Department of
Economics and Finance

Working Paper No. 13-21

Economics and Finance Working Paper Series

Nahla Samargandi, Jan Fidrmuc and Sugata Ghosh

Is the Relationship between Financial Development and Economic Growth Monotonic for Middle Income Countries?

July 2013

http://www.brunel.ac.uk/economics

Is the Relationship between Financial Development and Economic Growth Monotonic for Middle Income Countries?*

Nahla Samargandi†, Jan Fidrmuc‡ and Sugata Ghosh§

Abstract

We revisit the relationship between financial development and economic growth in a panel of 52 middle income countries over the 1980-2008 period, using pooled mean group estimator in a dynamic heterogeneous panel setting. We show that financial development does not have a linear positive long-run impact on economic growth in this sample. When we consider a non-linear relationship between financial development and growth, we find an inverted U-shaped relationship between finance and growth in the long run. In the short-run, the relationship is insignificant. This finding suggests that middle income countries face a threshold point after which financial development no longer contributes to economic growth.

Keywords: Financial development; economic growth; heterogeneous panels; pooled mean group estimation; non-monotonicity.

JEL Codes: C23, O11, O16, O47

* We benefited from helpful commene eece(-.4(ece8.4(but)8.4(es)]TJ0[C23)-10.4(Ke)9.3es)]TJ0[C23 mp)T5a7e01 Tc-,800.4(ece(-e* gD

I. Introduction

Over the last several decades, economists seemed to have reached a general consensus that the link between financial development and economic growth is positive. Recent empirical studies, however, offer contradictory evidence (see Kaminsky and Reinhart, 1999; Deidda and Fattouh, 2002; Wachtel, 2003; Favara, 2003; Rousseau and Wachtel, 2011and Arcand et al., 2011 and Demetriades and Rousseau, 2011). Consequently, the current verdict on the financial development-growth relationship has remained inconclusive. In this paper, we re-examine this relationship in the context of middle-income countries. When doing so, we apply recently developed econometric techniques that allow the relationship to vary between the short and long run, and the short-run relationship to vary across countries.

The original view (see Schumpeter, 1934); Gurley and Shaw, 1955; and Goldsmith, 1969) holds that a well-developed financial system stimulates growth by channelling savings to the most productive investment projects. Conversely, financial repression results in a poorly functioning financial system that in turn depresses growth: this can happen as a result of excessive government interference in the financial system with measures such as interest rate ceilings, higher bank reserve requirements, and direct credit programs to preferential sectors. The recent endogenous growth literature highlights the positive role of the financial sector in driving economic growth, particularly through its role in mobilizing savings, allocating resources to the most productive investments, reducing information,

sectional studies do not take advantage of time-series variation in the data. Finally, the issue of causality cannot be handled formally in cross-sectional studies (Khan and Senhadji, 2003). Moreover, Ahmed (1998) and Ericsson et al. (2001) point out that using instrumental variables does not solve this problem when the data are averaged over long periods. Furthermore, using time-series data does not resolve these problems either: Christopoulos and Tsionas (2004) and Beck (2008) argue that high-frequency data is required to gain econometric power from the time series approach, which limits the analysis to just a few countries for which such data are available.

In order to reduce the shortcomings of both cross-sectional and time series analysis, researchers increasingly turn to panel data that enable them to combine time series and cross-sectional features and offer a variety of estimation approaches (for example Calderon and Liu, 2003; Christopoulos and Tsionas, 2004; Dawson, 2010). However, these studies apply either the traditional fixed or random effect methods, or the panel cointegration technique. The former averages the data per country to isolate trend effects which hides the dynamic relationship between the variables of interests. The latter has the disadvantages that the evidence of long-term relationships can be obtained only when variables are integrated at the same level (Pesaran and Smith, 1995; Pesaran, 1997; and Pesaran and Shin, 1999)[5].

Recently, Loayza and Ranciere (2006) attempt to reconcile the remaining issure h5.1(th)-5.8(e)-58(e)-f(re h)-5d

relationship between financial development and economic growth is statistically insignificant. However in high–income countries, there is a positive link between financial development and economic growth.

Similar results were found by Rioja and Valev (2004), Rousseau and Wachtel (2002) and Favara (2003). More recently, Arcand et al. (2012) utilize different types of datasets at the country level and industry level. They find that the finance and growth relationship is positive only up to a certain point, and after that it turns negative. This negative relationship occurs once financial development, measured as the ratio of private credit by banks to GDP, exceeds a threshold of about 110% of GDP for high-income countries. This result was consistent across different types of estimators, including simple cross-section OLS regression, semi-parametric estimations and system- GMM.

financial development and economic growth in order to investigate the possibility of the economy being adversely affected due to “too much” finance. To achieve this, we include a quadratic term in the

Government consumption expenditure is vital in assessing the importance of fiscal policy in providing the public goods for both individuals and business, especially in education, health care and infrastructure. However, this variable also captures whether government expenditure creates distortions, which in turn lower growth. Finally, we include gross fixed capital formation as a percentage of GDP, denoted by lnca, to capture the investment physical capital. We include also a dummy for upper middle income countries, denoted by dincome.[10]

Measures of financial development

The construction of the variables to capture financial development is a difficult task due to a number of reasons. Financial services are provided by a wide range of financial institutions and agents. Among them, banks and stock markets both play a major role. In order to capture a complete picture, we need to consider different aspects of financial development, for instance, whether the financial sectors of the

the extent of transaction services provided by the financial system rather than the ability of the financial system to channel funds from depositors to investors. Therefore, credit to the private sector as a proportion of GDP is the third most widely used alternative measure of financial development. It is often argued that credit to the private sector is a better proxy of financial development (see Demetriades and Hussein, 1996; King and Levine, 1993a; Beck et al, 2000; Favara, 2003; Liang and Teng, 2006; Arcand et al., 2011). The importance of this measure rests in the fact that it only accounts for credit granted to the private sector that enables the utilization of funds and their allocation to more efficient and productive activities. It also excludes credit issued by the central bank and thus is a more accurate measure of the savings that financial intermediaries channel to the private sector.

