2. Literature Review

The early theoretical literature emphasizes the role of fiscal fundamentals in explaining fiscal vulnerabilities (Detragiache & Spilimbergo, 2001). The next generation of models stresses non-fiscal fundamentals in addition to fiscal factors (Calvo, 1988). Later, Cottarelli (2011) and Cottarelli et al. (2014) developed a fiscal monitoring framework that relies on an early warning system to assess rollover risk. They believe rollover risk stems from three broad dimensions: baseline fiscal variables, shocks to baseline variables, and other factors.

The empirical literature concerning the indicators of FS flourished after the eve of the European debt crisis in 2011. Earlier studies on driving factors of FS merely highlight the role of fiscal factors, ignoring the non-fiscal factors. For instance, Baldacci et al. (2011) believe weak fiscal fundamentals elevate rollover risk in developed countries. Later, some empirical studies suggest the role of non-fiscal variables as trigger factors of a fiscal crisis (Berti et al., 2012; Koester, 2014; Sumner & Berti, 2017). In contrast, De Cos et al. (2014) conclude that financial and fiscal variables are potential drivers of FS in 11 Euro Area countries.

More recently, Magkonis and Tsopanakis (2016) have revisited the robust driving factors of fiscal distress using extreme bound analysis. They find that fiscal and non-fiscal indicators enhance the predictive power of crises by 29 percent. Their findings are consistent with those of Berti et al. (2012). Some empirical studies highlight the role of governance quality on FS. However, the empirical literature in this strand is inadequate. Caceres and Kochanova (2012) are the only prominent studies that account for governance factors in determining FS. Their study utilizes internal and external accountability indices for governance. They find that both indices are significant in explaining the incidence of FS. The lack of empirical research on the institutional factors affecting FS prompts us to consider how these factors explicitly trigger fiscal stress.

A detailed literature review concerning FS's driving factors determines several issues. First, existing literature on the subject focuses mainly on European countries, with limited literature on emerging countries. The characteristics of emerging economies differ from those of European countries. These economies are more prone to political risk. Thus, investigating the driving factors of FS for emerging economies may highlight their institutional vulnerabilities to cater to political risk. Second, there is no established theoretical literature concerning the driving factors of FS, whereas empirical literature is broad but largely inconclusive. Next, the empirical literature on how political risk affects FS is still not established, while political risk is much more pronounced in emerging countries than in developed countries. Fourth, the phenomenon of crisis overlap needs rigorous exploration despite the realization that interconnections exist between financial and fiscal variables. We address these gaps to re-examine the driving factors of FS for a sample of emerging economies.

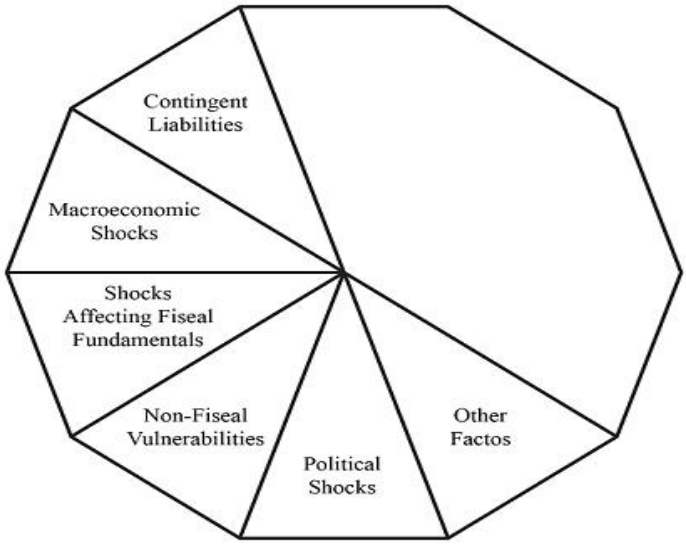
3. Methodology and Model

This section develops the conceptual framework and specifies the econometric procedure. It further discusses data and the construction of variables to investigate the triggers of FS.

3.1 Theoretical Framework

Theories of crisis determination highlight the presence of vulnerabilities, such as fiscal deficit and growing debt. These vulnerabilities raise concerns for fiscal sustainability and escalate FS. Moreover, fiscal and macro-financial imbalances are interconnected.

