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Revisiting the finance-growth nexus: Global evidence

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Abstract

Using a sample of 218 countries from 1960 to 2017, we document that higher bank credit is associated with a decline in economic growth one year ahead. However, higher bank credit can also boost economic growth after three years. In the meantime, stock market development is positively linked to economic growth after one year, but stock market development also deteriorates economic growth after two years. All these results are more pronounced for emerging markets. For emerging markets, stock market development is therefore essential for economic growth in the shorter term, while banking is particularly important to boost economic growth in the longer term. For high-income countries, the link between finance and growth remains ambiguous.

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1. Introduction

In spite of a vast literature assessing the finance-growth nexus during the last decades, no consensus has been reached whether or not financial development boosts economic growth. Meanwhile, the finance-growth nexus literature can be categorized into three strands. The first strand assesses whether stock markets and banks affect differently economic growth (Fufa & Kim, 2018; Mattana & Panetti, 2014; Naceur & Ghazouani, 2007). The second strand focuses on asessing the presence of thresholds in the finance-growth nexus (Soedarmono et al., 2019; Law et al., 2013; Deidda & Fattouh, 2002; Rioja and Valev, 2004a & 2004b). The third strand highlights non-linearity in the finance-growth nexus to test the "too much finance hypothesis" (Botev et al., 2019; Soedarmono et al., 2017; Samargandi et al., 2015; Arcand et al., 2012; Law & Singh, 2014).

In this paper, we focus on the first strand of the literature and assess whether the role of stock markets and banks affect economic growth intertemporally. To the best of our knowledge, no previous studies investigate the intertemporal effects of banks and stock markets on economic growth. Hence, we empirically test the theoretical contribution of Bencivenga and Smith (1991) who emphasize that financial intermediaries exist to promote long-term investment instead of short-term ventures.

Following the notion of Bencivenga and Smith (1991), a seminal work by King and Levine (1993) is the first to provide evidence that financial development matters for economic growth using a cross-country setting. This is because a well-functioning financial system not only enables better resources allocation for the economy, but also overcomes asymmetric information and reduces transaction costs for short-term and long-term investors by providing proper liquidity needs to boost capital stock accumulation (Bekaert et al., 2005; Bertocco, 2008). Several empirical studies following this notion also emerge regardless of whether country-level data, industry-level data, or firm-level data is used (Soedarmono et al., 2019; Levine, 1998; Rajan & Zingales, 1998; Fisman & Love, 2002).

Regarding the role of banking, recent literature highlights that the effect of bank credit on economic growth is conditional on bank credit types. From cross-country studies, the results suggest that higher enterprise credit tends to boost economic growth, while consumption credit has no effect on economic growth (Sassi & Gasmi, 2014; Beck et al., 2012). Meanwhile, Soedarmono et al. (2017) use a single-country setting to highlight that only working capital credit exhibits a positive and linear impact on economic growth in Indonesia, but consumption credit and investment credit has an inverted U-shaped relationship with economic growth.

This line of thought has also been widely examined and evidence from cross-country studies reveals that financial development in general might exhibit a non-linear effect on economic growth, which is referred to as the "too much finance" hypothesis (Samargandi et al., 2015; Arcand et al., 2012; Law and Singh, 2014). Financial development can indeed positively affect economic growth until a certain level has been reached. When financial development exceeds a certain level, there will be a decline in the real sector productivity, because more talents leave the productive sectors to work in the financial sector.

Aside from documenting non-linearity in the finance-growth nexus, the empirical literature also find the presence of thresholds. From a cross-country study, Law et al. (2013) document that the positive link between finance and growth is conditional on the quality of institutional development. Using firm-level and province-level data from Indonesia, Soedarmono et al. (2019) reveal the presence of thresholds in which that firms with higher financial constraints or firms located in provinces with higher ratio of credit to gross regional domestic product, exhibit better performance.

Another strand of literature focuses on the comparison between banking and stock market in spurring long-run economic growth. On the one hand, the role of delegated monitoring in banking enables bank managers to reduce information asymmetry between lenders and borrower and hence, banking can better establish long-term relationships than stock market, in order to spur long-run economic growth (Bencivenga and Smith, 1991; Diamond, 1984). On the other hand, other studies argue that stock market is better than banking to boost economic growth, because higher transparency in stock market enables lenders and borrowers to reduce the cost of information acquisition and transaction (Boyd and Smith, 1998; Allen and Gale, 1999). In turn, greater productivity and higher economic growth can be achieved.

