

## REM WORKING PAPER SERIES

### **Financial development and macroeconomic performance: a cointegration approach**

**Cândida Ferreira**

**REM Working Paper 0155-2020**

December 2020

**REM – Research in Economics and Mathematics**

Rua Miguel Lúpi 20,  
1249-078 Lisboa,  
Portugal

ISSN 2184-108X

Any opinions expressed are those of the authors and not those of REM. Short, up to two paragraphs can be cited provided that full credit is given to the authors.





**REM – Research in Economics and Mathematics**

Rua Miguel Lupi, 20  
1249-078 LISBOA  
Portugal

Telephone: +351 - 213 925 912

E-mail: [rem@iseg.ulisboa.pt](mailto:rem@iseg.ulisboa.pt)

<https://rem.rc.iseg.ulisboa.pt/>



<https://twitter.com/ResearchRem>

<https://www.linkedin.com/company/researchrem/>

<https://www.facebook.com/researchrem/>

# Financial development and macroeconomic performance: a cointegration approach

**Cândida Ferreira <sup>1</sup>**

ISEG, UL – Lisbon School of Economics and Management of the Universidade de Lisboa  
UECE - Research Unit in Complexity and Economics  
REM – Research in Economics and Mathematics  
e-mail: candidaf@iseg.ulisboa.pt

## **Abstract**

The paper tests the existence of long-term relations, measured through cointegration, between all the IMF financial development indices and some macroeconomic performance indicators applying panel cointegration tests in a panel with 46 countries, and in a panel including only the sub-sample of the 28 EU countries over the interval 1990-2017. Overall, there are no significant differences between the results obtained for whole sample and the panel including only the EU countries. The results obtained clearly point to the existence of cointegration between the financial development indices and the real Gross Domestic Product, as well as with the inflation, the unemployment rate, and very particularly, with the current account, and with the net international investment position. The results also show there are no significant differences between the results obtained for the financial institutions and for the financial markets. Moreover, the results related to the specific aspects addressed by the IMF indices very well demonstrate that much more important than the simple access to or the depth of the financial institutions and markets is the efficiency of these institutions and markets.

**Keywords:** Financial development; IMF Financial development indices; macroeconomic performance; cointegration; panel cointegration tests.

**JEL Classification:** E44, E02; F36; O43; C13.

---

<sup>1</sup> The author acknowledges financial Support from FCT – Fundação para a Ciência e Tecnologia (Portugal), national funding through research grant UIDB/05069/2020.

# Financial development and macroeconomic performance: a cointegration approach

## 1. Introduction

Well-functioning banking institutions and financial markets are usually considered important and necessary to ensure that credit sectors play their specific role in the processes of economic development, contributing to economic growth, namely by decreasing transaction costs and the problems connected to asymmetric information.

There is a large strand of literature, going back to at least to Schumpeter (1911), who maintained that the services provided by financial intermediaries are essential to economic innovation, productive investment, and economic growth. During the last decades, the importance of the banking sector performance to economic growth has been subject of intense theoretical debates and empirical studies, particularly, after the important King and Levine contributions (namely the renowned papers King and Levine 1993-a, 1993-b).

Despite the overall accepted consensus that financial development is relevant to economic growth, several studies (at least since Khan and Senhadji, 2000) underline that the size of the effects may vary with the estimation methods, data frequency, the defined functional forms of the relationships and particularly with the variables chosen as financial development indicators. The relevance of the indicators chosen to represent financial development is very well highlighted, for example, in Sahay et al (2015) who developed a new very encompassing financial index that is also very clearly presented and discussed in Svirydzenka (2016). The new financial development index includes nine indices reflecting three dimensions: the depth, the access, and the efficiency of the financial markets and institutions and is nowadays provided by the International Monetary Fund.

This paper seeks to contribute to the literature by analysing the cointegration of these nine financial indices with the macroeconomic performance, represented not only by the real Gross Domestic Product (GDP), but also by other relevant macroeconomic indicators, namely the inflation (proxied by the GDP deflator), the unemployment rate, the current account, and the net international investment position over the period 1990–2017. Using two of the most popular panel cointegration tests: the Pedroni (1999, 2004), and the Westerlund (2007) tests, the paper first considers a panel with 46 countries and then a panel including only the sub-sample of the 28 EU countries, aiming to test the robustness of the estimates, and questioning if the process of the European integration stimulates (or not) the cointegration between the financial development and the macroeconomic performance during the last decades.

The results obtained show that financial development is clearly cointegrated with all the indicators measuring macroeconomic performance and very strongly with the unemployment rate, the current account, and the net international investment position. A more detailed analysis of the results demonstrates that overall, cointegration with the Financial Markets Index is at least as strong as the cointegration with the Financial Institutions Index, indicating that the macroeconomic performance of the considered countries is clearly cointegrated not only with the development of the financial institutions but also with the development of the financial markets. Another relevant conclusion is that the efficiency of both the financial institutions and the financial markets are much more cointegrated with the economic performance of the considered countries than the simple access or the depth of the financial institutions and markets.

Finally, the results obtained for Panel 1 (including all the countries of the sample) are in line with the results obtained for Panel 2 (considering only the 28 EU countries) demonstrating the overall robustness of the results and that in what regards to the cointegration between the

financial development and the macroeconomic performance there are no significant differences between the behaviour of the EU countries and the other countries included in the sample.

The remainder of this paper is organised as follows: Section 2 provides a brief literature review; Section 3 describes the methodological aspects and the used data; Section 4 presents and discusses the results obtained; Section 5 concludes.

## **2. Brief literature review**

There is a strand of literature pointing to the consensus that well-functioning banking institutions and financial markets contribute positively to economic growth, particularly after the renowned contributions of King and Levine (1993-a) where the authors examine a cross-section of about 80 countries for the period 1960-89 finding that various measures of financial development are strongly associated with economic growth. They underline that each of the considered measures has shortcomings, but they all allow the relevant conclusion that finance matters, empirically confirming the Schumpeter's view that the services provided by financial intermediaries stimulate long-run growth. This conclusion was corroborated in King and Levine (1993-b) with the construction of an endogenous growth model and the overall conclusion that financial systems are important for productivity growth and economic development because good financial systems improve the probability of successful innovation and thereby accelerate economic growth, while financial sector distortions reduce the rate of economic growth by reducing the rate of innovation.