Figure 1: Risk Decagon: Proposed Theoretical Framework



Source: Author's construction

Thus, the driving factors of FS should incorporate macroeconomic imbalances and financial stress besides accounting for fiscal fundamentals (Cottarelli, 2011; Cottarelli et al., 2014). Our choice of potential driving factors relies on the analytical framework for fiscal risk presented in Figure 1. Shocks affecting the baseline fiscal model constitute the relevant portion of the risk decagon for the potential drivers of FS. We account for six types of shocks. Five shocks to the baseline fiscal model are similar to the ones proposed by Cottarelli (2011) and Cottarelli et al. (2014). They are contingent liabilities, shocks to the macroeconomy, shocks affecting fiscal fundamentals, non-fiscal vulnerabilities, and other factors. This study extends the conceptual framework by incorporating institutional factors as the sixth potential driver of FS. These dimensions of fiscal risk are as follows:

3.1.1 First Dimension: Systemic Risk as Contingent Liabilities

A contingent liability refers to a potential obligation that may arise from an event that has not yet occurred. In the present context, a non-contractual contingent liability stems from adverse feedback from the financial sector to the fiscal account. Thus, systemic risk, measured through the financial stress index, can be viewed as a non-contractual contingent liability for the government. Public finances are directly exposed to systemic risk.

The governments are forced to bailout state-owned banks in times of higher systemic risk. There are indirect fiscal costs in the form of bank recapitalization to secure liquidity and ensure credit supply in periods of systemic crisis. These direct and indirect fiscal costs increase fiscal risk and the level of FS (Cottarelli, 2011; Cottarelli et al., 2014). Financial stress has a spillover effect on the public balance sheet (Perotti, 1999). An

adverse feedback loop exists between banking and sovereign risk. Timely fiscal support to the ailing financial sector can mitigate the possibility of this feedback loop. However, government support for the financial system raises debt on the public balance sheets. Ultimately, it fuels FS**.** Such a phenomenon is known as a twin crisis (Gerling et al., 2017).

3.1.2 Second Dimension: Macroeconomic Shocks

The first macroeconomic shock is a loss in output measured through the output gap. Any increase in GDP growth indicates overheating in the real economy, building financial imbalances, and widening the gap. A high output gap deters financial stability and indirectly amplifies fiscal distress (Borio et al., 2017; Bruns & Poghosyan, 2018). The second factor is the differential in interest rate growth. A positive differential exerts pressure on government debt ratios if governments run a deficit in the primary balance. The continuously rising debt ends up in an unstable trajectory of debt that raises fiscal risk (Cottarelli, 2011; Cottarelli et al., 2014).

3.1.3 Third Dimension: Shocks to Fiscal Fundamentals

The third set of driving factors of FS is fiscal fundamentals. This study considers three fiscal fundamentals. The first is a higher gross government debt as a percent of GDP. High debt compels the government to abandon growth-enhancing activities and allocate more resources for debt service. It raises solvency concerns as unsustainable levels of debt trigger fiscal risks and a high level of FS. The second is fiscal balance (as a percent of GDP). A deficit in the public account indicates more reliance on borrowed funds. It, in turn, increases the debt-to-GDP ratio and FS. The third fiscal factor is primary balance. Its effect on FS depends on the condition of the debt sustainability. If the level of debt becomes unsustainable (real interest rate is lower than growth in real GDP), a deficit in primary balance will lead to an explosive pattern in the debt-to-GDP ratio. It accelerates sovereign risk and FS. Hence, the primary deficit signals a weaker fiscal position to halt the financial crisis (Cottarelli, 2011; Cottarelli et al., 2014).

3.1.4 Fourth Dimension: Non-Fiscal Vulnerabilities

Another dimension of the risk decagon is non-fiscal factors. Such factors indirectly affect fiscal risk. Two broader categorizations within non-fiscal factors are external factors and domestic factors. External factors measure the competitiveness of a country. The first external factor is the current account balance as a percentage of GDP. A persistent external account deficit indicates a loss of competitiveness. Fiscal deficit financing raises the default risk. It ultimately brings a surge in FS. The second external factor is the foreign exchange reserves held by the central bank. It measures international liquidity. A low level undermines the ability of the government to service its external obligations. Subsequently, it increases external debt and FS (Bruns & Poghosyan, 2018). A high level of private credit as a percentage of GDP, a domestic factor, elevates the public sector's contingent liabilities. Thus, the private sector debt crisis transmits to the public sector. It ultimately increases the fiscal risk (Cottarelli, 2011; Cottarelli et al., 2014).

3.1.5 Fifth Dimension: Political Risk

High political risk is a non-economic trigger factor for FS. It is an institutional factor that indicates how politicians' and policymakers' actions affect fiscal policy. An increase in political risk interferes with the quality of fiscal policy by generating micro and macro risks. It ultimately enhances fiscal risk (Caceres & Kochanova, 2012; Waszkiewicz, 2015).

