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Financial Development, Economic Growth and Inflation: Same paradigm?

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Abstract

We investigate the links between financial development, inflation and economic growth for 84 countries over the period from 1980 to 2017. We establish a bi-directional causality between economic growth and financial development on one hand, and on the other, a strong link between financial development and inflation. Moreover, we show that financial markets development, inflation and economic growth are linked and the levels of income have a strong impact on the significance of the relations between these variables.

Keywords: Economic growth, financial development, inflation, causality, dynamic panel VAR

JEL classification: L96; O32; O33

Introduction

Financial intermediaries and markets can provide us with information about profitable firms and risk diversification while they can also facilitate resource mobilisation and orient capital allocation towards the most productive and successful companies better. Thus, a well-developed financial system facilitates efficient resource allocation and productivity improvement, which are the right ingredients for long-run economic growth. Therefore, financial development plays a major role in changes in economic growth. Furthermore, financial liberalisation may lead to unfounded lending booms and financial crises. Thus, financial development can result in financial fragility and then financial crises and/or recessions in the short-run (Kim, *et al.,* 2010).

Loayza and Ranciere (2006) highlighted the coexistence of positive long-run and negative short-run relationships between financial development and growth. The negative short-run effect could result from financial fragility whereas the positive impact is associated with the long-run effects of financial development. Does financial development stimulate economic growth and/or does economic growth arouse or trigger financial development?

According to Pradhan *et al.,* (2014), four hypotheses are applied to establish the connections between economic growth and financial development:

1. The supply-leading hypothesis where financial development precedes economic growth (King and Levine, 1993; Levine et al., 2000; Ang, 2008; etc.).
2. The demand-following hypothesis that stipulates a causal nexus from economic growth to financial development (Jung, 1986).
3. The complementarity between economic growth and financial development (bi-directional causality, Pradhan *et al.,* 2014).

4. The absence of a significant relationship between financial development and economic growth (Chandavarkar, 1992).

The problems of the direction of the causality between these variables have not been empirically resolved. Besides, the global financial crisis raised some legitimate questions. Is financial development a risk for growth and economic stability? Is there a right pace for financial development? Does financial integration help economic activities in the short and long run?

Our paper consists of analysing the links between economic growth, financial development and inflation through a panel VAR. The papers devoted to dynamic panel data techniques have highlighted the performance of this approach (Arellano, 2003; Han and Philipps, 2010). We contribute to the literature in three ways: (i) We investigate the links between the three variables; (ii) We validate bi-directionality and cross linkages; (iii) We introduce an indicator of financial markets making possible comparability of countries.

Our main results are as follows:

i) We confirm a bi-directional causality between economic growth and financial development on one hand and, a strong link between financial development and inflation over the period under review on the other hand;
ii) There is not a strong cointegration relation between the three variables;
iii) Financial markets index, inflation and economic growth are linked and the model is consistent with the shock of the global financial crisis and the European sovereign debt crisis;
iv) The level of income of countries has an impact on the strength of linkages between the three variables.

Section I presents a brief review of literature on the relationship between the three variables. Section II describes the data. Section III analyses diagnostic tests. Section IV examines the impact of financial development on growth and inflation, and the trade-off between them. Section V concludes.

1. Is There a Consensus About the Nexus Between These Variables?

As real activity expands, finance grows in response to an increasing demand for its services from the non-financial sector. This view of finance is relatively well established in the literature. In another view, finance plays a role in economic growth.

McKinnon (1973) and Shaw (1973) argued that impediments to financial development – such as financial repression – were likely to hamper growth by:

- Limiting the amount of savings mobilised for investment purposes;
- Preventing financial intermediation from channelling resources into the most productive activities.

The 1990s saw diverse new theoretical models relying on endogenous growth and focusing on the various functions of the financial system. The main channels through which finance influence growth include: producing information; allocating capital to productive uses; monitoring investments and exerting corporate control; facilitating trading, diversification and management of risk; mobilising and pooling savings; and facilitating the exchange of goods and services. King and Levine (1993) found that initial levels of the size of the banking system relative to GDP could predict subsequent growth rates over extended periods. Levine *et al.* (2000) included stock market depth in their framework and found that causality went from finance to growth.

