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Financial Development and Economic Growth: The Role of Financial Liberalization

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Abstract

This paper argues that excessive liberalisation causes financial development to lose its effectiveness in generating economic growth. We investigate the hypothesis through a dynamic panel analysis for 88 countries for the period of 1973 - 2005 using a comprehensive financial development indicator constructed through principal component analysis of five different indicators used in the literature. For financial liberalisation, we use an aggregate index and its seven disaggregated components. The results indicate that the positive effect of financial development on long-run growth continues to decline as the financial sector becomes more liberalised. Our results are robust to changes in the financial development indicators and the disaggregation of the financial liberalisation index.

JEL Classification E44,G28,O16, O11

Keywords Financial Sector Liberalisation; Financial Development; Economic Growth

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1 Introduction

Until recent financial crisis, the dominant view in the finance-growth literature was that more financial development results in higher levels of economic growth, mainly through its impact on productivity growth (King and Levine (1993a), King and Levine (1993b), Levine (1997), Beck, Levine and Loayza (2000); Benhabib and Spiegel (2000); Aghion et al. (2005); Ang (2008)). Further, it was largely accepted that high levels of financial development reflect sound policies and institutions. However, recent evidence suggests that countries that have the most advanced financial sector are at the heart of the financial crisis. They may have financial systems that are “too large” and these exist not because of good policies and institutions, but rather because of poor regulatory systems (Rousseau and Wachtel (2011); Arcand et al. (2012)). Moreover, the post-crisis literature discussing the reasons of the meltdown of the financial system finds root in the deficiencies in financial sector regulation (Laeven et al., 2010).

This paper contributes to the finance-growth literature by examining the role of financial development on growth conditional on the extent of financial sector liberalisation (i.e., deregulation). Hence, besides looking at the direct effects of financial development and liberalisation on growth, we address two important questions: whether the growth effect of financial development is conditional on the level of financial liberalization; and whether excessive liberalization is associated with an apparent breakdown of the relationship between finance and growth. We investigate these questions by employing a multiplicative interaction model, where the effect of interaction between financial sector liberalisation and financial development on economic growth is analysed. We focus mainly on the impact of liberalisation reforms that have taken place in the form of lessening reserve requirements, controls on interest rates, entry barriers, state ownership, banking regulation and restrictions on capital markets on economic growth. This analysis is of great interest in the context of the recent crises and future actions required on the part of countries to deal with these problems.

Following Schumpeter (1934), McKinnon (1973) and Shaw (1973) proposed ‘financial liberalisation thesis’. They argued that repressive policies like setting interest rates affect the efficiency of the financial sector that affects economic growth adversely. Using cross-sectional data for 80 countries over the period 1960-1989, the findings of King and Levine (1993a) supports this view by showing that financial development stimulates both contemporaneous and future rates of eco-

economic growth through raising the rate of capital accumulation and its efficiency. Further, albeit with some exceptions, most of the literature on financial structure supports the financial services view that both banks and stock markets are important to economic growth ([Arestis and Demetriades \(1997\)](#); [Rousseau and Wachtel \(2000\)](#); [Beck et al. \(2000\)](#); [Beck and Levine \(2002\)](#); [Beck and Levine \(2004\)](#)).

In particular, the endogenous growth literature argues that finance reduces informational frictions and generates an external effect on aggregate investment efficiency which in turn offsets the notion of decreasing marginal productivity of capital ([Greenwood and Jovanovic \(1990\)](#); [Bencivenga and Smith \(1991\)](#)). [King and Levine \(1993b\)](#) in their model assume the role of the financial system in the evaluation of projects and diversification of the risks associated with innovation. Their analysis of the experience of five liberalised countries reveals an important role of the financial sector in the acceleration of economic growth through its impact on innovation.

Contrary to the above, there are studies that find either no or very weak support for the role of financial development on growth. For instance, [Lucas \(1988\)](#) believe that the growth finance literature “over-stresses” the importance of financial structure in the economic development process. On the middle ground, few favour the role of financial development in economic performance but assume the financial development as a necessary but not sufficient condition ([Holzmann, 1997](#)). Moreover, a large part of the literature conditions the positive impact of financial development to other factors, for example, legal origin ([Porta et al., 1996](#)), institutional quality ([Tressel and Detragiache, 2008](#)), functioning of political institutions ([Roe and Siegel, 2008](#)), level of income ([Odedokun, 1996](#)), etc. [Cojocaru et al. \(2011\)](#), using data over 1990-2008, provide evidence of the positive impact of financial development for the communist countries of Central and Eastern Europe and the commonwealth. However, they observe that this positive relationship becomes insignificant when the level of inflation is high.

