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Does fiscal transparency matter for financial (in)stability? An empirical study on emerging and developing countries

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Abstract

The purpose of the study is to examine to effect of fiscal transparency on financial instability in emerging and developing countries. On the top of the usual country-specific variables proposed by literature, the role of fiscal transparency is for the first time examined and found to be negative and significant beyond a certain threshold, confirming an inverted U-shaped relationship between fiscal transparency and financial instability. Our result has implications on the design of fiscal policy and on the fight against financial instability.

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1 Introduction

There is a growing number of studies that focus on the effects of fiscal transparency. According to International Monetary Fund (IMF, 2017, p. 1): fiscal transparency is defined as "*a comprehensive, relevant, timely, and reliable overview of the government's financial position and performance*." Most of research establishes that fiscal transparency underpins fiscal performance and sustains public debts (e.g., Alesina et al., 1999; Hameed, 2005; Alt and Lassen, 2006; Jarmuzek, 2006; Benito and Bastida, 2009; Sedmihradská and Haas, 2013; Arbatli and Escolano, 2015, etc.). Further, countries that benefit from a higher quality of fiscal governance observe low inflation rates (see Hameed, 2006; Montes and da Cunha Lima, 2018). This contradicts the conclusions of Menicali (2019) who, in a sovereign debt crisis scenario, finds that increasing fiscal transparency leads to greater inflation rates. Additionally, there is a positive relationship between economic growth and better transparency of fiscal practices (see Baldrich, 2005; Teig, 2006; Menicali, 2019). In the same context, de Mendonça and Calafate (2021) find that fiscal opacity erodes economic growth expectations in Brazil. Fiscal transparency is also a powerful tool to fight against corruption (see Haque and Neanidis, 2009; De Simone et al., 2017; Chen and Neshkova, 2020; Montes and Luna, 2020) and to improve government effectiveness (Montes et al., 2019). Those authors showed that increasing fiscal transparency is beneficial for government effectiveness in a mixed sample of developed and developing countries. It has both a direct effect and an indirect effect through improving fiscal performance. However, that effect is boosted further in developing countries if they adopt inflation targeting policy as recommended by Montes et al. (2019). Recently, Trabelsi (2022) identifies a positive and significant case of fiscal transparency -bank credit. She shows that fiscal transparency is an appealing tool to bank development and that this effect is transmitted through reasonable conduits. Further, Montes and Luna (2021) conclude for an important effect of fiscal communication for the credibility of the fiscal policy in Brazil.

Parallel to the effects of fiscal transparency, there is a voluminous strand of literature on the determinants of financial (in)stability wherein the common measure is the share of Non-performing Loans (NPLs). According to Schinasi (2004, p. 1): "*Financial stability is defined in terms of its ability to facilitate and enhance economic processes, manage risks, and absorb shocks. Moreover, financial stability is considered a continuum: changeable over time and consistent with multiple combinations of the constituent elements of finance.*" Most of the studies focus on the macroeconomic determinants of NPLs. This includes Espinoza and Prasad (2010), Louzis et al. (2010), Kauko (2012), Beck et al. (2015), Tanasković and Jandrić (2015), Dimitrios et al. (2016), Mazreku et al. (2018) and the list is not exhaustive. Other researches are concentrated on bank-specific variables. For example, Ghosh (2006) find that leverage affects NPLs. Podpiera and Weill (2008) establish a relationship between NPLs and cost efficiency. Dimitrios et al. (2016) show that NPLs are affected by managerial efficiency which is proxied by the return on equity. Khan et al. (2020) argue that efficiency and profitability are significant determinants of NPLs.[1]

Now, relating financial (in)stability to transparency has only received scant attention. To our knowledge, there are few papers that explore the relationship between transparency of policies and the stability of financial systems. The common thread across those papers is that they focus

[1] We note that our paper is not intended to give a review of the determinants of financial (in)stability. For a comprehensive and succinct literature review, we refer readers to Nikolopoulos and Tsalas (2017) and Manz (2019).

