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Financial Development and Domestic Public Debt in Emerging Economies: A Panel Cointegration Analysis

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Abstract

The share of domestic public debt over total public debt has increased in most developing economies during the last 30 years, these period also characterized by expansion and liberalization of the financial markets. Financial development requires the existence of appropriate institutional infrastructure and economic stability. This paper investigates the long-run relationship between financial development and domestic public debt in 18 emerging economies over the period 1987–2013. The study uses the second generation panel unit root test and panel cointegration analysis which allows for both cross section dependence and heterogeneity. The results reported in this study suggest that government borrowing from domestic banks has negative effect on financial development in the long run. Furthermore, the findings indicate that while trade openness enhances financial development, economic instability exerts a negative impact in emerging countries.

JEL classification**:** H63, O16.

Keywords**:** Domestic public debt, Financial development, Emerging countries, Panel cointegration.

1. Introduction

During the last few decades, a great deal of attention has been devoted to the rapid economic growth and sound fiscal discipline in emerging countries. A developed financial system is the fundamental element for rapid economic growth. The positive correlation between improvement in the real economy and development of the financial markets has been confirmed by many empirical studies (e.g. Roubini and Sala-i-Martin 1992; Calderon and Liu 2003). Many emerging economies have experienced considerable progress in their financial markets since the 1990s. A sustainable fiscal stance also promotes economic growth in the medium-long term. The stock of public debt has decreased in most of these economies, however the share of domestic public debt over total public debt has increased during the same period.

The well-functioning financial systems must have five main components: well organized monetary arrangements, a large banking sector, sustainable public finances, independent central bank, and developed securities markets (Rousseau and Sylla, 2003). The effects of fiscal policies on financial markets have received considerable attention in the literature. The legal and institutional infrastructure are the main determinant of financial development. La Porta et al. (1998) point out that low levels of shareholder and creditor rights are associated with smaller debt and equity markets. Similarly, Levine et al. (2000) emphasize that (i) the regulations for strengthening creditor rights, contract enforcement, and accounting practices have a positive

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effect on financial development and (ii) the legal and regulatory environment could explain cross-country differences in the level of development of the financial intermediary sector. Chinn and Ito (2006) also suggest that a higher level of financial openness accompanied by a threshold level of institutional and legal development contributes to the development of equity markets. In terms of fiscal policy, higher tax rates on capital gains and double taxation of dividends negatively influence the enlargement of equity capital (Kaufman, 1986). Public deficits may leads to capital flight as an indicator of an incentive for the government to tax domestic assets (Ize and Ortiz 1987).

There is a growing literature on the role of government regulations and fiscal policies in the evolution of financial systems. However, there are limited studies on the interaction between financial development and public debt. In theory, the size and composition of government debt have important direct and indirect effects on the financial sector. However, the direction of impact is ambiguous, depending on the level of economic development and the nature of government debt. The development of local financial markets facilitates domestic public debt and may lower the cost of government borrowing (Özkan et al. 2010). However, the effect of public debt on the financial system is more complicated. The aim of this paper is to examine the long-run relationship between financial development and domestic government debt for the case of selected emerging economies over the period 1987–2013 using panel cointegration analysis.

On the one hand, the government bond sector plays an important role in the development of local securities markets. Namely, the government bond is a safe asset for banks in many developing and transition countries which have observed low financial intermediation (Kumhof and Tanner 2005). The safety of government bonds facilitates financial development by serving to reduce risk for domestic banks. Domestic banks and institutional investors mostly prefer government bonds because of providing a regular flow of earnings, privileged treatment and offering high liquidity.

Moreover, government bond price is an indicator for the pricing of other securities. In such a case, the interest rate on government bonds must be market-determined; otherwise, important information will be lost and the efficiency of capital allocation will decrease (Herring and Chatusripitak 2007). The prices of fixed rate government bonds reflect inflation expectations and term premiums more clearly than other securities. The government bond sector contributes to the creation of more complete financial markets by means of developing new financial instruments. The yield curve of government securities provides more accurate information on the future evolution of interest rates and inflation (Castellanos 1998; Foncerrada 2005) and contributes to the pricing of corporate bonds and equities (Reinhart and Sack, 2000).