In the 2000s, the empirical work continued to evolve with the application of dynamic panel techniques (Beck and Levine, 2004). Another cohort of studies has mentioned that the contribution of financial development to growth differs across regions, countries and income levels (Barajas *et al.,* 2016, Nguyen *et al.,* 2019). The increased incidence of banking crises has also contributed to a "disappearing" empirical link between finance and growth (Rousseau and Wachtel, 2001). Here, there is a point beyond which additional deepening could reduce growth. This effect, the "too much finance" effect, points to nonlinearities related to financial depth (Arcand *et al.,* 2015).

Many explanations about the weakening of the finance-growth nexus, exists (De Gregorio and Guidotti, 1995; Rajan, 2005): high-income countries have reached the point at which financial depth no longer contributes to increasing the efficiency of investment; dangers of financial development that leads to large and complicated financial systems; increase in risky lending could generate financial fragility.

There are two opposing views on the relationship between finance and economic stability: a) Financial development lessens volatility by reducing frictions/informational asymmetries. it also makes the development of risk-sharing possible. This in turn reduces financial constraints, enhances the ability of firms and households to absorb shocks, and allows greater consumption smoothing. Thus, financial development could impact inflation; b) Finance increases economic and financial volatility and the probability of a crisis.

Conventional wisdom holds that inflation and growth are negatively correlated. However, studies provide very mixed results regarding this. The discrepancy between data and this view is related to the relevance of a Philips curve which leads to a positive correlation between inflation and growth in the short-run (Rousseau and Watchel, 2001). Finally, financial development may affect economic growth both directly (expenditure channels) and indirectly through its effect on inflation. Our paper follows the approach initiated by Beck and Levine, 2004 and show that the causal relationships exist particularly from finance to growth.

2. Data

2.1. Descriptive analysis

The current dataset covers 84 countries, distributed across all geographical and economic areas, and including 31 high-income economies, 44 middle or intermediate-income economies. The categorization of countries is based on the classification by income calculated using the World Bank Atlas Method. The main criterion used in the selection of the countries is the availability of data over a long period. This is why France and Italy are included in the sample while Germany is not. Indeed, due to German reunification, data regarding the whole of Germany covers a shorter period. Moreover, due to missing data from 1980 onwards or specific characteristics, some countries are not taken into consideration in the sample. For example, China is not in the set of countries whereas Brazil, India and South Africa are included in the sample. Finally, Eastern European countries are not included in the sample due to concerns regarding both the reliability and availability of their data. Nevertheless, all of the main economic systems or organisations have at least one representative in the sample. We use balanced panel data for 84 countries over the period 1980- 2017. This period covers the 1980s debt crises in Latin America and some middle-income countries, the crises of the 1990s in indebted low-income countries, the last global financial turmoil and the euro debt crisis. We also build subsamples of countries based on country level of income (high-income, intermediate or middle-income and low-income countries).

We examined three variables:

i) The real GDP (expressed in terms of constant USD 2010) – GDP growth (DGDP);
ii) The inflation which is the Consumer Price Index (CPI) growth rate (normalised to 100 in 2010, DCPI);
iii) The financial markets index (FM).

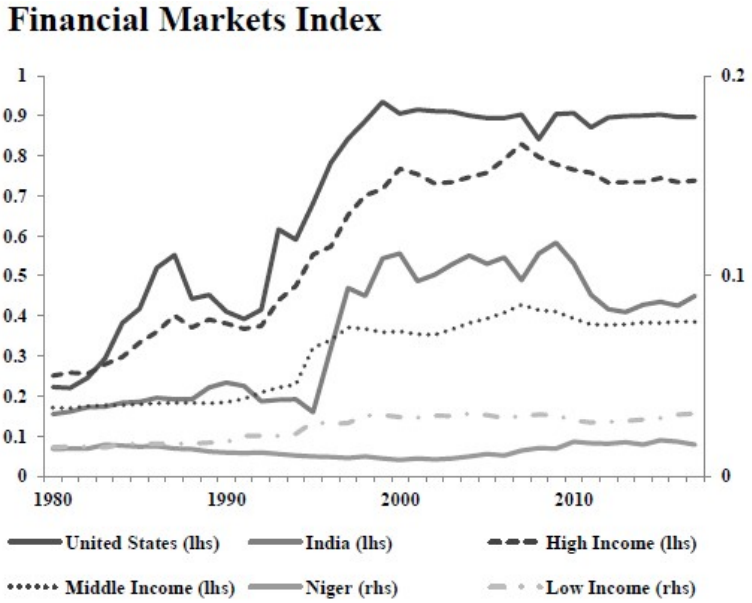
The real GDP and the CPI are drawn from the World Bank Database (World Bank Development Indicators) and the financial markets index is one of the IMF Financial Development Index. Svirydzenka (2016) built indicators based on identical inputs to gauge the relative importance of financial tools in countries. The financial index encompasses banking and non-banking institutions as well as markets across three dimensions: depth, access and efficiency. We are in favour of the financial markets index which is strongly correlated with the aggregate indicator.