Another frequently used variable is the ratio of commercial bank assets divided by the sum of commercial bank and central bank assets (see, Ang and McKibbin, 2007; Campos and Kinoshita, 2008). This variable measures the relative importance of a specific type of financial institutions (commercial banks) in the financial system. Ang and McKibbin (2007) argue that the advantage of this measure is that commercial banks make more efficient use of funds than central banks by channelling savings to profitable investment opportunities.

Based on this review, we construct an aggregate indicator of financial development as a composite variable that represents the overall development in the financial sector. The resulting variable combines three widely used indicators of financial development in the literature: the ratio of liquid liabilities (or M3) to nominal GDP (denoted *m3*), the ratio of commercial bank assets to the sum of commercial bank assets and central bank assets (*basset*) and the ratio of bank credit to the private sector to GDP (*private*). The source of these data is the 2008 version of World Bank's Financial Structure Dataset (Beck et al.,2008).[11] We follow the work of Ang and McKibbin (2007); Gries et al. (2009) and Campos and Kinoshita (2010), among others, to combine these variables into a single indicator by using principal components analysis (PCA). We denote the resulting variable as FD.

Our justifications for the need to construct this single variable are as follows: First, when we include all three financial variables in each regression, in most cases we obtain inconsistent results, which might be because financial development variables are highly correlated amongst themselves.[12] Thus, we use

11

this index to overcome the problems of multicollinearity. Second, studies attempting to investigate the link between financial development and growth have no uniform argument as to which proxies are most appropriate for capturing this linkage: they choose a number of different measures and subsequently come up with different results (see Chuah and Thai, 2004; Khan and Senhadji, 2003; King and Levine, 1993a; Savvides, 1995; among others). We believe that this new index of financial development is able to capture most of the information from the original data and is a better indicator than the individual variables.

Table 1 presentT.8c4R6(h)-2(e)4.6( )-5.2presu(sof h610.1(9)5.7p2(r8)7.2(n1.3(c)8.6(8)7.p(h610.(Ta)4.l9( )-5.c(9

correlated with the error terms (Campos and Kinoshita, 2008). In contrast to the fixed effects model, the random effects model is relatively less problematic in terms of degrees of freedom by assuming common intercepts. Nevertheless, the random effects model has another limitation in that it considers the model to be time invariant. This implies that the error at any period is uncorrelated with the past, present and future, known as strict exogeneity (Arellano, 2003). In real life, this assumption is very often invalid. Additionally, according to Loayza and Ranciere (2006), static panel estimators do not take advantage of the panel dimension of the data by distinguishing between the short and long-run relationships. Furthermore, Holly and Raissi (2009) argue that conventional panel data models assume homogeneity of the coefficients of the lagged dependent variable. This can lead to serious bias when in fact the dynamics are heterogeneous across the cross section units.

To conclude, the static panel approaches are unable to capture the dynamic nature of the data, which is a fundamental issue in the empirical growth literature. In addition, these estimators can only deal with the structural heterogeneity in the form of random or fixed effects, but impose homogeneity in the

whether the estimated panel models represent a structural long–run equilibrium relationship or a spurious one (Christopoulos and Tsionas, 2004). More importantly, Kiviet (1995) argues that in GMM estimation the imposition of homogeneity assumptions on the slope coefficients of lagged dependent variables could lead to serious biases.[14]

different order of integration irrespective of whether the variables under study are I (0) or I (1). In addition, both the short-run and long-run effects can be estimated simultaneously from a data set with large cross-section and time dimensions. Finally, the ARDL model, especially PMG and MG, provides consistent coefficients despite the possible presence of endogeneity because it includes lags of dependent and independent variables (Pesaran et al, 1999). For further understanding of the key features of the three different estimators in the dynamic panel formwork, we present the assumptions relating to each estimator.

Pooled Mean Group (PMG) model

The main characteristic of PMG is that it allows short-run coefficients, including the intercepts, the speed of adjustment to the long-run equilibrium values, and error (e)4.519nhedr9.1(a)e witedrf8G witng the coefficients are resricted to be homogeneous across countries. This is p(edrf8a)6(rticu)-4.7(l)-.6(arly-5.1(edu)-4.7(s)-2.4(ef)8.3(ul)-5.7(-4f)-4.7(e)6(n)-4.7(tf)-4.7(ere

condition for the consistency and validity of this approach is to have a sufficiently large time-series dimension of the data. The cross-country dimension should also be large (to include about 20 to 30 countries). Additionally, for small N the average estimators (MG) in this approach are quite sensitive to outliers and small model permutations (see Favara, 2003).

Dynamic Fixed Effects (DFE) model

Finally, the dynamic fixed effects estimator (DFE) is very similar to the PMG estimator and imposes restrictions on the slope coefficient and error variances to be equal across all countries in the long run. The DFE model further restricts the speed of adjustment coefficient and the short-run coefficient to be equal too. However, the model features country-specific intercepts. DFE has cluster option to estimate intra-group correlation with the standard error (Blackburne and Frank, 2007). Nevertheless, Baltagi, Gri, and Xiong (2000) point out that this model is subject to a simultaneous equation bias due to the endogeneity between the error term and the lagged dependent variable in case of small sample size.