3.1.6 Sixth Dimension: Other Factors

They include market sentiments or risk appetite. A high-risk appetite can reduce the likelihood of a fiscal crisis and, hence, FS if a country is a safe haven and vice versa.[1]

3.2 Model Specification

Based on the extended theoretical framework, the authors model the driving factors of FS as follows:

[1] Data constraints on market sentiments forced us to skip this dimension from the empirical analysis.

$$\mathrm{FisSI}_{i,t} = \beta_i \mathrm{FinSI}_{i,t} + \delta_i Macro_{i,t} + \delta_i Fis_{i,t} + \theta_i NonFis_{i,t} + \omega_i PRI_{i,t} + u_i + \varepsilon_{i,t} \quad \textbf{(1)}$$

Where FisSI and FinSI refer to the fiscal and financial stress indices for emerging countries, respectively. The study applies GDP PPP weights to aggregate annual fiscal and monthly financial stress indices for emerging countries.

This study follows Sadia et al. (2019) in constructing FinSIs. The authors consider three dimensions of risks, namely financial, economic, and political. They select seven components to account for these dimensions. These are banking sector risk, stock market volatility, currency risk, sovereign risk, credit stress, output gap, and political risk. They develop monthly FinSIs using Principal Component Analysis (hereafter PCA). Those indices are annualized through a monthly average. Likewise, the study relies on four dimensions of fiscal risk to compute FisSI using PCA. These are fiscal variables, long-term fiscal trends, assets and liabilities management, and political risk. $Macro$ refers to macroeconomic shocks affecting FS. The fiscal and non-fiscal fundamentals are Fis and $NonFis$, respectively. PRI denotes political shocks. The authors apply PCA to construct a composite PRI. u_i refers to country-specific effects, whereas $\varepsilon_{i,t}$ shows the random shock realized for the i[th] country at time t.

3.3 Econometric Techniques

This study uses several static and dynamic panel data techniques to investigate the driving factors of FS in emerging countries and robustness analysis. The study confirms the presence of dynamic effects/inertia by incorporating a lagged dependent variable into the dynamic panel data models. This justifies the application of dynamic panel data techniques. Baltagi (2008) mentioned the advantages of panel data. Panel data combines both section and time dimensions, thereby capturing more information. Furthermore, it considers the endogeneity problem and encounters less aggregation bias. This study employs robust standard errors to account for heteroskedasticity and autocorrelation in the estimates. The static panel data techniques include pooled ordinary least squares (POLS), fixed effects (FE), and two-stage least squares (2SLS). Further, for dynamic panel data, the study considers the system and the difference between generalized methods of moments (GMM). System GMM considers both the level equation and the first-difference equation together as a system. The technique utilizes level and difference instruments, making it a preferred choice over the difference GMM.

Before estimation, we perform two diagnostics for serial correlation and over-identifying restrictions. The serial correlation test of the Arellano-Bond test. This test should reject the null hypothesis of no first-order serial correlation and accept the null hypothesis of no second-order serial correlation. Next, the Hansen J test is applied to test over-identifying restrictions. The null hypothesis states that instruments are not correlated with the error term. The study exploits Hampel Identifiers to treat outliers (Wilcox, 2005). Hampel Identifiers (hereafter HI) define X as an outlier if

$$HI = \frac{/X_i - M/}{MAD/0.6745} > b \quad \textbf{(2)}$$

where X is a particular observation we suspect is an outlier, and M is the median of observations. Median of entered absolute values ($|X_1 - m|, /X_2 - M|, \ldots, /X_N - M/$) is MAD, while 0.6745 is the 75[th] quantile of the normal distribution. b refers to the cutoff for declaring an observation an outlier. This study is 3.5 as a cutoff as used in the Hampel procedure. For choosing between FE and RE models, the study applies the *Hausman* test (Hausman, 1978)

3.4 Data and Construction of Variables

This study considers annual data from 2000 to 2020 to investigate potential driving factors of FS for a panel of 17 emerging countries.2 According to the IMF (2017), the study classifies the countries as emerging economies. The sample consists of a total of 289 annual observations. Initially, we selected a large sample that

[2] The list of sampled countries is given in Table A2 in Appendix A.

got trimmed because of the non-availability of data for a few components of FisSI for the latest period. It confined our analysis to 17 countries until 2020.

Table A1 in the Appendix lists variables, their measurement, and data sources. The study applies widely used PCA on the normalized components to construct composite FisSI and FinSI for emerging economies. We combine 12 variables to develop composite FisSI for emerging economies. These variables are interest-rate-growth difference, gross debt by the general government, cyclically adjusted primary balance, fertility rate, age dependency ratio, population aging, gross financing needs, short-run debt as a ratio of total debt, debt held by non-residents, weighted-average maturity of total government debt, short-term external debt as a ratio of reserves, and political risk for emerging countries. We aggregate seven components for developing FinSI. They include risk of banking sector, volatility of stock market, currency risk, sovereign risk, credit stress, output gap, and political risk. Table 1 reports the results for PCA.

