sciendo

UDK: 336.71(611)
DOI: 10.2478/jcbtp-2023-0006

Journal of Central Banking Theory and Practice, 2023, 1, pp. 107-148
Received: 19 July 2021; accepted: 11 November 2021

Emna Trabelsi *

* *Department of Quantitative Methods, University of Sousse, Tunisia and Social and Economic Policy Analysis Laboratory, Tunis, Tunisia*

E-mail: emna.trabelsi2007@yahoo.fr

Does Fiscal Transparency Matter for Bank Development? A Lookup on Emerging and Developing Countries

Abstract: This paper examines how fiscal transparency is linked to bank development. It also hypothesizes that the effect is mediated by reasonable channel(s). Drawing upon a panel dataset of emerging and developing economies, we find that fiscal transparency is positively related to the private credit and to the ratio of liquid assets, implying that more transparent policies enhance bank development. Our panel regressions and the mediation analysis also suggest that the effect of fiscal transparency on private credit is significantly transmitted through the control of corruption, while it has a direct effect on the ratio of liquid assets.

Keywords: fiscal transparency, bank development, dynamic panel, mediation, bootstrapping.

JEL Classification: C23, E52, E58, E62.

1. Introduction

Many research papers have been devoted to studying financial development-economic growth nexus (e.g., Arestis and Demetriades, 1997; Levine, Loyaza and Beck, 2000; Allen and Gale, 2000; Beck and Levine, 2002, Demetriades and Andrianova, 2004; Demetriades, 2008; Asanović, 2020; etc.). Meanwhile, considerable work has been done to analyze the determinants of financial development.

For example, empirical works identify real per capita GDP and inflation as major drivers of both stock market and bank development (Boyd, Levine, Smith, 2001; Ben Naceur and Ghazouani, 2005). Openness of economies to trade and capital flows also leads to a strong financial sector (e.g., Kostas, 2002; Huang, 2005; Huang and Temple, 2005; Chinn and Ito, 2006; Baltagi, Demetriades and Law, 2009; Voghouei, Azali and Law, 2011; etc.). Others support the role of economic institutions in explaining the development of the financial sector with split views of linear and nonlinear effects (see Herger et al., 2007; Baltagi et al., 2009; Law and Azman-Saini, 2012; Tanasković and Jandrić; Oueslati and Ouerghi, 2018; Bayar, 2019; etc.)

We recognize that the framework of financial development and its determinants is rich in valuable contributions and these contributions are excellent anchors to identify a set of standard factors of financial development.[1] A significant body of the literature also links fiscal policy to financial development with the focus on fiscal instruments such as public debt, taxes or budgetary balance (see Section 2 for an overview). Despite fruitful efforts that are devoted to enlightening the role of fiscal policy in the development of financial systems, knowledge regarding an important aspect of fiscal policy- namely fiscal transparency- is totally absent. This paper essentially tries to fill this gap. One exception is Dutta and Mukherjee (2018) who conclude a positive correlation between financial development and a multidimensional transparency index, including the release of fiscal, financial, economic, and social information. Two notable differences exist between Dutta and Mukherjee`s and our paper. The first difference is that our index of fiscal transparency stands on its own. In other terms, we use a measure of transparency that only covers information about fiscal practices. The second difference relates to the direction of causality between financial development and the index of transparency. While Dutta and Mukherjee examine whether their multidimensional index of transparency is higher in more financially developed countries, we hypothesize that countries become more financially developed when they benefit from increased transparency in fiscal practices.

Our paper is the first to provide empirical evidence on the role of fiscal transparency as a potential determinant of bank development in emerging and developing countries. The result is robust to the use of two different proxies of bank development. We also provide the mechanisms for the transmission of the effect that underlie such empirical evidence by applying panel and mediation analyses.

---

[1] Please note that the present paper is not intended to give an extensive literature review on the determinants for financial development. However, we refer readers to Huang (2005) and Voghouei, Azali and Al Jamali (2011) who provide an excellent comprehensive overview of financial development and its determinants.

The rest of the paper is organized as follows. In Section 2, we review papers that relate fiscal policy to bank development. Section 3 explores potential ways with which fiscal transparency could impact the development of banking sector. In Section 4, we present data and the empirical model. Section 5 displays the results and discusses the findings. We confer the concluding points in Section 6.

2. Theoretical foundation and empirical evidence on the effects of fiscal policy on bank development

The theoretical exploration of the relationship between fiscal policy and financial development is almost scant. Two notable exceptions are of Caballero and Krishnamurthy (2004) and Ismihan and Ozkan (2012). The former proposes a theoretical model of the "crowding-out" effect of fiscal shocks on financial depth.[2] The model is then tested empirically and the authors conclude that the liquid assets of developing countries decline as the government deficits increase. They also note that the effect is more severe during crisis times. Ismihan and Ozkan develop a theoretical framework in which they also put the evidence of a "crowding-out" effect of public debt on financial development when the government is the dominant borrower. Their main conclusion, especially applies to the case of emerging and developing countries. Empirically, earlier papers fail to find a significant relationship between fiscal policy variables and the depth of financial development. This includes Boyd, Levine, Smith (2001) and Cuadro Saez, Gallego and Garcia-Herrero (2003) who use central government expenditures to GDP and fiscal deficits as instruments of fiscal policy, respectively. Detragiache, Gupta and Tressel (2005), however, find opposite effects of public debt on the ratio of deposits and loans and on private credit. Importantly, they find that public debt decreases the ratio of bank credit. The same finding is achieved by Cottarelli, Dell'Ariccia and Vladkova-Hollar (2005). Christensen (2005) documents that government debt may hinder the development of financial markets. Particularly, domestic debt negatively affects the private sector lending in Sub-Saharan African countries. Hauner (2006) finds that government borrowing from banks is likely to harm the depth and the quality of financial development of middle-income countries. In Hauner (2008), fiscal policy is approximated by credit to governments. The author finds that the effect of that variable depends on the level of development of the economies and on the aspect of bank sector development being studied. This includes deepening, profitability and efficiency. Hauner (2009) shows that higher public debt necessarily decreases the private credit in

[2] The "crowding-out" effect refers to the case where more public spending decreases private sector spending.

developing countries. Ayadi, Arbak, Ben Naceur and De Groen (2015) give support to the "crowding-out" effect hypothesis again and come to the conclusion that excessive fiscal deficits undermine the efficiency of the banking sector in Southern and Eastern Mediterranean countries. Also, Mun and Ismail (2015) share the view that public debt undermines private investment in Malaysia, especially in crisis episodes.

Fiscal policy is of paramount importance alongside monetary policy to the economic and financial environment as a whole. But can we say the same for fiscal transparency? The line of reasoning is founded on the idea that the effect of fiscal transparency on bank development is transferred indirectly through intermediate variables, called channels or mediators, so that comprehensive, clear, reliable, and timely communications about governments' activities may curb bank systems' behaviour in a beneficial direction. In order to have a coherent empirical exercise, we need to identify those channels (or mediators) using reasonable arguments from literature.

3. Potential channels and hypothesis development

Fiscal transparency has been the flavour of contemporaneous papers for its contribution to improve fiscal performance, corruption deterrence and monetary policy effectiveness. More transparency increases the credibility of governments and lowers the financial market risk premiums (Kopits and Craig, 1998). This is the reason why some central banks (Federal Reserve, the Bank of Japan, the Bank of England, and the Swedish Riksbank) allot about 2 to 4% of their monetary policy public statements to fiscal issues (Allard, Catenaro, Vidal and Wolswijk, 2014).[3] Fiscal transparency refers to the disclosure of high-quality information about the history of government spending, borrowing, raising taxes, and managing public assets and liabilities.[4] The relationship between fiscal transparency and bank development is based on four premises: First, many studies support the positive link between fiscal transparency and fiscal performance. Alesina, Hausmann, Hommes and Stein (1999) conclude that more transparency of budget in-

[3] Another strand of literature endogenizes fiscal transparency and grants a special focus on its institutional or political factors rather than on its effects (e.g., Alt, Lassen and Rose, 2006; Wehner and de Renzio, 2013; Allard et al., 2014; Andreula and Chong, 2015; Cicatiello, De Simone and Gaeta, 2017). However, we are only interested in the effect of fiscal transparency and not its determinants.

[4] A comprehensive codification of fiscal transparency was initiated by the International Monetary Fund (IMF) in 1998 with the publishing of the IMF's Code of Good Practices on Fiscal Transparency.

stitutions is associated with more fiscal discipline. Alt and Lassen (2006) identify a robust reducing-effect of their transparency index on public debt, while Benito and Bastida (2009) and Sedmihradská and Haas (2013) note a negative impact of fiscal transparency on the budget deficit. Also, Hameed (2005) shows that fiscal discipline is improved in most transparent countries. The same result is achieved by Jarmuzek (2006) for transition economies. Arbatli and Escolano (2015) argue that fiscal transparency is a leading determinant of fiscal performance. As shown in Section 2, public debt undermines the development of the banking sector. The second premise of our analysis rests on empirical evidence of fiscal transparency-corruption relationship. For instance, Hameed (2005), Sedmihradská and Haas (2013), Luna and Montes (2017) and Chen and Neshkova (2020) show that countries with higher transparency in fiscal practices enjoy the benefit of corruption deterrence. Montes and Luna (2020) corroborate this finding, while controlling for legal aspects. More corruption, in turn, decreases the private credit (Chinn and Ito, 2006; Cherif and Dreger, 2016). Inflation is the third channel that potentially transmits the effect of fiscal transparency in the private credit. For instance, Hameed (2006) and Montes and da Cunha Lima (2018) show that higher fiscal transparency undermines the inflation rate. The last probable channelling effect occurs via real economic growth. Indeed, Baldrich (2005) and Teig (2006) share the view that higher rates of economic growth are achieved in economies with better quality of fiscal governance. It will be remembered from the introduction that the development of the financial sector increases during economic expansion.

The discussion above can be distilled into the following hypothesis for empirical analysis.

Hypothesis 1. Fiscal transparency positively affects the development of the banking sector. The effect is likely to be transmitted by one or more channels.

4. Data and Methodology

4.1. Data

Our empirical analysis employs an unbalanced panel of 155 emerging and developing countries (see Table A-1 in Appendix A). Data availability restricts the period under investigation to 1998 - 2015. Due to missing data, the number of countries decreases and varies according to the variant of the model estimated. Compared to the advanced economies, emerging and developing countries had experienced relatively more episodes of financial instability which led to increased demand for policies' transparency.

For the dependent variable, we use the ratio of bank credit to GDP from the Global Financial Development database to measure bank sector development. According to Levine, Loyaza and Beck (2000), credit to the private sector is an important determinant of economic growth.

Many efforts have been invested in constructing relevant measures of fiscal transparency from several sources. We choose the target variable from Wang et al. (2015). The authors construct a generous dataset based on the IMF`s fiscal reporting database. According to our observations, Russia and El Salvador are the most transparent countries in terms of fiscal reporting. The International Budget Partnership also provides an index of budget transparency every two years starting from 2006.[5] However, the open budget index is available only for a short time period. Hence, we disregard it for insufficient observations.