Model Selection

We estimate equation (1) for the whole sample with PMG, MG and DFE and then apply the Hausman test to see whether there are significant differences among these three estimators. After that, we include dummy variables that should capture if there is a differential impact of financial development upon economic growth according to the income level (upper and lower-middle income). The first dataset consists 23 Upper Middle Income countries and the second dataset includes 29 Lower Middle Income with same variables used in our baseline specification.[17]

As we consider a sample of middle-income countries, we expect this group of countries to be homogenous with respect to economic growth and financial development. However,

significant difference between PMG and MG or PMG and DFE and the null is rejected. If there are outliers the average estimator may have a large variance and in that case the Hausman test would have

Results of PMG, MG and DFE

In order to identify the impact of the variables of interest, error correction based on autoregressive distributed lag ARDL (p,q) model has been used, with focus on the exclusive feature of PMG model over the other error-correction based estimations,

Hausman test for the three samples; MIC and the sub–samples, UMIC and LMIC, suggest that the regressors have homogeneous long run and heterogeneous short run effects on growth.

Our findings contradict the common assumption that financial development plays an essential role in promoting economic growth. What is more, they are also different from the findings of Loyaza and Rancier (2006) who found a positive homogenous association between financial intermediation and economic growth in the long–run, and a heterogeneous negative impact in the short-run using the same methodology. Nevertheless, our findings are in line with Ang and McKibbin (2007), who find that the return from financial development depends on the mobilization of savings and allocation of funds to productive investment projects. Due to frictions in the market in the form of high transaction costs and improper allocation of resources, the interaction between savings and investment and its link with economic growth is not strong in developing countries.

Our findings of an adverse effect of financial development on economic growth in UMIC are consistent

shown in Tables 6, 7 and 8. Interestingly, Table 6 reveals that FD has a positive and significant coefficient, while FD^2 has a negative and significant coefficient under PMG estimation in the whole sample (MIC). Hausman test results confirm that PMG is a better estimator than MG and DFE. This result supports the hypothesis of “Too Much Finance” presented by Arcand et al. (2011). It confirms that the marginal effect of financial development is positive up to a certain threshold point, but the marginal impact of FD is significantly negative after the threshold. In the case of upper middle income countries in particular, the size of the financial sector may be too large with respect to the socially optimal level. Hence, increasing FD can have a negative marginal effect on GDP growth. Note that these findings are almost the same for the whole sample, UMIC and LMIC.

Sufficient Condition for a Quadratic Relationship:

Lind and Mehlum (2010) point out that the conventional econometric model is not suitable for testing the composite null hypothesis that at the left side of the interval the relationship is decreasing, and at right side of the interval the relationship is increasing, or vice-versa. Moreover, Arcand et al. (2011) argue that if the model does not allow non-monotonocity, it may lead to a downward bias in the estimating effect of financial development on economic growth. Therefore, to confirm our finding of an inverted U shaped relationship, we conduct the U test of Lind and Mehlum (2010). To accomplish this, we estimate the following model:

ὝΏὴὝ꜀ عي ὤ ὈΌ شر ὤ̃ ὈΌ꜀ شر ὤ꜀ ὅ شر -꜀,

And then test the joint hypothesis:

Ὀ꜀ : ὤ شر ὤ̃2ὈΌ꜀ شي 0 ‘ ὤ شر ὤ̃2ὈΌ꜀ شي 0

against the alternative hypothesis:

Ὀ꜀ : ὤ شر ὤ̃2ὈΌ꜀ سي 0 ‘ ὤ شر ὤ̃2ὈΌ꜀ سي 0

Here FD_{min} and FDaAndὈ'ê0r€

indicates that inverted U shape exits in the lower middle-income countries as the lower bound of FD is

Tables

Table 1: Principal component analysis for financial depth index[23]:

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1				

Table 3: All the Middle Income Countries

	Pooled Mean Group		**Mean Group**		**Hausman Test**		**Dynamic Fixed Effect**	
Variable	Coef.	Std. Error	Coef.	Std. Error	h-test	p-value	Coef.	Std. Error
Long-Run Coefficients								
Trade	2.799***	-0.436	6.063***	-2.209			4.098***	-0.673
Fixed Capital	0.0605	-0.474	0.0306	-1.271			0.454	-0.741
Government Expenditure	-2.151***	-0.482	-6.17***	-2.198			-2.861***	-0.704
Population Growth	-0.111	-0.182	0.188	-1.332			0.624**	-0.283
Financial Development	-0.145	-0.115	0.0122	-0.635			-0.498***	-0.186
			Hausman Test[24]		3.92	0.560		
			Hausman Test[25]		4.18	0.523		
Error correction Coefficient	-0.891***	-0.0433	-1.128***	0.0392			-0.794***	-0.025
Δ Trade	-1.61	-1.693	0.647	-2.075			-0.794	-0.966
Δ Fixed Capital	11.59***	-1.516	9.906***	-1.567			8.077***	-0.797
Δ Government Expenditure	-10.97***	-1.963	-11.67***	-2.238			-4.801***	-1.04
Δ Population Growth	4.144	-4.881	12.87*	-7.289			-0.239	-0.297
Δ Financial Development	-0.847	-0.542	-1.474**	-0.647			-1.032***	-0.363
Intercept	-1.766***	-0.296	-2.229	-11.26			-6.736**	-3.04
Country	52		52				52	
Observation	1,454		1,454				1,454	

