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Asymmetry of information and financial development: Evidence from middle income countries

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Abstract

This study investigates whether information disclosure that is supposed to reduce information asymmetry enhances financial development. The study employs a Dynamic Common Correlated Mean group technique with data from 69 middle income countries for the period 2004-2015 to examine this relationship. Public credit registries are used as a measure for information asymmetry reduction whereas financial depth and financial access are proxies of financial development. Our results show that Information shared by public credit registries has a substantial positive impact on financial depth as well as on financial access. Therefore, governments in middle income countries should encourage and consolidate public information sharing offices because they are necessary in enhancing the development of the financial system.

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1. Introduction

Over the last decades, financial development has received a great deal of attention as a source of economic growth. Theoretically, financial development enhances the ability of an economy to mobilize domestic resources, allocate capital to productive investment and mitigate financial imperfections through reduced transaction costs (Levine, 2005; Ang, 2008). In fact, many authors have proposed different methods in order to enhance financial development and therefore increase economic growth (Kaouthar and Mondher, 2014; Herwartz and Walle**,** 2014; Ang and McKibbin, 2007). Among these methods, recent literature pays a particular focus on the phenomenon of credit information disclosure. Theoretically, it is suggested that credit information sharing may overcome adverse selection in financial markets by eliminating the information gap that banks have on borrowers and helping them to better evaluate loan risks (Salamata and Zahonogo, 2018). By so doing, information disclosure helps banks to better allocate resources by selecting projects that are less risky. According to Padilla and Jappeli (1993) credit information sharing also reduces moral hazard by increasing borrower's incentive to repay loans. As argued by Padilla and Pagano (2000), defaulters are likely to be blacklisted, and consequently be push out of external finance in future. Furthermore, mitigation of the hold-up problem allowed by the information sharing reduces interest rate, increases entrepreneur's incentives to exert effort and thereby diminishes moral hazard (Padilla and Pagano, 1997).

Empirically, while credit information sharing is beneficial for financial development at microeconomic level due to the reduction of credit risk (Jappelli and Pagano, 2000) and default rate (Houston et al., 2010), it has ambiguous effects at the macroeconomic level due to the composition effect (Brown et al., 2009). Information sharing mechanisms allow banks to extend loans to clients from other banks by obtaining their credit history with those banks (Guérineau and Léon, 2019). But this process may induce possible adverse consequences since banks may rely too much on previous credit history without an efficiency screening process of loan demand. As a result, borrowers with risky project but good credit history are likely to obtain a loan from a bank, if they are no more capable of obtaining it from their usual lenders. Hence the relationship between information sharing and financial development is not clear in the literature. In this paper, we attempt to assess the effect of credit information sharing on financial development in middle-income countries. The study is relevant and contributes to the existing literature because it uses a new panel data econometric analysis[1] which, unlike others, takes into account endogeneity problems resulting from possible correlations between residuals of the different individuals in the panel. The rest of the study is structured as follows. Section 2 gives the data and describes the empirical methodology. Section 3 presents the results and the related discussions while section 4 concludes.

2. Data and methodology

2.1 Data

We examine a panel of 69 middle income countries for the period 2004-2015. Our data are sourced from Policy IV Project, International Countries Risk Guide, World Development Indicators, Financial Development and Structure Data Base of the World Bank and International Monetary Fund. The starting and ending years are governed by data availability. In essence, data from information sharing offices (public credit registries and private credit bureaus) from the World Bank are only available from the year 2004. At the time of the study, the most updated year in Policy IV Project database is 2015. We choose a sample of middle-

[1] Dynamic Common Correlated Mean Group Estimator (Chudik and Pesaran, 2015)

income countries because in most of these countries, credit information sharing is a quite recent phenomenon.