In addition to the core variable, we employ a thorough set of macroeconomic variables - openness, institutional and structural determinants that are shown to contribute to bank development in many papers (e.g., Aisen and Franken, 2010; Voghouei, Azali and Al Jamali, 2011; Ben Naceur, Cherif and Kandil, 2014; Pham, 2015; Almarzoqi, Ben Naceur and Kotak, 2015; Aluko and Ajayi, 2018; etc.). We gather data from the World Bank and other sources. Detailed description of the variables is presented in Table A-2, followed by the Pearson correlation matrix in Table A-3 (see Appendix A). From the World Bank`s World Development Indicators database, we select real GDP per capita growth. The direction of causality between economic growth and financial development is nicely examined by Calderón and Liu (2003). Because both causal directions coexist (i.e., financial development promotes economic growth and economic growth fosters financial development) and since the target of the paper calls for a demanding-following hypothesis, we expect that a higher economic growth stimulates bank development. We incorporate the inflation rate in our model as the previous literature establishes that higher inflationary pressures decrease the share of bank credit. We add age dependency ratio, which is a demographic determinant that reflects the number of nonworking age people relative to working age ones. A higher dependency ratio implies a lower productivity growth, a higher government spending, and a lower long-run rate of economic growth. We expect a negative effect on bank development (Almarzoqi, Ben Naceur and Kotak, 2015). Also, trade openness, defined as the sum of imports and exports as a share of GDP, is known to contribute to higher levels of the private credit (see Baltagi, Demetriades and Law,

[5] "The International Budget Partnership is a global partnership of budget analysts, community organizers, and advocates working to advance public budget systems that work for people, not special interests", from https://internationalbudget.org/about-us/

2009; Gozgor, 2014). Furthermore, we use capital controls from Chinn and Ito (2006) as a proxy of financial globalization. It is expected that the amount of credit allocated by the banks to the private sector grows as the countries become more integrated to the foreign financial markets (Baltagi Demetriades and Law, 2009; Chen, Hamori and Kinkyo, 2016). Finally, we select control of corruption from the World Bank`s Worldwide Governance Indicators database. We expect that the ratio of bank credit is higher in countries with better quality of institutions (Huang, 2005; Baltagi Demetriades and Law, 2009; Law and Azman-Saini, 2012; Gazdar and Cherif, 2014; etc.).[6] While better information transparency and independence lead to a stronger banking sector, bank development might improve transparency of economic policies. Thus, we treat fiscal transparency as endogenous. Real GDP per capita growth, inflation, financial openness, and the control of corruption are potentially endogenous as well. Lastly, we assume that trade openness and age dependency ratio are exogenous in all specifications of the model.

4.2. Methodology

We make use of panel data for the empirical exercise. Panel models offer more accurate and efficient estimates than cross-sectional or time series regressions due to the high degree of freedom (Hsiao, 2007). To capture the effect of the variable of interest, we estimate a dynamic panel model as follows

$$\mathrm{Y}_{i,t} = \alpha \mathrm{Y}_{i,t-1} + \beta^{'} \mathbf{X}_{i,t} + \mu_i + \vartheta_t + \varepsilon_{i,t}, \;\; i = 1,2,\dots,N \quad t = 2,3,\dots,T \tag{1}$$

where $\mathrm{Y}_{i,t}$ is the ratio of bank credit to GDP, $\mathbf{X}_{i,t}$ is the vector of explanatory variables including the index of fiscal transparency and the control variables. The terms $\mu_i + \vartheta_t + \varepsilon_{i,t}$ are the country-specific units, time dummies, and the idiosyncratic error term. By specifying Eq. (1), we expect that the autoregressive parameter α is persistent but lower than one.[7,8]

---

[6] One can also consider institutional variables such as law and order, bureaucratic quality, etc. from the International Country Risk. However, we cannot access the related data because they are available at a cost. Furthermore, we do not include the legal rights index because data are available from the World Bank starting from 2013. Including remittances in the model does not qualitatively alter the results of the regressions but the variable itself always shows a statistically insignificant coefficient. Consequently, we choose to delete it from the model.

[7] Baltagi, Demetriades and Law (2009, p. 287) argue that "…Even flow variables, such as bank credit, are likely to display persistence from year to year."

[8] As a preliminary analysis, we conduct the Fisher unit root test on all variables. We find that only the ratio of bank credit is non stationary in level, but becomes stationary in first difference (see Table A-4 in Appendix).

Including the lagged dependent variable in the model raises an endogeneity concern because $Y_{i,t-1}$ is necessarily correlated with the unobserved country-specific effects μ_i. Using the ordinary least squares or the standard fixed effect estimator in such a case leads to biased estimates (Nickell, 1981). To wipe out the fixed effects, Arellano and Bond (1991) suggest first differencing Eq. (1) and then using lagged variables in levels $y_{i,t-2}$ and $X_{i,t-2}, t = 3, \dots, T$ as instruments for the transformed equation as given by Eq. (2) under the assumption of no serial correlation in the error term $\varepsilon_{i,t}$.

$$\Delta Y_{i,t} = \alpha \Delta Y_{i,t-1} + \beta' \Delta \mathbf{X}_{i,t} + \Delta \vartheta_t + \Delta \varepsilon_{i,t}, i = 1,2, \dots, N \quad t = 2,3, \dots, T \tag{2}$$

Eq. (2) implies that the following moment conditions are satisfied for the lagged dependent variable, it indicates that lags 2 or higher can be used as a valid set of instruments

$$\boldsymbol{E}[Y_{i,t-s} \Delta \boldsymbol{\varepsilon_{i,t}}] = \mathbf{0}, \;\; t = 3, \dots, T \;\text{ and }\; s = 2, \dots, t-1$$

However, some regressors in the vector $\mathbf{X}_{i,t}$ might also be endogenous when there is, for example, a reverse causality. This entails the absence of correlation between the endogenous regressor and future shocks to the dependent variable, thereby satisfying the following moment condition

$$\mathbf{E}[\mathbf{X}_{i,t-s} \Delta \boldsymbol{\varepsilon_{i,t}}] = \mathbf{0}, \;\; t = 3, \dots, T \;\text{ and }\; s = 2, \dots, t-1$$

If a regressor is predetermined, then only lagged values can be used as instruments. Thus, the predetermined regressor is uncorrelated with current and future shocks to the dependent variable. The related moment condition takes the expression below

$$\mathbf{E}[\mathbf{X}_{i,t-s} \Delta \boldsymbol{\varepsilon_{i,t}}] = \mathbf{0}, \;\; t = 3, \dots, T \;\text{ and }\; s = 1, \dots, t-1$$

Finally, strictly exogenous variables are required to be uncorrelated with past, current and future shocks to the dependent variable. Hence the following moment condition is mandatory

$$\mathbf{E}[\mathbf{X}_{i,t-s} \Delta \boldsymbol{\varepsilon_{i,t}}] = \mathbf{0}, \;\; t - s = 1, \dots, T$$

However, the Arellano-Bond estimator is inefficient when instruments are weak because it makes use of information contained in differences only. It becomes even trickier when the dependent variable is persistent. A system-GMM estimator is preferred thereof (Blundell and Bond, 1998). The system-GMM estimator is also appropriate when the number of groups (countries) exceeds the number

of periods. That condition fits well our case. Furthermore, Blundell and Bond (2000) argue that system-GMM outperforms in difference-GMM in case of persistent series. Blundell and Bond (1998) advocate combining the moment restrictions for differences and levels to improve the properties of the Arellano-Bond first-differenced estimator. Hence, system-GMM estimator uses as instruments the lagged variables in level for the first-differenced Eq. (2) and the lagged first differences for the level Eq. (1). Additional moments conditions are required for the level model, depending on the treatment of the explanatory variable(s) $\mathbf{X}_{i,t}$. For the lagged dependent variable, we have

$$\mathbf{E}[\Delta \mathbf{y}_{i,t-1}(\boldsymbol{\mu}_i + \boldsymbol{\varepsilon}_{i,t})] = \mathbf{0}, \quad t = 3, \ldots, T$$

and

$$\mathbf{E}[\Delta \mathbf{X}_{i,t-1}(\boldsymbol{\mu}_i + \boldsymbol{\varepsilon}_{i,t})] = \mathbf{0}, \quad t = 3, \ldots, T,$$

if $\mathbf{X}_{i,t}$ is endogenous; or

$$\mathbf{E}[\Delta \mathbf{X}_{i,t}(\boldsymbol{\mu}_i + \boldsymbol{\varepsilon}_{i,t})] = \mathbf{0}, \quad t = 2, \ldots, T,$$

in the case of strictly exogenous or predetermined regressor(s) $\mathbf{X}_{i,t}$.

An alternative estimator is to apply the instrumental variable method. However, that approach is challenging because it requires the use of external instruments for simultaneous endogenous variables that are uncorrelated with the shocks to the dependent variable, while the GMM approach has the advantage of using "internal" instruments, based on lagged values of the endogenous variable(s) themselves.

Finally, we estimate Eq. (1) by a two-step system-GMM technique with a forward orthogonal deviation transformation to maximize the sample size (Arellano and Bover, 1995).[9] Asymptotically robust standard errors are obtained with the finite sample correction of Windmeijer (2005). According to Hwang and Sun (2018, p. 2) "the two-step GMM estimator has a smaller asymptotic variance. Statistical tests based on the two-step estimator are also asymptotically more powerful than those based on the one-step estimator."

Also, we supplement the results with a battery of diagnostic tests as recommended by Roodman (2009a):

[9] In the words of Baum (2013, p. 44), "FOD transforms each observation by subtracting the average of all future observations, which will be defined (regardless of gaps) for all but the last observation".

(a) The first-difference error terms should not exhibit the second-order serial correlation (i.e., AR(2) is statistically insignificant).
(b) The consistency of the system-GMM estimator depends on the validity of instruments used in the model. The Hansen's J statistic of over-identifying restrictions is, therefore, computed. The test is consistent with the presence of autocorrelation and heteroscedasticity.
(c) It is known that too many instruments cause biased estimates, overfitting of the endogenous variables and a weaker Hansen test (Roodman, 2009b). The rule of thumb is to keep the number of instruments (j) less than the number of countries (N). To deal with this problem, we apply two strategies: We restrict the lags for instruments, and we replace the "GMM-style" instruments with their principal components (Kapetanios and Mercellino, 2010; Bai and Ng, 2013; Mehrhoff, 2009).

5. Results and discussion

5.1. Panel analysis

We present the benchmark results in columns 1-9 of Table 1 where we employ the private credit as the dependent variable. The lagged dependent variable is statistically significant at 1% level with roots ranging around 0.9, confirming that the share of bank credit is persistent and follows a dynamical process. The p-values related to the second-order serial correlation test and Hansen J statistic in the last lines of the table favour the validity of the instruments.

Consistently with the upward trend shown in Fig. A-1 in Appendix A, the coefficient of the fiscal transparency index of Wang, Irwin and Murara (2015) is statistically significant and positive with a magnitude ranging from 0.052 to 0.090. Thus, it is in the best interest of governments to release information on fiscal policies and on the state of public finance to strengthen the banking sector. When we progressively control for real GDP per capita growth, inflation, and control of corruption channels, fiscal transparency continues to exhibit a significant coefficient but with a smaller size effect. Furthermore, only inflation and control of corruption are statistically significant in all specifications and have their expected signs, while economic growth is only significant in column 7 of Table 1, implying that fiscal transparency has a potential direct impact on bank credit and an indirect impact through inflation and/or control of corruption. For the control variables, many of the coefficients do not meet the statistical significance. More capital inflows and openness to trade economically improve bank development but remain statistically insignificant, while a higher ratio of the non-working age

people to the working age seem to alleviate the share of bank credit. We also perform a dynamic panel regression of fiscal transparency on the first difference of bank credit. The results are available in Table B.1 of Appendix B. More fiscal transparency clearly improves the change in the share of bank credit. The size effect, though significant, falls a bit when controlling for inflation, real economic growth, and control of corruption. However, only the first two variables are statistically significant and have their expected sign. These results suggest that there is some form of mediation, but we need to run a separate mediation analysis in order to identify which intermediate variable(s) among inflation, economic growth and control of corruption lie(s) between fiscal transparency and the change in the private credit (see sub-section 5.2).