on transparency of financial stability itself. Indeed, Born et al. (2014) show that communication about financial stability reports decreases market volatility. Also, Čihák et al. (2012) argue that higher financial stability is associated with higher quality of financial stability reports. Based on a comprehensive index of financial stability transparency, Horváth and Vaško (2016) report that financial instability decreases up to a certain threshold of financial stability transparency, while van Duuren et al. (2019), using the same index, conclude that it reduces financial instability if countries have a low institutional quality. Despite the calls to increasing transparency and the significant efforts to analyze its effects, the empirical question on how transparency of fiscal policy affects the health of financial systems remains unexplored. This paper tries essentially to fill this gap. For instance, Das et al. (2010) claim that poor debt management can worsen financial stability. Dumičić (2019) identifies channels through which fiscal policy affects financial (in)stability. The author argues that public debt management, tax policies and fiscal sustainability could have direct and indirect effects on systemic risks. Further, the impact of fiscal policy on financial cycles directly mitigates the harmful effects of financial crisis.

Both fiscal transparency and financial stability have been of much discussion in literature, but this is the first time that we make a convincing case for an empirical relationship between them in emerging and developing countries. This paper examines whether fiscal transparency impacts financial (in)stability by employing two widely used metrics of financial (in)stability, namely the share of non-performing loans to total gross loans and banking crisis dummy. Particularly, we show that an inverted U-shaped relationship exists between the index of Wang et al. (2015) and financial instability proxies. Our result is robust to different specifications of the same model.

The rest of the paper is organized as follows. We present data and the empirical strategy in Section 2. We expose and discuss the results in Section 3 and Section 4 concludes.

2 Method and data

In this paper, we employ country-specific variables affecting the share of non-performing loans to total loans (NPLs), which will be used as the dependent variable in the baseline regressions. We estimate a dynamic panel model by following earlier literature that explore the determinants of NPLs as a dynamical process (e.g., Dimitrios et al., 2016) and by using the system GMM method consistently with Blundell and Bond (1998) and Arellano and Bover (1995). The method of estimation is known to accommodate the case where the number of cross sections is higher than the temporal dimension. Furthermore, the system GMM overcomes the endogeneity bias. The endogeneity problem normally derives from the existence of omitted variables, measurement errors of the variables included in the model, and/or simultaneity between the dependent and independent variables (see Barros et al., 2020). Using the ordinary least squares (OLS) or the standard fixed effect estimator to estimate a dynamic panel model leads to biased estimates (Nickell, 1981) because the assumption of absence of correlation between the lagged dependent variable and the error term is necessarily violated. Some other regressors can also be potentially endogenous. Arellano and Bond (1991) assert that the estimates from system GMM are grounded even in the case of omitted variables. We use instruments based on lagged values of the dependent variable and of the explanatory variables. The validity of the set of instruments is performed with the test of overidentifying restrictions of Hansen (1982). As a part of the diagnostic tests, we limited the number of instruments to be less than the number of countries and we checked for the second order serial correlation (see Roodman, 2009a, b).

We focus on 155 emerging and developing countries over the period 1998-2014 (see Table A-1 in Appendix). Data availability is the sole reason behind the choice of the aforementioned period of investigation. Furthermore, missing data roughly reduces the sample size to the half. We retrieve data from the World Development Indicators database and Global Financial Development database for the controls. We used particularly macroeconomic variables that have been found to affect the fragility of the banking sector in literature. We employ GDP growth, GDP per capita (in log), two proxies of financial development, namely, credit to the private sector by banks as a share of GDP and market capitalization, trade openness, inflation rate, real interest rate, exchange rate, lending rate and unemployment rate. The variable of interest, namely fiscal transparency, is collected from Wang et al. (2015). The authors generously provide a database for a high number of countries. Their measure is compiled using Government Finance Statistics Yearbooks which provide data of finances related to six items: General Government, Central government, state government, local government, budgetary government and extrabudgetary government. For each of these items, Wang et al. (2015, p. 9) "*give a country score according to the breadth of the institutional coverage for that item*:

0 if it does not report the item
1 if it reports the item for the budgetary central government, but not central, not general government
2: if it reports the item for central government, but not general government.
3: if it reports the item for the general government"

The index of fiscal transparency is then converted on the scale of 100 and ranges, therefore, over the interval [0,100]. A high score implies higher transparency in the fiscal practices.