On the other hand, government debt could have negative effects on the development of financial markets. First of all, excessive public debt may crowd out private investment. Bank credit to the private sector is a key measure of financial development and therefore government borrowing is harmful for financial development. Caballero and Krishnamurthy (2004) provide empirical support that crowding out is systematically larger in emerging markets than in developed economies and rises significantly during crises. Crowding out effect is limited in open economies, but emerging markets are not as well integrated into the international markets (Claeys et al. 2012). Moreover, this effect is more harmful in developing countries because small- and medium-sized private companies heavily rely on bank financing (Bua et al. 2014). Emran and Farazi (2009) emphasize that in emerging markets the effect of government debt and budget deficit on the interest rate is not as large as in developed countries, therefore the quantity channel of crowding out is more important. The crowding out effect on private

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borrowing can lead to loss of benefit from the government bond as a pricing benchmark and hedging instrument (McCauley and Remolona 2000).

A high level of public debt could also have a negative effect on the development of local financial markets as the associated risk of government insolvency could increase interest rates (Dorrucci et al. 2009). Large public sector borrowing from the domestic banks is associated with a high level of profitability, but lowers deepening and efficiency of the banking sector; this corresponds to the lazy bank view in the literature (Hauner 2009). Gray et al. (2014) indicate that both government and central bank actions may explain the low loan-to-deposit ratios. For instance, when the central banks lend to the government, customer deposits at commercial banks increase with ensuing reduction in the loan-to-deposit ratios. Excessive borrowing from banking sector could also create moral hazard and thus prevent banks' incentives to explore profitable investment opportunities (Emran and Farazi, 2009). This problem seems to be more severe in periods of uncertainty. Finally, it must be noted that excessive government debt is one of the main reasons for the financial crisis.

Recent empirical studies on the relationship between financial development and government debt have also produced mixed results. We provide empirical support for the relation between financial development and public debt by using non-stationary panel techniques. We extend the existing literature in two ways. Firstly, we analyze this relation for emerging market economies. Secondly, we use new generation panel data methods, which allows for both cross section dependence and heterogeneity. To our knowledge, there is no study in the literature that takes this issue into account. Our empirical results provide strong evidence that domestic public debt has negative effect on financial development.

The rest of the paper is organized as follows. Section 2 presents a brief review of the existing empirical literature. Section 3 describes the data and discusses the econometric methodology and empirical results, and Section 4 presents our conclusions.

2. Empirical Literature

The relationship between public debt and financial development has been analyzed from different aspects in the recent empirical literature and the studies have reached varying conclusions. A summary of selected empirical studies is presented in Table 1.

Kutivadze (2011) provides empirical evidence that the share of domestic debt in total debt positively depends on the level of financial development in panel data analysis. In contrast, Altaylıgil and Akkay (2013) find a negative relationship between financial development and domestic public debt in country-specific analysis. The impact of external debt on financial markets has been investigated by Bordo and Meissner (2006), they suggest that foreign currency debt is dangerous when mismanaged, but hard currency debt alone does not always cause a financial crisis. Some researchers (e.g. Ayadi et al. 2015, Bua 2014, Emran and Farazi 2009, Caballero and Krishnamurthy 2004) find empirical evidence for the negative effect of government borrowing on private credit in developing countries, which implies the 'crowding-out' hypothesis. Similarly, Hauner (2008, 2009) suggests that public sector borrowing from the domestic banking system increases the profitability but reduces the efficiency of banks in developing countries; therefore banking sectors that generally lend to the public sector tend to grow more slowly. These evidences support the `lazy bank' approach in developing countries, whereas, in the case of developed countries, the empirical evidence for the relationship between financial development and domestic public debt is not unambiguous.