N 0 o c c c

Table 4: Upper Middle Income

	Pooled Mean Group		Mean Group		Hausman Test		Dynamic Fixed Effect	
Variable	Coef.	Std. Error	Coef.	Std. Error	h-test	p-value	Coef.	Std. Error
Long-Run Coefficients								
Trade	2.481***	-0.715	5.081**	-2.124			3.883***	-0.987
Fixed Capital	-1.474**	-0.747	-1.679	-2.09			-1.016	-1.11
Government Expen.	-3.326***	-0.709	-11.10***	-3.594			-2.841***	-0.969
Population Growth	-0.352*	-0.293	-0.488	-2.06			0.347	-0.43
Financial Development	-0.327**	-0.163	-0.0471	-0.477			-0.72***	-0.255
			Hausman Test[26]		5.25	0.386		
			Hausman Test[27]		2.03	0.844		
Error correction Coefficient	-0.938***	-0.0626	-1.171***	-0.058			-0.85***	-0.0368
Δ Trade	-0.773	-2.805	1.379	-3.065			-1.083	-1.463
Δ Fixed Capital	15.00***	-2.297	13.65***	-2.698			10.52***	-1.159
Δ Government Expenditure	-11.12***	-2.376	-14.27***	-2.654			-4.64***	-1.546
Δ Population Growth	7.873	-12.88	12.3	-14.26			-0.438	-0.521
Δ Financial Development	-1.602*	-0.945	-2.081*	-1.114			-1.50***	-0.566
Intercept	7.092***	-0.707	16.64	-17.85			-2.069	-4.723
Country	23		23				23	
Observation	644		644		644		644	

Note: *, **, and *** indicate significance at 10 %, ** at 5 % and *** at 1 %. Estimations are done by using (xtpmg) routine in Stata. Pooled mean group, mean group, and dynamic fixed effects, all controlling for country and time effects. While the first panel (LR)

Table 5: Lower Middle Income

	Pooled Mean Group		Mean Group		Hausman Test		Dynamic Fixed Effect	
Variable	Coef.	Std. Error	Coef.	Std. Error	h-test	p-value	Coef.	Std. Error
Long-Run Coefficients								
Trade	2.924***	-0.545	6.842*	-3.617			3.729***	-0.926
Fixed Capital	1.265**	-0.605	1.386	-1.552			1.840*	-0.993
Government Expen.	-1.892***	-0.67	-2.258	-2.548			-3.32***	-1.032
Population Growth	0.128	-0.247	0.724	-1.767			0.905**	-0.382
Financial Development	0.0995	-0.168	0.0592	-1.085			-0.164	-0.278
			Hausman Test					

Table 6 for All Middle Income Country

Model: GDPG =f (Trade, Fixed Capital, Government, Population Growth, Financial Development, Financial development Square)

	Pooled Mean Group		Mean Group		Hausman Test		Dynamic Fixed Effect	
Variable	Coef.	Std. Error	Coef.	Std. Error	h-test	p-value	Coef.	Std. Error
Long-Run Coefficients								
Trade	2.923***	-0.46	5.528**	-2.468			3.954***	-0.669

Table 7 for All Upper Middle Income Country

Model: GDPG =f (Trade, Fixed Capital, Government, Population, Financial Development, Financial development Square)

	Pooled Mean Group		Mean Group		Hausman Test		Dynamic Fixed Effect	
Variable	Coef.	Std. Error	Coef.	Std. Error	h-test	p-value	Coef.	Std. Error
Long-Run Coefficients								
Trade	2.550***	-0.715	4.637**	-2.296			3.878***	-0.983
Fixed Capital	-1.505**	-0.744	-0					

Table 8: for All Lower Middle Income Country

Model: GDPG =f (Trade, Fixed Capital, Government, Population, Financial Development, Financial development Square)

	Pooled Mean Group		Mean Group		Hausman Test		Dynamic Fixed Effect	
Variable	Coef.	Std. Error	Coef.	Std. Error	h-test	p-value	Coef.	Std. Error
Long-Run Coefficients								
Trade	3.471***	-0.602	6.235	-4.071			3.529***	-0.922

Table 9: U-Test:

The table reports the results of the Sasabuchi-Lind-Mehlum test for inverse U-shaped relationship. There model have been consider i) Whole Middle Income Country (MIC) ii) Upper Middle Income Country (UMIC) and iii) Lower Middle Income Country (LMIC)

	MIC	UMIC	LMIC
Slope at FD_{min}	0.74***	0.82**	0.92***
	(2.36)	(0.07)	(2.34)
Slope at FD_{Max}	-1.04***	-0.87*	-1.21***
	(-2.49)	(-1.32)	(-2.13)
SLM test for inverse U shape	2.36	1.96	2.14

-

Christopoulos, D.K. and Tsionas, E.G. (2004). Financial Development and Economic Growth: Evidence from Panel Unit Root and Cointegration Tests. *Journal of Development Economics,* **73**(1),55-74.

Chuah. H. L., and Thai.V. (2004). Financial Development and Economic Growth: Evidence from Causality Tests for the GCC countries. *IMF Working Paper, WP/04/XX (Fall).*

Dawson, P.J. (2010). Financial Development and Economic Growth: A Panel Approach. *Applied Economics Letters*, **17**(8), 741-745.

Deidda, L. and Fattouh, B. (2002). Non-linearity between finance and growth. *Economics Letters,* **74**(3), 339-345.

Demetriades, P. and P. L. Rousseau (2011) "The changing face of financial development", paper presented at the MMF Conference, University of Birmingham.

Demetriades, P. and S. H. Law (2006). "Finance, Institutions and Economic Growth". *International Journal of Finance and Economics,* 11(3), 245-260.

Demetriades, P.O. and Hussein, K.A. (1996). Does Financial Development Cause Economic Growth? Time-Series Evidence from 16 Countries. *Journal of Development Economics,* 51(2), 387-412.

Easterly, W. and Levine, R., 2001. What have we learned from a decade of empirical research on growth? It's Not Factor Accumulation: Stylized Facts and Growth Models. *World Bank Economic Review,* **15**(2), pp. 177-219.

Eberhardt, M., and Teal, F. (2010). Econometrics for Grumblers: A New Look At Cross-Country Growth Empirics, Journal Of Economic Surveys, Forthcoming.