Following this strand of literature Levine and Zervos (1998) considered data for 49 countries, for the interval 1976-1990, concluding that there was a strong correlation between the rates of real per-capita output growth and stock market liquidity. Also, Demirgüç-Kunt and Levine

(1999), using data for 150 countries spanning the 1990s, demonstrated that wealthy countries had developed financial systems better and defined this development in terms of the size and efficiency of the financial sector, measured by the assets, liabilities, overhead costs, and interest rate margins.

Beck et al (2004) considered the ratio between credits from financial intermediaries to the private sector divided by GDP as a proxy of financial intermediation in a panel of 52 countries during the period 1960 to 1999, concluding that financial development was clearly pro-growth as well as pro-poor.

Greenwood et al (2010, 2013) empirically analysed the effects of financial development on economic growth, deploying a state cost verification model and concluded that as financial sector efficiency increased, financial resources got redirected from the less productive firms to their more productive peers. This analytical approach was applied to both US and cross-country data (more precisely, to a sample of 45 countries, that was first applied in Beck et al., 2000) and one of the key findings pointed to the conclusion that world output could increase by 53 per cent if all countries adopted the best global financial practices.

Cecchetti and Kharroubi (2012) considered a sample of developed and emerging economies and analysed how financial development contributed to aggregate productivity growth and concluding in favour of an inverted U-shaped financial development effect, meaning that this development exerted a positive influence on productivity growth but only up to a certain point and after that point the influence on growth turned negative. Moreover, these authors focussed on advanced economies showing that a fast-growing financial sector could be detrimental to aggregate productivity growth. Corroborating these conclusions, Aizenman et al (2015), examining sector-level data in 41 economies found that finance increased economic growth, but only up to a point, concluding also that there were heterogeneous effects across sectors.

Several other studies, such as Bhide (1993) and Bencivenga et al (1995), had already underlined the existence of relevant costs associated with the role of financial intermediaries and that sometimes these intermediaries could be subject to adverse selection and moral hazard problems which would constrain real economic growth-enhancing resource allocation, exaggerating the increase in interest rates, or contributing to the decrease in the saving rates. Simultaneously, De Gregorio and Guidotti (1995) considered that high-income countries had reached a point at which financial depth could no longer contribute to increasing the efficiency of the investment.

Loayza and Rancière (2006) focused on the importance of the time horizon, supporting that, in the long-term, the studies on economic growth found a positive relationship between financial development and real growth; however, in the short term, the literature, and very particularly the one concerning bank crises, provides evidence of a negative relationship, revealing that monetary aggregates could represent good predictors of economic crisis. More recently, Laeven and Valencia (2013) confirmed the important role of credit market frictions to the performance of the real economic activity during the recent crisis, using a sample including a large cross section of firms from 50 countries in both advanced and emerging market economies. Dabla-Norris et al (2015) analysed the sector-level productivity developments in the most advanced economies, considering the period from 1970 to 2007, concluding that before the recent international financial crisis, the financial sector of the advanced economies was not orienting the resources towards the most productive economic sectors. Prochniak and Wasiak (2016) considered a sample of 28 EU and 34 OECD economies in the period of 1993–2013, taking into consideration the impact of the financial crisis on the relationship between finance and growth and concluding that an excessively large size of the financial system does not lead to more rapid economic growth, on the contrary, it may even negatively affect GDP growth.



Bijlsma et al (2018) performed a meta-analysis on 551 estimates from 68 empirical studies that take private credit to GDP as a measure for financial development, confirming that the analysed empirical studies on the finance-growth relationship show a wide range of estimated effects. They also concluded that overall, there was a positive but decreasing effect of financial development on growth.

The provided examples clearly demonstrate that the contribution of the financial intermediaries to economic growth is far from consensual. Khan and Senhadji (2000) had already stated that while the general effects of financial development on the real outputs might be considered positive, the size of these effects varied not only with the estimation methods, data frequency or the defined functional forms of the relationships but also with the variables chosen as financial development indicators. Corroborating these statements, Gaytan and Rancière (2004) concluded that, from one side, credit to the private sector and bank deposits contribute negatively to growth but, from another side, stock market size, liquidity and investment contribute positively to economic development. The same kind of conclusions were obtained by Ayadi et al (2013) using a sample of northern and southern Mediterranean countries for the 1985-2009 period, these authors confirmed that there are deficiencies in bank credit allocation in the considered countries as credit to the private sector and bank deposits are negatively associated to economic growth; however, on the stock market side, their results indicate that stock market size and liquidity do contribute to growth. Also, Cournède and Denk (2015) focusing on advanced countries, more precisely on OECD countries and G20 countries between 1970 and 2011, found that intermediated credit had a negative link with GDP growth and that stock market size had a positive one.

The relevance of the indicators chosen to represent financial development was very clearly highlighted by Sahay et al (2015). Underlying that most of the empirical literature approximates financial development by the ratio of private credit to GDP, and to a lesser extent, by the stock

market capitalization, also as a ratio of GDP, this study developed a financial index encompassing the banking and non-banking financial institutions as well as the financial markets across three dimensions: depth (size and liquidity), access (ability of individuals and companies to access financial services) and efficiency (ability of institutions to provide financial services at low costs and with sustainable revenues and the level of activities of financial markets). The Financial Development Index was also very clearly presented and well discussed in Svirydzienka (2016) and it is nowadays provided by the International Monetary Fund. This IMF database includes nine indices over 180 countries, with annual frequency from 1980 onwards (although not all the indices are available for all countries since 1980).

### **3. Methodology and data**

The paper discusses the potential influence of financial development on economic performance using panel data techniques which have the advantage of providing more informative data. More precisely, the paper opts to use panel cointegration techniques as cointegration provides an appropriate conceptual framework to analyse the long-term relationship between two series. The existence of cointegration implies that causality exists between the two series, although it does not indicate the direction of the causal relationship. The general definition of cointegration follows that of Engle and Granger (1987), meaning that two non-stationary series,  $x_t$  and  $y_t$ , with the same order of integration, will be considered cointegrated (and long-term equilibrium relationships exist) if there is a stationary linear combination of these series,  $z_t$ , which can be defined using the equation  $z_t = x_t - a - by_t$  where  $a$  and  $b$  are constant terms.

Among the available panel cointegration tests, this paper chooses two of the most popular ones: the Pedroni (1999, 2004), and the Westerlund (2007) tests.