However, it is also well documented that well-functioning stock market and banking systems play a different role for economic growth depending on the stage of economic development. For developed countries, stock market is more likely to contribute to economic growth, because stock market development can meet demand for advanced financial services (Song and Thakor, 2010). On the contrary, banking tends to be suitable for developing countries with less sophisticated markets infrastructure to monitor and acquire information from lenders and borrowers (Singh and Weisse, 1998). In addition, they also argue that banking plays an important role in developing countries in which borrowers with higher asset opacity dominate the financial system and hence, long-term relationships are required to improve their productivity in the long run. Meanwhile, stock market is more suitable for investors pursuing short-term profits. Put differently, stock market tends to contribute to short-run economic growth, while banking tends to boost long-run economic growth. In line with this notion, Fufa and Kim (2018) provide evidence that both stock market and banking can positively affect economic growth for more homogeneous groups of countries reflecting the degree of markets sophistication, technological innovations, and economic development.

In this paper, our contribution is twofold. First, based on Singh and Weisse (1998) who argue that stock market and banking play a different role in affecting short-run growth and long-run growth, we test whether there are intertemporal effects of banks and stock markets on economic growth. In other words, we test whether banking and stock market development affect economic growth with a lag of one to three years following Foos et al. (2010), although they investigate a different issue regarding the link between loan growth and risk in banking. Hence, to our knowledge, we are the first to provide empirical evidence for Singh and Weisse (1998). As a second contribution, we build on the work of Fufa and Kim (2018) and previous literature (e.g. Deidda and Fattouh, 2002; Rioja and Valev, 2004a & 2004b) highlighting that the role of banks and stock markets depend on the characteristics of groups of countries. We specifically distinguish country sample based on country income status (i.e. high-income countries and emerging markets) based on the World Bank categorization.

The rest of this paper is organized as follows. Section 2 describes data, variables and empirical methodology to tackle the issues discussed in this study. Section 3 provides empirical results, while section 4 concludes.

2. Data, variables, and methodology

We obtain data from the World Development Indicators (WDI) database provided by the World Bank. Our sample covers 218 countries consisting of developed and developing countries from 1960 to 2017. With regards to dependent variable, we use *GROWTHC* defined as the annual growth rate of real per capita GDP (gross domestic product). To ensure for robustness, we also

consider an alternative measure of economic growth measured by the annual growth rate of real GDP (*GROWTH*).

Explanatory variables of interest include *CRED* and *STOCK*. *CRED* is the ratio of domestic credit to private sector by banks of GDP, while *STOCK* is the ratio of stock market capitalization to GDP. Higher *CRED* and *STOCK* are associated with a higher level of banking and stock market development, respectively. Several control variables are also included in our regression models. These include annual inflation rate (*INF*) based on the growth of consumer prices, the ratio of final consumption expenditure (i.e. government and private sector consumption) to GDP (*FCONS*), the ratio of foreign direct investment to GDP (*FDI*), and the ratio of gross capital formation to GDP (*GCF*).

Meanwhile, our regression model is shown in Eq. (1). *Y* represents one of the measures of economic growth and *FIN* represents financial development measures (*CRED* or *STOCK*).

$$Y_{i,t} = \beta_0 + \beta_1 Y_{i,t-1} + \beta_2 FIN_{i,t-1} + \beta_3 FIN_{i,t-2} + \beta_4 FIN_{i,t-3} + \beta_5 INF_{i,t} + \beta_6 FCONS_{i,t} + \beta_7 FDI_{i,t} + \beta_8 GCF_{i,t} + error_{it} \quad (1)$$

To estimate Eq. (1), we use a dynamic panel data model following Blundel and Bond (1998) to avoid potential endogeneity and reverse causality problems[1]. We opt to use the two-step system GMM (generalized method of moments) estimation. The two-step system GMM estimation is more efficient than the standard GMM, because the homoscedasticity assumption of the error components is relaxed.

Previous studies on the finance-growth nexus also implement the two-step system GMM estimation (e.g. Soedarmono et al., 2017; Arcand et al., 2012; Hasan et al., 2009; Sassi and Gasmi, 2014). We also take into account orthogonal deviations of instruments in addition to adopting Windmeijer's (2005) small sample correction, so that the two-step covariance matrix is adjusted by a finite-sample condition. Yet, in the two-step system GMM estimation, the issues related to too many instruments might distort the validity of coefficients. Hence, we also collapse all instrumental variables in all models following Roodman (2009). Overall, the validity of the two-step system GMM estimation is fulfilled when the AR(2) test and the Hansen-J test are not rejected. Aside from estimating Eq. (1) using the two-step system GMM technique, we also use the one-step difference GMM technique to ensure that the results are robust to different estimation procedures.