Depending on the set of controls, we estimate multivariate specifications of the following model

$$\mathrm{NPLs}_{it} = \alpha \mathrm{NPLs}_{it-1} + \theta_1 \mathrm{FT}_{it} + \theta_2 \mathrm{FT}_{it}^2 + \beta' \mathbf{X}_{it} + \varepsilon \quad (1)$$

where **X** is a vector of the controls, FT and FT^2 denote fiscal transparency index and the squared term of fiscal transparency, the subscripts i and t denote the country and time dimensions, respectively. The autoregressive coefficient α tests for the persistence of NPLs and we expect a positive and statistically significant sign.

3 Results and discussion

3.1 Results

The scatterplot in Figure 1 is not conclusive on the form of the relationship between fiscal transparency and the share of NPLs. So, we move onto panel regressions to extract the exact type of the function (i.e., linear/nonlinear). The idea of the existence of an optimal threshold of fiscal transparency in our case comes from previous theoretical literature on monetary policy transparency (Walsh, 2007; Cukierman, 2009; van der Cruijsen et al., 2010) and that too much transparency might lead to inefficient liquidated banks. Further, Gick and Pausch (2012) and Goldstein and Sapra (2014) build models showing that the excessive public dissemination of macro stress tests improves market discipline if there are excessive informational frictions. This fact was empirically proved by Horváth and Vaško (2016) who conclude a U-shaped quadratic relationship between monetary policy transparency and financial instability. However, the line of reasoning works in the opposite direction (inverted U-shaped) in our case because we consider that more is better for the health of financial systems and governments in emerging

and developing countries, specifically, are urged to increase fiscal transparency as the levels are already low in those countries. In the discussion sub-section, we motivate further the finding of an inverted U-shaped link.