Pedroni (1999, 2004) test the null hypothesis of no cointegration in non-stationary panels and can be regarded as a panel equivalent of the well-known Engle and Granger (1987) cointegration test applied in time series analysis. In general terms, Pedroni considers the following type of regression:

$$y_{it} = \alpha_i + \beta_{1i}x_{1,it} + \beta_{2i}x_{2,it} + \dots + \beta_{Mi}x_{M,it} + e_{it} \quad (1)$$

where  $y_{it}$  is the variable being tested,  $i = 1, \dots, N$  are the cross units,  $t = 1, \dots, T$  the time periods,  $m = 1, \dots, M$  are the independent variables. The variables are assumed to be integrated of order one for each cross unit  $i$  of the panel and, under the null of no cointegration the residual  $e_{it}$  will also be  $I(1)$ . The test allows member specific effects and deterministic trends for the parameters  $\alpha_i$  as well as individual variations of the slope coefficients,  $\beta_i$ , meaning that the cointegration vectors may be heterogenous across members of the panel.

Using the residuals from the static, long-run, regressions, Pedroni provides seven specific panel cointegration test statistics. Four of them are panel statistics, based on pooling the residuals of the regressions along the within dimension of the panels: panel-v, panel-rho, panel-PP and panel-ADF statistics. The other three are group statistics, based on pooling the residuals along the between dimension of the panels: group-rho, group-PP and group-ADF statistics.

As clearly recognised, for example, in Neal (2014) the relative power of these seven Pedroni statistics is not totally clear and they can even provide contradictory results. However, similar results of several of these seven statistics can be interpreted as a sign of robustness of the Pedroni's panel cointegration test results.

The Westerlund (2007) panel cointegration test is also derived under the null hypothesis of no cointegration, but contrary to the Pedroni test, this test is not based on the residuals of the long-run static regressions. The Westerlund test is based on structural rather than residual dynamics

and assesses the significance of the adjustment coefficient in an error corrector model of the following type:

$$Dy_{it} = c_i + a_{i1} * Dy_{it-1} + \dots + a_{ip} * Dy_{it-p} + b_{i0} * Dx_{it} + b_{i1} * Dx_{it-1} + \dots + b_{ip} * Dx_{it-p} + a_i(y_{it-1} - b_1 * x_{it-1}) + u_{it} \quad (2)$$

The test is very flexible and works well in unbalanced, heterogeneous and/or relatively small panels, allowing for dependence both between and within the cross-panel units. It provides four test statistics:  $G_t$ ,  $G_a$ ,  $P_t$  and  $P_a$ . The  $G_t$  and  $G_a$  statistics test  $H_0: a_i = 0$  for all  $i$  versus  $H_a: a_i < 0$  for at least one of the series,  $i$ , starting from a weighted average of the individually estimated coefficients  $a_i$  and their respective t-ratios. The  $P_t$  and  $P_a$  test statistics consider the pooled information of all panel cross-section units to test  $H_0: a_i = 0$  for all  $i$  versus  $H_a: a_i < 0$  for all cross-section units.

The paper considers 46 countries (Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, China, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, India, Indonesia, Ireland, Italy, Japan, Republic of Korea, Latvia, Lithuania, Luxembourg, Malta, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States) over the interval 1990-2017. All the data used in this paper are sourced from the IMF databases and the paper tests the cointegration between all the IMF financial development indices and some performance indicators, presented in the following table:

**Table 1 – Used data<sup>(\*)</sup>**

<b>Financial indices <sup>(**)</sup></b>	<b>Macroeconomic indicators <sup>(***)</sup></b>
Financial Development Index	Gross Domestic Product
Financial Institutions Access Index	Deflator
Financial Institutions Depth Index	Unemployment rate
Financial Institutions Efficiency Index	Current account
Financial Institutions Index	Net international investment position
Markets Access Index	
Financial Markets Depth Index	
Financial Markets Efficiency Index	
Financial Markets Index	

(\*) All data are sourced from the IMF databases and were extracted the 20<sup>th</sup> July 2020.

(\*\*)The construction of these IMF financial development indices is presented in the Annex 1 of this paper, and they are very well explained in Sahay et al (2015) and in Svirydenka (2016).

(\*\*\*) More precisely, the Gross Domestic Product is the “Gross Domestic Product, Volume, Seasonally Adjusted” (2010=100), and the Deflator is the “Gross Domestic Product, Deflator, Seasonally Adjusted” (2010=100), both sourced from the National Accounts, Constant Prices, Seasonally Adjusted, of the International Financial Statistics (IFS). The Unemployment rate is the “Labour Markets, Unemployment Rate, Percent”, sourced from the Prices, Production and Labour selected indicators of the International Financial Statistics (IFS). The Current account is sourced from the Balance of Payments Standard Presentation (Millions of U.S. Dollars). The Net international investment position (Millions of U.S. Dollars) provides the “value of the financial assets of the residents of an economy that are claims on non-residents or are gold bullion held as reserve assets; and the liabilities of the residents of an economy to non-residents” and the data were extracted from IMF Data Warehouse.

#### **4. Empirical results**

Aiming to analyse the possible existence of long-run relationships between each of the variables representing the macroeconomic performance of the considered countries and each of the IMF financial development indices for these countries the paper uses two of the most popular panel cointegration tests that are presented in the previous section: Pedroni, and Westerlund tests. These tests are applied to two panels: Panel 1 considers all the 46 countries included in the sample, and Panel 2 includes only the sub-sample of the 28 EU countries, over the interval 1990-2017.

Before proceeding with the panel cointegration tests the paper analyses the stationarity of the series using two widely recommended panel unit root tests: Levin-Lin-Chu test (Levin et al, 2002), and Hadri Lagrange multiplier tests (Hadri, 2000). According to the results reported in

Annex 2, many of the considered variables are not stationary at their levels, but all of them are stationary at their first differences, and therefore it is possible to admit that they are integrated in the order one. Moreover, there are no remarkable differences between the results obtained for Panel 1 (including the whole sample of 46 countries) and for Panel 2 (including only the sub-sample of the 28 EU countries).

The results obtained with the panel cointegration tests for Panel 1 are reported in Table 2. Overall, it is possible to conclude that there is evidence of relevant cointegration and that the results obtained either with Pedroni or with Westerlund tests do not reveal significant differences. Nevertheless, and not surprisingly, the robustness of the seven specific statistics provided by the Pedroni test is not always the same; the same occurs in the four statistics obtained with the Westerlund test.

The first evident conclusion is that, looking at the overall financial index, more precisely the Financial Development Index, it is possible to say that cointegration between this index and all the five indicators representing macroeconomic performance should not be rejected.