Next, we perform a robustness check to assess the validity and consistency of the core coefficient estimates. We substitute the private credit with the ratio of liquid assets to total assets. The results are available in columns 10-18 of Table 1. The diagnostic tests, namely, the number of instruments, the second serial correlation and the Hansen test of overidentifying restrictions meet the desired requirements mentioned in sub-section 4.2. Additionally, the autoregressive parameter is a bit lower than the one associated with the ratio of bank credit, but it is highly significant. The behaviour of the controls generally mimics the left-hand side of Table 1 in terms of the sign and the statistical significance as well. Particularly, the index of Wang, Irwin and Murara (2015) features as the leading determinant of the liquid assets. A one-unit increase in the transparency of the fiscal practices significantly augments the ratio of liquid assets by 0.095 to 0.242, implying that a higher information quality on how governments spend, raise and manage public resources matters for the health of the banking sector. Likewise, the size effect shifts downwards once we account for the inflation rate, real economic growth and control of corruption afterwards. However, we note that the control of corruption becomes statistically insignificant, letting us think that if fiscal transparency exerts an indirect effect on the ratio of liquid assets, then this effect should occur through inflation and less likely via real GDP per capita growth or control of corruption. Otherwise, fiscal transparency has only a direct effect on the ratio of liquid assets.

5.2. Channels through which fiscal transparency affects bank development: A mediation analysis

In this section, we need to test whether the effect of fiscal transparency (X) on bank development (Y) is mediated by some reasonable variables. According to Section 3, we retrieve three potential mediators: control of corruption (M_1), infla-

tion (M_2) and economic growth (M_3).[10] If an indirect effect of X on Y is likely to occur through multiple (independent) mediators like the case shown in Fig. A-2a, then a parallel mediation situation takes place.[11] Applying a parallel mediation analysis entails the estimation of seemingly unrelated regressions (SUREG) with bootstrapped confidence intervals (CI) computed for the coefficients as recommended by Preacher and Hayes (2008).[12] The SUREG model is written as follows:

$$\begin{cases} \mathrm{M}_1 = \alpha_1 + a_1\mathrm{X} + \gamma_1 Z + \varepsilon_1 \\ \mathrm{M}_2 = \alpha_2 + a_2\mathrm{X} + \gamma_2 Z + \varepsilon_2 \\ \mathrm{M}_3 = \alpha_3 + a_3\mathrm{X} + \gamma_3 Z + \varepsilon_3 \\ \mathrm{Y} = \beta + b_1\mathrm{M}_1 + b_2\mathrm{M}_2 + b_3\mathrm{M}_3 + c'\mathrm{X} + \theta Z + \epsilon \end{cases}$$

where M_i, X, Z and Y are the mediators, the predictor variable, the covariate(s), and the outcome variable, respectively. If multiple mediators are causally related, then there is a case of serial mediation (see Fig. A-2b) with causal orders given in Table 2.[13] The SUREG model becomes

$$\begin{cases} \mathrm{M}_1 = \alpha_1 + a_1\mathrm{X} + \gamma_1 Z + \varepsilon_1 \\ \mathrm{M}_2 = \alpha_2 + a_2\mathrm{X} + d\mathrm{M}_1 + \gamma_2 Z + \varepsilon_2 \\ \mathrm{M}_3 = \alpha_3 + a_3\mathrm{X} + e\mathrm{M}_2 + f\mathrm{M}_1 + \gamma_3 Z + \varepsilon_3 \\ \mathrm{Y} = \beta + b_1\mathrm{M}_1 + b_2\mathrm{M}_2 + b_3\mathrm{M}_3 + c'\mathrm{X} + \theta Z + \epsilon \end{cases}$$

The final results available from Table B.2 in Appendix B indicate that the parallel mediation suggests that fiscal transparency significantly exerts an indirect effect on bank credit through control of corruption (effect = 0.177, 90% CI (P): 0.051 to 0.374, 90% CI (BC): 0.054 to 0.382, 90% CI (BCa): 0.047 to 0.365). The effect of fiscal transparency on bank credit through inflation or economic growth channel is not statistically significant. If our dependent variable is the change in the ratio of bank credit, then control of corruption and economic growth appear as statistically significant mediators at 10% level if both variables are assumed to act

[10] We did not account for the fiscal performance channel because we do not find regressions in which the effect of public debt (or fiscal balance) on bank development is statistically significant.

[11] For a more discussion on the types of mediation analysis, we refer readers to Demming, Carsten, Jahn and Boztug (2017).

[12] Since the mediation analysis assumed independence between observations, we have averaged all variables over the period under investigation in order to obtain cross-country data.

[13] Paths (a_1), (a_2) and (a_3) in Figs. A-2a-b which highlight the effect of the variable of interest (X) on the mediators (M_1), (M_2) and (M_3), respectively, were checked beforehand (available upon request). Indeed, we find that fiscal transparency has a statistically significant impact on control of corruption, inflation and economic growth, respectively.

as independently on the transmission of the effect of fiscal transparency to the change in the ratio of bank credit.

Next, we hypothesize that control of corruption, inflation and economic growth are causally related as shown in Table 2.[14] The long-way path (Fiscal transparency → Control of corruption: M_1 → Inflation: M_2 → Economic growth: M_3 → Bank credit) is statistically insignificant, control of corruption appears again as the channel through which fiscal transparency is transferred to the ratio of bank credit. To sum up, control of corruption acts as an independent mediator: more transparent fiscal practices reduce corruption. The share of bank credit, in turn, increases in less corrupt countries. We run the same analysis on the change in the ratio of bank credit as the dependent variable. We find that the long-way specific indirect effect of fiscal transparency through control of corruption and economic growth is statistically significant at 10%. This result contradicts, in part, the panel regressions of Table B.1 because control of corruption fails to exert a statistically significant effect on the change of bank credit. Finally, if we use the ratio of liquid assets instead of the private credit, we could not identify a significant channel among control of corruption, inflation and economic growth whether we assume a parallel or a serial mediation analysis. We can conclude that fiscal transparency has a direct effect on the stability of bank systems.

While interesting, some caution should be exercised when interpreting the causal mediation analysis because the current approach does not account for the dynamical process of the outcome variables and/or the endogeneity of the mediators and regressors. To the best of our knowledge, no method has yet existed to solve both issues. Nevertheless, the findings provide some support to our system-GMM results.

[14] The causal path (fiscal transparency: X → control of corruption: M_1 → inflation: M_2 → economic growth: M_3 → bank development: Y) in Table 2 hinges on the results of previous literature. It will be reminded from Section 3 that a significant relationship between fiscal transparency and corruption is shown in many papers (e.g., Sedmihradská and Haas, 2013; Luna and Montes 2017; Chen and Neshkova, 2019). Now, the relationship between control of corruption and inflation is also tested in empirical literature. Al-Marhubi (2000), among others, find that inflation is higher in countries with more corruption. The relationship between corruption and economic growth is also documented in literature (e.g., Ahmad, Aman Ullah and Arfeen, 2012; Huang, 2016). Studies that record inflation to be a determinant of economic growth are numerous (e.g., Burdekin, Goodwin, Salamun and Willett, 1994; Javier and Hernando, 1999; etc.).

6. Conclusion

The recent financial crisis called for the renewal of policies by public authorities. Based on a country-level sample covering emerging and developing economies, we find that fiscal transparency is an important determinant for a well-developed banking sector. Furthermore, we show that control of corruption plays a significant mediating role in the relationship between fiscal transparency and the private credit. If we focus on the change in the ratio of bank credit, the mediation bootstrapping analysis identifies economic growth and the control corruption as potential channels that transmit the effect of fiscal transparency to the change in bank credit. Examining the stability dimension of the banking sector development suggests that fiscal transparency positively and directly matter for the ratio of liquid assets. Both results are robust to a wide variety of model specification. Our findings complement the existing empirical literature on the desirability of fiscal transparency. Fiscal transparency not only improves fiscal performance to allow for smoother fiscal policy, fights corruption and sustains economic growth, but also provides valuable benefits to the bank systems.

While the current study offers new insights on the role of fiscal transparency in the development of the banking sector, there will be room for a generalization of this conclusion to the development of the financial system in its multidimensional definition (see also Sahay, Čihák, N'Diaye and Barajas, 2015).

Acknowledgments

The author is grateful to useful comments on an earlier version of the manuscript from the participants of 5ème Journées Economiques et Financières Appliquées (JEFA2019) held in Mahdia, Tunisia.

References

1. Ahmad, E., Aman Ullah, M. and Arfeen, M. I. (2012). Does Corruption Affect Economic Growth? *Latin American Journal of Economics*, 49(2), 277–305.
2. Aisen, A. and Franken, M. (2010). Bank Credit During the 2008 Financial Crisis: A Cross-Country Comparison. IMF Working Paper No. 47. Retrieved from https://www.researchgate.net/profile/Ari_Aisen/publication/46433369_Bank_Credit_During_the_2008_Financial_Crisis_A_CrossCountry_Comparison/links/5592b6c708ae1e9cb4297352.pdf
3. Alesina, A., Hausmann, R., Hommes, R. and Stein, E. (1999). Budget Institutions and Fiscal Performance in Latin America. *Journal of Development Economics*, 59, 233-253.
4. Allard, J., Catenaro, M., Vidal, J.P. and Wolswijk, G. (2014). Central bank communication on fiscal policy. *European Journal of Political Economy*, 30, 1-14.
5. Allen, F. and Gale, D. (2000) Comparing financial systems. MIT Press, Cambridge.
6. Al-Marhubi, Fahim A. (2000) Corruption & inflation. *Economics Letters*, 66(2), 199-202.
7. Almarzoqi, Raja M., Ben Naceur, S. and Kotak, A. (2015). What Matters for Financial Development & Stability? IMF Working Paper No. 173. Retrieved from https://www.imf.org/external/pubs/ft/wp/2015/wp15173.pdf
8. Alt, James E. and Lassen, Dreyer D. (2006). Fiscal transparency, political parties, and debt in OECD countries. European Economic Review, 50(6), 1403-1439.
9. Alt, James E., Lassen, Dreyer D. and Rose, S. (2006). The Causes of Fiscal Transparency: Evidence from the American States. IMF Staff Papers, 53(1), 30-57.
10. Aluko, Olufemi A. and Ajayi, Michael A. (2018). Determinants of banking sector development: Evidence from Sub-Saharan African countries. *Borsa Istanbul Review*, 18(2), 122-139.
11. Andreula, N. and Chong, A. (2016). Do good institutions improve fiscal transparency? *Economics of governance*, 17(3), 241-263.
12. Arbatli, E. and Escolano, J. (2015). Fiscal Transparency, Fiscal Performance and Credit Ratings. *Fiscal Studies*, 36(2), 237-270.
13. Arellano, M. and Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence & an application to employment equations. *Review of Economic Studies*, 58, 277– 297.