Eberhardt, M. (2012). Estimating panel time-series models with heterogeneous slopes. *Stata Journal, 12,* 1, 61-71.

Ericsson, N. R., Irons, J. S., and Tryon, R. W. (2001).Output and inflation in the long run. *Journal of Applied Econometrics, 16,* 3, 241-253.

Favara, G. (2003). An Empirical Reassess4JNmi6(f)11.6((c)92(pih4(i)7e9.4(l Rel)4.3(at9.2(pio.4(i)7s3(es.)7.7(p)-

Holly, S. and Raissi, M. (2009). The Macroeconomic Effects of European Financial Development: A Heterogeneous Panel Analysis. Working Paper D.1.4

Im, K.S., Pesaran, M.H. and Shin, Y. (1995). Testing for unit roots in heterogeneous panels.WP, Department of Applied Economics, University of Cambridge.

Johansen, S. (1995).Likelihood-Based Inference in Cointegrated Vector Autoregressive Models.*Oxford; New York: Oxford University Press.*

Kaminsky, G.L., and Reinhart, C.M. (1999). The twin crises: the causes of banking and balance-of-payments problems. *The American Economic Review (Evanston),* **89**(03), 473-500. .

Khan, M.S., and Senhadji, A.S. (2003). Financial Development and Economic Growth: A Review and New Evidence. *Journal of African Economies,* 12(2), 89-110.

King, R.G. And Levine, R.(1993a). Finance and Growth: Schumpeter Might be Right. *The Quarterly Journal of Economics,* 108(3), 717-737.

King, R.G. and Levine, R. (1993b). Finance, Entrepreneurship, and Growth: Theory and Evidence. *Journal of Monetary Economics,* 32(3), 513.

Kar, M., S. Nazlioglu and H. Agir (2011), "Financial development and economic growth nexus in the MENA countries: Bootstrap panel granger causality analysis", *Economic* Modelling, Vol. 28, Nos. 1-2, pp. 685-693.

Kiviet, J. 1995. On bias, inconsistency, and efficien" ef, incofbia,in(of)6.3dnc a,fl(of)6.3dnc,,ofls..3(s)1lysis",

Pesaran, H. 1997, "The Role of Econometric Theory in Modelling the Long Run", *Economic Journal,* vol. 107, no. 440, pp. 178-191.

Pesaran, M.H., Shin, Y. and Smith, R.P., (19

APPENDIX (not for publication)

Appendix 1:

Sample of Countries	
Upper Middle Income (23)	**Lower Middle Income (29)**
Algeria	Belize
Argentina	Bolivia
Brazil	Cameroon
Chile	Cape Verde
Colombia	Congo, Rep.
Costa Rica	Cote d'Ivoire
Dominica	Ecuador
Dominican Republic	Egypt, Arab Rep.
Fiji	El Salvador
Gabon	Guatemala
Grenada	Guyana
Iran, Islamic Rep.	Honduras
Jamaica	India
Malaysia	Indonesia
Mauritius	Jordan
Mexico	Sri Lanka
Panama	Syrian Arab Republic
Seychelles	Swaziland
South Africa	Papua New Guinea
Suriname	Paraguay
Turkey	Peru
Uruguay	Philippines
Venezuela, RB	Senegal
	Thailand
	Tonga
	Tunisia
	Vanuatu
	Morocco
	Pakistan

Appendix 2: Descriptive Statistics: The summary statistics about the variables used in the econometric analysis for the 52 middle income countries during the period 1980-2008 and extract from the World Bank

Variable	Obs	Mean	Std. Dev	Min	Max
GDP Growth Rate	1506	3.539446	4.432292	-17.146	23.5977
GDP per Capita Growth Rate	1508	1.643451	4.413579	-19.6798	19.8214
M3/GDP	1441	0.4626401	0.2609722	.0450278	1.323384
Private/GDP	1482	0.3192095	0.2164487	.01737	1.65962
Bank Asset/GDP	1467	0.7867373	0.1892425	.045232	1.26446
FD	1508	0.0022351	1.343541	-3.23216	6.07906
Government Expenditure/GDP	1486	14.81404	5.713606	2.975538	38.83615
Gross Fixed Capital/GDP	1459	22.13563	6.555832	6.510486	59.7324
Trade/GDP	1483	78.34604	42.3759	11.54567	283.4363
Population	1508	4.18e+07	1.29e+08	64400	1.10e+09

Appendix 3: Definitions of the variables and sources

VARIABLES	label	DEFINITIONS	source

Appendix 4: Correlation Matrix between financial development variables

	Private/GDP	Basset/GDP	M3/GDP
Private/GDP	1		
Basset/GDP	0.8630	1	
M3/GDP	0.6841	0.4721	1

Appendix 5

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Unexplained
M3	0.6079	-0.4864	0.6276	0
Private	0.6739	-0.1019	-0.7317	0
Bank Asset	0.4198	0.8678	0.2659	0

Figure 1

Appendix 6: Middle Income Countries (Full- sample) (**m3/gdp** as a measure financial development)