A more careful analysis of the results obtained for the overall IMF Financial Development Index shows that there is evidence of cointegration not only with the real GDP (that is usually considered in the empirical analyses of the relevance of financial development to economic growth) but also that the evidence of cointegration of this overall index is still stronger (and in increasing order) with the deflator, the unemployment rate, the current account, and the net international investment position.

Now looking at the index that summarizes the relevance of the financial institutions, the IMF Financial Institutions Index, it is possible to confirm that there is sufficient evidence of the cointegration of this index with the real GDP as well as that the evidence of cointegration is much stronger with the deflator, the unemployment rate, the current account, and very particularly, with the net international investment position.

**Table 2 – Results obtained with panel cointegration tests - PANEL 1**

Gross Domestic Product and	Pedroni							Westerlund			
	Panel -v	Panel -rho	Panel -PP	Panel -ADF	Group-rho	Group-PP	Group-ADF	Gt	Ga	Pt	Pa
Financial Development Index	.3303	-2.233**	-4.218***	-2.813***	-1.045	-4.139***	-2.128**	-2.494***	-7.372	-17.486***	-6.515***
Financial Institutions Access Index	-1.985	1.421	-0.02785	1.559	1.94	-4.223	2.623	-1.810	-4.452	-14.724***	-4.385
Financial Institutions Depth Index	-.03332	-.6321	-1.959**	-.4238	.07727	-2.225**	-.6032	-1.732	-5.091	-12.323***	-4.614
Financial Institutions Efficiency Index	.485	-5.639***	-8.286***	-6.994***	-5.101***	-10.17***	-5.515***	-3.213***	-11.982***	-23.485***	-10.786***
Financial Institutions Index	-1.053	-.7954	-3.341***	-.215	-1.242*	-5.565***	-1.357*	-2.170***	-6.122	-20.128***	-7.385***
Financial Markets Access Index	-.2675	-2.697***	-5.188***	-3.467***	-1.769**	-5.832***	-3.28***	-2.660***	-9.468***	-15.322***	-6.631***
Financial Markets Depth Index	-1.658	.742	-.7581	.5946	2.308	.09976	1.49	-1.881	-5.516	-11.157	-3.716
Financial Markets Efficiency Index	1.473*	-3.337***	-4.648***	-3.416***	-1.352*	-4.386***	-2.28**	-3.015***	-13.006***	-15.688***	-7.933***
Financial Markets Index	-.7601	-.6828	-2.557***	-1.672**	.763	-2.075**	-1.306*	-2.336***	-7.743	-13.725***	-5.266**
<b>Deflator and</b>											
Financial Development Index	.9075	-3.026***	-5.047***	-3.269***	-1.983**	-5.529***	-2.995***	-2.579***	-7.916	-17.358***	-6.656***
Financial Institutions Access Index	-1.222	-.7607	-2.71***	-.619	.2569	-3.11***	-.2949	-1.713	-4.843	-13.642***	-4.313
Financial Institutions Depth Index	.4592	-2.551***	-3.846***	-1.542**	-1.047	-3.563***	-1.558**	-1.704	-5.403	-12.513***	-4.842
Financial Institutions Efficiency Index	1.071	-7.214***	-9.612***	-7.405***	-6.574***	-12.29***	-7.234***	-3.272***	-12.459***	-24.410***	-12.314***
Financial Institutions Index	-.3721	-2.352**	-4.852***	-1.591**	-2.243**	-7.271***	-3.372***	-2.106***	-6.354	-19.462***	-7.498***
Financial Markets Access Index	.4998	-4.009***	-6.327***	-4.362***	-3.324***	-7.138***	-4.147***	-2.612***	-9.349***	-16.330***	-7.663***
Financial Markets Depth Index	-1.186	-.08384	-1.645**	-.6783	1.517	-.8392	-.6429	-1.943	-5.821	-11.325**	-3.902
Financial Markets Efficiency Index	1.758**	-4.326***	-5.694***	-4.213***	-2.345**	-5.587***	-3.259***	-3.269***	-14.103***	-17.678***	-9.035***
Financial Markets Index	-.3442	-1.628**	-3.586***	-3.143***	-.393	-3.377***	-3.588***	-2.473***	-8.197	-14.528***	-5.727**
<b>Unemployment Rate and</b>											
Financial Development Index	1.587**	-3.415***	-5.179***	-2.901***	-2.168*	-5.425***	-2.005**	-2.518***	-8.035	-18.068***	-7.351***
Financial Institutions Access Index	-1.538	.8565	-.6168	1.127	1.911	-.3791	2.407**	-1.709	-4.910	-16.998***	-5.303*
Financial Institutions Depth Index	.2065	-.3644	-1.599**	-1.264*	.9779	-1.345*	-1.812**	-1.694	-5.533	-11.271	-4.363
Financial Institutions Efficiency Index	.9498	-6.109***	-8.591***	-5.645***	-5.251***	-10.63***	-6.481***	-3.491***	-13.116***	-25.960***	-12.909***
Financial Institutions Index	-.4689	-1.76**	-4.373***	-2.003**	-1.61**	-6.385***	-2.14**	-2.237***	-6.801	-21.325***	-8.268***
Financial Markets Access Index	.1625	-2.715***	-5.108***	-3.026***	-2.003**	-6.157***	-3.477***	-2.598***	-9.806***	-16.756***	-8.136***
Financial Markets Depth Index	-1.117	.5854	-.7251	.4927	1.99	-.137	.8838	-1.739	-5.420	-9.676	-3.647
Financial Markets Efficiency Index	2.304**	-4.586***	-5.842***	-3.87***	-2.797***	-5.905***	-3.075***	-3.501***	-15.038***	-19.075***	-9.994***
Financial Markets Index	.1132	-1.529**	-3.106***	-1.522**	-.2667	-2.908***	-.9121	-2.457***	-8.192	-14.997***	-6.194***
<b>Current account and</b>											
Financial Development Index	1.215*	-2.935***	-5.498***	-5.164***	-2.591***	-6.578***	-4.999***	-2.397***	-7.845	-17.934***	-7.648***
Financial Institutions Access Index	-.5904	-.4701	-2.418**	-1.166*	-.02807	-3.569***	-.7854	-2.303***	-6.545	-19.839***	-6.613***
Financial Institutions Depth Index	1.099	-2.353**	-4.025***	-3.394***	-.7056	-3.804***	-3.278***	-1.831	-5.871	-13.956***	-6.048***
Financial Institutions Efficiency Index	1.113	-5.884***	-9.336***	-7.516***	-6.567***	-12.82***	-7.701***	-3.265***	-12.784***	-23.192***	-11.431***
Financial Institutions Index	.3654	-2.76***	-6.013***	-5.15***	-3.157***	-9.162***	-8.375***	-2.338***	-7.327	-22.029***	-8.775***
Financial Markets Access Index	.3145	-2.816***	-5.621***	-4.074***	-2.495***	-6.661***	-4.68***	-2.564***	-9.565***	-14.674***	-7.042***
Financial Markets Depth Index	-1.359	.551	-1.344*	-.3736	1.698	-.922	-.4786	-1.664	-5.318	-9.459	-3.706
Financial Markets Efficiency Index	1.746**	-3.529***	-4.952***	-4.092***	-1.676**	-4.921***	-3.381***	-3.123***	-13.833***	-16.986***	-8.880***
Financial Markets Index	-.3642	-.8452	-2.894***	-3.439***	.202	-2.809***	-3.17***	-2.153***	-7.595	-12.293***	-5.300*
<b>Net international investment position and</b>											
Financial Development Index	2.705***	-4.623***	-6.627***	-5.853***	-3.444***	-7.359***	-5.361***	-2.536***	-9.552***	-16.280***	-7.046***
Financial Institutions Access Index	1.434*	-2.752***	-4.48***	-1.439*	-1.593***	-5.097***	-.593	-2.672***	-10.111***	-21.627***	-10.187***
Financial Institutions Depth Index	2.208**	-3.189***	-4.933***	-4.447***	-1.828**	-5.21***	-5.094***	-2.282***	-8.715***	-13.713***	-6.329***
Financial Institutions Efficiency Index	3.173***	-9.006***	-11***	-9.043***	-7.507***	-13.48***	-9.775***	-3.527***	-14.550***	-24.246***	-14.562***
Financial Institutions Index	2.754***	-5.23***	-7.54***	-4.991***	-4.138***	-9.261***	-5.431***	-2.654***	-10.114***	-23.476***	-12.875***
Financial Markets Access Index	1.347*	-4.098***	-6.285***	-4.283***	-2.516***	-6.622***	-5.403***	-2.693***	-9.500***	-14.273***	-6.670***
Financial Markets Depth Index	.401	-1.36*	-2.86***	-2.366**	.1297	-2.635***	-2.739***	-1.840	-5.940	-9.196	-3.438
Financial Markets Efficiency Index	3.117***	-5.29***	-6.532***	-5.595***	-3.167***	-6.526***	-5.136***	-3.208***	-14.096***	-17.790***	-9.682***
Financial Markets Index	1.297*	-2.926***	-4.536***	-5.42***	-1.361*	-4.484***	-5.946***	-2.180***	-7.632	-12.064***	-5.121