In terms of the lagged values of financial development variables, we consider a time lag of one to three years unlike Foos et al. (2010) who use a time lag until four years. This is because our sample size is relatively small compared to Foos et al. (2010). Finally, Eq. (1) is estimated in two stages. In the first stage, we include all countries in the sample. In the second stage, we partition the sample into two sub-groups of emerging markets and high-income countries following the definition used in the World Development Indicators database. In this regard, emerging markets comprise countries that are not listed in the high-income countries group.

[1] Indeed, there is no unique approach to deal with potential endogeneity problems in financial development indicators, although dynamic panel data models are implemented (Fajeau, 2020). In this regard, the choice of instrumental variables is essential, but too many instruments can also alter the finance-growth nexus. While this econometric issue is important, finding proper approaches to deal with endogeneity problems in the finance-growth nexus is beyond the scope of our present study.

3. Empirical results

In Table I, we show the descriptive statistics of our variables. Table II shows the findings to highlight the role of banking and stock market in economic growth for all countries, while Table III and Table IV present the similar findings for a sub-group of emerging markets and high-income countries, respectively.

During the 1960-2017 period, stock markets development outweighs banking in average, although the number of observations for stock market development is rather limited. Table I shows that the ratio of credit to GDP (*CRED*) only reaches 34.4%, while the ratio of stock market capitalization to GDP (*STOCK*) reaches 59.4% in average.

Table I. Desriptive statistics

Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum
GROWTH (%)	9,118	2.071	6.372	-64.996	140.501
GROWTHC (%)	9,121	3.878	6.565	-64.047	149.973
CRED (%)	7,460	34.406	33.443	0.001	312.019
STOCK (%)	2,099	59.360	93.996	0.055	1274.132
INF (%)	9,130	31.359	421.234	-98.704	26765.860
FCONS (%)	7,604	81.174	17.270	4.193	241.974
FDI (%)	7,307	3.878	15.217	-82.892	773.928
GFC (%)	7,760	23.160	10.478	-5.740	219.069

Source: Authors' calculation.

In Table II, we find the negative link between bank credit and economic growth with a time lag of one year regardless of the measurement of economic growth and econometric methods. In contrast, stock market development is positively linked to economic growth one year ahead. These findings highlight that stock market plays an important role in boosting economic growth with a shorter time lag. Hence, our findings follow prior literature on the importance of stock market in economic development (e.g. Boyd and Smith, 1998; Allen and Gale, 1999).

Table II. Baseline regressions: All countries

Explanatory variables	Dependent variables							
	Two-Step System GMM				*One-Step Difference GMM*			
	GROWTHC	*GROWTHC*	*GROWTH*	*GROWTH*	*GROWTHC*	*GROWTHC*	*GROWTH*	*GROWTH*
Dep. var(-1)	0.23385***	0.39219***	0.2406***	0.5228***	0.22294***	0.37188***	0.2372***	0.35407***
	(0.030)	(0.061)	(0.030)	(0.118)	(0.032)	(0.066)	(0.029)	(0.043)
CRED(-1)	-0.02454**		-0.0282**		-0.03004**		-0.0286**	
	(0.012)		(0.012)		(0.013)		(0.013)	
CRED(-2)	-0.00983		-0.00853		-0.00319		-0.00229	
	(0.014)		(0.013)		(0.014)		(0.014)	
CRED(-3)	0.02740***		0.02176**		0.01700*		0.01447*	
	(0.010)		(0.010)		(0.010)		(0.010)	
STOCK(-1)		0.01248**		0.00966**		0.01104**		0.01045**
		(0.006)		(0.005)		(0.005)		(0.004)
STOCK(-2)		-0.01323*		-0.0136**		-0.01304**		-0.01163**
		(0.007)		(0.006)		(0.006)		(0.005)
STOCK(-3)		-0.00069		0.00259		0.00112		0.00098
		(0.003)		(0.003)		(0.002)		(0.002)
INF	-0.00037**	-0.0031***	-0.00035**	-0.0018**	-0.00030*	-0.0029***	-0.00027	-0.0029***
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
FCONS	-0.00137	0.00492	-0.00733	-0.00158	-0.01390	-0.05238**	-0.01659	-0.0744***
	(0.009)	(0.046)	(0.009)	(0.012)	(0.019)	(0.025)	(0.020)	(0.022)
FDI	0.01431	0.00158	0.02075	-0.00067	0.01372	0.00357	0.01351	0.00212
	(0.012)	(0.004)	(0.013)	(0.003)	(0.012)	(0.005)	(0.012)	(0.005)
GCF	0.12807***	0.09688	0.1249***	0.06677**	0.13070***	0.06627**	0.1360***	0.0824***
	(0.019)	(0.065)	(0.022)	(0.030)	(0.032)	(0.027)	(0.031)	(0.024)
Observations	5,032	1,689	5,035	1,690	4,860	1,601	4,863	1,602
Number of countries	172	88	172	88	172	85	172	85
AR(2) test	0.850	0.907	0.948	0.608	0.762	0.350	0.940	0.704
Hansen-J test	0.112	0.356	0.062	0.039	0.081	0.668	0.054	0.577