14. Arellano, M. and Bover, O. (1995). Another look at the instrumental variables estimation of error components models. *Journal of Econometrics*, 68, 29–51.
15. Arestis, P. and Demetriades, P. (1997). Financial development and economic growth: assessing the evidence. *Economic Journal*, 107, 783–99.
16. Asanović, Ž. (2020). Essay on finance-Growth nexus. *Journal of Central Banking Theory and Practice*, 9(1), 97-109.
17. Ayadi, R., Arbak, E., Ben Naceur, S. and De Groen, W. P. (2015). Financial Development, Bank Efficiency, and Economic Growth Across the Mediterranean. In: Ayadi R., Dabrowski M., De Wulf L. (eds) Economic and Social Development of the Southern and Eastern Mediterranean Countries. Springer, Cham.Bai, J. and Ng, S. (2013). Principal components estimation and identification of static factors. *Journal of Econometrics*, 176(1), 18-29.
18. Bayar, Y. (2019). Macroeconomic, institutional and bank-specific determinants of non-performing loans in emerging market economies: A dynamic panel regression analysis. *Journal of Central Banking Theory and Practice*, 8(3), 95-110.
19. Baldrich, J. (2005). Fiscal Transparency and Economic Performance. Working Paper. Retrieved from http://www.aaep.org.ar/anales/works/works2005/baldrich.pdf
20. Baltagi, Badi H., Demetriades, Panicos, O. and Law, Siong Hook (2009). Financial development and openness: Evidence from panel data. *Journal of Development Economics*, 89(2), 285-296.
21. Baum, Christopher F. (2013). Dynamic panel data estimators. Retrieved from http://fmwww.bc.edu/EC-C/S2013/823/EC823.S2013.nn05.slides.pdf
22. Beck, T. and Levine, R. (2002). Growth and capital allocation: does having a market—or bank-based system matter? *Journal of Financial Economics*, 64, 147–180.
23. Ben Naceur, S. and Ghazouani, S. (2005). Does Inflation Impact on Financial Sector Performance in the MENA Region? Panel Data Evidence. Working paper. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=856344
24. Ben Naceur, S., Cherif, M. and Kandil, M. (2014). What drives the development of the MENA financial sector? *Borsa Istanbul Review*, 14(4), 212-223.
25. Benito, B. and Bastida, F. (2009). Budget Transparency, Fiscal Performance, and Political Turnout: An International Approach Public Administration Review, 69(3), 403-417.
26. Blundell, R. and Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87, 115–143.

27. Blundell, R. and Bond, S. (2000). GMM Estimation with persistent panel data: an application to production functions. *Econometric Reviews*, 321-340.
28. Boyd, J.H., Levine, R. and Smith, D.B. (2001). The impact of inflation on financial sector development. *Journal of Economic Literature*, 31, 1-19.
29. Burdekin, Richard C. K., Goodwin, T., Salamun, S. and Willett, Thomas D. (1994). The effects of inflation on economic growth in industrial and developing countries: is there a difference? *Applied Economics Letters*, 1(10), 175-177.
30. Caballero, Ricardo J. and Krishnamurthy, A. (2004). Fiscal Policy and Financial Depth. National Bureau of Economic Research Working Paper 10532.
31. Calderón, C. and Liu, L. (2003). The direction of causality between financial development and economic growth. *Journal of Development Economics* 72(1): 321-334.
32. Chen, C. and Neshkova, M. I. (2020). The effect of fiscal transparency on corruption: A panel cross-country analysis. *Public Administration*, 98(1), 226-243.
33. Chen, W., Hamori, S. and Kinkyo, T. (2016). Financial development and financial openness nexus: the precondition of banking competition. *Applied Economics*, 48(12), 1130-1139.
34. Cherif, M. and Dreger, C. (2016). Institutional Determinants of Financial Development in MENA countries. *Review of Development Economics*, 20(3), 670-680.
35. Chinn, M. and Ito, H (2006). What matters for financial development? Capital controls, institutions and interactions. *Journal of development Economics*, 81(1), 163–192.
36. Christensen, J. (2005). Special Data Section Domestic Debt Markets in Sub-Saharan Africa. IMF Staff Papers, Palgrave Macmillan, 52(3), 1-7.
37. Cicatiello, L., De Simone, E. and Gaeta, G.L. (2017). Political determinants of fiscal transparency: A panel data empirical investigation. *Economics of Governance*, 18(4), 315-336.
38. Cottarelli, C., Dell'Ariccia, G. and Vladkova-Hollar, I. (2005). Early Birds, Late Risers, and Sleeping Beauties: Bank Credit Growth to the Private Sector in Central and Eastern Europe and in the Balkans. *Journal of Banking and Finance*, 29(1), 83–104.
39. Creel, J, Hubert, P. and Labondance, F. (2016). The Intertwining of Bank Credit and Bank Instability. Working Paper. Retrieved from https://www.boeckler.de/pdf/v_2016_10_22_creel.pdf
40. Cuadro Saez, L., Gallego, S. and Garcia-Herrero, A. (2003). Why Do Some Countries Develop More Financially? The Role of the Central Bank and Banking Supervision. Moneda y Credito (No. 216), 105–171.

41. Demetriades, P. and Andrianova, S. (2004). Finance and growth: what we know and what we need to know. In C. Goodhart (ed.), Financial Development and Economic Growth: explaining the links, Palgrave Macmillan, Basingstoke and New York: 38–65.
42. Demetriades, P. O. (2008). New perspectives on finance and growth. Working Paper No. 08/14, Department of Economics, University of Leicester. Do, Q.-T. and Levchenko, A.A., 2004. Trade and financial development, World Bank Policy Research Working Paper No. 3347, Washington, DC.
43. Demming, Carsten, L., Jahn, S. and Boztug, Y. (2017). Conducting Mediation Analysis in Marketing Research. *Marketing ZFP – Journal of Research and Management*, 39, 76-93.
44. Detragiache, E., Gupta, P. and Tressel, T. (2005). Finance in Lower Income Countries: An Empirical Exploration. IMF Working Paper No. 05/167 (Washington: International Monetary Fund).
45. Dutta, N. and Mukherjee, D. (2018). Can financial development enhance transparency? *Economic Change and Restructuring*, 51(4), 279-302.
46. Garcia-Herrero, A. and Del Rio, P., (2003). Financial stability and the design of monetary policy. Banco de España Working Paper No. 0315. Retrieved from https://www.bde.es/f/webbde/SES/Secciones/Publicaciones/PublicacionesSeriadas/DocumentosTrabajo/03/Fic/dt0315e.pdf
47. Gazdar, K. and Cherif, M. (2014). The quality of institutions and financial development in MENA countries: An empirical investigation. *Risk Governance and Control: Financial Markets and Institutions*, 4(4), 65-80.
48. Gozgor, G. (2014). Determinants of domestic credit levels in emerging markets: The role of external factors. *Emerging Markets Review*, 18, 1-18.
49. Hameed, F. (2005). Fiscal transparency and economic outcomes. IMF Working Paper No. 225. Retrieved from https://www.imf.org/external/pubs/ft/wp/2005/wp05225.pdf
50. Hameed, F. (2006). Essays on fiscal transparency and inflation expectations. PhD Dissertation, Johns Hopkins University, pp. 1-170.
51. Hansen, Lars, P. (1982). Large sample properties of generalized method of moments estimators. *Econometrica*, 50(4), 1029-1054.
52. Hauner, D. (2006). Fiscal Policy and Financial Development. IMF Working Paper No. 06/26 (Washington, International Monetary Fund).
53. Hauner, D. (2008). Credit to government and banking sector performance. *Journal of Banking and Finance*, 32(8), 1499-1507.
54. Hauner, D. (2009). Public debt and financial development. *Journal of Development Economics*, 88(1), 171-183.

55. Herger, N., Hodler, R. and Lobsiger, M. (2007). What determines financial development? Culture, institutions, or trade. NCCR Trade Regulation Working Paper No. 2007/05.
56. Hsiao, C. (2007). Panel data analysis—advantages and challenges. Test, 16, 1-22.
57. Huang, C. J. (2016). Is corruption bad for economic growth? Evidence from Asia-Pacific countries. *The North American Journal of Economics and Finance*, 35, 247–256.
58. Hwang, J. and Sun, X. (2018). Should We Go One Step Further? An Accurate Comparison of One-step and Two-step Procedures in a Generalized Method of Moments Framework. *Journal of Econometrics*, 207(2), 381-405.
59. Huang, Y. and Temple, J.R.W. (2005). Does external trade promote financial development? CEPR Discussion Paper No. 5150.
60. Huang, Y. (2005). What determines financial development? Bristol Economics Discussion Paper No. 05/580. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=925051
61. Ismihan, M. and Ozkan, G. (2012). Public debt and financial development: A theoretical exploration. *Economics Letters*, 115(3), 348-351.
62. Jarmuzek, M. (2006). Does Fiscal Transparency Matter? The Evidence from Transition Economies. Warsaw, Poland: Center for Social and Economic Research. Retrieved from https://iweb.cerge-ei.cz/pdf/gdn/RRCV_77_paper_03.pdf
63. Javier, A. and Hernando, I. (1999). Does Inflation Harm Economic Growth? Evidence from the OECD. In M. Feldstein, ed., The Costs and Benefits of Price Stability, University of Chicago Press, pp. 315-348.
64. Kapetanios, G. and Marcellino, M. (2010). Factor-GMM estimation with large sets of possibly weak instruments. *Computational Statistics and Data Analysis*, 54(11), 2655-2675.
65. Kopits, G. and Craig, J. (1998). Transparency in Government Operations. IMF Occasional Paper No. 158.
66. Kostas, M. (2002). The impact of financial liberalization policies on financial development evidence from developing economies. Discussion Papers in Economics 02/1, Department of Economics, University of Leicester.
67. Kaufmann, D., Kraay, A. and Mastruzzi, M. (2010). The worldwide governance indicators: Methodology and analytical issues. World Bank policy research working paper, (5430).
68. Law, S. H. and Azman-Saini, W. N. W. (2012). Institutional quality, governance, and financial development. *Economics of governance*, 13(3), 217-236.
69. Levine, R., Loyaza. N. and Beck, T. (2000). Financial intermediation and growth: Causality and causes. *Journal of Monetary Economics*, 46, 31-77.