There are limitations to the financial index (Svirydzenka, 2016). It was not possible to get sufficiently extensive country and time-period data on some institutions and activities. Moreover, the index does not take into account shadow banking in the middle-income countries, credit transfers or mobile banking, etc.. Features (diversity in financial intermediaries…) are not incorporated in the index. Finally, the financial markets index only catches the characteristics of financial systems and it does not capture their fundamental drivers or specific measures (financial stability, macro prudential, etc.). Indexes may also overstate the level of financial development.

We constructed curves corresponding with a GDP-weighted development index for country groups based on three income levels. 2006 is the benchmark year in the average indexes. Figure 1shows that the hierarchy associated with the income levels predominates: the index corresponding with the high-income countries is higher than those associated with the intermediate and low-income economies. In addition, the dynamics of this index are strongly linked to the income levels. In the middle-income countries, the financial markets index is more volatile with a break in the mid-1990s and small amplitude fluctuations until the global financial crisis,

which led to a sharp drop. For low-income countries, financial markets being in their embryonic state, their index is quasi invariant over the last 35 years.

Figure 1.



Finally, an indicator focused on a specific characteristic can provide us good performances. Thus, the financial markets index is a good candidate to describe the financial development.

2.2. Stationary Tests

Im, Pesaran and Shin, IPS, (2003) pioneered a new wave of unit root tests in the panel data in which the heterogeneity condition is accepted. Their tests allows for residual serial correlation and heterogeneity of the dynamics and error variances across groups. The IPS tests are more powerful than the Levin, Lin and Chu tests in most cases. We present the IPS test on the first-order difference of: i) the logarithm of the financial markets index; and ii) inflation and economic growth. These variables are stationary with fixed effect or with fixed effect and deterministic trend and taking into account cross-section dependence (Table 1).

Table 1. Unit Root Tests

(1982-2017)

	IPS			
	With intercept		With intercept and trend	
	W-*Stat*	p-values	W-*Stat*	p-values
DFM	-57.98	0.00	-54.03	0.00
DGDP	-2.91	0.00	-2.71	0.00
DCPI	-12.88	0.00	-8.08	0.00

The IPS lags are selected via the conventional selection criteria.

3. Causality and Panel Cointegration Tests

We run a panel Granger causality and a panel cointegration tests on 84 countries over the full period.

3.1. Causality between economic growth, inflation and financial markets development

Long and short-run causality tests will help to set diagnostic regarding econometric approach. The test confirms a bi-directional causal link between GDP and the financial markets index in both the short and long run (Tables 2). Both the supply-leading and demand-following hypotheses prevail (Asamoah and Alagidede, 2020). Furthermore, some other causal links appeared in both the short and long-run between economic growth, inflation and the financial markets index as the coefficient of the error correction term is significant everywhere.

Table 2. Causality Tests

(1982-2017)

		Long-run	Short-run
Effect variables		*ECT*	*DGDP* *DCPI* *DFM*
DGDP	*DCPI*	-0.001*	-0.043***
	DFM	-0.012***	0.045***
DCPI	*DGDP*	-0.087**	-1.12***
	DFM	-0.065**	-0.45***
DFM	*DGDP*	*-0.143***	*0.14****
	DCPI	*0.13****	*-0.007****

ECT: Error Correction Term. The long-run causality prevails when the coefficient of the lagged Error Correction Term (ECT) is significantly different from 0.