Table 1: Results for Principal Component Analysis

Country Groups / **Components**	**FisSI**		**FinSI**	
	Eigenvalues	Proportion	Eigenvalues	Proportion
First Component	3.0191	0.2516	1.7892	0.2256
Second Component	2.0749	0.1729	1.0603	0.1515
Third Component	1.4502	0.1208	1.0146	0.1449
Fourth Component	1.3417	0.1118	0.9563	0.1366
Fifth Component	0.9740	0.0812	0.8865	0.1266
Sixth Component	0.8235	0.0686	0.7717	0.1102
Seventh Component	0.7676	0.0640	0.5213	0.0745
Eighth Component	0.6506	0.0542	-	-
Ninth Component	0.4207	0.0351	-	-
Tenth Component	0.3071	0.0256	-	-
Eleventh Component	0.1303	0.0109	-	-
Twelfth Component	0.0405	0.00034	-	-

Source: Author's construction

It reveals that the first principal component captures about one-fourth of the variation in data for both stress indices. The standard literature suggests that a composite index may account for at least 50-60 percent of the total variation. Thus, we take a non-standardized average of the components having eigenvalues greater than 1. In the present context, we take an average of the first three components to construct FisSI and FinSI. The constructed FisSI and FinSI explain 54.53 and 52.20 percent of the cumulative proportion of variation for emerging economies, respectively.

4. Results and Discussions

This section empirically analyzes the driving factors of FS for emerging countries. Both static and dynamic models are estimated to check the robustness of the results. The authors estimate equation (1) using the POLS method. We apply an econometric procedure of general and specific models based on all the observations, as shown by columns (1) and (3) of Table 2. Next, we estimate the general and specific models after removing outliers. These are shown in columns (2) and (4), respectively. The Hampel Identifier is used to address the problem of outlier observations. The results are placed in the third and fifth columns of Table 2, respectively.

The researchers explain the factors driving FS one by one. Political risk (PRI) is the first source of disruptions in public accounts. The authors initially consider the current value of PRI, which stays insignificant. Thus, they take both the current and lag values of PRI to evaluate whether the political risk in the previous period triggers FS in the current period. A high value of the lagged PRI exhibits lower political risk. This high value tends to reduce FS. Political risk affects FS by creating uncertainty about the stance of public policy. Besides, this hampers the government's future solvency and reduces investments. Our findings are in line with those of Waszkiewicz (2015).

The financial stress index (FinSI) for emerging markets positively affects FS across all the models. It validates the notion of interlinkages between the financial and real sides of the economy. Vulnerabilities in the financial sector require support for the financial system at the cost of deterioration in public balance sheets. It lowers the bond prices while these bonds carry a heavy weight in the bank's balance sheet and squeeze the credit. Thus, an adverse feedback loop is established between the sovereign bond market, the financial sector, and the real economy. The finding conforms to the literature on crisis overlap. Financial and fiscal crises overlap, with one preceding the other. Further, the coefficients are statistically significant at 1% in all models (Acharya et al., 2014; Gerling et al., 2017).

The second set of variables is the macroeconomic factors affecting FS. The first macroeconomic factor, the output gap (OG), affects FS positively but insignificantly. The widening OG is, in fact, a reflection of the overheated economy characterized by financial imbalances. These imbalances indirectly accelerate FS through adverse feedback from financial vulnerabilities.

However, the variable is dropped from the specific model as its effect is weakly significant. The second macroeconomic factor affecting FS is the interest rate growth differential (IRGD). It is an indicator of debt sustainability. Negative IRGD stayed a pervasive feature for debt dynamics in such economies. However, this trend reversed in the late 2000s. It is attributed to turbulences in European regions, financial developments, and rising interest rates - a rise in interest rate differential - signals a destabilizing debt-to-GDP ratio. Consequently, a sovereign debt crisis and FS are more likely. A high debt ratio requires more resources devoted to reversing the debt trajectory.

Another set of variables affecting FS is fiscal fundamentals. The first factor is gross debt (GD) in emerging economies. A high level of GD raises interest payments that crowd out investment and signal market panic. Excessive debt hampers growth and impedes the ability of the government to formulate countercyclical fiscal policy. Thus, growing debt shows fiscal mismanagement, high fiscal risks, and FS. The government's overall balance (GOB) is the second fiscal factor that drives FS. A deficit makes the government more reliant on borrowing, which elevates public debt. A high debt trajectory translates into high FS.