70. Luna, P. H. L. and Montes, G. C. (2017). Mitigating corruption through fiscal transparency: a panel data approach. Working Paper. Retrieved from https://www.anpec.org.br/encontro/2017/submissao/files_I/i5-d4a89660590a747a0316f17f1af25fff.pdf
71. Mehrhoff, J. (2009). A solution to the problem of too many instruments in dynamic panel data GMM. Discussion Paper, Series 1: Economic Studies No. 31. Retrieved from https://core.ac.uk/download/pdf/6386086.pdf
72. Montes, Gabriel C. and da Cunha Lima, Luiza L. (2018). Effects of fiscal transparency on inflation and inflation expectations: Empirical evidence from developed and developing countries. *The Quarterly Review of Economics and Finance*, 70, 26-37.
73. Montes, G. C. and Luna, P.H. (2020). Fiscal transparency, legal system and perception of the control on corruption: empirical evidence from panel data. Empirical Economics. https://doi.org/10.1007/s00181-020-01849-9
74. Mun, M. W. and Ismail, N. W. (2015). The Impact of Domestic Public Debt on Financial Development in Malaysia. *International Journal of Social Science Research, Macrothink Institute*, 3(2), 1-19.
75. Nickell, S. (1981) Biases in dynamic panel models with fixed effects. *Econometrica*, 49(6), 1417-1426.
76. Oueslati, T. and Ouerghi F. (2018). Does central banking promote financial development? *Borsa Istanbul Review*, 18(1), 52-75.
77. Pham, Thi Hong Hanh (2015). Determinants of Bank Lending. HAL Working Papers. Retrieved from https://hal.archives-ouvertes.fr/hal-01158241.
78. Preacher, K.J. and Hayes, A.F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavioral Research Methods*, 40, 879-891.
79. Roodman, D. (2009a). A note on the theme of too many instruments. *Oxford Bulletin of Economics and statistics*, 71(1), 135-158.
80. Roodman, D. (2009b). How to do xtabond2: an introduction to difference and system GMM in Stata. *Stata Journal*, 9(1), 86-136.
81. Sahay, R., Čihák, M., N'Diaye, P. and Barajas, A. (2015). Rethinking Financial Deepening: Stability and Growth in Emerging Markets. *Revista De Economia Institucional*, 17(33), 73-107.
82. Sedmihradská, L. and Haas, J. (2013). Budget Transparency and Fiscal Performance: Do Open Budgets Matter? ACTA VSFS, 7(2), 109-122.
83. Tanasković, S., and Jandrić, M. (2015). Macroeconomic and institutional determinants of non-performing loans. *Journal of Central Banking Theory and Practice*, 4(1), 47-62.
84. Teig, M. (2006). Fiscal Transparency and Economic Growth. Paper presented at European Doctoral Seminar, 06.

85. Voghouei, H., Azali, M. and Law, S.H. (2011). Does the political institution matter for financial development? *Economic Papers: A Journal of Applied Economics and Policy*, 30(1), 1– 2.
86. Voghouei, H., Azali, M. and Al Jamali M. (2011). A survey of the determinants of financial development. *Asian Pacific Economic Literature*, 25(2), 1-20.
87. Wang, Rachel F., Irwin, Timothy C. and Murara, Lewis K. (2015). Trends in fiscal transparency: Evidence from a new database of the coverage of fiscal reporting IMF Working Paper No. 188. Retrieved from https://www.imf.org/en/Publications/WP/Issues/2016/12/31/Trends-in-Fiscal-Transparency-Evidence-from-a-New-Database-of-the-Coverage-of-Fiscal-43177
88. Wehner, J. and de Renzio, P. (2013). Citizens, legislators, and executive disclosure: the political determinants of fiscal transparency. *World Development*, 41, 96–108.
89. Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics*, 126(1), 25-51.

Table 1: Effect of fiscal transparency on bank development

Variables	Dependent variable: Bank credit								
	Path (c): Without mediators			Path (c'): With mediators					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Bcredit_{it-1}$	0.959***	0.931***	0.941***	0.929***	0.937***	0.922***	0.919***	0.922***	0.964***
	(0.055)	(0.046)	(0.052)	(0.030)	(0.027)	(0.036)	(0.030)	(0.034)	(0.032)
$Liquid\ assets_{it-1}$									
FT_{it-1}	0.090***	0.112***	0.112***	0.082**	0.065*	0.089**	0.062	0.063*	0.052*
	(0.028)	(0.040)	(0.039)	(0.036)	(0.035)	(0.035)	(0.042)	(0.038)	(0.027)
$Agedep_{it}$	0.011	-0.172***	-0.147**	-0.044**	-0.036*	-0.033*	-0.024	-0.018	0.011
	(0.042)	(0.066)	(0.063)	(0.020)	(0.019)	(0.019)	(0.026)	(0.028)	(0.025)
$Inflation_{it-1}$				-0.067***	-0.073***	-0.073***	-0.070***	-0.079***	-0.055***
				(0.019)	(0.017)	(0.018)	(0.018)	(0.021)	(0.021)
$RGDPPCG_{it-1}$				0.042	0.061	0.059	0.089	0.109	0.194*
				(0.109)	(0.115)	(0.066)	(0.083)	(0.085)	(0.100)
CC_{it-1}							2.158*	2.207*	2.208*
							(1.267)	(1.311)	(1.301)
FO_{it-1}	1.473					0.453			0.187
	(1.174)					(0.648)			(0.506)
Tradeit	0.002		0.004		0.010	0.003		0.007	-0.000
	(0.010)		(0.010)		(0.006)	(0.007)		(0.007)	(0.006)
Constant	-0.025	13.230**	10.753**	4.716**	4.262**	4.183**	5.246*	6.006**	1.723
	(3.919)	(5.151)	(4.892)	(2.224)	(1.908)	(2.056)	(2.754)	(2.480)	(2.178)
N°observations	1367	1501	1435	1446	1392	1327	1446	1392	1327
N°countries	133	142	139	138	136	130	138	136	130
N°instruments	61	42	44	50	48	70	68	72	82
AR1 (p-value)	0.004	0.004	0.005	0.007	0.008	0.007	0.008	0.008	0.008
AR2 (p-value)	0.265	0.067	0.079	0.200	0.226	0.288	0.117	0.114	0.138
Hansen (p-value)	0.215	0.385	0.434	0.604	0.534	0.464	0.245	0.151	0.390
Indirect effect	-	-	-	0.03	0.047	0.001	0.050	0.049	0.038
95% confidence interval for α	X	X	X	[0.871,0.987]	[0.883,0.991]	[0.851,0.992]	[0.859,0.0.979]	[0.855,0.989]	X

Notes: Robust standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

Bcredit: the private credit, Liquid assets: the ratio of liquid assets to total assets, FT: Fiscal transparency, Agedep: Age dependency ratio, Inflation: rate of inflation, GDPPCG: Real GDP per capita growth, FO: Financial openness, Trade: Trade openness, CC: Control of corruption. AR1: The first-order serial correlation, AR2: The second-order serial correlation, Hansen: Hansen test of overidentifying restrictions. Path (c): the total effect of fiscal transparency on bank development. Path (c'): the direct effect of fiscal transparency on bank development. The indirect effect of fiscal transparency on bank development = The total effect – The direct effect = (c) – (c'). α: The autoregressive parameter in Eq. (1).

Table 1: Effect of fiscal transparency on bank development - continued

Variables	Dependent variable: Liquid assets								
	Path (c): Without mediators			Path (c'): With mediators					
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
$Bcredit_{it-1}$									
$Liquid\ assets_{it-1}$	0.790***	0.868***	0.889***	0.790***	0.881***	0.800***	0.828***	0.823***	0.823***
	(0.099)	(0.081)	(0.094)	(0.073)	(0.060)	(0.075)	(0.086)	(0.078)	(0.080)
FT_{it-1}	0.242*	0.217**	0.153*	0.095*	0.099**	0.140*	0.154**	0.110*	0.118*
	(0.135)	(0.110)	(0.083)	(0.057)	(0.047)	(0.082)	(0.075)	(0.063)	(0.063)
$Agedep_{it}$	0.056	0.156	-0.009	0.069*	0.071**	0.086	0.045	0.069	0.079
	(0.061)	(0.131)	(0.075)	(0.038)	(0.033)	(0.068)	(0.056)	(0.054)	(0.075)
$Inflation_{it-1}$				-0.104***	-0.108***	-0.091**	-0.095**	-0.103***	-0.074**
				(0.032)	(0.038)	(0.035)	(0.044)	(0.036)	(0.035)
$RGDPPCG_{it-1}$				0.368*	0.547*	0.181	0.416*	0.360	0.274
				(0.201)	(0.329)	(0.245)	(0.235)	(0.235)	(0.330)
CC_{it-1}							-2.477	-1.246	0.245
							(2.817)	(2.869)	(3.326)
FO_{it-1}	-2.255					-0.587			-0.356
	(1.976)					(2.314)			(1.852)
Tradeit	0.031		0.005		0.010	0.022		0.022	0.021
	(0.019)		(0.011)		(0.009)	(0.018)		(0.016)	(0.017)
Constant	-0.007	-10.498	2.282	1.229	-7.891**	-2.955	-0.392	-2.569	-3.257
	(4.997)	(9.288)	(8.294)	(2.923)	(3.637)	(5.884)	(4.602)	(3.598)	(5.340)
N°observations	1299	1432	1361	1346	1301	1242	1346	1301	1243
N°countries	133	143	139	137	134	128	137	134	128
N°instruments	57	39	41	74	64	86	83	77	90
AR1 (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR2 (p-value)	0.907	0.418	0.935	0.935	0.771	0.817	0.959	0.718	0.828
Hansen (p-value)	0.106	0.160	0.124	0.172	0.114	0.177	0.206	0.183	0.201
Indirect effect	-	-	-	0.078	0.008	0.010	0.040	0.061	0.033
95% confidence interval for α	X	X	X	[0.649,0.932]	[0.673,0.999]	[0.653,0.947]	[0.659,0.997]	[0.671,0.977]	[0.677,0.980]

Table 2: Causal order of mediators in serial mediation analysis

	Fiscal transparency
M_1	Control of corruption
M_2	Inflation
M_3	Economic growth

Appendix A

Fig. A-1: Bank credit and fiscal transparency. Data are averaged by country

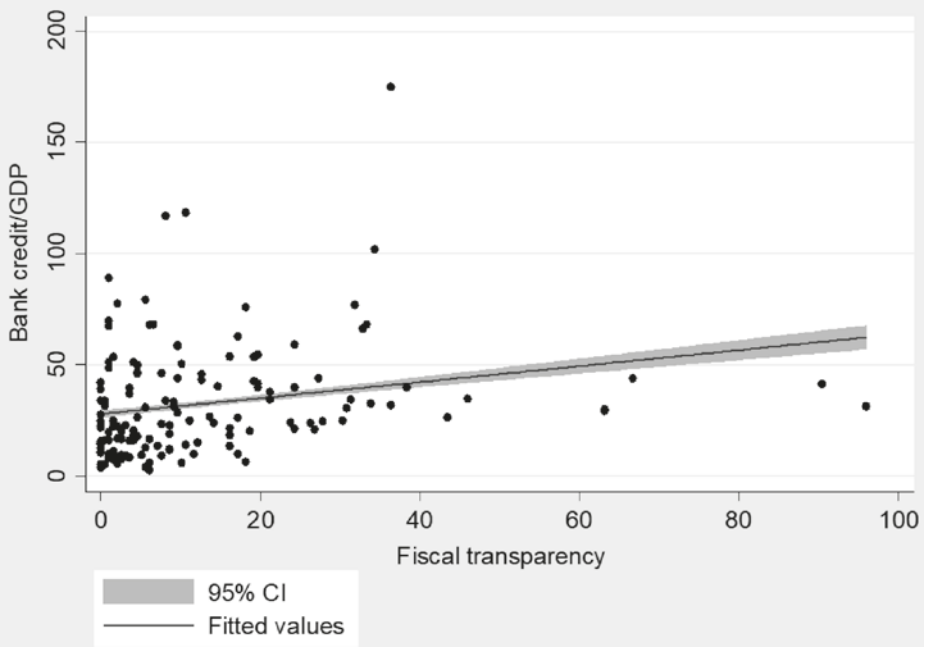
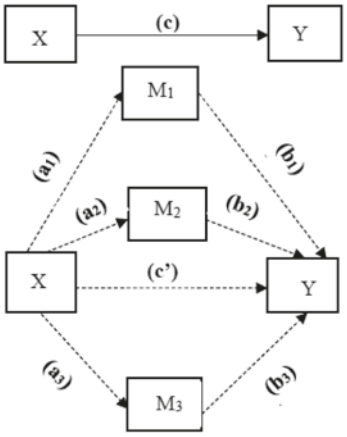
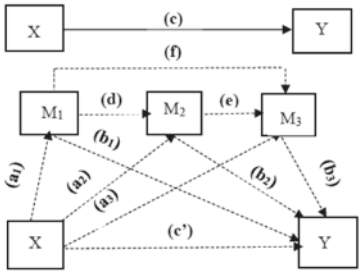