3.2. Do structural relations exist between the three variables?

We run the Westerlund (2007) test which is based on structural dynamics and no common-factor restriction. The null hypothesis (no cointegration) allows us to infer whether the error-correction term in a conditional panel error-correction model (ECM) is equal to zero. This test accommodates cross-sectional dependence. The framework is described by:

$\Delta Yit = \delta i'dt + \alpha i(Yi,t-1-\beta i'Xi,t-1) + \Sigma\theta ij\Delta Yi,t-jpij=1++\Sigma\gamma ij\Delta Xi,j-tpij=qi+\varepsilon it$

αi are the parameters of the error-correction term, while εit are random white noise disturbances, Yit and $Xjit$are the observable endogenous and exogenous variables.

Westerlund (2007) proposed 2 group-mean tests (Ga ,Gt) and 2 panel tests (Pa and Pt) based on the ECM.

The group-mean tests are based on weighted sums of the αi estimated for individual countries, whereas the panel tests are based on an estimate of α ($\alpha i=\alpha$ for all i) for the panel as a whole.

The null hypothesis for the group-mean test is:

$H0G$: $\alpha i=0$ for all i against $H1G$: $\alpha i<0$

The null hypothesis for the panel test is:

$H0P$: $\alpha=0$ for all i against $H1P$: $\alpha<0$

We mostly accept the null hypothesis (no cointegration) between GDP growth, CPI inflation and financial development (Table 3).

Table 3. Panel Cointegration Tests

(1982-2017)

		Value	***Z-value***	***p-value***
GDP	Gt	**-1.316**	**7.022**	**1.00**
	Ga	**-4.863**	**6.116**	**1.00**
	Pt	**-7.485**	**7.682**	**1.00**

Pa	**-2.714**	**5.072**	**1.00**	
CPI	Gt	-2.551	-5.039	0.00
Ga	-12.715	-5.152	0.00	
Pt	**-17.366**	**-1.886**	**0.03**	
Pa	**-3.996**	**3.008**	**0.99**	
FM	Gt	-2.837	-7.841	0.00
Ga	**-6.091**	**4.354**	**1.00**	
Pt	-18.823	-3.298	0.01	
Pa	**-6.216**	**-0.565**	**0.29**	

Standard errors adjusted for heteroscedasticity and autocorrelations are needed for Ga and Pa. Figures in bold correspond with a high level of statistical significance.

4. Lessons from a PVAR Approach

We privilege the dynamic panel econometric approach which does not overshadow the dynamic proprieties of the variables. The dynamic panel techniques mitigate endogeneity and accommodate persistence effect (Alvarez and Arellano, 2003; Han and Phillips, 2010, Kim *et, al., 2010). We take into account heterogeneity via individual specific effects. We introduce dynamic in a panel specification by nesting an autoregressive distributed lag (ARDL) model. Our paper is in line with studies, carried out on cross-sectional data, which highlight the existence of some specific features of subgroups of individuals.*

4.1. The model

As there is no cointegration relationship, we drop the ECT and impose an identical lag length in the Pradhan et al. (2014) system of equations. We obtain a panel VAR of order (p) (PVAR (p)).

Thus, the empirical model is as follows (Shan, 2005):

$$DGDP_{it} = \eta_{1i} + \sum_{k=1}^{p} \alpha_{1ik} DGDP_{it-k} + \sum_{k=1}^{p} \beta_{1ik} DFM_{it-k} + \sum_{k=1}^{p} \delta_{1ik} DCPI_{it-k} + \varepsilon_{1it}$$

$$DFM_{it} = \eta_{2i} + \sum_{k=1}^{p} \alpha_{2ik} DFM_{it-k} + \sum_{k=1}^{p} \beta_{2ik} DGDP_{it-k} + \sum_{k=1}^{p} \delta_{2ik} DCPI_{it-k} + \varepsilon_{2it}$$

$$DCPI_{it} = \eta_{3i} + \sum_{k=1}^{p} \alpha_{3ik} DCPI_{it-k} + \sum_{k=1}^{p} \beta_{3ik} DGDP_{it-k} + \sum_{k=1}^{p} \delta_{3ik} DFM_{it-k} + \varepsilon_{3it}$$

Where:

- *DGDP* is the economic growth rate; *DFM* describes the changes in the financial markets index; *DCPI* represents the inflation rate based on *CPI*; p is the lag length;
- i is a country index (i = 1, 2…., 84);
- t denotes the year (t = 1, 2,.., 38);
- $\varepsilon nit,n$=1,2,3, is a normally distributed error term for i and t with a zero mean and a finite variance;
- $\eta ni,\alpha nik,\beta nikp,\delta niks,\gamma ni,n$=1,2,3;$i$=1,…,84;$k$=1,...,$p$;$kp$=1,…$q$,$ks$=1,…,$r$, are the unknown parameters;
- $\eta ni,n$=1,2,3;i=1,…,84, are the intercepts of each of the three regressions;
- $\alpha nik,\beta nikp$,and $\delta niks$, are the parameters associated with the lagged values of the endogenous factors;
- *ECT* is the error correction term derived from the cointegration equation. γni,is its coefficient.

4.2. Regression results

We estimate the model using the GMM estimator (Arellano, 2003; Han and Phillips, 2006). We carried out the estimations with the statistical software R (Panelvar Package, Sigmund and Ferstl, 2019).The results are in Table 4. The conventional model selection criteria lead to fixing the lag length of the VAR to 1. Overall, the coefficients of the VAR(1) are statistically significant. Almost all coefficients of the explanatory factors are significant at 1% most of the time. Moreover, the links are consistent with intuition. One caveat arises from a

risk of over-identifying (Hansen test, Table 4). However, the rejection of the over-identifying restrictions can result from parameter heterogeneity. Angrist *et al.* (2000) highlighted that testing over-identifying restrictions "is out of the window in a fully heterogeneous world". Moreover, according to Shan *et al.* (2001), a time-series approach can be superior to a cross-sectional one. However, the large size of our sample makes a time-series approach difficult. This is why we privilege a cross-sectional framework.

When we look at the regressions one by one, we notice that economic growth seems significantly persistent and positively correlated in particular with the financial development measure (King and Levine, 1993): one more point on the financial markets index leads to a 0.13 point increase in GDP. Inflation has an insignificant impact on GDP. The financial markets index is less persistent than economic growth. It is not surprising because financial markets can be impacted by financial innovations which spread more easily in the economy. Economic growth has a weak but significant impact on the financial markets index while inflation is not influencing it. Thus economic growth and the financial markets index display parallel growth paths (Fung, 2009). Finally, the estimated coefficients for the equation of inflation display characteristics similar to those of the previous regressions: a high level of persistence of inflation; strong significance of the effects of GDP and financial markets index on inflation. Inflation sensitivity to financial development is slightly lower than that to economic growth.

Table 4. Panel VAR(1) Model

(1981-2017)

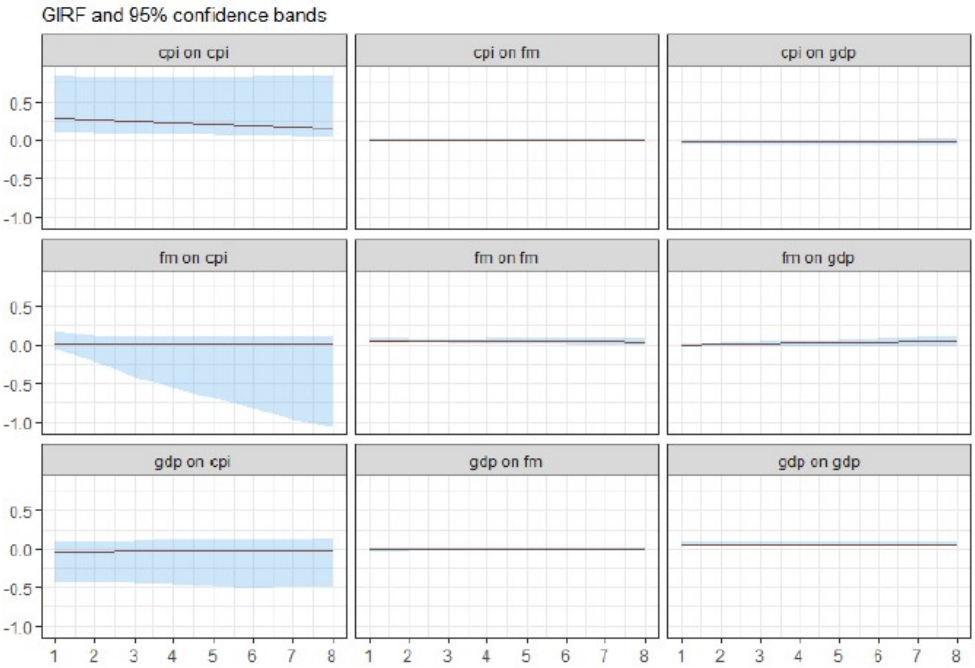
	DGDP	*DFM*	*DCPI*
DGDP (-1)	0.998***	0.006***	0.029*
	(0.0005)	*(0.0002)*	*(0.012)*
DFM (-1)	0.133***	0.948***	0.0218***
	(0.0402)	*(0.0167)*	*(0.0008)*
DCPI (-1)	-0.0016	0.009	0.918***
	(0.0015)	*(0.008)*	*(0.033)*
Intercept	0.047***	-0.1296***	-0.0002
	(0.0089)	*(0.0028)*	*(0.0004)*
Hansen test			
Statistics	*2823.06*		
p-value	*0.00*		
Number of parameters	*90*		