	PMG		MG		DFE	
GDP Growth	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run
Ec		-0.893***		-1.106***		-0.797***
		(0.0411)		(0.0423)		(0.0245)
Δ Trade		-0.751		1.224		-1.054
		(1.581)		(2.205)		(0.959)
Δ Fixed Capital		11.75***		9.758***		8.354***
		(1.506)		(1.603)		(0.790)
Δ Government Expenditure		-10.61***		-9.779***		-3.950***
		(2.046)		(2.375)		(1.045)
Δ Population Growth		5.546		7.858		-0.169
		(6.496)		(6.127)		(0.294)
Δ M3		-13.47***		-19.29***		-14.60***
		(4.867)		(5.740)		(2.151)
Hausman Test[36]					3.24(0.66)	
Hausman Test[37]					1.87(0.86)	
Trade	3.290***		10.92		3.908***	
	(0.421)		(7.594)		(0.669)	
Fixed Capital	0.601		1.708		0.544	
	(0.470)		(2.025)		(0.727)	
Government Expenditure	-1.845***		-2.827		-2.449***	
	(0.469)		(4.180)		(0.702)	
Population Growth	0.0789		0.423		0.565**	
	(0.175)		(2.482)		(0.279)	
M3	-1.510**		5.241		-2.881***	
	(0.708)		(11.95)		(1.026)	
Constant		-5.433***		-0.701		-6.026**
		(0.393)		(14.85)		(2.942)
Observations	1,447	1,447	1,447	1,447	1,447	1,447

Note:*, **, and *** indicate significance at 10 %, ** at 5 % and *** at 1 %. Estimations are done by using (xtpmg) routine in Stata. Pooled mean group, mean group, and dynamic fixed effects, all controlling for country and time effects.While the first panel (LR) shows long-run effects. The second panel reports both short-run effects (SR) and the speed of adjustment (ec).Hausman test is indicating that PMG is consistent and efficient estimation than MG and DFE estimation. The lag structure is ARDL (1, 1, 1, 1, 1, 1) and the order of variables is: GDP Growth, Trade, Fixed Capital, Government Expenditure, Population Growth and, M3. All the middle income countries, annual data 1980–2008. Source: Authors' estimations

[36] PMG is efficient estimation than MG under null Hypothesis

[37] PMG is efficient estimation than DFE under null Hypothesis

Appendix 7: Upper Middle Income Countries(**m3/gdp** as a measure financial development)

	PMG		MG		DFE	
GDP Growth	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run
Ec		-0.960***		-1.184***		-0.853***
		(0.0543)		(0.0523)		(0.0361)
Δ Trade		-0.248		-1.207		-1.749
		(2.509)		(2.702)		(1.466)
Δ						

Appendix 8: Lower Middle Income Countries (**m3/gdp** as a measure financial development)

	PMG		MG		DFE	
GDP Growth	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run
		-0.834***		-1.045***		-0.746***
Ec		(0.0543)		(0.0619)		(0.0330)
		-1.484		3.152		-0.128
Δ Trade		(2.015)		(3.321)		(1.280)
		8.830***		6.747***		5.328***
Δ Fixed Capital		(1.848)		(1.862)		(1.119)
		-9.918***		-7.502**		-3.842***
Δ Government Expenditure		(3.387)		(3.781)		(1.394)
		1.569		7.620		-0.138
Δ Population Growth		(4.200)		(5.809)		(0.353)
		-17.06***		-24.44***		-15.17***
Δ M3		(6.126)		(8.274)		(3.056)
		-0.834***		-1.045***		-0.746***
Hausman Test[40]					1.99(0.85)	
Hausman Test[41]					1.95(0.85)	
Trade	3.728***		18.58		3.647***	
	(0.542)		(13.40)		(0.929)	
Fixed Capital	1.872***		3.474		2.110**	
	(0.599)		(3.301)		(0.976)	
Government Expenditure	-1.695***		1.779		-2.850***	
	(0.644)		(6.991)		(1.023)	
Population Growth	0.266		2.388		0.799**	
	(0.235)		(4.150)		(0.373)	
M3	-0.0841		13.81		-1.795	
	(1.229)		(21.25)		(1.774)	
Constant		-11.03***		-22.96		-8.374**
		(0.770)		(21.25)		(3.783)
Observations	808	808	808	808	808	808

Note:*, **, and *** indicate significance at 10 %, ** at 5 % and *** at 1 %. Estimations are done by using (xtpmg) routine in Stata. Pooled mean group, mean group, and dynamic fixed effects, all controlling for country and time effects while the

Appendix 9: Middle Income Countries (

Appendix 10: Upper Middle Income Countries (**private/gdp** as a measure financial development)

	PMG		MG		DFE	
GDP Growth	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run
Ec		-0.958***		-1.207***		-0.861***
		(0.0661)		(0.0470)		(0.0368)
Δ Trade		-0.0693		1.970		-1.100
		(2.726)		(2.866)		(1.448)
Δ Fixed Capital		14.61***		13.86***		10.33***
		(2.260)		(2.898)		(1.146)
Δ Government Expenditure		-8.698***		-10.99***		-4.746***
		(2.443)		(2.812)		(1.538)
Δ Population Growth		8.959		6.138		-0.429
		(14.79)		(12.05)		(0.519)
Δ PRIVATE		-16.16**		-18.98**		-8.269***
		(7.351)		(9.026)		(2.591)
Hausman Test[44]					7.80(0.16)	
Hausman Test[45]					2.13(0.83)	
Trade	2.142***		5.258**		3.815***	
	(0.674)		(2.445)		(0.962)	
Fixed Capital	-1.174		-0.157		-0.856	
	(0.745)		(1.859)		(1.094)	
Government Expenditure	-3.182***		-8.175***		-2.777***	
	(0.697)		(3.073)		(0.968)	
Population Growth	-0.446		-1.325		0.351	
	(0.306)		(2.170)		(0.423)	
PRIVATE	-4.182***		-8.886**		-5.267***	
	(0.913)		(3.773)		(1.413)	
Constant		9.030***		8.655		-0.976
		(0.924)		(20.65)		(4.699)
Observations	640	640	640	640	640	640