Non-fiscal fundamentals characterize external and domestic factors. The government's current account balance (CA) is the first external factor. Any deterioration in CA reflects the loss of competitive position for emerging economies. Such losses increase the need for debt financing, which raises default risks and FS. This coefficient is statistically significant across all the models. Likewise, the second factor is a fall in the foreign exchange reserves (RES) held by the central bank, which halts the ability of the government to finance external liabilities. Falling reserves raise public debt as well as FS. However, the impact is highly insignificant in the general model, forcing us to drop it from the specific model.

Finally, the coefficient of private credit to the banking sector (DC), a domestic factor, is positive and significant at 1 percent. It indicates the spillover effect of private credit on the public sector. In periods of financial turmoil, governments finance most of the DC through government bailouts. A high demand for DC exerts pressure on public accounts, especially when the banking sector fails to supply credit to the private sector. Thus, the government rescues the banking crisis and curtails the possibility of negative feedback loops from banking to sovereign defaults. This analysis demonstrates that fiscal triggers, political risk, crisis spillover, and debt sustainability are vital in determining FS. The bottom part of the table reports reasonably high F-statistics and R^2. Thus, the model is a good fit and explains the variation in FisSI quite well.

Table 2: Driving Factors of Fiscal Stress for Emerging Countries, POLS Method

Model	General Model		Specific Model	
	(1)	(2)	(3)	(4)
Variables	All Observations	Excludes Outliers	All Observations	Excludes Outliers
PRI	5.7197** (0.016)	5.1963*** (0.003)	3.2930 (0.179)	4.5096** (0.011)
L.PRI	-4.3726* (0.064)	-3.2479* (0.064)	-1.0266 (0.658)	-0.8839 (0.597)
FinSI	0.5924*** (0.000)	0.5905*** (0.000)	0.6117*** (0.000)	0.6144*** (0.000)
OG	0.0204 (0.965)	0.5990** (0.026)	-	-
IRGD	1.7220** (0.013)	1.3639*** (0.008)	2.1268*** (0.005)	2.0172*** (0.007)
GD	0.0505*** (0.000)	0.0337*** (0.000)	0.0394*** (0.000)	0.0271*** (0.000)
GOB	-1.9259*** (0.009)	-2.3643*** (0.000)	-2.1546*** (0.000)	-2.3824*** (0.000)
CA	-0.0758*** (0.000)	-0.0360*** (0.002)	-0.0673*** (0.001)	-0.0210* (0.072)
RES	0.7930*** (0.000)	0.7624*** (0.000)	-	-
DC	0.4215* (0.0505)	0.3771** (0.0337)	0.2220** (0.032)	0.2847*** (0.000)
Constant	-0.0263*** (0.000)	-0.0266*** (0.000)	-0.0122*** (0.007)	-0.0160*** (0.000)
Observations	272	236	272	236
R-Squared	0.995	0.997	0.995	0.996
F-Statistics	1799.21*** (0.000)	2630.30** (0.000)	1749.8*** (0.000)	1567.87*** (0.000)

Notes: The dependent variable is FisSI. PRI denotes political risk. FinSI refers to the financial stress index. Macroeconomic factors driving FisSI are the output gap as a percent of potential GDP (OG) and interest rate growth differential (IRGD). Fiscal fundamentals include gross debt as a ratio of GDP (GD) and overall government balance as a percent of GDP (GOB). Non-fiscal fundamentals include two external factors, namely current account balance as a percent of GDP (CA) and foreign exchange reserves (RES), and domestic factor, namely domestic credit to the banking sector as a percent of GDP (DC) ***, **, and * represent significance at 1, 5, and 10 percent, respectively. Values in parentheses refer to P-values of individual coefficients. All the models used robust standard errors. Outliers are removed from model (2) and model (4) by applying *Hampel Identifiers* on the residuals of model (1) and (3), respectively.

Next, equation (1) is re-estimated by applying the fixed effects (FE) model. Before that, we chose between the fixed and Random effect models using the Hausman test. The null hypothesis states that the difference between coefficients is not systematic. A high-test statistic (or low probability) confirms the rejection of the null hypothesis. Thus, the Fixed Effect is our preferred model over the Random Effect. Table 3 reports results for the driving factors of FS using the FE Model.