Source: Author's calculation.

\*\*\*significant at 1% level; \*\* significant at 5% level; \* significant at 10% level. Panel 2 includes all the 46 countries of the sample.

In what regards to the specific aspects related to the financial institutions (in terms of access, depth, and efficiency, as described in Appendix 1), the results obtained show that there is no strong cointegration between the Financial Institutions Access Index and the real GDP, that this cointegration increases with the deflator, the unemployment rate, the current account, and that

it is clearly strong with the net international investment position. Also, the cointegration of the Financial Institutions Depth Index with the real GDP is not very strong, but it becomes stronger with the deflator, the unemployment rate, the current account, and very specially, with the net international investment position. Finally, the results obtained for the Financial Institutions Efficiency Index clearly point to the existence of strong cointegration between this index and all the five indicators of macroeconomic performance, demonstrating that in all considered situations, the efficiency ) of the banking institutions (that is, their ability to provide financial services at low costs) is much more relevant to economic performance than the simple access (more precisely, the ability of individuals and companies to access financial services) or the depth (meaning, the size and liquidity) of these institutions.

The same kind of analysis, but now looking at the results obtained for the financial markets, indicates that the overall IMF Financial Institutions Index is also clearly cointegrated with the real GDP, as well as with the other four measures of macroeconomic performance.

A more careful analysis of the specific aspects of the financial markets in terms of the access, depth, and efficiency, overall corroborates the conclusions obtained for the financial markets: the cointegrations between the IFM Financial Markets Efficiency Index and all the five macroeconomic performance indicators are much stronger than those obtained for the Financial Markets Access Index and the Financial Markets Depth Index. Moreover, in what regards to the depth index, it is even possible to reject its cointegration with almost all the considered macroeconomic indicators (the exception is the net international investment position, for which the existence of cointegration with the Financial Markets Depth Index cannot be rejected).

The results obtained for Panel 2 (considering only the EU countries) are reported in Table 3 and clearly demonstrate that the cointegration of the overall Financial Development Index with all the five variables representing macroeconomic performance is still more evident than in the previous panel (which considers all the 46 countries included in the sample).