Source and notes: Authors' calculation. Regressions are estimated using the two-step system GMM method. The models are valid when the AR(2) test and the Hansen-J test are not significant. Constants and time dummies are included, but not reported. *** indicates that coefficients are statistically significant at the 1% level, while ** and * indicate that coefficients are statistically significant at the 5% and the 10% levels, respectively.

When we observe the coeffcients of three-year-lagged value of *CRED* in Table II, we obtain different results regarding its association with economic growth. Specifically, higher *CRED* is positively linked to economic growth three years ahead. The impact of bank credit on economic growth three years ahead is also economically noteworthy[2]. This finding follows the notion of Bencivenga and Smith (1991) and Augier and Soedarmono (2011) in which the presence of banks as financial intermediary will promote higher incentives for economic agents to invest in long-term projects instead of short-term ventures. Consequently, the role of banks in spurring economic growth can be seen with longer time lags than the role of stock markets[3].

Yet, *STOCK* also shows a different association with economic growth in which stock market development is negatively linked to economic growth after two years, although stock market

[2] In terms of economic significance, we can calculate as follows. For instance, when we use the two-step system GMM estimation and *GROWTHC* as a dependent variable, it is shown that the standard deviation of *GROWTHC* is 0.0656, while the coefficient of *CRED*(-3) is 0.0274 and the standard deviation of *CRED* is 0.3344. Hence, a one-standard deviation increase in *CRED* increases *GROWTHC* by 0.14 (or 0.0274 x 0.3344 divided by 0.0656) of its mean value. Because the standard deviation of *CRED* is 0.3344, then a 1% increase in *CRED* is associated with an increase in *GROWTHC* three years ahead by 43% (or 0.14/0.3344) of its mean value. An indentical finding can also be obtained when *GROWTH* is used as a dependent variable.

[3] Indeed, our analysis in this paper, regarding the role of banks and stock markets in economic development, does not cover another segment of the financial system, which is non-public equity. Arguably, non-public equity might also be a primary source of financing for new and innovative firms, which may also affect the long-run success of an economy. However, whether or not the role of non-public equity outweighs the roles of banks and stock markets in terms of boosting economic growth remains unclear and requires further assessments for future research in the finance-growth nexus.

development positively affects economic growth until one year ahead. The positive impact of stock markets on economic growth one year ahead is also economically significant[4]. This finding is also in line with Henry (2000a) who documents that country's cost of equity capital declines after eight months of its initial stock market liberalization and hence, spurring domestic investment immediately for economic growth (Henry, 2000b). However, in the longer run, our finding also supports the notion that stock market liberalization increases firm-level operating performance as in Mitton (2006).

Overall, the AR(2) test and the Hansen-J test shown in Table II are not rejected at least at the 5% level, suggesting that all regression models are valid. Hence, we empirically support a hypothesis emphasized by Sigh and Weisse (1998) in which stock market development is important to spur economic growth immediately, while bank credit might require some time to spur economic growth. Our findings also confirm that banking and stock market development is complementary in spurring economic growth. This notion is somehow related to Botev et al. (2019) in which they document that the positive association between bank credit and economic growth only occurs when stock markets are deeper.