The coefficient of FinSI is once again positive and statistically significant at 1 percent across all the models. It reflects the existence of complex dynamics between the financial and fiscal sides. High systemic financial risk accelerates fiscal risk, elevating concerns about fiscal sustainability in emerging economies. It confirms the notion of crisis overlap (Acharya et al., 2014; Tagkalakis, 2013; Elgin & Uras, 2013). The first macroeconomic factor driving FS is the output gap (OG). Such periods accompany monetary imbalances, generally financed by the government. Thus, public debt and fiscal risks increase. These findings are robust to the POLS model. The second macroeconomic factor, IRGD, has a positive and significant impact on FS at 10 percent in the specific model. It reveals that public debt is sustainable in emerging countries. A high gross debt as a percent of GDP (GD), the first fiscal factor, tends to elevate FS. The interplay of the interest rate and the GDP growth rate drives the debt ratio.

Table 3: Driving Factors of Fiscal Stress for Emerging Countries, FE Model

Model	General Model	Specific Model	General Model	Specific Model
	(1)	(2)	(3)	(4)
Variables	All Observations	Excludes Outliers	All Observations	Excludes Outliers
PRI	1.4431 (0.468)	2.7671** (0.019)	0.8021 (0.679)	2.8463** (0.025)
L.PRI	-0.9276 (0.612)	0.1607 (0.882)	-0.5922 (0.743)	-0.007 (0.995)
FinSI	0.657*** (0.000)	0.5787*** (0.000)	0.6516*** (0.000)	0.5885*** (0.000)
OG	1.862*** (0.000)	1.068*** (0.000)	1.9424*** (0.000)	1.0852*** (0.000)
IRGD	1.312*** (0.003)	0.3866 (0.103)	1.2516*** (0.004)	0.4260* (0.097)
GD	0.020 ***(0.000)	0.0204*** (0.000)	0.0191*** (0.002)	0.0197*** (0.000)
GOB	1.2594** (0.015)	-1.4837*** (0.000)	-1.290** (0.0150)	-1.3800*** (0.000)
CA	0.0101 (0.696)	0.0048 (0.739)	-	-
RES	-0.824***(0.000)	-0.4267*** (0.000)	-0.745***(0.000)	-0.3939*** (0.000)
DC	0.5429 (0.155)	0.1197 (0.633)	-	-
Observations	272	236	272	219
R-Squared	0.995	0.997	0.995	0.9945
F-Statistics	367.49***(0.000)	162.32*** (0.000)	459.59***(0.000)	206.69*** (0.000)
Notes: As for Table 2				

High GD is detrimental to fiscal sustainability as it raises FS in two ways: First, it generates sovereign risk directly through the higher principal amount of debt. Second, interest payments on public debt require a fiscal surplus to service debt. Thus, a high debt burden requires the government to allocate more funds for maintaining fiscal sustainability, which puts pressure on fiscal policy by enhancing fiscal risk and, hence, FS. The next fiscal factor is the government's overall fiscal balance (GOB). Worsening of GOB curtails the government's ability to respond to business cycles. Deficits lower national savings and raise the interest rate. It hampers the ability to service debt when high interest rate escalates FS, as fiscal sustainability is compromised.

Non-fiscal fundamentals influence FS moderately. First, deficits in the current account (CA) again have a positive but statistically insignificant impact on FS. Thus, we dropped CA from the general model. However, the second external factor, a change in RES, has a negative and statistically significant impact on FS at 1 percent across all the models. A higher level of RES lessens the burden on fiscal sustainability. High RES eases the payment of debt denominated in foreign currency. External debt constitutes a significant proportion of overall debt in emerging countries. The next factor is private credit to the banking sector (DC). An increase in DC elevates fiscal risk during the financial crisis. The supply of DC squeezes during such periods, and the government intervenes to support the banking sector. It ultimately exhausts government resources and raises government debt to avert negative feedback loops from the financial to the real economy. It puts pressure on the government's balance sheet and boosts FS. Overall, findings confirm that fiscal fundamentals, macroeconomic factors, crisis spillovers, and political risk are vital in explaining FS. The results are more or less robust in Table 2. A high R^2 and F statistics confirm that the fit is quite good, and the coefficients are jointly significant.

Next, the study investigates the driving factors of FS using dynamic models. Columns (1) to (4) in Table 4 present results for a one-step system, Generalized Methods of the Moment (henceforth System GMM). A high value of lagged FS tends to enhance FS in the current period. The finding suggests the presence of the dynamic effect. Moreover, this coefficient is statistically significant at the 1 percent level. The level and lagged values of PRI are incorporated to explore the impact of PRI on FS. The coefficient for lagged PRI is negative and significant. It shows that a high value of lagged PRI (low political risk) tends to decrease FS. Low political risk is a barometer of lesser uncertainty in formulating fiscal policy. Findings support crisis overlaps in the dynamic model. However, the magnitude of this impact is small in the dynamic model compared to static models presented in Tables 2 and 3.