**Table 3 – Results obtained with panel cointegration tests - PANEL 2**

Gross Domestic Product and	Pedroni							Westerlund			
	Panel -v	Panel -rho	Panel -PP	Panel -ADF	Group-rho	Group-PP	Group-ADF	Gt	Ga	Pt	Pa
Financial Development Index	.5133	-2.845***	-4.728***	-4.059***	-2.094**	-5.353***	-3.354***	-2.685***	-8.070	-14.598***	-7.185***
Financial Institutions Access Index	-1.498	.748	-.8345	.7401	.6089	-1.654**	2.459	-1.900	-4.848	-12.439***	-4.807
Financial Institutions Depth Index	-.1366	-.616	-1.88**	-.7417	-.1812	-2.323**	-1.63**	-1.974	-5.932***	-10.365	-4.983
Financial Institutions Efficiency Index	-.6606	-2.546***	-5.603***	-4.344***	-2.602***	-7.425***	-5.287***	-3.332***	-12.183***	-19.021***	-10.874***
Financial Institutions Index	-1.513	-.07202	-2.795***	.1776	-1.447**	-5.323***	.05636	-2.460***	-7.029	-17.165***	-8.027***
Financial Markets Access Index	-.1067	-2.423**	-4.572***	-3.349***	-1.869**	-5.105***	-3.843***	-2.692***	-9.580***	-11.918***	-6.557***
Financial Markets Depth Index	-1.613	.9135	-.2983	1.602	2.628	.8204	1.725	-1.853	-4.978	-8.720	-3.517
Financial Markets Efficiency Index	1.351*	-3.318***	-4.235***	-3.531***	-1.501**	-4.015***	-2.78***	-2.402***	-8.957**	-12.018***	-7.817***
Financial Markets Index	-.6834	-.8917	-2.21**	-1.795**	.2857	-1.759**	-1.255*	-2.404***	-8.189	-10.409***	-5.141
<b>Deflator and</b>											
Financial Development Index	1.074	-4.037***	-5.782***	-4.467***	-2.954***	-6.241***	-3.461***	-2.993***	-9.488***	-15.447***	-7.828***
Financial Institutions Access Index	-1.16	-.4905	-2.105**	-.8167	-.5969	-3.253***	-.8546	-2.207***	-6.063	-12.784***	-5.092
Financial Institutions Depth Index	.8359	-2.643	-3.965***	-3.152	-1.894**	-4.293***	-3.19***	-2.103**	-6.980	-10.537***	-5.322
Financial Institutions Efficiency Index	-.1458	-4.157***	-6.842***	-4.179***	-3.598***	-8.766***	-3.769***	-3.547***	-13.278***	-19.559***	-12.241***
Financial Institutions Index	-.9112	-1.673**	-4.192***	-2.554***	-2.01**	-6.311***	-4.323***	-2.632***	-7.910	-17.240***	-8.362***
Financial Markets Access Index	.6689	-3.83***	-5.413***	-4.584***	-2.474***	-5.504***	-4.058***	-2.716***	-10.060***	-12.671***	-8.109***
Financial Markets Depth Index	-1.201	-.1488	-1.489**	-.9742	1.108	-1.013	-.3191	-2.127**	-6.175	-10.499***	-4.508
Financial Markets Efficiency Index	1.545**	-3.99***	-5.013***	-4.063***	-2.705***	-5.121***	-4.075***	-2.735***	-10.236***	-14.006***	-9.204***
Financial Markets Index	-.1938	-2.21**	-3.639***	-3.787***	-1.402*	-3.814***	-3.199***	-2.681***	-9.187**	-11.983***	-6.110**
<b>Unemployment Rate and</b>											
Financial Development Index	1.164*	-3.603***	-5.496***	-3.341***	-3.099***	-6.449***	-2.431***	-2.811***	-9.432**	-15.022***	-8.076***
Financial Institutions Access Index	-1.107	-.3701	-2.15**	-1.696**	-.6135	-3.317***	-2.291**	-2.222***	-6.440	-15.488***	-6.449***
Financial Institutions Depth Index	-.05365	-.449	-1.576**	-.7242	.3392	-1.446*	-1.028	-1.986	-6.743	-9.706	-4.821
Financial Institutions Efficiency Index	-.1161	-3.731***	-6.363***	-3.991***	-3.454***	-8.225***	-5.355***	-3.722***	-13.331***	-20.638***	-12.694***
Financial Institutions Index	-1.052	-1.063	-3.519***	-.6796	-1.303*	-5.651***	-.8596	-2.778***	-8.637*	-18.408***	-9.253***
Financial Markets Access Index	.2673	-2.623***	-4.581***	-2.986***	-2.141**	-5.387***	-2.852***	-2.586***	-9.476***	-11.687***	-6.749***
Financial Markets Depth Index	-1.416	.9542	-.2745	.1768	2.257	.3808	.2873	-1.757	-5.238	-7.594	-3.478
Financial Markets Efficiency Index	1.709**	-3.958***	-5.06**	-3.299***	-2.907***	-5.49***	-2.262**	-2.890***	-10.813***	-14.421***	-9.541***
Financial Markets Index	-.3674	-1.156*	-2.546***	-1.158*	-1.259	-2.398**	-4.452	-2.549***	-8.679*	-11.141***	-5.766***
<b>Current account and</b>											
Financial Development Index	1.307**	-3.531***	-5.763***	-5.607***	-3.358***	-7.454***	-4.571***	-2.749***	-9.193***	-15.961***	-8.746***
Financial Institutions Access Index	.04804	-1.866**	-3.559***	-2.132*	-1.649**	-4.685***	-2.535***	-2.907***	-8.423	-17.487***	-7.332***
Financial Institutions Depth Index	1.742**	-3.409***	-4.49***	-3.168***	-1.932*	-4.35***	-2.357**	-2.155**	-7.143	-12.054***	-6.846***
Financial Institutions Efficiency Index	.1556	-3.797***	-6.823***	-5.328***	-3.781***	-8.757***	-5.989***	-3.412***	-12.889***	-18.235***	-11.087***
Financial Institutions Index	.0403	-2.641***	-5.315***	-4.975***	-3.162***	-7.576***	-5.812***	-2.870***	-9.003***	-18.931***	-9.456***
Financial Markets Access Index	.7553	-3.371***	-5.469***	-3.583***	-2.644***	-6.06***	-3.506***	-2.701***	-10.363***	-12.424***	-7.486***
Financial Markets Depth Index	-.7522	-.2993	-1.635**	-.6753	1.051	-.9635	-.893	-1.510	-4.561	-6.894	-3.195
Financial Markets Efficiency Index	.9709	-3.051***	-4.284***	-4.014***	-1.565**	-4.182***	-3.793***	-2.645***	-10.136***	-13.666***	-9.055***
Financial Markets Index	-.3004	-1.517**	-2.992***	-3.4***	-.7737	-2.988***	-3.789***	-2.246***	-8.082	-9.746**	-5.276
<b>Net international investment position and</b>											
Financial Development Index	2.618***	-5.015***	-6.522***	-6.556***	-3.966***	-7.375***	-6.197***	-2.962***	-11.859***	-15.015***	-9.030***
Financial Institutions Access Index	2.352**	-3.289***	-4.776***	-3.025***	-2.859***	-6.352***	-4.013***	-3.081***	-11.181***	-22.074***	-13.852***
Financial Institutions Depth Index	2.065**	-3.049***	-4.218***	-4.032***	-2.502***	-4.985***	-4.249***	-2.648***	-10.270***	-12.086***	-7.833***
Financial Institutions Efficiency Index	1.885***	-5.943***	-7.918***	-5.722***	-5.083***	-9.85***	-6.837***	-3.646***	-14.818***	-18.658***	-14.485***
Financial Institutions Index	2.115**	-4.211***	-6.495***	-3.265***	-4.791***	-9.491***	-5.739***	-3.117***	-11.984***	-23.303***	-15.900***
Financial Markets Access Index	1.027	-3.461***	-4.996***	-3.108***	-2.509***	-5.501***	-3.752***	-3.086***	-10.832***	-12.113***	-7.659***
Financial Markets Depth Index	-.1747	-.09904	-.8675	-.3647	1.178*	-.3882	.7601	-1.710	-5.231	-7.190	-3.527
Financial Markets Efficiency Index	2.679***	-5.077***	-6.06***	-5.42***	-3.643***	-6.396***	-5.661***	-2.680***	-10.520***	-14.169***	-9.962***
Financial Markets Index	.8889	-2.564***	-3.524***	-3.781***	-1.353*	-3.521***	-4.241***	-2.360***	-8.401	-9.784**	-5.548*

Source: Author's calculation.