Fig. A-2a: Parallel mediation analysis, based on Demming, Jahn and Boztug (2017, p. 79)



Predictor variable: X Mediators: M_1, M_2, M_3
Outcome variable: Y
Specific indirect effect of X on Y through M_1: a_1b_1
Specific indirect effect of X on Y through M_2: a_2b_2
Specific indirect effect of X on Y through M_3: a_3b_3
Total indirect effect of X on Y: $a_1b_1 + a_2b_2 + a_3b_3$
Direct effect of X on Y: c'
Total effect of X on Y: $c=c' + a_1b_1 + a_2b_2 + a_3b_3$

Fig. A-2b: Serial mediation analysis, based on Demming, Jahn and Boztug (2017, p. 79)



Predictor variable: X, Mediators: M_1, M_2, M_3, Outcome variable: Y
Short-cut specific indirect effect of X on Y through M_1: a_1b_1
Short-cut specific indirect effect of X on Y through M_2: a_2b_2
Short-cut specific indirect effect of X on Y through M_3: a_3b_3
Long-way specific indirect effect of X on Y through M_1 and M_2: a_1db_2
Long-way specific indirect effect of X on Y through M_1 and M_3: a_1fb_3
Long-way specific indirect effect of X on Y through M_2 and M_3: a_2eb_3
Long-way specific indirect effect of X on Y through M_1, M_2 and M_3: a_1deb_3
Total indirect effect of X on Y: $a_1b_1 + a_2b_2 + a_3b_3 + a_1db_2 + a_1deb_3 + a_2eb_3 + a_1fb_3$
Direct effect of X on Y: c'
Total effect of X on Y: $c=c' + a_1b_1 + a_2b_2 + a_3b_3 + a_1db_2 + a_1deb_3 + a_2eb_3 + a_1fb_3$

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	

Table A-2: Variables, definitions, descriptive statistics and sources

Variables	Notation	Description	Mean	S.D.	Min	Max	Source
Dependent variable							
Bank credit	Bcredit	Domestic private sector credit by banks as a % of GDP.	32.72	27.73	0.15	253.45	World Bank, World Development Indicators database
Liquid assets to deposit and short-term funding	Liquid	The ratio of the value of liquid assets (easily converted to cash) to short-term funding plus total deposits. Liquid assets include cash and due from banks, trading securities and at fair value through income, loans and advances to banks, reverse repos and cash collaterals. Deposits and short-term funding include total customer deposits (current, savings and term) and short-term borrowing (money market instruments, CDs and other deposits).	39.71	22.29	0.00	226.86	World Bank, Global Financial Development Database
Variable of interest							
Fiscal transparency index	FT	An aggregate index based on the scores of six items from The Government Finance Statistics Yearbooks: 1/ liabilities, 2/financial assets, 3/ non-financial assets, 4/ the statement of the sources and use of cash 5/ the statement of government operations; and 6/ the statement of other economic flows. The items' score depends on which subsector of general government reports the item. The overall index takes a maximum of 18 converted to 100.	12.02	18.19	0.00	100.00	Wang, Irwin and Murara (2015)
Control variables							
Age dependency ratio	Agedep	The dependency ratio is a measure showing the number of dependents, aged zero to 14 (young) and over the age of 65 (old), to the total population, aged 15 to 64. It is also referred to as the "total dependency ratio." This indicator gives insight into the amount of people of nonworking age compared to the number of those of working age.	66.23	19.58	16.33	112.68	World Bank, World Development Indicators database
Real GDP per capita growth	RGDPPCG	Year on year real growth of Gross domestic product per capita.	2.54	5.61	-62.21	104.66	World Bank, World Development Indicators database
Inflation	Inflation	Percentage increase of the consumer price index that shall be kept low to ensure price stability.	19.81	504.87	-35.84	24,411.00	World Bank, World Development Indicators database
Trade openness	Trade	Total of imports and exports of good and service as a % of GDP.	85.75	40.49	0.31	531.74	World Bank, World Development Indicators database
Financial openness	FO	An index measuring a country's degree of capital account openness. A proxy for financial globalization.	-0.05	1.48	-1.89	2.39	Chinn and Ito (2006)
Control of corruption	CC	The score takes the value between -2.5 (bad performance) and 2.5 (good performance).	-0.33	0.73	-2.49	1.65	World Bank, World Governance Indicators database by Kaufmann, Kraay and Mastruzzi (2010)

Table A-3: Pearson pairwise correlation matrix

	Bcredit	Liquid	FT	Inflation	RGDPPCG	Agedep	FO	Trade	CC
Bcredit	1.00								
Liquid	-0.37	1.00							
	(0.00)								
FT	0.24	-0.22	1.00						
	(0.00)	(0.00)							
Inflation	-0.13	0.13	-0.02	1.00					
	(0.00)	(0.00)	(0.45)						
RGPPCG	-0.07	0.06	0.05	-0.03	1.00				
	(0.00)	(0.01)	(0.04)	(0.10)					
Agedep	-0.53	0.21	-0.37	0.02	-0.05	1.00			
	(0.00)	(0.00)	(0.00)	(0.31)	(0.02)				
FO	0.15	-0.08	0.20	-0.03	-0.04	-0.24	1.00		
	(0.00)	(0.00)	(0.00)	(0.13)	(0.07)	(0.00)			
Trade	0.24	0.01	0.00	-0.00	0.10	-0.18	0.14	1.00	
	(0.00)	(0.60)	(0.91)	(0.93)	(0.00)	(0.00)	(0.00)		
CC	0.54	-0.21	0.17	-0.04	-0.09	-0.46	0.22	0.15	1.00
	(0.00)	(0.00)	(0.00)	(0.08)	(0.00)	(0.00)	(0.00)	(0.00)	

Notes: Bcredit: the private credit, Liquid assets: the ratio of liquid assets to total assets, FT: Fiscal transparency, Agedep: Age dependency ratio, Inflation: rate of inflation, RGDPPCG: Real GDP per capita growth, FO: Financial openness, Trade: Trade openness, CC: Control of corruption.

Table A-4: Unit root test in levels I(0) and first difference I(1)

We apply Fisher test of unit root because we have a strongly unbalanced panel.

Variables	Stationary in level	Non stationary in level	Stationary in first difference
Bcredit		X	X
Liquid	X		
FT1	X		
Inflation	X		
RGDPPCG	X		
Agedep	X		
FO	X		
Trade	X		
CC	X		

Fisher unit root test (Philips-Perron) for bank credit*

***Without trend**

```
Fisher-type unit-root test for bcredit
Based on Phillips-Perron tests
------------------------------------------------------------------------------
Ho: All panels contain unit roots           Number of panels       =     184
Ha: At least one panel is stationary        Avg. number of periods =   16.15

AR parameter:     Panel-specific            Asymptotics: T -> Infinity
Panel means:      Included
Time trend:       Not included
Newey-West lags: 1 lag
------------------------------------------------------------------------------
                                     Statistic      p-value
------------------------------------------------------------------------------
 Inverse chi-squared(368)  P        275.6179       0.9999
 Inverse normal            Z          6.9544       1.0000
 Inverse logit t(914)      L*         6.8505       1.0000
 Modified inv. chi-squared Pm        -3.4053       0.9997
------------------------------------------------------------------------------
 P statistic requires number of panels to be finite.
 Other statistics are suitable for finite or infinite number of panels.
------------------------------------------------------------------------------
```

***Including trend**

```
Fisher-type unit-root test for bcredit
Based on Phillips-Perron tests
------------------------------------------------------------------------------
Ho: All panels contain unit roots           Number of panels       =     149
Ha: At least one panel is stationary        Avg. number of periods =   16.28

AR parameter:     Panel-specific            Asymptotics: T -> Infinity
Panel means:      Included
Time trend:       Included
Newey-West lags: 1 lag
------------------------------------------------------------------------------
                                     Statistic      p-value
------------------------------------------------------------------------------
 Inverse chi-squared(298)  P        334.6658       0.0706
 Inverse normal            Z          5.0927       1.0000
 Inverse logit t(739)      L*         3.7711       0.9999
 Modified inv. chi-squared Pm         1.5019       0.0666
------------------------------------------------------------------------------
 P statistic requires number of panels to be finite.
 Other statistics are suitable for finite or infinite number of panels.
------------------------------------------------------------------------------
```

Fisher unit root test (Philips-Perron) for the ratio of liquid assets

****Without trend**

```
Fisher-type unit-root test for liquid
Based on Phillips-Perron tests
------------------------------------------------------------------------------
Ho: All panels contain unit roots           Number of panels       =    157
Ha: At least one panel is stationary        Avg. number of periods =  15.13

AR parameter:    Panel-specific             Asymptotics: T -> Infinity
Panel means:     Included
Time trend:      Not included
Newey-West lags: 1 lag
------------------------------------------------------------------------------
                                     Statistic      p-value
------------------------------------------------------------------------------
 Inverse chi-squared(308)  P        531.9392       0.0000
 Inverse normal            Z         -5.1078       0.0000
 Inverse logit t(769)      L*        -6.5546       0.0000
 Modified inv. chi-squared Pm         9.0228       0.0000
------------------------------------------------------------------------------
 P statistic requires number of panels to be finite.
 Other statistics are suitable for finite or infinite number of panels.
------------------------------------------------------------------------------
```

****Including trend**

```
Fisher-type unit-root test for liquid
Based on Phillips-Perron tests
------------------------------------------------------------------------------
Ho: All panels contain unit roots           Number of panels       =    157
Ha: At least one panel is stationary        Avg. number of periods =  15.13

AR parameter:    Panel-specific             Asymptotics: T -> Infinity
Panel means:     Included
Time trend:      Included
Newey-West lags: 1 lag
------------------------------------------------------------------------------
                                     Statistic      p-value
------------------------------------------------------------------------------
 Inverse chi-squared(308)  P        684.0030       0.0000
 Inverse normal            Z         -7.5702       0.0000
 Inverse logit t(739)      L*       -10.3582       0.0000
 Modified inv. chi-squared Pm        15.1496       0.0000
------------------------------------------------------------------------------
 P statistic requires number of panels to be finite.
 Other statistics are suitable for finite or infinite number of panels.
------------------------------------------------------------------------------
```

Fisher unit root test (Philips-Perron) for fiscal transparency

****Without trend**

```
Fisher-type unit-root test for FT1
Based on Phillips-Perron tests
-------------------------------

Ho: All panels contain unit roots           Number of panels  =     150
Ha: At least one panel is stationary        Number of periods =      11

AR parameter:     Panel-specific            Asymptotics: T -> Infinity
Panel means:      Included
Time trend:       Not included
Newey-West lags: 1 lag
```

		Statistic	p-value
Inverse chi-squared(300)	P	430.4977	0.0000
Inverse normal	Z	-2.7647	0.0028
Inverse logit t(579)	L*	-4.4656	0.0000
Modified inv. chi-squared	Pm	5.3275	0.0000

P statistic requires number of panels to be finite.
Other statistics are suitable for finite or infinite number of panels.