Table 4: Driving Factors of Fiscal Stress for Emerging Countries, GMM Models

Method	**One-Step Generalized System GMM**				**Difference GMM**			
Model	**General Model**		**Specific Model**		**General Model**		**Specific Model**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variable	All Obs	Excludes Outliers	All Obs	Excludes Outliers	All Obs	Excludes Outliers	All Obs	Excludes Outliers
L.FisSI	0.6242*** (0.000)	0.6498*** (0.000)	0.5301*** (0.000)	0.5515*** (0.000)	0.4632*** (0.003)	0.2904*** (0.000)	0.4826*** (0.000)	0.522*** (0.000)
PRI	5.3954** (0.036)	5.1509** (0.012)	5.8943** (0.031)	4.6727*** (0.005)	5.3251 (0.105)	6.2873** (0.036)	9.3858** (0.013)	6.1980** (0.010)
L.PRI	-6.896*** (0.007)	-5.186*** (0.000)	-6.1053** (0.015)	-4.6749*** (0.000)	-5.8004** (0.018)	-5.2062** (0.017)	-7.133*** (0.004)	-5.0485** (0.028)
FinSI	0.2404*** (0.000)	0.230*** (0.000)	0.2907** (0.000)	0.2770*** (0.000)	0.3748*** (0.004)	0.498*** (0.000)	0.3587*** (0.001)	0.3897** (0.028)
OG	0.3085 (0.225)	0.2984 (0.214)	0.5632* (0.062)	0.2602* (0.053)	1.1077** (0.011)	0.7531*** (0.009)	0.9414** (0.014)	0.8127*** (0.006)
IRGD	0.5290 (0.125)	0.2396 (0.127)	0.3797* (0.052)	0.3985* (0.074)	1.4522 (0.479)	3.1142** (0.047)	-	-
GD	0.0145* (0.075)	0.0109 (0.131)	0.0250** (0.020)	0.0129*** (0.001)	0.0096 (0.436)	0.0205** (0.023)	0.0310** (0.033)	0.0218** (0.012)
GOB	0.8861 (0.295)	0.5726 (0.228)	-	-	-0.1440 (0.858)	-0.1196 (0.872)	-	-
CA	0.0616** (0.021)	-0.0587* (0.055)	-0.0360* (0.068)	-0.0276** (0.030)	0.0157 (0.772)	0.0168 (0.628)	-	-
RES	-0.0852 (0.612)	-0.0877 (0.612)	-	-	0.5951** (0.016)	0.3265 (0.136)	-	-
DC	0.2189 (0.595)	0.1003 (0.736)	-	-	0.3882 (0.526)	0.6310 (0.433)	-	-
Constant	0.0030 (0.689)	-0.001 (0.956)	0.001 (0.934)	-0.001 (0.769)	-	-	-	-
Obs	272	237	272	235	255	208	255	202
R Squared	0.3211	-0.0075	0.7255	0.7916	-	-	-	-
F-test Statistics	225.23*** (0.000)	125.38*** (0.000)	216.36*** (0.000)	171.91*** (0.000)	124.38 (0.000) ***	58.92 (0.000) ***	58.95 (0.000) ***	42.82 (0.000) ***
AR (1)	Z= -1.76* (0.079)	Z=-2.21** (0.027)	Z=-1.68* (0.093)	Z=-1.87** 0.061)	Z= -1.51 (0.131)	Z= -2.08 (0.038)	Z=-1.83 (0.067)	Z=-1.98 (0.048)
AR (2)	Z= -0.67 (0.500)	Z= 0.07 (0.948)	Z= -0.81 (0.420)	Z= -0.52 (0.603)	Z=-1.04 (0.300)	Z=-0.55 (0.585)	Z= -0.96 (0.338)	Z= 1.42 (0.155)
Hansen Test	10 (1.000)	4.11 (1.000)	12.36 (0.983)	12.06 (0.986)	9.46 (0.994)	11.50 (0.977)	11.20 (0.886)	13.07 (0.787)
Notes: As for Table 2								

Once again, fiscal fundamentals (IRGD), contribute significantly to raising FS, while non-fiscal factors appear to have little impact. Political risk, crisis spillover, fiscal fundamentals, and debt sustainability are vital in raising FS. The bottom part of Table 4 presents the results of the two diagnostic tests. The first test for serial correlation exhibits that the AR (1) term is significant, while the AR (2) is not significant. It confirms that the model is free from serial correlation. The second test, the Hansen J test for over-identifying restrictions, reveals that the null hypothesis is accepted. Thus, instruments and error terms are not correlated.