There is also wariness found in the literature on the “one size fits all” assumption and the monotonic relationship between finance and growth. For example, [Deidda and Fattouh \(2002\)](#), using threshold model over the data of [King and Levine \(1993a\)](#) find an insignificant relationship for developing countries, whereas, the relationship is significant and positive for developed countries. [Rioja and Valev \(2007\)](#) divided a sample of 74 countries into three regions over the period 1961-1995. Among their defined regions of financial depth, at low levels they find no significant relationship between finance and growth, for medium level there is strong and positive relation-

ship, and for high level they find weak but positive relationship. [Arcand et al. \(2012\)](#) using the private credit to GDP ratio as a measure of financial depth, conclude that countries with a small and medium sized financial sector benefit from increased financial depth, whereas, the effect of the size of the financial sector vanishes as the size of financial sector reaches to 80-100% of GDP.

The issue of causality is another source of disagreement regarding the relationship between finance and growth. [Demetriades and Hussein \(1996\)](#) find little support for the leading role of finance in economic growth. They find bi-directionality and in some cases reverse causation. Using a GMM panel estimator to address the issue of causality, [Levine et al. \(2000\)](#) conclude that financial development has a first order effect on long-run growth. However, a re-examination of their analysis by [Favarra \(2003\)](#), using cross sectional and panel data analysis, show no evidence of causality running from financial deepening to GDP growth.

Our study also contributes to the literature on the effects of financial liberalisation on economic growth, which provides contradictory views. For example, [Stulz \(1999\)](#) argues that financial liberalisation increases level of investment by allowing risk diversification and lowering down agency costs. [Ayhan Kose et al. \(2009\)](#) find a clear and robust association between de-jure measures of financial openness and total factor productivity growth for a sample of 67 countries over the period 1966-2005. However, they find less clear evidence for the effect of de-facto measures of financial openness on TFP growth¹. Similarly, [Bekaert et al. \(2011\)](#), dividing growth into capital stock growth and total factor productivity growth find a positive impact of financial openness on both channels of growth. On the contrary, [Caprio et al. \(2005\)](#) show that the liberalisation of the financial sector is followed by instability in the financial sector that causes economic growth to fall. [Jarrow \(2014\)](#) shows that the problems in financial markets lead to contraction of economic growth through channels of credit risk.

[Crotty \(2009\)](#) finds radical financial deregulation along with the New Financial Architecture (NFA)²– that is based on very weak theoretical foundations– responsible for the 2007-08 financial crisis. He concludes that the biggest reason for the recent crisis is the emergence of financial boom following the progressive deregulation along with successive bailouts of the financial institutions with the label of “too big to fail”. [Crotty \(2009\)](#) further notes that since the NFA defines less

¹[Ayhan Kose et al. \(2009\)](#) explain de-jure measure of capital account openness as no constraints on capital account transactions and de-facto measured as stock to foreign assets and liabilities to GDP ratio.

²New Financial Architecture refers to the integration of modern day financial markets with the era’s light government regulation.

regulations for commercial banks, even lesser for investment banks and hardly any for the ‘shadow banking system’—hedge and private equity funds and bank-created Special Investment Vehicles (SIVs), these developments have caused a remarkable increase in complex, opaque and illiquid financial assets, which have given rise to system wide leverage. Similarly, [Grant \(2010\)](#) also finds the roots of the recent financial crisis in the recent Financial Services Modernization Act of 1999 in the USA³.

Our study advances the literature that examines the impact of financial liberalisation policies on finance-growth relationship. Though the post-crisis literature counts the lax regulatory environment to be liable for the failure of the financial sector ([Acharya and Richardson, 2009](#), [Sinha et al., 2012](#), [Crotty, 2009](#)), it lacks the systematic and rigorous empirical analysis⁴. Our study fills this gap by analysing the impact of financial liberalisation on finance-growth relationship by employing a multiplicative interaction model with a panel data where we take into account the interactions between the alternative measures of financial development and financial liberalisation.

Our goal is similar to [Arestis \(2006\)](#) and [Demetriades and Rousseau’s \(2011\)](#) work⁵, but it improves the analysis in following counts. *First*, the scope of our empirical model is wider than [Demetriades and Rousseau’s \(2011\)](#) work. Our model explicitly takes into account the interactions between financial development and our measure of financial liberalisation. *Second*, our financial development measure is more comprehensive as it is an index of financial development (FD) using principal component analysis (PCA) of six standard measures of financial development. *Third*, we look into the interaction effect of each of the disaggregated measures of financial liberalisation to find out which component is more important than others. *Finally*, on methodology, we take into account the issues of parameter heterogeneity, outliers, omitted variables and endogeneity in growth equations.