This study uses financial depth as the main measure of financial development because as assumed by Katsiaryna (2016), it is the only indicator which adds to the standard banking sector depth measure usually used in the literature (bank credit to private sector), indicators for other financial institutions (assets of mutual fund and pension fund industries and the size of life and non-life insurance premiums). The study also uses financial access as an alternative proxy of financial development for robustness checks. As for the measure of information sharing, we choose to use public credit registries rather than private credit registries. In accordance with recent information sharing literature (Tchamyou, 2019) six control variables are used and are consistent with the recent financial development literature (Asif et al., 2019; Asongu et al., 2016), namely, remittances, economic growth, inflation, property rights, government integrity and business freedom.

2.2 Methodology

Our basic equation of interest to investigate on the information asymmetry-financial development nexus is as follows:

$$FD_{it} = \beta_i^P PCR_{it} + \beta_i^X X_{it} + \mu_{it} \qquad \mu_{it} = \alpha_i + \theta_i f_t + \varepsilon_{it} \qquad (1)$$

Where FD denotes financial development, PCR is public credit registries and X is the set of control variables. These variables constitute the observable part of our model, with their parameter coefficients β_i^j (j=P, X) allowed to differ across countries[2]. This heterogeneity is a key feature of our empirical setup. Equation (1) also includes country-specific intercept (α_i) and a set of unobserved common factors f_t with country specific factor loadings θ_i to account for the levels and evolution of unobserved total factor productivity, respectively. As agued by Chudik et al. (2011), the common factors can be a combination of strong factors, representing global shocks such as the recent financial crisis, and weak factors, capturing local spillover effect along channels determined by shared cultural heritage, geographic proximity, economic or social interaction. Therefore, these common factors not only drive financial development but also public credit registries and the control variables. The parameters β_i^P on public credit registries and β_i^X on control variables are therefore not identified unless we find some way to account for the unobservable factors in the error term μ, or a valid and informative set of instruments. Due to the omnipresence of unobserved factors and the underlying heterogeneity in equilibrium relationship between public credit registries and financial development, it is not possible to obtained instruments that are both valid and informative. However, as documented by Eberhardt et al. (2013) and Eberhardt and Presbitero (2015), a way to account for unobservable factors in the error term is to allow for a more flexible evolution of unobserved total factor productivity over time: $\mu_{it} = \alpha_i + \theta_{it} + \varepsilon_{it}$, whereby unobserved total factor productivity evolution differs in each country and over time but is not constrained to deviate from world unobserved total factor productivity. Therefore, we use the following error term equation to capture θ_{it} :

$$\mu_{it} = \alpha_i + \sum_{s=1}^{M} \theta_{s,i}^s f_{s,t}^s + \sum_{k=1}^{\infty} \theta_{w,i}^k f_{w,t}^k + \varepsilon_{it} \quad (2)$$

[2] In line with Pesaran and Smith (1995), we assume that these parameter coefficients are fixed.

In this implementation, as assumed by Chudik et al. (2011), the underlying heterogeneity in the equilibrium relationship is captured by the fact that there are only a limited number (M) of strong factors $f_{s,t}$, which affect all countries in the world and an infinity of weak factors $f_{w,t}$, which only affect small subsets of countries.

We adopt an error correction model representation of the above equations of interest because as proposed by Eberhard and Presbitero (2015), this offers some advantages over static models and restricted dynamic specifications. Such a representation renders it possible to distinguish short-run from long-run behavior; investigate the error correction term and deduce the speed of adjustment of the economy to the long-run equilibrium; and also test for co-integration in the error correction model by closer investigation of the statistical significance of the error correction term. The error correction representation is as follows:

$$\Delta FD_{it} = \alpha_i + \rho_i(FD_{i,t-1} - \beta_i^P PCR_{i,t-1} - \beta_i^X X_{i,t-1} - \theta_i f_{t-1}) + \gamma_i^P \Delta PCR_{it} + \gamma_i^X \Delta X_{it} + \gamma_i^F f_t + \varepsilon_{it} \quad (3)$$

$$\leftrightarrow \quad \Delta FD_{it} = \pi_{oi} + \pi_i^{EC} FD_{i,t-1} + \pi_i^P PC_{i,t-1} + \pi_i^X X_{i,t-1} + \pi_i^F f_{t-1} + \pi_i^p \Delta PC_{it} + \pi_i^x \Delta X_{it} + \pi_i^f \Delta f_t + \varepsilon_{it} \quad (4)$$