Note:*, **, and *** indicate significance at 10 %, ** at 5 % and *** at 1 %. Estimations are done by using (xtpmg) routine in Stata. Pooled mean group, mean group, and dynamic fixed effects, all controlling for country and time effects while the first panel (LR) shows long-run effects. The second panel reports both short-run effects (SR) and the speed of adjustment (ec).Hausman test is indicating that PMG is consistent and efficient estimation than MG and DFE estimation. The lag structure is ARDL (1, 1, 1, 1, 1, 1) and the order of variables is: GDP Growth, Trade, Fixed Capital, Government Expenditure, Population Growth and, private. All the upper middle income countries, annual data 1980–2008. Source: Authors' estimations

[44] PMG is efficient estimation than MG under null Hypothesis

[45] PMG is efficient estimation than DFE under null Hypothesis

Appendix 11: Lower Middle Income Countries (

Appendix 12: Middle Income Countries (**Bank Asset /gdp** as a measure financial development)

	PMG		MG		DFE	
GDP Growth	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run
Ec		-0.904***		-1.144***		-0.809***
		(0.0417)		(0.0376)		(0.0248)
Δ Trade		-1.226		-0.324		-1.027
		(1.538)		(1.887)		(0.961)
Δ Fixed Capital		11.04***		10.80***		7.589***
		(1.527)		(1.810)		(0.804)
Δ Government Expenditure		-11.52***		-13.01***		-5.095***
		(1.906)		(2.208)		(1.042)
Δ Population Growth		5.700		9.342		-0.166
		(6.341)		(8.776)		(0.299)
Δ Bank Asset		11.35**		9.161*		6.452***
		(5.166)		(5.391)		(1.793)
Hausman Test[48]					4.81(0.43)	
Hausman Test[49]					2.87(0.71)	
Trade	2.517***		4.285**		3.655***	
	(0.409)		(2.002)		(0.651)	
Fixed Capital	-0.396		-0.261		-0.0767	
	(0.479)		(1.295)		(0.740)	
Government Expenditure	-1.931***		-6.127***		-2.739***	
	(0.486)		(2.366)		(0.704)	
Population Growth	0.0611		-1.244		0.777***	
	(0.183)		(1.625)		(0.282)	
Bank Asset	1.872**		9.727*		1.526	

Appendix 13: Upper Middle Income Countries (**Bank Asset /gdp** as a measure financial development)

	PMG		MG		DFE	
GDP Growth	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run
Ec		-0.959***		-1.199***		-0.862***
		(0.0580)		(0.0576)		(0.0365)
Δ Trade		-0.105		-0.531		-0.976
		(2.402)		(2.934)		(1.455)
Δ Fixed Capital		14.69***		15.02***		9.569***
		(2.355)		(2.923)		(1.173)
Δ Government Expenditure		-12.43***		-17.18***		-4.730***
		(2.535)		(2.760)		(1.558)
Δ Population Growth		10.83		8.832		-0.298
		(15.19)		(16.30)		(0.525)
Δ Bank Asset		3.412		-3.287		7.345***
		(5.217)		(6.586)		(2.487)
Hausman Test[50]					7.16(0.20)	
Hausman Test[51]					0.91(0.96)	
Trade	2.591***		2.526		3.807***	
	(0.689)		(1.952)		(0.971)	
Fixed Capital	-2.318***	*7w.640016 Tc0 Tw[ ) 0dvtl 5(7w.6M)5.4( )-374				

Appendix 14: Lower Middle Income Countries (**Bank Asset /gdp** as a measure financial development)

	PMG		MG		DFE	
GDP Growth	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run
Ec		-0.860***		-1.100***		-0.764***
		(0.0574)		(0.0488)		(0.0336)
Δ Trade		-2.542		-0.160		-0.594
		(2.001)		(2.504)		(1.285)
Δ Fixed Capital		8.100***		7.453***		4.696***
		(1.772)		(2.115)		(1.132)
Δ Government Expenditure		-10.35***		-9.696***		-5.376***
		(2.886)		(3.208)		(1.386)
Δ Population Growth		2.696		9.746		-0.155
		(3.511)		(9.276)		(0.359)
Δ Bank Asset		16.96**		19.03**		3.886
		(7.876)		(7.747)		(2.623)
Hausman Test[52]					3.97(0.55)	
Hausman Test[53]					3.45(0.63)	
Trade	2.034***		5.681*		3.263***	
	(0.522)		(3.250)		(0.878)	
Fixed Capital	1.244**		0.191		1.346	
	(0.612)		(1.513)		(0.981)	
Government Expenditure	-1.860***		-0.695		-3.710***	
	(0.662)		(3.053)		(1.006)	
Population Growth	0.0569		-1.752		1.089***	
	(0.237)		(2.431)		(0.374)	
Bank Asset	1.999*		17.80**		2.932**	
	(1.020)		(7.054)		(1.459)	
Constant		-4.432***		-26.14**		-6.766*
		(0.367)		(11.69)		(3.753)
Observations	808	808	808	808	808	808

Note:*, **, and *** indicate significance at 10 %, ** at 5 % and *** at 1 %. Estimations are done by using (xtpmg) routine in Stata. Pooled mean group, mean group, and dynamic fixed effects, all controlling for country and time effects while the

Appendix 15: All middle income courtiers after **removing outlier**

	PMG		MG		DFE	
VARIABLES	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run
Error Correction		-0.881***		-1.128***		-0.806***
		(0.0453)		(0.0415)		(0.0266)
Δ Trade		-2.069		0.585		-0.422
		(1.706)		(2.142)		(1.041)
Δ Fixed Capital		11.21***		9.407***		8.122***
		(1.652)		(1.729)		(0.837)
Δ Government Expenditure		-11.21***		-11.92***		-5.423***
		(2.149)		(2.471)		(1.092)
Δ Population Growth		5.855		12.84		-0.237
		(5.573)		(8.191)		(0.312)
Δ FD		-0.544		-1.107*		-0.976**
		(0.557)		(0.606)		(0.379)
Hausman Test[54]					3.26(0.659)	
Hausman Test[55]						