In the next turn, we augment the analysis by observing emerging markets and high-income countries separately. We build on the work of Fufa and Kim (2018) who argue that observing more homogenous groups of countries is necessary to find robust evidence on the finance-growth nexus. Table III presents our findings when a sub-group of emerging markets is analyzed. In general, the findings reported earlier are not altered. For emerging markets, bank credit (*CRED*) is important to boost economic growth with a time lag of three years, while stock markets development (*STOCK*) is positively linked to economic growth one year ahead and negatively associated with economic growth after two years. The AR(2) test and the Hansen-J test are also not significant for a sub-group of emerging markets and hence, all regression models are valid. Moreover, Table IV provides empirical evidence on the finance-growth nexus for a sub-group of high-income countries. It is shown that bank credit is not significant in influencing economic growth, while the role of stock market development is also ambiguous due to the fact that the AR(2) tests are statistically significant. This highlights that the regressions models are not valid for interpretation.

With regards to control variables, *INF*, *FCONS* and *GCF* show consistent results. Higher inflation and final consumption expenditure are associated with lower economic growth, but higher gross capital formation boosts economic growth. These results hold for different sub-samples of emerging markets and high-income countries. Meanwhile, foreign diret investment (*FDI*) has a positive impact on economic growth, but this positive link only holds for emerging markets.

Finally, two robustness checs are also undertaken to ensure that our results hold for different types of econometric metods[5]. First, we use first-difference transormation of instruments instead of ortghonal devations and hence, we exclude potential country-specific effects. Our results are not altered due to this modification. Second, we exclude time dummy variables in all models presented from Table II to Table IV. However, our findings also remain consistent with previous discussions presented earlier.

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[4] When we use the two-step system GMM estimation and *GROWTHC* as a dependent variable, it is shown that a one-standard deviation increase in *STOCK* is associated with an increase in *GROWTHC* by 0.17 of its mean (or 0.01248 x 0.9399 divided by 0.0656). In other words, a 1% increase in *STOCK* increases *GROWTHC* by 19% of its mean after one year. An identitical concept can be used to calculate economic significance when *GROWTH* is used as a dependent variable.

[5] The results are not presented in the paper, but are available upon request.

Table III. The finance-growth nexus in emerging markets

Explanatory variables	Dependent variables							
	Two-Step System GMM				*One-Step Difference GMM*			
	GROWTHC	GROWTHC	GROWTH	GROWTH	GROWTHC	GROWTHC	GROWTH	GROWTH
Dep.var(-1)	0.21900***	0.30482***	0.2386***	0.3304***	0.20614***	0.28287***	0.2202***	0.2858***
	(0.034)	(0.082)	(0.035)	(0.057)	(0.039)	(0.085)	(0.035)	(0.060)
CRED(-1)	-0.00888*		-0.01792*		-0.03182*		-0.0359**	
	(0.014)		(0.013)		(0.016)		(0.016)	
CRED(-2)	-0.02889		-0.02595		-0.01911		-0.01705	
	(0.024)		(0.023)		(0.023)		(0.023)	
CRED(-3)	0.02663**		0.02186**		0.02170*		0.01701*	
	(0.016)		(0.017)		(0.016)		(0.016)	
STOCK(-1)		0.03916***		0.0411***		0.04172***		0.0355***
		(0.009)		(0.011)		(0.009)		(0.008)
STOCK(-2)		-0.0417***		-0.0504***		-0.0456***		-0.0452***
		(0.011)		(0.014)		(0.011)		(0.011)
STOCK(-3)		0.00007		0.00943		0.00140		0.00547
		(0.009)		(0.010)		(0.008)		(0.007)
INF	-0.00031*	-0.00268***	-0.00028*	-0.0024***	-0.00032*	-0.0029***	-0.00029*	-0.0027***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
FCONS	-0.01629	-0.00519	-0.01482	0.03037	-0.02420	-0.07070*	-0.02314	-0.06813*
	(0.010)	(0.033)	(0.011)	(0.027)	(0.024)	(0.039)	(0.025)	(0.034)
FDI	0.03565	0.16530***	0.03264	0.1297***	0.03117	0.26547***	0.02573	0.2362***
	(0.023)	(0.049)	(0.021)	(0.043)	(0.028)	(0.081)	(0.027)	(0.070)
GCF	0.12469***	0.09764*	0.1193***	0.11210**	0.13369***	0.04769	0.1393***	0.06571*
	(0.021)	(0.056)	(0.025)	(0.044)	(0.036)	(0.040)	(0.036)	(0.039)
Observations	3,709	661	3,709	661	3,590	617	3,590	617
Number of countries	119	44	119	44	119	42	119	42
AR(2) test	0.798	0.577	0.557	0.850	0.900	0.491	0.690	0.682
Hansen-J test	0.336	0.994	0.335	0.989	0.269	0.976	0.286	0.988

Source and notes: Authors' calculation. Regressions are estimated using the two-step system GMM method. The models are valid when the AR(2) test and the Hansen-J test are not significant. Constants and time dummies are included, but not reported. *** indicates that coefficients are statistically significant at the 1% level, while ** and * indicate that coefficients are statistically significant at the 5% and the 10% levels, respectively.