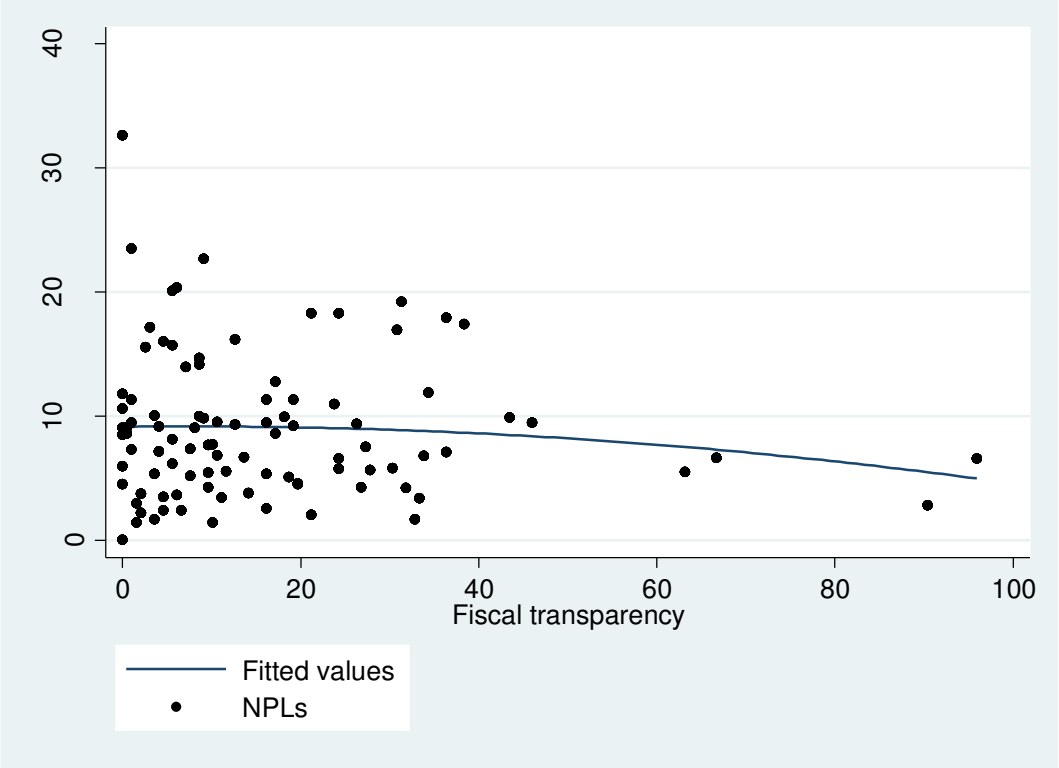

Figure 1 Average NPLs and fiscal transparency in emerging and developing countries

The estimation results of our model are presented in Table 1, where the coefficients of the quadratic form are presented along with their corresponding Windmeiger (2005) corrected robust standard errors. We estimate multivariate regressions that only differ in the set of control variables included in each estimation. As a preliminary analysis (not reported), we checked for a linear relationship between fiscal transparency and financial instability. Our results fail to detect a significant linear form for our sample. We, therefore, hypothesize a quadratic regression. Based on Eq. (1), the first partial derivative with respect to fiscal transparency is given by

$$\frac{\partial \text{NPLs}}{\partial FT} = \theta_1 + 2\theta_2 FT \tag{2}$$

Consistently with Eq. (2), we have an inverted U-shaped relationship if $\theta_1 > 0$ and $\theta_2 < 0$. The threshold beyond which fiscal transparency reduces financial instability is achieved when the first partial derivative in Eq. (2) is null. In other terms, we have

$$\widehat{FT} = -\frac{\widehat{\theta_1}}{2\widehat{\theta_2}}$$

The usual and common procedure implies that both $\widehat{\theta_1}$ and $\widehat{\theta_2}$ have the correct sign and are individually significant. Lind and Mehlum (2010) propose an appropriate test of U-shape or inverted U-shape that consists of checking two necessary conditions: (1) The sign of the second derivative has the proper sign (in our case $\theta_2 < 0$). (2) The estimated extremum point (i.e., $\widehat{FT}$) is within the data range.

Table 1. Effect of fiscal transparency on the share of NPLs

	(1)	(2)	(3)	(4)	(5)	(6)
Fiscal transparency	0.067**	0.066*	0.066*	0.082*	0.061*	0.073*
	(0.032)	(0.039)	(0.040)	(0.043)	(0.033)	(0.042)
Fiscal transparency^2	-0.001**	-0.001*	-0.001*	-0.001**	-0.001**	-0.001*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Country-specific controls	Yes	Yes	Yes	Yes	Yes	Yes
N° observations	785	756	743	637	637	729
N° countries	89	87	86	76	76	83
N° instruments	67	72	85	72	60	74
AR1 (p-value)	0.058	0.051	0.069	0.073	0.074	0.062
AR2 (p-value)	0.159	0.146	0.150	0.119	0.103	0.141
Hansen test of over-identification restrictions (p-value)	0.295	0.527	0.482	0.172	0.473	0.221
Slope at the minimum	0.067	0.066	0.066	0.082	0.061	0.073
Slope at the maximum	-0.066	-0.061	-0.073	-0.075	-0.054	-0.082
Inverted U-test	1.986	1.698	1.652	1.852	1.847	1.650
Inverted U-test (p-value)	0.024	0.045	0.049	0.032	0.033	0.050
Extremum point	50.345	52.004	47.310	52.293	53.019	47.134
Data range	[0,100]	[0,100]	[0,100]	[0,100]	[0,100]	[0,100]

Robust standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

According to Table 1, both fiscal transparency and the squared term of fiscal transparency enter the model significantly and both have their proper signs. However, as claimed by Lind and Mehlum (2010), the inverted U-shaped relationship should not be assessed on the basis of the statistical significance of the individual coefficients. We, therefore, present the overall test of the inverted U-shape, the extremum point and the data range. The last lines of Table 1 corroborate the finding of a quadratic relationship between fiscal transparency and the share of NPLs at the conventional statistical levels. Particularly, the publication of high quality of information about governments' borrowing, spending, and the management of public assets and liabilities leads to a decline in financial instability beyond a certain value. The size of the threshold varies between 47.134 and 53.019 and it is within the data range ([0,100]).