We use a panel data of 88 countries over the period 1973-2005 to explore this conditional effect employing dynamic panel data analysis. Our results show the interactions between financial sector development and its liberalisation to be important for growth, with financial development

³This act called an end to the decades long regulations of the financial sector that were in place since the great depression of 1930s

⁴Few exceptions, as discussed in the Introduction, are [Arestis \(2006\)](#) and [Demetriades and Rousseau’s \(2011\)](#).

⁵[Demetriades and Rousseau \(2011\)](#) examines the impact of no banking supervision taking value 0 when there is no banking supervision and +3 when banking supervision is at its best using simple ordinary least squares (OLS) on the relationship between finance and growth. Whereas, [Arestis \(2006\)](#) provide a theoretical account related to the link between finance and growth in the presence of the policies of financial liberalisation. This study differs from both in terms of scope and technique.

having negative effects on growth for high levels of liberalisation. Our findings suggest that the impact of financial development varies both with the overall level of financial liberalisation and when there is change in its components.

Our study is valuable as it provides evidence in support of the existing literature that suggests "excessive financial liberalisation" to be the main cause for almost every channels through which financial sector may lose its desired positive impact on the real economy. For example, *first*, the lessening impact of finance on growth may arise from the excessive *financial deepening* as a result of financial liberalisation. Excessive financial deepening in the form of credit expansion results in credit boom and bust cycles, which weaken the banking structure and create inflationary pressures⁶. *Second*, financial crisis and the collapse of finance-growth relationship could be caused by the *excessive risk taking* behaviour of financial institutions (Móczár, 2010), which arises under the liberalised financial system (Diaz-Alejandro, 1985, Hellmann and Murdock, 1995, Easterly et al., 2001). *Third*, the *ambiguity of the effect of financial liberalisation on private saving* arises because of the ambiguities in the relationship between interest rates and savings and also due to the nature of the financial liberalisation process that also involves reversals. Bandiera et al. (2000) show that financial liberalisation leads to a fall in savings, contrary to the belief that the saving rate rises because of financial liberalisation⁷. *Fourth*, the *risky investment behaviour* as a result of financial liberalisation and existence of *unstable financial structure* (Grabel, 1995).

The structure of our paper is as follows: Section 2 discusses the data and econometric methods used in this study. Section 3 provides the main results, with robustness analysis in Section 4. Section 5 concludes.

2 Data and Methodology

2.1 Data

Our dynamic panel analysis examines five year averages of growth in 88 countries over 1973-2005 (see table 11 in the Appendix for the list of countries). As usual, five year averages are used to control for business cycle effects⁸. Data availability, specifically for financial development

⁶see Rousseau and Wachtel (2011) for further debate.

⁷Jappelli and Pagano (2000) provided similar findings for national savings and growth in OECD countries.

⁸Five year averages are calculated over the period 1973-1977, 1978-1982, 1983-1987, 1988-1992, 1993-1997, and 1998-2005. The observation of 1973 is used as a proxy of initial per capita real GDP for first average over the period

and financial sector liberalisation, dictates the countries selected and time period studied. Our dependent variable is Economic growth measured by growth rate of GDP per capita. In addition to financial development and financial liberalisation variables, we use explanatory variables that are common in empirical growth literature; these are *Initial level of (log) real GDP per capita* to control for convergence and average years of secondary schooling to represent human capital, *investment growth* as a measure of physical capital accumulation, exports and imports as share of GDP as a measure of *openness*, government expenditure as share of GDP as a measure of *government size*, and log of one plus consumer price index as a measure of *inflation*. The panel of countries has diverse mix: 22 developed countries, 12 emerging Asian economies, 17 Latin American economies, 12 countries from sub-Saharan Africa, 18 transitional economies, 7 from Middle East and North Africa.

2.1.1 Measure of Financial Development

A good financial development indicator should include information on different aspects of financial system such as depth, access, efficiency and stability for both financial institutions and markets. It should also provide information about the ability of the financial system to channel funds from depositors to investors (Ang and McKibbin, 2007). In order to capture as many aspects of financial development as possible, we use principal component analysis (PCA) on frequently used banking sector indicators⁹ of financial development to get new summary aggregate index. Following the previous studies covering the data since 1970s for financial development (e.g., Tressel and Detragiache (2008)) we choose not to use stock market indices due to their lack of data availability.