In equation (3), the β_i^j(for j = P, X) represent the coefficients of long-run equilibrium relationship between financial development (FD), public credit registries (PC) and the control variables selected in our model. The γ_i^j represent the coefficients of short-run relationship. ρ_i indicate the speed of convergence of the economy to its long-run equilibrium. We include the unobserved common factors f in our long-run equation because we seek to investigate an equilibrium relationship between financial development, public credit registries, control variables selected and total factor productivity.

In equation (4) we have reparametrized the model in equation (3). From the coefficients on the levels terms (π_i^j for j=P,X) we can now back out the long-run parameters, $\beta_i^P = -\pi_i^P/\pi_i^{EC}$ and $\beta_i^X = -\pi_i^X/\pi_i^{EC}$, whereas from the coefficients on the terms in first difference we can read off the short-run parameters directly. π_i^{EC} relates to the speed at which the economy returns to the long-run equilibrium, while inference on π_i^{EC} parameter will provide insights into the presence of a long-run equilibrium relationship. According to Eberhardt and Presbitero(2015), if $\pi_i^{EC} = \rho_i = 0$ we have no co-integration and the model reduces to a regression with variables in first differences (the level terms in brackets in equation (3) drop out). If $\pi_i^{EC} = \rho_i \neq 0$ we observe error correction, this means that following a shock the economy returns to the long run equilibrium path, and thus there exists co-integration between the variables.

Following Chudik and Pesaran (2015), in addition to cross-section average of all model variables, we employ further lags of the cross-section average to capture unobservable and omitted elements of the co-integration relationship. Our estimation equation is thus:

$$\Delta FD_{it} = \pi_{i0} + \pi_i^{EC} FD_{i,t-1} + \pi_i^P PCR_{i,t-1} + \pi_i^X X_{i,t-1} + \pi_i^p \Delta PCR_{it} + \pi_i^x \Delta X_{it} + \pi_{1i}^{CA}\overline{\Delta FD_t} + \pi_{2i}^{CA}\overline{FD_{t-1}} + \pi_{3i}^{CA}\overline{PCR_{t-1}} + \pi_{4i}^{CA}\overline{X_{t-1}} + \pi_{5i}^{CA}\overline{\Delta PCR_t} + \pi_{6i}^{CA}\overline{\Delta X_t} + \sum_{l=2}^{r} \pi_{7il}^{CA}\overline{\Delta FD_{t-l}} + \sum_{l=1}^{r} \pi_{8il}^{CA}\overline{\Delta PCR_{t-l}} + \sum_{l=1}^{r} \pi_{9il}^{CA}\overline{\Delta X_{t-l}} + \varepsilon_{it} \quad (5)$$

Equation (5) represent the Chudik and Pesaran (2015) Dynamic Common Correlated Mean Group estimator (DCCE). These authors show that once augmented with sufficient number of lagged cross-section averages, the DCCE performs well. As proposed by Eberhardt and Presbitero (2015) the rule of thumb suggests that the sufficient number (p) of lagged cross-section average is determined as follow: $p = integer\left(T^{1/3}\right)$, where T is the number of periods in the study. An important characteristic of DCCE is that features such as non-stationarity,

cross-section correlation, heterogeneity in the equilibrium relationship across-countries are captured by the empirical specification and the use of additional terms in the regression equation (Eberhardt and Presbitero, 2015).