As a robustness check, we replicate the econometric analysis by substituting the share of NPLs by the banking crisis dummy which equals one if a systemic crisis occurs in a country and 0 otherwise. The associated data are collected from Laeven and Valencia (2013) who date systemic banking crises based on the intensity of the policy response to reduce the use of subjective criteria to identify crisis episodes. Laeven and Valencia (2013, p. 228) define a banking crisis as "*an event that meets two conditions:*

- ✓ *Significant signs of financial distress in the banking system (as indicated by significant bank runs, losses in the banking system, and/or bank liquidations).*
- ✓ *Significant banking policy intervention measures in response to significant losses in the banking system.*"

Then, we estimate a panel logistic regression with fixed effects. Using OLS estimates in that case is not efficient and induce biased standard errors and p-values as advanced by Allison

(1999).[2] Results are available in Table 2. We again find a significant inverted U-shaped relationship between fiscal transparency and the occurrence of banking crisis dummy. The second partial derivative ($\widehat{\theta_2}$) is negative as expected and statistically significant. The level of fiscal transparency beyond which it reduces the occurrence of financial crisis is within the range of data and it varies between 36.639 and 39.612. Overall, our results imply that increasing transparency of fiscal practices is demanding in emerging and developing countries.

Our results imply that not only higher fiscal transparency levels foster the overall economic governance and support the fight against corruption but also, they will pay off in terms of healthier financial systems and crisis management and prevention.

Table 2. Effect of fiscal transparency on banking crisis

	(1)	(2)	(3)	(4)	(5)	(6)
Fiscal transparency	0.169**	0.223*	0.271*	0.171*	0.363**	0.228**
	(0.083)	(0.119)	(0.151)	(0.098)	(0.157)	(0.112)
Fiscal transparency^2	-0.002**	-0.003*	-0.003*	-0.002*	-0.004**	-0.003**
	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Country-specific controls	Yes	Yes	Yes	Yes	Yes	Yes
N° countries	71	71	71	62	62	71
Slope at the minimum	0.169	0.223	0.271	0.171	0.363	0.228
Slope at the maximum	-0.293	-0.371	-0.413	-0.266	-0.527	-0.395
Inverted U-test	1.902	1.841	1.782	1.602	2.217	1.912
Inverted U-test (p-value)	0.031	0.035	0.040	0.057	0.015	0.030
Extremum point	36.658	37.518	39.612	39.141	40.760	36.639
Data range	[0,100]	[0,100]	[0,100]	[0,100]	[0,100]	[0,100]

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

3.2 Discussion

When governments increase the degree of transparency of information, this lead, in the first place and according to our results, to an increase in financial instability. Indeed, starting from a zero level of transparency which fits an authoritarian regime (for example), any increase in the level of communication seems to have a disruptive effect. Economic agents who are not used to that kind of information or believe that economic climate is not favorable often find it difficult to trust that information at the first glance. The introduction of transparency seems therefore to have a negative effect on financial stability. However, beyond a certain value of fiscal transparency, markets get attentive to the disclosed information and trust more information conveyed by the government. In that case, credibility about a country's fiscal plans is strengthened and market confidence in the work of public institutions is underpinned. Financial instability, therefore, decreases. This is the case, for example, of democratic countries wherein we observe high degrees of fiscal transparency and stable financial systems.