Heteroscedasticity and Autocorrelation Consistent (HAC) Standard errors are in parentheses. $***p<0.001, **p<0.01, *p<0.05$.

According to Pesaran and Shin (1998), instead of shocking all the error elements, we shock only one element and integrate out the effects of other shocks using the historically observed distribution of the errors. The generalized impulse response functions (GIRFs, Figure 2) describe how all the variables change along a predefined time horizon after a shock to a specific factor.

First, an inflationary shock is rather long lasting and its impact on output and the financial markets index is small but positive. This is consistent with the Mundell-Tobin effect. The GIRFs confirm that a shock affecting the financial markets index leads to slight economic growth and the effect is gradual and keeps on increasing until the end of our 12-year window. Also, a shock on the financial markets index leads to increased inflation, which is consistent with higher GDP growth. Lastly, financial markets index shocks are not strongly persistent over time as the development of financial markets is a policy decision. Finally, a positive shock to growth does not lead to increased inflation. Growth has been driven by productivity and not only purely driven by aggregate demand. This results from the fact that global productivity has been on an upward trend since the mid-1980s while global inflation was tamed after the global oil shocks (1973 and 1980).

Figure 2. Generalized Impulse Response Functions
(1981-2017)



Notes: Horizontal axis (X-axis); periods (in years); vertical axis (Y-axis); changes in the variable induced by a shock (in percentage).

4.3. Does the global financial crisis affect the model?

We estimate the model over a sub-period spanning from 1981 to 2006. The results for the full sample and the reduced sample are broadly similar. Indeed, the degrees of significance of the main coefficients are identical (with the exception of the inflation effect on economic growth). The persistence in the three equations is not statistically different from one sample to another. The over-identifying hypothesis is still possible.

However, the sensitivity of economic growth to financial development is greater over the period 1981-2006 (0.27 versus 0.13). Thus, the reaction of real activity to financial development was stronger before the global financial crisis. However, the effect of economic growth on the financial markets index remained unchanged, while the effect of financial markets on inflation is weaker over 1981-2006 (0.052 versus 0.074).

One of the explanations of the similarity between the two periods could be found in Petrovic *et al*, 2021 who showed that the EMDEs implemented large countercyclical fiscal and monetary policies during the global recession. Doing so, they strongly stimulated activity and smoothed growth slowdown during the global crisis.

4.4. Does heterogeneity inside the sample matter?

To test the hypotheses of heterogeneity and over-identifying, we estimate the PVAR model on homogeneous panels of countries: high-income; middle-income; and low-income. The results are reported in Tables 5 a, b and c. Firstly, the results are significantly different particularly when we take into consideration the relationships between financial markets index and the two other variables. In fact, if economic growth strongly impacts the financial markets index in the high-income countries, this link is not statistically significant for intermediate and low-income countries bearing in mind that this correlation is strong and significant for the whole panel. Moreover, the variables under review seem more persistent in the cases of the lowest income countries.