On the other hand, Azzimonti and Francisco (2012) investigate the casual relation between government borrowing and financial liberalization. The evidence obtained in their study indicates that government debt increases when financial markets become internationally integrated. Claeys et al. (2012) examine relation between financial integration and crowding out effect. Their results suggest that international financial integration limits the crowding out effect of public debt. Gennaioli et al. (2014) found that sovereign default affects private credit negatively and the effect is more disruptive in countries where banks hold more public bonds.

Table 1. A Summary of Selected Empirical Studies

Author	Country	Time Period	Methodology	Result
Ayadi et al. (2015)	Mediterranean countries	1985 – 2009	Panel data REM	dv: private debt, iv: public debt Crowds out effect
Mun and Ismail (2015)	Malaysia	1980-2010	Time series ARDL	dv: financial development, iv: bank credit to government, Negative Effect
Gennaioli et al. (2014)	46 countries	1980-2005	Panel Data FEM	dv: private credits, iv: public defaults Negative Effect
Bua et al. (2014)	36 low-income countries	1971-2011	Panel data Correlation	dv: private debt, iv: public debt Crowds out effect
Altaylıgil and Akkay (2013)	Turkey	2002 – 2012 (quarterly)	Time series ECM	dv: fin. development, iv: domestic debt Negative Effect
Azzimonti and Francisco (2012)	22 OECD	1973 - 2005	Panel data FEM	dv: public debt, iv: fin. liberalization Negative Effect
Claeys et al. (2012)	46 countries	1990-2005	Panel data Spatial panel t.	dv: interest rates, iv: public debt Crowding out effect
Kutivadze (2011)	130 countries	1994 - 2007	Panel data SEM, GMM	dv: domestic debt, iv: fin. Development Positive Effect
Emran and Farazi (2009)	60 developing countries	1975 - 2006	Panel data, 2SLS, GMM	dv: private credit, iv: gov. borrowing Crowding out effect
Hauner (2009)	73 developing economies	1960 - 2004	Panel data FEM	dv: financial development, iv: bank credit to government, Negative Effect
Hauner (2008)	142 countries	1960 - 2005	Panel data FEM, GMM	dv: financial deepening, iv: bank credit to government, Negative effect in developing countries
Bordo and Meissner (2006)	36 developed-developing countries	1880 - 1913 1972 - 1997	Panel data FEM	dv: financial crises, iv: foreign currency debt, negative effect in some cases
Caballero and Krishnamurthy (2004)	31 advanced-emerging countries	1980-2000	Panel data OLS	dv: private credit, iv: gov. borrowing Crowding out effect

Notes: dv-iv: dependent-independent variable, REM: random-effects model, FEM: fixed-effects model, ECM: error correction model, SEM: simultaneous equations model 2SLS: two-stage least-squares, GMM: generalized method of moments.

3. Methodology and Empirical Results

3.1 The Model and Data

Using yearly data for the period of 1987-2013, the study examines the long-run relationships among financial development and domestic public debt for eighteen emerging countries (Argentina, Brazil, China, Chile, Egypt, Hungary, India, Indonesia, Jordan, Malaysia, Pakistan, Peru, Poland, Philippines, South Africa, Thailand, Turkey and Venezuela). These countries were selected based on the data availability in the IMF list of emerging markets. In order to empirically investigate the impact of domestic public debt on financial development we use the following model.

$$FD_{it} = \beta_{0i} + \beta_{1i}Debt_{it} + \beta_{2i}Control_{it} + \varepsilon_{it} \quad \text{for } i = 1,2,..,N;\ t = 1,2,\ldots,T \qquad (1)$$

where FD_{it} is the indicator of financial development, $Debt_{it}$ is the ratio of bank credit to government to GDP (*BC*), $Control_{it}$ represent other potential determinants of financial development in country i and year t, ε_{it} is an error term.