Finally, we estimate equation (1) using the difference GMM method. This method caters to the problem of endogeneity in the model. The authors include lagged dependent variables to assess the possible dynamics in the model. Columns (5) to (8) in Table 4 present the results of the difference in GMM. Overall, findings confirm that political risk, crisis spillover, systemic risk, and gross debt are crucial in explaining FS. The diagnostic tests confirm the presence of first-order serial correlation and the absence of second-order serial correlation. The J test results show that the restrictions are valid. The analysis of the driving factors of FS reveals that fiscal fundamentals are vital to explaining FS. The findings further suggest that emerging economies, characterized by

unsustainable debt levels, face an elevation in FS. Moreover, political factors play a significant role in intensifying FS. Another interesting conclusion is that non-contractual contingent liabilities induce high FS.

5. Conclusion and Policy Implications

This study examines the potential driving factors of FS for a panel of emerging countries. The authors utilize a set of factors, such as political risk, crisis spillovers, macroeconomic imbalances, fiscal fundamentals, non-fiscal vulnerabilities, and other factors. They select a sample of 17 emerging countries from 2000 to 2020. This study is unique in that it considers political risk and non-contractual contingent liabilities for determining FS. A range of panel data estimation methods is applied to conduct a robustness analysis. The study finds that fiscal fundamentals are crucial to deciding FS.

This finding is in line with Baldacci et al. (2011). Furthermore, lower debt sustainability, measured through high IRGD, elevates FS. The results further show that PRI plays a vital role in determining FS. Thus, political risk puts upward pressure on rollover risk in emerging countries. The results further suggest that high non-contractual contingent liabilities escalate FS. The authors draw the following policy implications: First, emerging economies should manage public debt, particularly external borrowing, and fiscal deficit, which may help them attain fiscal sustainability. Second, fiscal vulnerabilities significantly contribute to FS. Fiscal discipline may eradicate rollover risk. To this end, adopting fiscal rules may promote fiscal discipline. In this context, the successful experiences of Chile and Brazil can serve as a guideline for other emerging countries. Furthermore, establishing a regional fiscal union may facilitate coordinated fiscal policy responses during periods of financial crisis in emerging countries.

The countries should remember that the European Monetary Union is a failed union where conflicts arose over the fiscal bailout packages in the aftermath of the European debt crisis. The formation of a fiscal union committed to fiscal discipline may be a more pragmatic approach to achieving fiscal sustainability. However, this formation is not free from challenges of political will. Nevertheless, once formed, the union can serve as a regulatory body that provides timely guidelines to the countries to address challenges and promote best practices. Furthermore, the union can impose stringent fiscal discipline requirements that can help mitigate the risk of rollover. It can even obligate emerging economies to pool funds during periods of fiscal stability, which can be used as a fiscal buffer to safeguard member countries from rollover risk during financial crises. Emerging countries should strengthen their institutions, as strong institutions can promote fiscal discipline.

Acknowledgement
The authors acknowledge comments from the editor and anonymous reviewers.

Data Availability Statement.
Data will be provided on demand.

Funding:
This research has received no funding.

Conflict of Interest Disclosure Statement:
There is no conflict of interest among the authors of the study.

Ethical Approval:
This research article has not violated any ethical standards.

Appendix:

Table A1: List of Variables, Measurement, and Data Sources

Variables	Measurement	Source
Fiscal stress index for emerging countries	The weighted average index of fiscal stress for emerging countries based on GDP PPP weights	Author's calculations
Financial stress index for emerging countries	The weighted average index of fiscal stress for emerging countries based on GDP PPP weights	Author's calculations
Output gap	Percentage deviation of real GDP from potential GDP	Author's estimates
Interest rate growth differential	The interest rate on general government debt (deflated by the GDP deflator) minus the real GDP growth rate	Author's calculations
Government debt as a percent of GDP	Gross general government debt as a percent of GDP	World Development Indicators
General government overall balance as a percent of GDP	General government expenditures net of taxes plus interest payments	World Development Indicators
Current account balance as a percent of GDP	The ratio of the sum of exports and imports as a percent of GDP	World Development Indicators,
Foreign exchange reserves held by the central bank	Level of foreign exchange reserves in $, and SDRs, including gold	World Development Indicators,
Domestic credit to the private sector as a percent of GDP	Credit provided by the monetary authority, banks, and other corporations to the private sector	World Development Indicators,
Political risk index	Composite index through PCA	ICRG, PRS

Table A2: List of Sampled Countries

Argentina	Pakistan
Brazil	Peru
China	The Philippines
Colombia	Poland
Hungary	Russia
India	Thailand
Indonesia	Turkey
Malaysia	Venezuela
Mexico	

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