****Including trend**

```
Fisher-type unit-root test for FT1
Based on Phillips-Perron tests
-------------------------------

Ho: All panels contain unit roots           Number of panels  =     150
Ha: At least one panel is stationary        Number of periods =      11

AR parameter:     Panel-specific            Asymptotics: T -> Infinity
Panel means:      Included
Time trend:       Included
Newey-West lags: 1 lag
```

		Statistic	p-value
Inverse chi-squared(300)	P	401.1468	0.0001
Inverse normal	Z	-1.8907	0.0293
Inverse logit t(569)	L*	-3.8468	0.0001
Modified inv. chi-squared	Pm	4.1293	0.0000

P statistic requires number of panels to be finite.
Other statistics are suitable for finite or infinite number of panels.

Fisher unit root test (Philips-Perron) for inflation rate

****Without trend**

```
Fisher-type unit-root test for inflation
Based on Phillips-Perron tests
------------------------------------------------------------------------------
Ho: All panels contain unit roots           Number of panels       =     143
Ha: At least one panel is stationary        Avg. number of periods =   16.41

AR parameter:    Panel-specific             Asymptotics: T -> Infinity
Panel means:     Included
Time trend:      Not included
Newey-West lags: 1 lag
------------------------------------------------------------------------------
                                    Statistic      p-value
------------------------------------------------------------------------------
Inverse chi-squared(286)  P       1354.9675       0.0000
Inverse normal            Z        -23.4593       0.0000
Inverse logit t(714)      L*       -30.0119       0.0000
Modified inv. chi-squared Pm        44.6958       0.0000
------------------------------------------------------------------------------
P statistic requires number of panels to be finite.
Other statistics are suitable for finite or infinite number of panels.
------------------------------------------------------------------------------
```

**** Including trend**

```
Fisher-type unit-root test for inflation
Based on Phillips-Perron tests
------------------------------------------------------------------------------
Ho: All panels contain unit roots           Number of panels       =     143
Ha: At least one panel is stationary        Avg. number of periods =   16.41

AR parameter:    Panel-specific             Asymptotics: T -> Infinity
Panel means:     Included
Time trend:      Included
Newey-West lags: 1 lag
------------------------------------------------------------------------------
                                    Statistic      p-value
------------------------------------------------------------------------------
Inverse chi-squared(286)  P       1146.6988       0.0000
Inverse normal            Z        -19.7565       0.0000
Inverse logit t(709)      L*       -24.9423       0.0000
Modified inv. chi-squared Pm        35.9876       0.0000
------------------------------------------------------------------------------
P statistic requires number of panels to be finite.
Other statistics are suitable for finite or infinite number of panels.
------------------------------------------------------------------------------
```

Fisher unit root test (Philips-Perron) for real economic growth

****Without trend**

```
Fisher-type unit-root test for gdpcg
Based on Phillips-Perron tests
-------------------------------------

Ho: All panels contain unit roots          Number of panels       =    165
Ha: At least one panel is stationary       Avg. number of periods =  16.31

AR parameter:    Panel-specific            Asymptotics: T -> Infinity
Panel means:     Included
Time trend:      Not included
Newey-West lags: 1 lag
```

		Statistic	p-value
Inverse chi-squared(330)	P	1695.3730	0.0000
Inverse normal	Z	-26.5392	0.0000
Inverse logit t(819)	L*	-35.5276	0.0000
Modified inv. chi-squared	Pm	53.1471	0.0000

P statistic requires number of panels to be finite.
Other statistics are suitable for finite or infinite number of panels.

****Including trend**

```
Fisher-type unit-root test for gdpcg
Based on Phillips-Perron tests
-------------------------------------

Ho: All panels contain unit roots          Number of panels       =    165
Ha: At least one panel is stationary       Avg. number of periods =  16.31

AR parameter:    Panel-specific            Asymptotics: T -> Infinity
Panel means:     Included
Time trend:      Included
Newey-West lags: 1 lag
```

		Statistic	p-value
Inverse chi-squared(330)	P	1548.2832	0.0000
Inverse normal	Z	-22.7755	0.0000
Inverse logit t(819)	L*	-31.3346	0.0000
Modified inv. chi-squared	Pm	47.4216	0.0000

P statistic requires number of panels to be finite.
Other statistics are suitable for finite or infinite number of panels.

Fisher unit root test (Philips-Perron) for age dependency ratio

***Without trend**

```
could not compute test for panel 76

Fisher-type unit-root test for agedep
Based on Phillips-Perron tests
---------------------------------------------------------------------------
Ho: All panels contain unit roots           Number of panels       =     159
Ha: At least one panel is stationary        Avg. number of periods =   16.88

AR parameter:     Panel-specific            Asymptotics: T -> Infinity
Panel means:      Included
Time trend:       Not included
Newey-West lags: 1 lag
---------------------------------------------------------------------------
                                    Statistic      p-value
---------------------------------------------------------------------------
 Inverse chi-squared(316)  P       1521.8473       0.0000
 Inverse normal            Z        -13.1710       0.0000
 Inverse logit t(714)      L*       -26.1779       0.0000
 Modified inv. chi-squared Pm        47.9660       0.0000
---------------------------------------------------------------------------
 P statistic requires number of panels to be finite.
 Other statistics are suitable for finite or infinite number of panels.
```

****Including trend**

```
Fisher-type unit-root test for agedep
Based on Phillips-Perron tests
---------------------------------------------------------------------------
Ho: All panels contain unit roots           Number of panels       =     159
Ha: At least one panel is stationary        Avg. number of periods =   16.88

AR parameter:     Panel-specific            Asymptotics: T -> Infinity
Panel means:      Included
Time trend:       Included
Newey-West lags: 1 lag
---------------------------------------------------------------------------
                                    Statistic      p-value
---------------------------------------------------------------------------
 Inverse chi-squared(316)  P        326.7785       0.3262
 Inverse normal            Z          7.6633       1.0000
 Inverse logit t(564)      L*         6.8163       1.0000
 Modified inv. chi-squared Pm         0.4287       0.3341
---------------------------------------------------------------------------
 P statistic requires number of panels to be finite.
 Other statistics are suitable for finite or infinite number of panels.
---------------------------------------------------------------------------
```

Fisher unit root test (Philips-Perron) for financial openness

****Without trend**

```
Fisher-type unit-root test for FO
Based on Phillips-Perron tests
---------------------------------------
Ho: All panels contain unit roots          Number of panels       =    147
Ha: At least one panel is stationary       Avg. number of periods =  16.58

AR parameter:    Panel-specific            Asymptotics: T -> Infinity
Panel means:     Included
Time trend:      Not included
Newey-West lags: 1 lag
```

		Statistic	p-value
Inverse chi-squared(294)	P	1070.4861	0.0000
Inverse normal	Z	-11.5365	0.0000
Inverse logit t(459)	L*	-26.3197	0.0000
Modified inv. chi-squared	Pm	32.0217	0.0000

P statistic requires number of panels to be finite.
Other statistics are suitable for finite or infinite number of panels.

****Including trend**

```
Fisher-type unit-root test for FO
Based on Phillips-Perron tests
---------------------------------------
Ho: All panels contain unit roots          Number of panels       =    147
Ha: At least one panel is stationary       Avg. number of periods =  16.58

AR parameter:    Panel-specific            Asymptotics: T -> Infinity
Panel means:     Included
Time trend:      Included
Newey-West lags: 1 lag
```

		Statistic	p-value
Inverse chi-squared(294)	P	945.0176	0.0000
Inverse normal	Z	-8.7095	0.0000
Inverse logit t(459)	L*	-21.6674	0.0000
Modified inv. chi-squared	Pm	26.8475	0.0000

P statistic requires number of panels to be finite.
Other statistics are suitable for finite or infinite number of panels.

Fisher unit root test (Philips-Perron) for trade openness

****Without trend**

```
Fisher-type unit-root test for trade
Based on Phillips-Perron tests
-------------------------------------
Ho: All panels contain unit roots          Number of panels       =    157
Ha: At least one panel is stationary       Avg. number of periods =  15.93

AR parameter:    Panel-specific            Asymptotics: T -> Infinity
Panel means:     Included
Time trend:      Not included
Newey-West lags: 1 lag
-------------------------------------------------------------------------
                                    Statistic      p-value
-------------------------------------------------------------------------
Inverse chi-squared(310)  P        451.2448       0.0000
Inverse normal            Z         -3.8148       0.0001
Inverse logit t(774)      L*        -4.2008       0.0000
Modified inv. chi-squared Pm         5.6725       0.0000
-------------------------------------------------------------------------
P statistic requires number of panels to be finite.
Other statistics are suitable for finite or infinite number of panels.
-------------------------------------------------------------------------
```

****Including trend**

```
Fisher-type unit-root test for trade
Based on Phillips-Perron tests
-------------------------------------
Ho: All panels contain unit roots          Number of panels       =    157
Ha: At least one panel is stationary       Avg. number of periods =  15.93

AR parameter:    Panel-specific            Asymptotics: T -> Infinity
Panel means:     Included
Time trend:      Included
Newey-West lags: 1 lag
-------------------------------------------------------------------------
                                    Statistic      p-value
-------------------------------------------------------------------------
Inverse chi-squared(310)  P        483.4583       0.0000
Inverse normal            Z         -4.6209       0.0000
Inverse logit t(759)      L*        -5.4516       0.0000
Modified inv. chi-squared Pm         6.9663       0.0000
-------------------------------------------------------------------------
P statistic requires number of panels to be finite.
Other statistics are suitable for finite or infinite number of panels.
-------------------------------------------------------------------------
```

Fisher unit root test (Philips-Perron) for control of corruption

****Without trend**

```
Fisher-type unit-root test for cc
Based on Phillips-Perron tests
-------------------------------

Ho: All panels contain unit roots           Number of panels       =    166
Ha: At least one panel is stationary        Avg. number of periods =  14.69

AR parameter:    Panel-specific             Asymptotics: T -> Infinity
Panel means:     Included
Time trend:      Not included
Newey-West lags: 1 lag
```

		Statistic	p-value
Inverse chi-squared(332)	P	787.0463	0.0000
Inverse normal	Z	-8.0051	0.0000
Inverse logit t(834)	L*	-11.0425	0.0000
Modified inv. chi-squared	Pm	17.6592	0.0000

P statistic requires number of panels to be finite.
Other statistics are suitable for finite or infinite number of panels.

****Including trend**

```
Fisher-type unit-root test for cc
Based on Phillips-Perron tests
-------------------------------

Ho: All panels contain unit roots           Number of panels       =    166
Ha: At least one panel is stationary        Avg. number of periods =  14.69

AR parameter:    Panel-specific             Asymptotics: T -> Infinity
Panel means:     Included
Time trend:      Included
Newey-West lags: 1 lag
```

		Statistic	p-value
Inverse chi-squared(332)	P	701.6765	0.0000
Inverse normal	Z	-4.3826	0.0000
Inverse logit t(829)	L*	-7.2491	0.0000
Modified inv. chi-squared	Pm	14.3462	0.0000

P statistic requires number of panels to be finite.
Other statistics are suitable for finite or infinite number of panels.

Fisher unit root test (Philips-Perron) for the change in bank credit

****Without trend**

```
Fisher-type unit-root test for dbcredit
Based on Phillips-Perron tests
---------------------------------------------------
Ho: All panels contain unit roots           Number of panels       =     149
Ha: At least one panel is stationary        Avg. number of periods =   15.27

AR parameter:     Panel-specific            Asymptotics: T -> Infinity
Panel means:      Included
Time trend:       Not included
Newey-West lags: 1 lag
```

		Statistic	p-value
Inverse chi-squared(298)	P	1282.8479	0.0000
Inverse normal	Z	-23.2605	0.0000
Inverse logit t(744)	L*	-28.1465	0.0000
Modified inv. chi-squared	Pm	40.3409	0.0000

P statistic requires number of panels to be finite.
Other statistics are suitable for finite or infinite number of panels.