\*\*\*significant at 1% level; \*\* significant at 5% level; \* significant at 10% level. Panel 2 includes the sub-sample of the 28 EU countries.

In what regards to the IMF Financial Institutions Index, cointegration is also more evident than in Panel 1 and it increases from the real GDP, the unemployment rate, the deflator, the current account, and it is still stronger with the net international investment position.

The results related to the specific aspects of the financial markets (access, depth, and efficiency) overall confirm the conclusions already obtained for the previous panel. There is no strong cointegration between the Financial Institutions Access Index and the real GDP, but this cointegration increases with the deflator, the unemployment rate, the current account, and is evidently stronger with the net international investment position. Similar conclusions are obtained for the Financial Institutions Depth Index; now the weaker cointegration is with the unemployment rate, and the evidence of cointegration increases with the real GDP, the deflator, the current account, and it is again stronger with the net international investment position. Moreover, and clearly in line with the previous conclusions, the results obtained for the Financial Institutions Efficiency Index show its strong cointegration with all the five indicators of macroeconomic performance, confirming that the efficiency of the banking institutions is much more relevant to the economic performance than the access or the depth of the banking institutions. A more detailed analysis of the results obtained for the indices representing the access, the depth, and the efficiency of the financial markets, overall, confirms the previous conclusions. Now there is no clear evidence of cointegration of the Financial Markets Depth Index with any of the considered macroeconomic performance indicators; but there is strong and very strong evidence of the cointegration of the Financial Markets Access Index and the Financial Markets Efficiency Index with all the five of macroeconomic performance indicators. Overall, the results obtained for Panel 2 are in line with those for Panel 1, providing evidence that in what regards to the cointegration between the different aspects of financial development and the macroeconomic performance there is no significant difference between the behaviour of the EU countries and the other countries included in the sample.

#### **4. Concluding remarks**

This paper contributes to the literature by the confirmation of the existence of long-term (cointegration) relationships between all the nine indices related to financial development that are provided by the IMF and the five indicators that were chosen to measure macroeconomic performance of a sample including 46 countries over the period 1990-2017.

Applying two of the most popular panel cointegration tests the paper provides robust evidence of the existence of cointegration between the overall Financial Development Index, as well as of the Financial Institutions Index and the Financial Markets Index not only with the real GDP but also with the other macroeconomic performance indicators, and in particular with the two indicators related to the international performance (the current account and the net international investment position).

Summarizing, the results obtained clearly demonstrate that more important than the simple access to the financial institutions and markets, meaning the ability of individuals and companies to access financial services, or the depth the financial institutions and markets, more precisely, their size and liquidity, is the efficiency of these financial institutions and markets, that is, the ability of the institutions to provide financial services at low costs and with sustainable revenues and the level of activities of financial markets.

Overall, the results obtained in this paper do not confirm the conclusions of some authors, namely Gaytan and Rancière (2004), Ayadi et al (2013), and Cournède and Denk (2015), in what regards to the differences between the relevance of the financial institutions versus financial markets to economic growth.

The conclusions of this paper are mostly in line with the large strand of literature supporting that financial development is relevant to economic growth, and particularly to those, such as Loayza and Rancière (2006), who focused on the importance of the time horizon, underlying that, in the long-term, the empirical studies on economic growth found a positive relationship

between financial development and the real growth. This paper also supports the statements of Svirydzenka (2016) corroborating that the development and diversity of the financial systems across countries requires multiple indicators to measure financial development. The paper clearly concludes that, in the long-run, the development and specially the efficiency of both the financial institutions and financial markets, are strongly cointegrated not only with the real GDP but also with other relevant indicators of macroeconomic performance, such as the inflation, the unemployment rate, the current account, and the net international investment position.

## References

- Aizenman, J., Jinjara, Y., and Park, D. (2015) *Financial Development and Output Growth in Developing Asia and Latin America: A Comparative Sectoral Analysis*, NBER Working Paper 20917 National Bureau of Economic Research, Cambridge, Massachusetts.
- Ayadi, R., Arbak, E., Ben-Naceur, S., and De Groen, W.P. (2013) *Financial Development, Bank Efficiency and Economic Growth across the Mediterranean*, European Commission European Research Area, WP 6 – Financial services and capital markets; MEDPRO Technical Report No 30.
- Beck, T., Demirgüç-Kunt, A., and Levine, R. (2000) “A new database on financial development and structure”, *World Bank Economic Review*, **14**, pp. 597–605.
- Beck, T., Demirgüç-Kunt, A., and Levine, R. (2004) *Finance, Inequality and Poverty: Cross-Country Evidence*, World Bank Policy Research Working Paper No. 3338.
- Bencivenga, V., Smith, B., and Starr, R. (1995) – “Transaction Costs, Technological Choice and Endogenous Growth”, *Journal of Economic Theory*, **67**, pp. 53-117.
- Bhide, A. (1993) – “The Hidden Costs of Stock Market Liquidity”, *Journal of Financial Economics*, **34**, pp. 1-51.