4 Conclusion

Using system GMM method and annual data of emerging and developing countries in the 1998-2014 period, we find that fiscal transparency exerts a negative and a statistically significant

[2] Allison (1999) identifies three potential issues which lead to biased estimates if OLS is used, namely, heteroscedasticity, non-normality and possibly non-linearity.

impact on financial instability only when it exceeds a certain threshold. Our result is robust for the use of two indicators of financial instability. This is the first empirical study that explores the real role of fiscal transparency in the stability of the financial systems. The finding of an inverted U-shape could be useful when designing fiscal policies as well as policies to achieve financial stability. In sum, increasing fiscal transparency beyond a certain threshold is mandatory in emerging and developing countries. In other terms, governments seeking to improve the stability of financial systems in emerging and developing countries should increase further the current levels of fiscal transparency. Future research could be devoted to the update of data on fiscal transparency and explore its effects on other economies' regions. Further, Fiscal transparency favors a faster and more adapted reaction to economic conditions and reduces, then, the severity of different crises. Indeed, the unprecedented sanitary crisis appealed governments to take economic responses to limit the impact of Covid-19. For instance, Wending et al. (2020) argue that fiscal transparency is one the key pillars for the success of the Covid-19 to fiscal policy response. In addition, Małecka-Ziembińska (2021) highlight the importance of fiscal transparency in the process of recovering from the crisis, which strengthens public finance and reduces the borrowing costs in emerging and low-income developing countries. Incoming research could focus on the effects of fiscal transparency on financial stability in the era of the pandemic crisis. Such research is akin to the availability of data at reasonable frequency and for our sample of countries. Finally, we believe that disaggregating the determinants of financial instability in the same sample of countries is an appealing research question.[3]

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[3] We are grateful to an anonymous reviewer for this suggestion.

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Appendix

Table A-1. List of countries

Afghanistan	Cameroon	Guatemala	Marshall Islands	Rwanda	Ukraine
Albania	Central African Republic	Guinea	Mauritania	Samoa	United Arab Emirates
Algeria	Chad	Guinea-Bissau	Mauritius	Sao Tome and Principe	Uruguay
Angola	Chile	Guyana	Mexico	Saudi Arabia	Uzbekistan
Anguilla	China	Haiti	Micronesia	Senegal	Vanuatu
Antigua and Barbuda	Colombia	Honduras	Moldova	Serbia	Venezuela
Argentina	Comoros	Hungary	Mongolia	Seychelles	Vietnam
Armenia	Congo	India	Montenegro	Sierra Leone	Yemen
Aruba	Congo, Dem. Rep.	Indonesia	Montserrat	Solomon Islands	Zambia
Azerbaijan	Costa Rica	Iran	Morocco	Somalia	Zimbabwe
Bahamas	Cote d'Ivoire	Iraq	Mozambique	South Africa	
Bahrain	Croatia	Jamaica	Myanmar	Sri Lanka	
Bangladesh	Cuba	Jordan	Namibia	St. Kitts and Nevis	
Barbados	Cyprus	Kazakhstan	Nepal	St. Lucia	
Belarus	Djibouti	Kenya	Nicaragua	St. Vincent and Grenadines	
Belize	Dominica	Kiribati	Niger	Sudan	
Benin	Dominican Republic	Kuwait	Nigeria	Suriname	
Bermuda	Ecuador	Kyrgyz Republic	Oman	Swaziland	
Bhutan	Egypt	Lao PDR	Pakistan	Syria	
Bolivia	El Salvador	Lebanon	Palau	Tajikistan	
Bosnia and Herzegovina	Equatorial Guinea	Lesotho	Panama	Tanzania	
Botswana	Eritrea	Liberia	Papua New Guinea	Thailand	
Brazil	Ethiopia	Libya	Paraguay	Togo	
Brunei Darussalam	Fiji	Macedonia	Peru	Tonga	
Bulgaria	Gabon	Madagascar	Philippines	Trinidad and Tobago	
Burkina Faso	Gambia	Malawi	Poland	Tunisia	
Burundi	Georgia	Malaysia	Qatar	Turkey	
Cabo Verde	Ghana	Maldives	Romania	Turkmenistan	
Cambodia	Grenada	Mali	Russia	Uganda	