Different indicators of financial development have been used in the literature. In this study a financial development index was constructed from four indicators, namely, broad money to GDP (%), private credit by deposit money banks and other financial institutions to GDP (%), stock market total value traded to GDP (%) and stock market capitalization to GDP (%) by utilizing the principal component analysis. The broad measure of the money stock (M3/GDP) is a commonly used proxy for financial development. The second indicator is credit to the private sector which is interpreted as financial depth and it correlates strongly with long-term economic growth (Demirgüç-Kunt and Levine 2008). High values of the stock market total value traded to GDP indicate a more active equity market, which may be associated with a relatively efficient allocation of capital so more financial efficiency results (Kutivadze 2011). Finally, market capitalization relative to GDP is an important factor as it captures the size of a financial system and is a measure of stock market development. The degree to which the public can access financial services is also important, but the data for this financial variable is limited. There are several reasons for the use of two stock market indicators in the index. Firstly, the stock markets indicate more advanced stage of financial development compared with the banking system (see Mckinnon, 1973). Secondly, market capitalization and total value traded ratios follow a different pattern both over time and between countries, thereby these variables are complementary in terms of the development of the stock market (for example Turkey and Egypt). Lastly, this approach reduces the risk of belonging to the same universe of the components of financial development and the public debt. The data source for all financial series is Global Financial Development database.

To capture the composition of domestic public debt we used borrowings from the banking system because the banking sector is the weighted part of the financial system in developing countries. It is measured credits given by domestic money banks to government and state-owned enterprises to GDP (%). Moreover, higher bank credit to public sector is significantly negatively related to growth and these nations also tend to have more government intervention in the economy, a larger public sector and more trade restrictions (Hauner, 2009).

Three control variables are included in the regressions in order to avoid possible omitted variable bias. Real GDP per capita (Y_{it}) is used for a proxy of economic development following Roubini and Sala-i-Martin (1992) and King and Levine (1993). High inflation rate increases uncertainty and may causes distortions in decision-making process, so it is a plausible indicator of economic stability. So we use consumer price index (CPI_{it}) as a control variable in the regressions. Trade openness (TO_{it}) affects financial development through both supply side (Rajan and Zingales, 2003) and the demand side (Newbery and Stiglitz, 1984) of external finance. The real income, inflation rate, trade openness and public debt series were obtained from the World Development Indicators. Descriptive statistics for variables presented in Appendix. The logarithms of all the variables are used in the econometric analysis.

3.2 Preliminary Data Analysis

In this study the empirical analysis is performed in three stages: panel unit root tests, panel cointegration and causality analysis. The first generation panel unit root and cointegration tests assumed cross-sectional independence in the errors. However cross section dependence may be arise due to spatial dependence, spillover effects, or unobservable common factors. Cross-sectional dependency must be taken into account in empirical analysis as a result of the increasing economic and financial interdependence of countries (Nazlioglu et al. 2011). Another important question in panel data analysis is whether the slope coefficients are

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homogeneous across groups. In classical panel data analysis, it is assumed that the slope coefficients of the variables are homogeneous across individual units. If the slope coefficients are individual specific, this would lead to biased estimation and inference.

For the reasons explained above, we first test the cross-sectional dependency using three CD tests developed by Breusch and Pagan (1980) and Pesaran (2004). The Lagrange multiplier test statistic for cross section dependence of Breusch and Pagan (1980) is expressed as:

$$LM_{BP} = T\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{ij}^{2} \tag{2}$$

where $\hat{\rho}_{ij}^{2}$ is the estimated correlation coefficient among the residuals obtained from individual OLS estimations. LM_{BP} follows a chi-square distribution with $N(N-1)/2$ degrees of freedom (where N is the number of cross sections). While the Breusch-Pagan (1980) Lagrange multiplier test (LM_{BP}) can be used in cases with a fixed N and the time period (T) is large (small panel), Pesaran tests (CD_{LM} and CD) have satisfactory performance for moderately large T and N:

$$CD_{LM} = \left(\frac{1}{N(N-1)}\right)^{1/2}\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\left(T\hat{\rho}_{ij}^{2} - 1\right) \tag{3}$$