****Including trend**

```
Fisher-type unit-root test for dbcredit
Based on Phillips-Perron tests
---------------------------------------------------
Ho: All panels contain unit roots           Number of panels       =     149
Ha: At least one panel is stationary        Avg. number of periods =   15.27

AR parameter:     Panel-specific            Asymptotics: T -> Infinity
Panel means:      Included
Time trend:       Included
Newey-West lags: 1 lag
```

		Statistic	p-value
Inverse chi-squared(298)	P	1112.8042	0.0000
Inverse normal	Z	-18.8441	0.0000
Inverse logit t(744)	L*	-23.4562	0.0000
Modified inv. chi-squared	Pm	33.3757	0.0000

P statistic requires number of panels to be finite.
Other statistics are suitable for finite or infinite number of panels.

Appendix B

Table B.1: Effect of fiscal transparency on the change of bank development

Variables	Dependent variable: Change in bank credit								
	Path (c): Without mediators			Path (c'): With mediators					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$dBcredit_{it-1}$	0.280***	0.321***	0.255***	0.202***	0.197***	0.120*	0.217***	0.221***	0.200***
	(0.075)	(0.059)	(0.081)	(0.055)	(0.054)	(0.067)	(0.056)	(0.057)	(0.062)
FT_{it-1}	0.044*	0.068*	0.046*	0.042**	0.042*	0.042*	0.043*	0.040*	0.041**
	(0.026)	(0.041)	(0.027)	(0.021)	(0.022)	(0.024)	(0.023)	(0.024)	(0.017)
$Agedep_{it}$	-0.005	0.005	0.023	0.001	0.002	-0.004	0.007	0.008	0.009
	(0.012)	(0.016)	(0.018)	(0.009)	(0.010)	(0.013)	(0.018)	(0.016)	(0.020)
$Inflation_{it-1}$				-0.049**	-0.048**	-0.044***	-0.047**	-0.047**	-0.036**
				(0.020)	(0.020)	(0.009)	(0.018)	(0.018)	(0.014)
$RGDPPCG_{it-1}$				0.251**	0.229**	0.083**	0.177*	0.164*	0.166*
				(0.098)	(0.098)	(0.032)	(0.101)	(0.099)	(0.094)
CC_{it-1}							0.300	0.369	0.454
							(1.417)	(1.184)	(1.195)
FO_{it-1}			1.068			0.090			0.142
			(0.960)			(0.821)			(0.453)
$Trade_{it}$		0.004	0.000		0.003	0.002		0.002	0.000
		(0.004)	(0.006)		(0.003)	(0.006)		(0.004)	(0.004)
Constant	0.218	0.712	-1.265	-0.088	-0.375	-0.185	0.471	-0.593	0.635
	(1.129)	(1.614)	(1.306)	(0.944)	(1.070)	(1.295)	(1.138)	(1.155)	(1.252)
N°observations	1497	1432	1366	1443	1389	1326	1443	1389	1326
N°countries	142	139	133	138	136	130	138	136	130
N°instruments	66	66	85	92	94	110	105	106	122
AR1 (p-value)	0.003	0.002	0.005	0.004	0.004	0.008	0.004	0.005	0.008
AR2 (p-value)	0.421	0.249	0.166	0.938	0.993	0.822	0.797	0.696	0.631
Hansen (p-value)	0.109	0.153	0.203	0.160	0.180	0.160	0.156	0.227	0.467
Indirect effect	-	-	-	0.002	0.026	0.004	0.001	0.028	0.005

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

dBcredit: the change in bank credit, FT: Fiscal transparency, Agedep: Age dependency ratio, Inflation: rate of inflation, GDPPCG: Real GDP per capita growth, FO: Financial openness, Trade: Trade openness, CC: Control of corruption. AR1: The first-order serial correlation, AR2: The second-order serial correlation, Hansen: Hansen test of overidentifying restrictions. Path (c): the total effect of fiscal transparency on dBcredit. Path (c'): the direct effect of fiscal transparency on dBcredit. The indirect effect of fiscal transparency on dBcredit = The total effect – The direct effect = (c) – (c').

Table B.2: Cross-sectional mediation analysis

Dependent variable: Bank credit						
Variable	Mediator	Results	Type of analysis	Indirect effect	N° observations	N° bootstrap replications
Fiscal transparency	Control of corruption	Coefficient	Parallel	0.177	140	5000
		90% confidence interval		[0.051, 0.374] (P) [0.054, 0.382] (BC) [0.047, 0.365] (BCa)		
	Inflation	Coefficient	Parallel	-0.006	140	5000
		90% confidence interval		[-0.027, 0.0110] (P) [-0.022, 0.014] (BC) [-0.031, 0.009] (BCa)		
	Economic growth	Coefficient	Parallel	0.008	140	5000
		90% confidence interval		[-0.033, 0.059] (P) [-0.023, 0.072] (BC) [-0.018, 0.092] (BCa)		
	Control of corruption	Coefficient	Serial	0.178	140	5000
		90% confidence interval		[0.053, 0.378] (P) [0.054, 0.380] (BC) [0.044, 0.359] (BCa)		
	Inflation	Coefficient	Serial	-0.004	140	5000
		90% confidence interval		[-0.030, -0.001] (P) [-0.010, 0.009] (BC) [-0.009, 0.035] (BCa)		
	Economic growth	Coefficient	Serial	0.010	140	5000
		90% confidence interval		[-0.038, 0.066] (P) [-0.032, 0.075] (BC) [-0.025, 0.094] (BCa)		
	Control of corruption and inflation	Coefficient	Serial	-0.002	140	5000
		90% confidence interval		[-0.009, 0.021] (P) [-0.012, 0.015] (BC) [-0.019, 0.012] (BCa)		
	Control of corruption and economic growth	Coefficient	Serial	-0.002	140	5000
		90% confidence interval		[-0.017, 0.010] (P) [-0.024, 0.006] (BC) [-0.034, 0.005] (BCa)		
	Inflation and economic growth	Coefficient	Serial	-0.004	140	5000
		90% confidence interval		[-0.030, -0.001] (P) [-0.010, 0.009] (BC) [-0.009, 0.035] (BCa)		
	Control of corruption, inflation and economic growth	Coefficient	Serial	0.0002	140	5000
		90% confidence interval		[-0.001, 0.002] (P) [-0.0008, 0.004] (BC) [-0.0006, 0.005] (BCa)		

Dependent variable: Liquid assets						
Variable	Mediator	Results	Type of analysis	Indirect effect	N° observations	N° bootstrap replications
Fiscal transparency	Control of corruption	Coefficient	Parallel	-0.028	73	5000
		90% confidence interval		[-0.103, 0.021] (P) [-0.121, 0.014] (BC) [-0.112, 0.018] (BCa)		
	Inflation	Coefficient	Parallel	0.000	73	5000
		90% confidence interval		[-0.015, 0.011] (P) [-0.010, 0.020] (BC) [-0.010, 0.017] (BCa)		
	Economic growth	Coefficient	Parallel	0.0002	73	5000
		90% confidence interval		[-0.029, 0.040] (P) [-0.035, 0.033] (BC) [-0.036, 0.032] (BCa)		
	Control of corruption	Coefficient	Serial	-0.025	73	5000
		90% confidence interval		[-0.097, 0.020] (P) [-0.115, 0.015] (BC) [-0.104, 0.017] (BCa)		
	Inflation	Coefficient	Serial	0.0005	73	5000
		90% confidence interval		[-0.011, 0.012] (P) [-0.004, 0.031] (BC) [-0.005, 0.028] (BCa)		
	Economic growth	Coefficient	Serial	0.002	73	5000
		90% confidence interval		[-0.029, 0.044] (P) [-0.025, 0.048] (BC) [-0.025, 0.048] (BCa)		
	Control of corruption and inflation	Coefficient	Serial	-0.001	73	5000
		90% confidence interval		[-0.011, 0.005] (P) [-0.015, 0.003] (BC) [-0.014, 0.003] (BCa)		
	Control of corruption and economic growth	Coefficient	Serial	-0.0004	73	5000
		90% confidence interval		[-0.011, 0.008] (P) [-0.013, 0.007] (BC) [-0.014, 0.006] (BCa)		
	Inflation and economic growth	Coefficient	Serial	0.0005	73	5000
		90% confidence interval		[-0.011, 0.012] (P) [-0.004, 0.031] (BC) [-0.005, 0.028] (BCa)		
	Control of corruption, inflation and economic growth	Coefficient	Serial	-8.128e-06	73	5000
		90% confidence interval		[-0.001, 0.001] (P) [-0.002, 0.001] (BC) [-0.002, 0.001] (BCa)		

Dependent variable: Change in bank credit						
Variable	Mediator	Results	Type of analysis	Indirect effect	N° observations	N° bootstrap replications
Fiscal transparency	Control of corruption	Coefficient	Parallel	0.0021	140	5000
		90% confidence interval		[-0.000,0.007] (P) [0.00002,0.0073] (BC) [0.00004,0.0074] (BCa)		
	Inflation	Coefficient	Parallel	0.0005	140	5000
		90% confidence interval		[-0.0003,0.0016] (P) [-0.0003,0.0018] (BC) [-0.0001,0.0024] (BCa)		
	Economic growth	Coefficient	Parallel	0.0025	140	5000
		90% confidence interval		[0.0005,0.005] (P) [0.001,0.006] (BC) [0.0007,0.006] (BCa)		
	Control of corruption	Coefficient	Serial	0.0022	140	5000
		90% confidence interval		[-0.0001,0.007] (P) [0.00001,0.007] (BC) [0.00003,0.007] (BCa)		
	Inflation	Coefficient	Serial	0.0003	140	5000
		90% confidence interval		[-0.0002,0.0011] (P) [-0.0002,0.0010] (BC) [-0.00011,0.0013] (BCa)		
	Economic growth	Coefficient	Serial	0.0030	140	5000
		90% confidence interval		[0.0009,0.006] (P) [0.0012,0.007] (BC) [0.0012,0.007] (BCa)		
	Control of corruption and inflation	Coefficient	Serial	0.0002	140	5000
		90% confidence interval		[-0.0005,0.0001] (P) [-0.00036,0.0008] (BC) [-0.0002,0.0011] (BCa)		
	Control of corruption and economic growth	Coefficient	Serial	-0.0007	140	5000
		90% confidence interval		[-0.0018,-0.0001] (P) [-0.0022,-0.0002] (BC) [-0.002,-0.0002] (BCa)		
	Inflation and economic growth	Coefficient	Serial	0.0003	140	5000
		90% confidence interval		[-0.0002,0.0011] (P) [-0.0002,0.001] (BC) [-0.0001,0.0013] (BCa)		
	Control of corruption, inflation and economic growth	Coefficient	Serial	0.0001	140	5000
		90% confidence interval		[-0.0001,0.0002] (P) [-0.0001,0.0003] (BC) [-0.0000,0.0004] (BCa)		

Notes: Data are averaged by country to obtain cross-sectional observations.

(P) percentile confidence interval
(BC) bias-corrected confidence interval
(BCa) bias-corrected and accelerated confidence interval