3. Empirical results

Before presenting and commenting estimation results, we first assess cross sectional dependence, then we run unit root tests and finally we perform panel co-integration tests. Regarding cross-sectional dependence test, results show that there is dependence between countries in our sample for all the variables. Stemming from these results and as agued by Banerjee et al. (2000), we perform Pesaran (2007) panel second generation unit root tests. The results indicate that financial depth, public credit registries, property right and business freedom are non-stationary at level and are therefore integrated at first level. Since our variables are integrated in order one, there is a presumption of co-integration between them. As the last step in our preliminary tests, we perform the Pedroni (1999) panel co-integration test. The results of that test indicate the presence of a strong co-integration relationship between financial depth, public credit registries, property right and business freedom. To save more space, the results of these preliminary tests were not included in the main text but are available upon request from the authors.

Table I presents results derived from the error correction model specification, with estimates for a standard Mean Group estimator in column (1), which ignores unobserved common factors, and a Dynamic Common Correlated Mean Group estimator in column (2) which takes into account the unobserved common factors and therefore, includes cross-sectional averages. The model in column (2) adds only contemporaneous cross-section averages[3]. In each model we first focus on long-run estimates as well as the coefficient of the lagged level of financial depth to investigate error correction and thus evidence for a long-run relationship. For All the two models, there is evidence of error correction because the coefficients on financial depth lagged variables are negative and significant. The negative coefficient on financial depth lagged indicates conditional convergence with respect to financial depth. This convergence is conditional in that it concludes that if the other regressors are kept constant, the growth rate of financial depth is bigger as the financial depth lagged is small. For model (2), the long-run coefficient on public credit registries appears highly statistically significant and positive, whereas short-run coefficient is insignificant. The later does not imply the absence of any significant effect, but rather highlights the heterogeneity across countries with dynamic on average cancelling out. The MG estimator in contrast yields statistically insignificant coefficients on public credit registries both in short run and long run. Diagnostic tests at the bottom of Table I indicate that the use of cross section considerably reduces residuals cross-section dependence (the CD statistic drop from 1.67 in the MG to -0.81 in the DCCE model). The null hypothesis of weak cross-sectionally dependent residuals is rejected for model (1) and accepted for model (2). Recall that the presence of cross-section dependence indicates that we have misspecified the total factor productivity process which may indicate that our estimates are biased (Eberhardt and Presbitero; 2015). This seems to be the case in MG model.

According to the results in model (2) the statistically significant and positive long-run coefficient of public credit registries means that an increase in information shared by public credit registries reduces information asymmetry and therefore enhances financial development. In term of economic significance this result assumes that an increase of one unit in public credit

[3] We use Chudik and Pesaran (2015) recommended rule of thumb $(p = interger(12^{1/3}) = 1)$ with relevance of an autoregressive distributive lags. In our error correction model this equates to adding only contemporaneous cross-section averages.

registries contributes to an increase in financial development of 18.8%[4]. The financial system therefore deepens because public credit registries give more positive information than negative information with respect to the borrower's loan history. This finding is in line with that of Asongu et al. (2016) who found that bank funding will be reduced if the credit register gives more negative information than positive information.

The results of Table I also show that property rights have a negative and significant effect on financial depth. A tight protection of property rights can induces financial institutions to be indifferent as to the nature of the investment project that is financed with their funds (Padilla and Pagano, 2000). Consequently, borrowers will have an incentive to undertake excessively risky projects while financial institutions will have no incentive to restrain them because of the tight protection of their property rights. As a result, the number of risky projects financed will increase and therefore, leads to the collapse of credit market. Furthermore, Table I indicates that remittances have a positive and significant effect on financial depth. According to Bhattacharya et al. (2018) this result means that lowering the transactions costs on remittances will encourage a larger share of remittances to flow through formal financial channels and therefore enhance financial depth.