While under the null hypothesis with $T\rightarrow\infty$ first and then $N\rightarrow\infty$, the CD_{LM} statistic has standard normal distribution, the CD test has asymptotic standard normal distribution under the null hypothesis with $T\rightarrow\infty$and $N\rightarrow\infty$ in any order:

$$CD = \left(\frac{2T}{N(N-1)}\right)^{1/2}\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{ij} \tag{4}$$

where $\hat{\rho}_{ij}$is the pair-wise correlation coefficient from the residuals of the ADF regressions. In order to test for homogeneity, we perform the Δ tests proposed by Pesaran and Yamagata (2008). This test is a re-scaled version of the Swamy (1970) test of slope homogeneity and it has the correct size and satisfactory power in panels for various combinations of N and T. The modified version of Swamy's test statistic which is valid for a fixed N and as $T\rightarrow\infty$ is

$$\tilde{S} = \sum_{i=1}^{N}\left(\hat{\beta}_i - \tilde{\beta}_{WFE}\right)'\frac{X_i' M_\tau X_i}{\tilde{\sigma}_i^2}\left(\hat{\beta}_i - \tilde{\beta}_{WFE}\right) \tag{5}$$

where $\hat{\beta}_i$ and $\tilde{\beta}_{WFE}$ are estimators from the pooled OLS and the weighted fixed effect pooled OLS, respectively. $M\tau$ is an identity matrix. The standardized dispersion statistics are defined by

$$\tilde{\Delta}= \sqrt{N}\left(\frac{N^{-1}\tilde{S}-k}{\sqrt{2k}}\right) \tag{6}$$

Pesaran and Yamagata (2008) use the following mean and variance bias adjusted versions of $\tilde{\Delta}$ to enhance the small sample properties of the test under normally distributed errors:

$$\tilde{\Delta}_{adj}= \sqrt{N}\left(\frac{N^{-1}\tilde{S}-E(\tilde{z}_{iT})}{\sqrt{Var(\tilde{z}_{iT})}}\right) \tag{7}$$

where $E(\tilde{z}_{iT})$=k and $Var(\tilde{z}_{iT}) = 2k(T-k-1)/(T+1)$. The cross-sectional dependency test results are reported in Table 2. It is clear that the null hypothesis of no cross section dependence across the countries is strongly rejected for both variables and the model, implying that a shock which occurred in one of the emerging countries seems to be transmitted to the others.

Globalization and the absence of repressive regulations have intensified the international transmission of financial shocks. This result confirms that the developing countries are, as expected, cross-sectionally correlated in terms of their financial markets. Table 2 also reports the results from the slope homogeneity tests of Pesaran and Yamagata (2008). Both tests reject the null hypothesis of slope homogeneity which implies country specific heterogeneity. Our sample includes countries from different regions (e.g. developing Asia, Latin America, Middle East and North Africa, Europe and Central Asia). The differences in terms of institutional and economic factors are situated in the origin of such heterogeneity. Another reason is that these countries are at different stages of the financial development process. For example, the difference between China and Argentina is more than three times in terms of financial depth (measured by broad money to GDP) during the analysis period.

Table 2. The Cross-sectional Dependence and Homogeneity Tests

CD tests	*logFD*	*logBC*	*logY*	*logCPI*	*logTO*	*Model*
Test						
LM_{BP}	423.3***	221.6***	333.1***	414.2***	215.3***	509.6***
CD_{LM}	15.45***	3.927***	10.29***	14.93***	3.564***	20.38***
CD	-0.551	-3.04***	-1.92**	5.228***	-2.55***	9.565***
Homogeneous test						
$\tilde{\Delta}$						12.84***
$\tilde{\Delta}_{adj}$						14.49***

Notes: LM_{BP}, CD_{LM}, CD, denote the Breusch-Pagan (1980) LM statistic, the Pesaran (2004) LM statistic, and the Pesaran (2004) test statistic based on the pair-wise correlation coefficients for cross-sectional dependence, respectively. The null hypothesis is no cross-sectional dependence. $\tilde{\Delta}$ and $\tilde{\Delta}_{adj}$ denote Pesaran and Yamagata (2008) homogeneity tests. The null hypothesis is slope homogeneity. ***, ** indicate rejection of the null hypothesis at 1 and 5% levels of significance.