Besides, in the economic growth equation, the impact of the financial development factor is negligible in both high- and low-income countries whereas it is statistically significant for the intermediate-income countries. Expansion of the financial markets would have a depressive effect on real activity. These results could be compared with those of Shan et al. (2001) and Shan (2005) who stressed that “at the best, weak support is found for the hypothesis that financial development leads economic growth”. For low-income countries, these findings

can stem from financial liberalisation in a poor regulatory environment (De Gregorio and Guidotti, 1995). Gries et al. (2009) also revealed limited support for the hypothesis of finance-led growth for Sub-Saharan Africa.

Moreover, financial markets would not have any effect on changes in inflation in any subgroups. Those differences between the subgroups of countries are often highlighted in the literature (Fung, 2009). Finally, while the financial markets index equation displays some good characteristics for high-income countries and, to a lesser extent for middle-income countries it is particularly poor for low-income countries. This finding results from the weak development of the financial markets in these countries. Whatever the subgroup, there is no risk of over-identifying (see the Hansen tests in Tables 5 a, b and c). The over-identifying restrictions imposed in the model are valid (p-values of the null hypothesis equal 1). The over-identification highlighted before seems essentially due to the heterogeneity among the countries.

Table 5a. Panel VAR(1) Model for High-Income Countries
(1981-2017)

	DGDP	*DFM*	*DCPI*
DGDP(-1)	0.998***	0.003*	0.022***
	(0.0014)	*(0.0015)*	*(0.005)*
DFM(-1)	0.078	0.835***	0.225
	(0.0474)	*(0.057)*	*(0.122)*
DCPI (-1)	-0.002	0.027*	0.854***
	(0.0111)	*(0.013)*	*(0.038)*
Intercept	0.0343***	-0.118***	-0.053
	(0.0044)	*(0.008)*	*(0.003)*
Hansen test			
Statistics	*64.39*		
p-value	*0.98*		
Number of parameters	*90*		

Table 5b. Panel VAR(1) Model for Middle-Income Countries
(1981-2017)

	DGDP	*DFM*	*DCPI*
DGDP (-1)	1.04***	0.02	0.03***
	(0.021)	*(0.014)*	*(0.006)*
DFM (-1)	-0.64*	0.927**	-0.77
	(0.258)	*(0.12)*	*(0.47)*
DCPI (-1)	0.007***	-0.002	0.96***
	(0.0018)	*(0.0021)*	*(0.019)*
Intercept	-0.94*	-0.464	-0.06***
	(0.48)	*(0.31)*	*(0.015)*
Hansen test			
Statistics	*185.38*		
p-value	*1.38*		
Number of parameters	*90*		

Table 5c. Panel VAR(1) Model for Low-Income Countries
(1981-2017)

	DGDP	*DFM*	*DCPI*
DGDP (-1)	1.13***	-0.008	0.21
	(0.15)	*(0.03)*	*(0.23)*
DFM(-1)	2.73	-0.043	4.36
	(3.04)	*(0.047)*	*(4.85)*
DCPI (-1)	-0.058	0.014	0.87***
	(0.081)	*(0.022)*	*(0.12)*
Intercept	-2.67	0.095	-4.21
	(3.03)	*(0.11)*	*(4.68)*
Hansen Test Statistics	*0.07*		
p-value	*1*		
Number of parameters	*90*		

HAC Standard errors are in parentheses. $***p<0.001, **p<0.01, *p<0.05$.

5. Conclusion

Even though the topic of this paper has already been thoroughly investigated, conducting this study has been interesting for many reasons. Firstly, we test some models on reliable data across a wide range of countries over a long period of time (1980 to 2017). Secondly, we take into account the properties of the variables through the introduction of the characteristics of the countries. Thus, while the test on all countries gives very promising results − the confirmation of a bi-directional causality between economic growth and financial development, or the validation of a strong link between financial market and inflation − the estimates run for the entire sample seem subject to a risk of model over-identification. However, the over-identification does not emanate from a misspecification of the model but seems related to the heterogeneity in the panel. Indeed, the estimates performed with homogeneous sub-panels have shown that heterogeneity matters in the relationships between economic growth, financial development and inflation. Thirdly, the global financial crisis did not significantly influence the relationships between economic growth, financial development and inflation. Further investigation should improve the identification procedure. Introducing non-linearity in relationships between the variables whatever the level of income could be a potential avenue for improvement (Arawatari *et al.,* 2018, Swamy and Dharani, 2019).

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