Table IV. The finance-growth nexus in high-income countries

Explanatory variables	Dependent variables							
	Two-Step System GMM				*Difference GMM*			
	GROWTHC	*GROWTHC*	*GROWTH*	*GROWTH*	*GROWTHC*	*GROWTHC*	*GROWTH*	*GROWTH*
Dep.var(-1)	0.31784***	0.41522***	0.3234***	0.3548***	0.31942***	0.39592***	0.3193***	0.3676***
	(0.035)	(0.051)	(0.042)	(0.049)	(0.035)	(0.045)	(0.043)	(0.042)
CRED(-1)	-0.01888		-0.01481		-0.02364		-0.02254	
	(0.022)		(0.024)		(0.024)		(0.024)	
CRED(-2)	-0.00398		-0.00272		0.00351		0.00512	
	(0.024)		(0.023)		(0.025)		(0.023)	
CRED(-3)	0.01794		0.00687		0.00691		0.00112	
	(0.014)		(0.013)		(0.016)		(0.015)	
STOCK(-1)		0.01634**		0.01640**		0.01379**		0.01499**
		(0.006)		(0.006)		(0.005)		(0.006)
STOCK(-2)		-0.02125**		-0.02030***		-0.02188***		-0.02147***
		(0.008)		(0.007)		(0.008)		(0.008)
STOCK(-3)		0.00396*		0.00328*		0.00515**		0.00406**
		(0.002)		(0.002)		(0.002)		(0.002)
INF	-0.01178**	-0.00046	-0.01189*	0.00127	-0.01697**	-0.00043	-0.01633**	-0.00190
	(0.006)	(0.002)	(0.007)	(0.002)	(0.008)	(0.001)	(0.007)	(0.001)
FCONS	-0.00493	-0.01889	-0.05241**	-0.05992***	-0.04311	-0.09925***	-0.05705*	-0.12925***
	(0.024)	(0.024)	(0.021)	(0.021)	(0.039)	(0.035)	(0.032)	(0.030)
FDI	0.00926	0.00371	0.01261	0.00320	0.01027	0.00497	0.01117	0.00380
	(0.011)	(0.004)	(0.013)	(0.003)	(0.013)	(0.004)	(0.013)	(0.004)
GCF	0.06385*	0.07195**	0.07010**	0.09299***	0.04186	0.03074	0.05924*	0.06809**
	(0.034)	(0.029)	(0.032)	(0.031)	(0.032)	(0.030)	(0.033)	(0.028)
Observations	1,323	1,028	1,326	1,029	1,270	984	1,273	985
Number of idcnum	53	44	53	44	53	43	53	43
AR(2) test	0.114	0.028	0.182	0.008	0.106	0.011	0.180	0.003
Hansen-J test	0.759	0.981	0.737	0.956	0.661	0.931	0.672	0.932

Source and notes: Authors' calculation. Regressions are estimated using the two-step system GMM method. The models are valid when the AR(2) test and the Hansen-J test are not significant. Constants and time dummies are included, but not reported. *** indicates that coefficients are statistically significant at the 1% level, while ** and * indicate that coefficients are statistically significant at the 5% and the 10% levels, respectively.

4. Concluding remarks

This paper aims to test whether financial depth affects economic growth intertemporally. Using dynamic panel data models, banking and stock market development contribute differently to boost economic growth. On the one hand, banking can strengthen economic growth after three years, although higher bank credit intially reduces economic growth one year ahead. On the contrary, stock market development can immediately boost economic growth after one year, but it start to deteriorate economic growth two years ahead. We also find that such evidence are more pronounced for emerging markets.

In terms of policy implications, this paper advocates the importance of financial deepening both from banking or stock market, especially for emerging markets. For emerging markets that focus on boosting economic growth immediately for economic recovery, enabling stock market development is essential. Meanwhile, for emerging markets focusing on boosting economic

growth sustainably, strengthening banking sector development is also necessary. For high-income economies, the link between financial development and economic growth is rather ambiguous. Hence, conditions to establish the positive association between financial development and economic growth in high-income economies warrant further empirical investigations.

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