3.3 Panel Unit Root Testing

The next step in our analysis is determining the degree of integration of each variable. LM_{BP}, CD_{LM}, and CD test results indicate that second generation unit root tests which allow for cross section dependence must be used. For this purpose we use the Cross-sectionally Augmented Dickey Fuller (CADF) panel unit root test proposed by Pesaran (2007). This test eliminates cross-sectional dependence by standard ADF regressions which are augmented with the cross section averages of lagged levels and first differences of the individual series (Pesaran, 2007). The CADF test is based on the following regression model:

$$\Delta y_{it} = \alpha_i + b_i y_{i,t-1} + c_i \bar{y}_{t-1} + \sum_{j=0}^{p} d_{ij} \Delta \bar{y}_{t-j} + \sum_{j=1}^{p} \delta_{ij} \Delta y_{i,t-j} + e_{it} \quad (8)$$

where $\bar{y}_t$ is the cross section mean of y_{it}. The null hypothesis assumes that each series is non-stationary, $H_o: b_i = 0$ for all i, while the alternative hypothesis is that at least one of the individual series is stationary, $H_1: b_i < 0$ for at least one i. CIPS (Cross-Sectionally Augmented IPS) statistics are cross section averages of the CADF test statistics:

$$CIPS = N^{-1} \sum_{i=1}^{Ni} t_i \quad (9)$$

where t_i statistics are obtained from each CADF model for each individual i of the panel. Emerging countries have experienced one of two major deterioration period of the 20th century with regard to sovereign default and systemic banking crises in 1980s (see Reinhart and Rogoff, 2010). After this, global financial crisis damaged their fiscal balance and stability of financial system. The unit root test results for both 'constant' and 'constant and trend' specifications are presented in Table 3. According to the CIPS test results, the null hypothesis of unit root cannot be rejected at levels for all variables in both intercept and intercept-trend models. On the contrary, the differenced series are stationary. This leads us to decide that all series are integrated of order one, I(1).

Table 3. Pesaran (2007) CIPS Panel Unit Root Test Results

Variables	constant	constant&trend		constant	constant&trend
logFD	-2.569***	-2.141	Δ*logFD*	-3.350***	-3.439***
logBC	-1.888	-2.397	Δ*logBC*	-3.588***	-3.895***
logY	-2.126	-2.897***	Δ*logY*	-2.780***	-2.777**
logCPI	-1.934	-3.321***	Δ*logCPI*	-2.912***	-3.016***
logTO	-1.905	-2.052	Δ*logTO*	-3.162***	-3.411***

The number of lags was determined by the Schwarz criterion. The relevant 1, 5, and 10% critical values for the CIPS statistics are −2.38, −2.20, and −2.11 with an intercept (Pesaran 2007, Table 2-b, p280), −2.88, −2.77, and −2.63 with an intercept and a linear trend (Pesaran 2007, Table 2-c, p281), respectively. ***, **, * denotes significance at the 1, 5, and 10% level, respectively.

3.4 Panel Cointegration Test

Having established the non-stationarity of the series, we use the panel bootstrap cointegration test developed by Westerlund and Edgerton (2007) for the purpose of testing the existence of a long-run relationship between the variables. This test based on the Lagrange multiplier test of McCoskey and Kao (1998), and the advantage of the test is that it works well in small samples and allows for cross-sectional dependence. Consider the following panel data model:

$$y_{it} = \alpha_i + x_{it}'\beta_i + z_{it} \tag{10}$$

where $z_{it} = u_{it} + v_{it}$ with $v_{it} = \sum_{j=1}^{t} n_{ij}$ ($n_{it} \sim iid$). If there is no cross section dependence, the null hypothesis of cointegration can be tested by the following test statistic.