To further examine the relationship between information sharing and financial development, we re-estimate the model by using financial access as a proxy for financial development. We repeat the Dynamic Common Correlated Mean Group estimation for our sample of countries. The results are reported in Table I column (3). The sign, the economic and statistical significance of the long run coefficient on public credit registries are found to be quite similar to those obtained in column (2). Therefore, our findings are robust for different indicators of financial development. Furthermore, the results reported in column (3) indicated that remittances also have a significant positive effect on financial access. Therefore, the effect of remittances does not change with financial development indicators.

[4] Recall that the long run equilibrium coefficient between financial depth and public credit registries is obtained by the following formula $\beta_i^P = \frac{-\pi_i^P}{\pi_i^{EC}}$;with $\pi_i^{EC} = -0.553$ and $\pi_i^p = 0.104$, $\beta_i^P = 0.188$.

Table I: Results of the error correction models

VARIABLES	(1) MG	(2) DCCE	(3) DCCE
Short run			
Economic growth		0.023	
		(0.016)	
Public credit registries	0.107	0.214	0.023
	(0.110)	(0.155)	(0.043)
Property rights		-0.014	-0.006
		(0.011)	(0.007)
Remittances			-0.380
			(0.296)
Business freedom		-0.043	-0.003**
		(0.040)	(0.001)
Inflation		0.000	-0.00
		(0.001)	(0.005)
Government integrity		0.015	0.000
		(0.021)	(0.002)
Long-run			
Financial depth lagged	-0.819***	-0.553***	
	(0.111)	(0.115)	
Financial access lagged			-0.620***
			(0.098)
Public credit registries	0.086	0.104***	0.109***
	(0.163)	(0.009)	(0.011)
Property rights	-0.011	-0.006**	0.000
	(0.034)	(0.003)	(0.002)
Remittances	0.436	0.022***	0.021***
	(0.305)	(0.002)	(0.007)
Business freedom	0.003	-0.001	-0.010***
	(0.006)	(0.002)	(0.003)
Inflation	-0.006	0.001	-0.000
	(0.020)	(0.001)	(0.001)
Government integrity	0.037	0.009**	0.001
	(0.023)	(0.004)	(0.002)
Economic growth	0.002	-0.001	
	(0.021)	(0.002)	
Constant	-1.536***	1.156**	0.597**
	(0.442)	(0.520)	(0.266)
Observations	747	680	680
Number of groups	69	69	69
R-squared	0.17	0.88	0.92
CD statistics	1.67*	-0.81	-0.29
CD statistics P-value	0.095	0.416	0.771

Notes: Standards error are in parentheses, *** p<0.01, ** p<0.05, * p<0.1. MG is the standard Mean Group estimator, DCCE is the Dynamic Common Correlated Mean Group Estimator. Estimations have been undertaken using the logarithm of financial development indicators and logarithm (1+ public credit registries) since this last indicator has many zero values for a number of middle-income countries during the selected period of study.

4- Conclusion and policy implications

The current study investigates how information asymmetry affects financial development in a panel of 69 middle income countries for the period spanning from 2004 to 2015. Public credit registries are used as a proxy for reducing information asymmetry whereas financial development is measured in terms of financial depth and financial access. The empirical evidence is based on the Dynamic Common Correlated Mean Group estimator. Our finding is robust for the two different indicators of financial development.

The main policy implication of this study is that, the institution of public information sharing offices should be encouraged and consolidated across middle income countries because they are necessary in diminishing information asymmetry and then enhancing the development

of the financial system. Our finding does not however give insights on the channels through which information shared by public credit registries could efficiently affect the financial sector. In particular, we did not explore other possible characteristics of the countries, such as the quality of communication technology tools that may explain this effect. Communication technology is a natural instrument by which public information sharing offices can accomplish their theoretical role of reducing information asymmetry in the financial system. Therefore, future studies can improve the existing literature by assessing the role of the quality of communication technology tools in enhancing the effect of information shared by public credit registries on financial development.

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