- Bijlsma, M., Kool, C., and Non, M. (2018) “The effect of financial development on economic growth: a meta-analysis”, *Applied Economics*, **50**, pp. 6128-6148.
- Cecchetti, S., and Kharroubi, E. (2012) *Reassessing the impact of finance on growth*, Bank for International Settlements, Working Paper No. 381.
- Cournède, B., and Denk, O. (2015) *Finance and Economic Growth in OECD and G20 Countries*, OECD Economics Department Working Papers No. 1223.
- Dabla-Norris, E., Guo, S., Haksar, V., Kim, M., Kochhar, K., Wiseman, K. and Zdzienicka, A. (2015) *The New Normal: A Sector-Level Perspective on Growth and Productivity Trends in Advanced Economies*, IMF Staff Discussion Note International Monetary Fund, Washington.
- De Gregorio, J., and Guidotti, P. (1995) “Financial Development and Economic Growth”, *World Development*, **23**, pp. 433–48.
- Demirgüç-Kunt, A., and Levine, R. (1999) *Bank-Based and Market-Based Financial Systems: Cross Country Comparisons*, World Bank Policy Research Working Paper, No 2143.
- Engle, R.F., and Granger, C.W.J. (1987) “Cointegration and error correction: Representation, estimation and testing”, *Econometrica*, **55**, pp. 251–276.
- Gaytan, A., and Rancière, R. (2004) *Wealth, Financial Intermediation and Growth*, Departments of Economics and Business, Universitat Pompeu Fabra, Economics Working Papers No 851.
- Greenwood, J., Wang, C., and Sanchez, J. M. (2010) “Financing development: The role of information costs”, *American Economic Review*, **100**, pp. 1875–1891.
- Greenwood, J., Sanchez, J.M., and Wang, C. (2013) “Quantifying the impact of financial development on economic development”, *Review of Economic Dynamics*, **16**, pp. 194-215.
- Hadri, K. (2000) “Testing for stationarity in heterogenous panel data”, *The Econometrics Journal*, **3**, pp. 148-161.

- Khan, M. S., and Senhadji, A. (2000) *Financial Development and Economic Growth: An Overview*, IMF Working Paper No 209.
- King, R., and Levine, R. (1993-a) "Finance and Growth: Schumpeter Might Be Right", *Quarterly Journal of Economics*, **108**, pp. 717-737.
- King, R., and Levine, R. (1993-b) "Finance, entrepreneurship and growth: theory and evidence", *Journal of Monetary Economics*, **32**, pp. 513-542.
- Laeven, L., and Valencia, F. (2013) "Systemic Banking Crises Database", *IMF Economic Review*, **61**, pp. 225–270.
- Levin, A., Lin, C. F., and Chu, C. S. (2002) "Unit Root Tests in Panel Data: Asymptotic and Finite Sample Properties", *Journal of Econometrics*, **108**, pp. 1-24.
- Levine, R., and Zervos, S. (1998) "Stock markets, banks and economic growth", *American Economic Review*, **88**, pp. 537-558.
- Loayza, N. V., and Rancière, R. (2006) "Financial Development, Financial Fragility, and Growth", *Journal of Money, Credit and Banking*, **38**, pp. 1051-1076.
- Neal, T. (2014) "Panel cointegration analysis with xtpedroni", *Stata Journal*, **14**, pp. 684-692.
- Pedroni, P. (1999) "Critical values for cointegration tests in heterogeneous panels with multiple regressors", *Oxford Bulletin of Economics and Statistics*, **61**, pp. 653–670.
- Pedroni, P. (2004) "Panel cointegration: Asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis", *Econometric Theory*, **20**, pp. 597–625.
- Prochniak, M., and Wasiak, K. (2016) "The impact of the financial system on economic growth in the context of the global crisis: Empirical evidence for the EU and OECD countries", *Empirica*, **44**, pp. 295–337.
- Sahay, R., Cihak, M., N'Diaye, P., Barajas, A., Bi, R., Ayala, D., Gao, Y., Kyobe, A., Nguyen, L., Saborowski, C., Svirydenka, K. and Yousefi, S.R. (2015) *Rethinking Financial*

*Deepening: Stability and Growth in Emerging Markets*, IMF Staff Discussion Note, SDN/15/08.

Schumpeter, J.A. (1911) *The Theory of Economic Development: An inquiry into profits, capital, credit, interest and the business cycle*, Harvard University Press, Cambridge, Massachusetts (1st ed. in English, 1934).

Svirydzhenka, K. (2016) *Introducing a New Broad-based Index of Financial Development*, IMF Working Paper, WP/16/5.

Westerlund, J. (2007) “Testing for Error Correction in Panel Data”, *Oxford Bulletin of Economics and Statistics*, **69**, pp. 709-748.

### Appendix 1 – Construction of the Financial Development Index

	FINANCIAL INSTITUTIONS	FINANCIAL MARKETS
<b>DEPTH</b>	1. Private-sector credit (% of GDP) 2. Pension fund assets (% of GDP) 3. Mutual fund assets (% of GDP) 4. Insurance premiums, life and non-life (% of GDP)	1. Stock market capitalization to GDP 2. Stocks traded to GDP 3. International debt securities government (% of GDP) 4. Total debt securities of nonfinancial corporations (% of GDP) 5. Total debt securities of financial corporations (% of GDP)
<b>ACCESS</b>	1. Branches (commercial banks) per 100,000 adults 2. ATMs per 100,000 adults	1. Percent of market capitalization outside of top 10 largest companies 2. Total number of issuers of debt (domestic and external, nonfinancial corporations, and financial corporations)
<b>EFFICIENCY</b>	1. Net interest margin 2. Lending-deposits spread 3. Non-interest income to total income 4. Overhead costs to total assets 5. Return on assets 6. Return on equity	1. Stock market turnover ratio (stocks traded/capitalization)

Source: Sahay, R., Cihak, M., N'Diaye, P., Barajas, A., Bi, R., Ayala, D., Gao, Y., Kyobe, A., Nguyen, L., Saborowski, C., Svirydzhenka, K. and Yousefi, S.R. (2015) *Rethinking Financial Deepening: Stability and Growth in Emerging Markets*, IMF Staff Discussion Note, SDN/15/08, pp. 34.

## Appendix 2 – Results obtained with panel unit root tests (p-values)

Variables	PANEL 1				PANEL 2			
	Levin Li		Fisher		Levin Li		Fisher	
	levels	Differences	levels	differences	levels	differences	levels	differences
Financial Development Index	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Financial Institutions Access Index	0.5006	0.0000	0.0000	0.0000	0.0593	0.0000	0.0000	0.0000
Financial Institutions Depth Index	0.0039	0.0000	0.0001	0.0000	0.0043	0.0000	0.0007	0.0000
Financial Institutions Efficiency Index	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Financial Institutions Index	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Markets Access Index	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Financial Markets Depth Index	0.0000	0.0000	0.0488	0.0000	0.0002	0.0000	0.1968	0.0000
Financial Markets Efficiency Index	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Financial Markets Index	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Gross Domestic Product	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deflator	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unemployment Rate	0.2330	0.0000	0.3759	0.0000	0.6353	0.0000	0.5464	0.0000
Current account	0.3240	0.0000	0.5488	0.0000	0.9972	0.0000	0.3235	0.0000
Net international investment position	1.0000	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000	0.0000

Source: Author's calculations. Data are sourced from the IMF databases and extracted the 20th July 2020.