$$LM_N^+ = \frac{1}{NT^2} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{\omega}_i^{-2} S_{it}^2 \tag{11}$$

In equation (10) $\hat{\omega}_i$ is the long-run variance of u_{it} and S_{it} is the partial sum of z_{it}. Due to this test is very sensitive to serial correlation and the test results based on the asymptotic normal distributions can be highly misleading in small samples, Westerlund and Edgerton (2007) propose the use of bootstrap critical values.

As previously shown, the models exhibit cross section dependence in the error terms and all series are integrated of order one, I(1). Therefore, we perform the Westerlund and Edgerton (2007) cointegration test which takes into account cross section dependence among countries. The results of the cointegration test, which are presented in Table 4, show that the null hypothesis of cointegration cannot be rejected among the variables in all of the models. Consequently, we can conclude that there exists a long-run relationship among financial development and the explanatory variables in emerging economies.

Table 4. Results of the Panel LM Bootstrap Cointegration Tests

	Intercept only		Intercept and trend	
	LM_N^+Stat	Bootstrapp-value	LM_N^+Stat	Bootstrap p-value
Model	3.682	1.000	12.327	0.955

The bootstrap p-values are based on 10000 replications.

3.5 The Magnitudes of the Cointegration Relationship

In order to estimate the cointegration vector, various panel long-run estimators can be used such as the FMOLS or DOLS estimator suggested by Pedroni (2000, 2001). However these estimators may be biased in the presence of cross-sectional dependence. To solve this problem Pesaran (2006) proposed the Common Correlated Effects (CCE) estimator which allows for cross-sectional dependencies that potentially arise from multiple unobserved common factors. The common correlated effects type estimator is valid in cases of different numbers of unobserved common factors and in the presence of the serial correlation and variance heterogeneity of error terms. Common correlated effects (CCE) estimators are based on cross section augmented regression which is defined as follows:

$$y_{it} = a_i + b_i x_{it} + c_i \bar{x}_t + d_i \bar{y}_t + e_{it} \tag{12}$$

where $\bar{x}_t$ and $\bar{y}_t$ denote the simple cross section averages of x_{it} and y_{it} in year t, respectively. In this paper we use the mean group version of the Common Correlated Effects estimator (CCEMG) of Pesaran (2006). The CCEMG estimator includes cross section averages of the independent variables as regressor and allows for unobserved common factors to have a unit root (Kapetanios et al., 2011). This estimator is a simple average of the individual CCE estimators ($\hat{b}_{CCEMG} = (1/N)\sum_{i=1}^{N} \hat{b}_i$).

Table 5. Cointegration Vector Estimation

	MG		CCEMG	
	Coefficient	p-value	coefficient	p-value
logBC$_{t-1}$	-0.1697	0.205	-0.1566	0.030
	(0.1340)		(0.0720)	
logY$_{t-1}$	0.7714	0.004	0.3622	0.315
	(0.2708)		(0.3606)	
logTO$_t$	0.6758	0.002	0.4483	0.006
	(0.2223)		(0.1636)	
logCPI$_t$	-0.0223	0.866	-1.2014	0.004
	(0.1326)		(0.4172)	
constant	-2.550	0.004	-1.4987	0.457
	(0.8836)		(2.0151)	
Obs	485		485	
Wald Test	34.98	0.000	25.70	0.000

Notes: MG stands for Mean Group estimates and CCEMG denote the Common Correlated Effects Mean Group estimates, respectively. The coefficients of $\bar{x}_t$ and $\bar{y}_t$ in the regression models are not reported here. Standard errors are given in parentheses. ***, **, * indicate statistical significance at the 1, 5, 10% level.