Appendix 16: All upper middle income courtiers after **removing outlier**

	PMG		MG		DFE	
VARIABLES	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run
Error Correction		-0.954***		-1.184***		-0.868***
		(0.0657)		(0.0619)		(0.0386)
Δ Trade		-1.551		0.922		-1.081
		(2.959)		(3.268)		(1.558)
Δ Fixed Capital		15.58***		14.23***		10.93***
		(2.429)		(2.923)		(1.227)
Δ Government Expenditure		-11.62***		-14.61***		-5.367***
		(2.261)		(2.702)		(1.612)
Δ Population Growth		7.486		11.21		-0.643
		(14.53)		(15.55)		(0.574)
Δ FD		-1.309		-1.758*		-1.360**
		(1.001)		(1.020)		(0.583)
Hausman Test[56]					4.20(0.520)	
Hausman Test[57]					1.55(0.907)	
Trade	2.861***		5.156**		3.997***	
	(0.752)		(2.104)		(1.021)	
Fixed Capital	-1.646**		-1.962		-0.857	
	(0.767)		(2.277)		(1.141)	
Government Expenditure	-3.573***		-11.03***		-3.017***	
	(0.738)		(3.942)		(1.009)	
Population Growth	-0.331		-0.292		0.282	
	(0.296)		(2.219)		(0.442)	
FD	-0.311*		0.0418		-0.607**	
	(0.167)		(0.514)		(0.264)	
Constant		6.871***		15.28		-2.411
		(0.768)		(18.86)		(4.877)
No Countries	21		21		21	
Observations	588		588		588	

[56] PMG is efficient estimation than MG under null Hypothesis

[57] PMG is efficient estimation than DFE under null Hypothesis

Appendix 17: All lower middle income courtiers after **removing outlier**

	PMG		MG		DFE	
VARIABLES	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run
Error Correction		-0.819***		-1.081***		-0.752***
		(0.0587)		(0.0553)		(0.0363)
Δ Trade		-2.424		0.303		0.419
		(1.976)		(2.889)		(1.398)
Δ Fixed Capital		7.040***		5.357***		4.655***
		(1.810)		(1.685)		(1.170)
Δ Government Expenditure		-11.05***		-9.653**		-5.651***
		(3.822)		(3.936)		(1.466)
Δ Population Growth		5.813*		14.21*		-0.151
		(3.018)		(7.872)		(0.365)
Δ FD		0.0628		-0.561		-0.720
		(0.585)		(0.715)		(0.493)
Hausman Test[58]					0.63(0.986)	
Hausman Test[59]					1.95(0.855)	
Trade	3.666***		7.617*		4.375***	
	(0.638)		(4.027)		(0.994)	
Fixed Capital	0.803		0.256		1.913*	
	(0.672)		(1.580)		(1.040)	
Government Expenditure	-2.304***		-1.627		-3.824***	
	(0.721)		(2.873)		(1.087)	
Population Growth	0.500*		0.700		1.007**	
	(0.290)		(2.044)		(0.398)	
FD	0.197		0.549		-0.0434	
	(0.188)		(1.192)		(0.293)	
Constant		-7.218***		-17.93		-9.676**
		(0.537)		(15.65)		(4.301)
No Courtiers	26		26		26	
Observations	698		698		698	

[58] PMG is efficient estimation than MG under null Hypothesis

[59] PMG is efficient estimation than DFE under null Hypothesis

Appendix 18: All middle income courtiers after **removing outlier** (Non- liner estimation).

	PMG		MG		DFE	
VARIABLES	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run

Appendix 19: All upper middle income courtiers after **removing outlier**, (Non- liner estimation).

	PMG		MG		DFE	
VARIABLES	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run
Error Correction		-0.956***		-1.229***		-0.870***
		(0.0714)		(0.0603)		(0.0386)
Δ Trade		-1.896		1.402		-1.010
		(2.931)		(3.458)		(1.553)
Δ Fixed Capital		15.48***		13.34***		10.55***
		(2.500)		(2.770)		(1.233)
Δ						

Appendix 21: List of Countries with Outliner and Leverage Observation

Outlier and leverage Countries with unusual Observation	Minimum 10 %/ Maximum 10%
Tonga	Mini
Vanuatu	Mini
Dominica	Mini
India	Maxi
Indonesia	Maxi

Figure 2: the effect of FD on economic growth obtain from table 3

Figure 3: the effect of FD on economic growth obtain from table 4

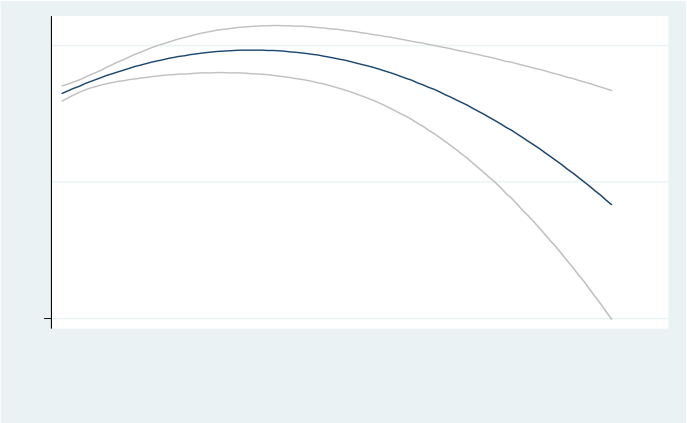

Figure 4: the effect of FD on economic growth obtain from table 5

Figure 5: the effect of FD on economic growth obtain from table 6

Figure 6: the effect of FD on economic growth obtain from table 7

Figure 7: the effect of FD on economic growth obtain from table 8