In the previous stage, we found that cointegration relation; we are also interested in the coefficient estimates of the cointegration vectors. The estimation results of the cointegration parameters (based on MG and CCEMG) are reported in Table 5. The MG estimation errors might be biased due to cross-sectional dependence and will not be considered. According to the CCEMG results, the coefficients of bank credit to government are negative and statistically significant at the 5% level, where the coefficients can be interpreted as elasticity estimates (this result is consistent with Hauner, 2008; Mun and Ismail, 2015; Altaylıgil and Akkay 2013). The coefficient for real income are positive but not significant, coefficients of the trade openness and inflation are positive and negative respectively and are both statistically significant. Only for consumer price index, the elasticity value is greater than 1. These results confirm the "safe asset" and "lazy bank" view in the theoretical literature[2]. Furthermore, economic stability is a necessary condition for financial development and the integration of the real economy to the international markets promote growth of the financial system.

4. Conclusions

The existence of broad, deep, resilient and stable financial markets is a necessary condition for the sustainable economic growth. Governments play an essential role in both the emergence of financial markets and the process of financial deepening. In the first stage of financial development, governments intervene in financial markets to provide efficient allocation of resources with the regulatory policies, the establishment of banking monopolies, central bank policies or legislative regulation of property rights. In the process of financial deepening, the financing of the budget deficit is at the center of the interaction between the financial markets and fiscal policies. Many emerging economies have experienced marked progress in their financial markets after the 1990s. The stock of public debt in emerging countries has decreased about fifteen percent point during the last 30 years; on the other hand, governments have substituted external debt with domestically issued debt using aggressive policies in these countries. From this perspective, this paper analyzes the relation between domestic government debt and financial development in emerging market economies.

The results of this study indicate that financial system and government debt are related and negative external effects of public debt on financial system are greater relative to positive regulatory effect. The heavy presence of government debt instruments in the domestic banks cause some distortions in the financial system: (I) In terms of maturity structure, domestic banks could change their preference towards the short-term portfolio allocation, (II) investment to the risk free government bonds discourage the banks from lending to the private sector and so move banks away support to private enterprise, (III) excessive level of domestic public debt could also reduce resistance to the financial crisis by increasing interest rate, speculative short term capital inflows and fragility.

The results clearly show that well-functioning financial markets require sustainable public debt and economic stability. But, the developing countries have strong incentives to finance government expenditure through borrowing. The policy implication that derived from the result that if policy makers want to promote financial development, they need to take into consideration the fiscal discipline in the long run. Because, against generally accepted benefits of government in the early stages of development, the heavily indebted governments could become a potential source of financial instability.

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[2] We also use another domestic public debt indicator in different scale is measured by outstanding domestic public debt securities to total public debt to improve the reliability of the results. The results show similar pattern in the relation between domestic public debt and financial development index.

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Appendix

Table A1. Summary statistics and sources of variables

Variable	Mean	Std. Dev.	Minimum	Maximum	N	Source
Financial development index (FD)	1.28	0.34	-0.45	2.00	486	Our calculation based on GFDD
Bank credit to government to GDP (BC)	13.02	10.40	0.14	64.16	483	GFDD
Domestic public debt to total public debt (DD)	23.03	14.98	0.69	63.13	327	GFDD
Real GDP per capita (Y)	3729	2713	350.0	11749	477	WDI
Consumer price index 2010:100 (CPI)	86.51	31.01	0.19	131.9	486	WDI
Trade openness (TO)	65.25	22.01	15.4	168.2	486	WDI
M3/GDP	56.99	33.99	8.62	179.4	486	GFDD
Private credit by deposit money banks and other financial institutions to GDP	50.09	37.16	4.80	165.8	476	GFDD
Stock market total value traded to GDP (%)	24.00	30.89	0.01	186	420	GFDD
Stock market capitalization to GDP (%)	51.13	51.35	0.17	278	419	GFDD

Countries: Argentina, Brazil, China, Chile, Egypt, Hungary, India, Indonesia, Jordan, Malaysia, Pakistan, Peru, Poland, Philippines, South Africa, Thailand, Turkey and Venezuela