The use of PCA for the aggregate index of financial development is gaining popularity in growth finance literature to construct a summary index of financial development and other dimensions of financial systems (Huang, 2011, Ang and McKibbin, 2007). Methodologically, the PCA produces an orthogonal summary index using N number of different indicators that are highly correlated. These principle components theoretically can capture the highest amount of variance among different indicators, capturing different dimensions of the dataset.

Our PCA draws information from six financial development indicators in log form: Private

1973-1977.

⁹The data for all indicators are taken from the World Bank's Financial Structure and Economic Development Database (2008).

credit/GDP ratio (PVT/Y), Liquid Liabilities/GDP ratio (LL/Y), Bank assets to deposit money bank assets and central bank assets (BA/BCBA), Deposit money banks assets/ GDP ratio (DBA/Y), Central bank assets to GDP ratio (CBA/Y), and Bank credit/ bank deposit ratio (BC/BD). Generally, studies use M2/ GDP ratio or private credit/ GDP ratio as measures of financial development. However, as [Ang and McKibbin \(2007\)](#) argue that these measures only show the extent of transaction services provided by the financial system rather than their ability to channelize funds, we resort to using the six indicators mentioned above. These measures of financial development are usually strongly correlated ([Ang and McKibbin, 2007](#)), which validates the use of a single representative index for the measure of financial development¹⁰.

We perform the PCA analysis over the years for our group of countries on our representative indexes of financial development¹¹ to capture the impact of transition in the financial system across the countries over time. Our summary index measures important dynamics of the changes in the financial development due to the coverage of the data set.

Table 1: Principal component analysis for financial development index for the year 1973

	PCA 1	PCA 2	PCA 3	PCA 4	PCA 5	PCA 6
Eigenvalues	3.23756	1.62338	.756813	.291184	.0728865	.0181775
% of variance	0.5396	0.2706	0.1261	0.0485	0.0121	0.0030
Cumulative%	0.5396	0.8102	0.9363	0.9848	0.9970	1.0000
Variable	Vector 1	Vector 2	Vector 3	Vector 4	Vector 5	Vector 6
LL/Y	0.4688	0.3425	-0.2591	-0.1435	0.7490	0.1193
BA/BCBA	0.3937	-0.4045	-0.2712	0.7796	-0.0054	-0.0025
PVT/Y	0.5385	0.1035	0.1670	-0.1642	-0.2359	-0.7673
CBA/Y	-0.0940	0.6521	0.5004	0.5602	0.0412	-0.0017
DBA/Y	0.5233	0.2202	0.0204	-0.1448	-0.5445	0.5998
BC/BD	0.2292	-0.4843	0.7620	-0.0993	0.2919	0.1929

¹ LL/Y=Log of Liquid Liabilities to GDP Ratio

² BA/BCBA =Log of Deposits money bank assets to deposit money bank assets and central bank

³ PVT/Y=Log of Bank private credit to GDP (%)

⁴ CBA/Y=Log of Central bank assets to GDP (%)

⁵ DBA/Y=Log of Deposits money bank assets to GDP (%)

⁶ BC/BD=Log of bank credit to bank deposit

¹⁰Table 14 in the Appendix shows correlation matrix for the components of financial development. With only few exceptions, all variables are significantly correlated with each other with sufficiently large magnitudes.

¹¹The percent variance for all principal components—six in this case— for all years from 1973–2005 and the results for the first vector corresponding to the first component of principal component analysis are available upon request.

For the purpose of illustration we present results for a specific year, 1973, obtained from PCA. [Table 1](#) displays the results obtained from the PCA analysis for the year 1973. The eigenvalues indicated in the table explains about 53.96% of the standardised variance, the second principal component explains 27.06%, the third explains 12.61%, the fourth 4.8%, the fifth 1.21% and the last principal component accounts for 0.3%. From the given amount of variation explained by principal components, we observe that the first component that explains the most of the variation is the best measure of financial development. By using the weights given by the first eigenvector the first principal component is computed as a linear combination of the six measures of financial development. The individual contributions of LL/Y, BA/BCBA, PVT/Y, CBA/Y, DBA/Y, and BC/BD to the standardised variance of the first principal component comes out to be around¹² 22.76%, 19.11%, 26.14%, -4.5%, 25.41%, and 11.13% respectively. We use these individual contributions as the basis of weighting to develop our financial development index.

2.1.2 Measure for Financial Liberalisation

To measure overall changes in the policies of liberalisation in our sample countries, we use an index developed by [Abiad et al. \(2008\)](#) that measures overall change of level of liberalisation in a sample of 91 countries. This is the most updated data set available that takes into account the overall level of financial liberalisation in different countries. Compared to earlier databases by [Edison and Warnock \(2003\)](#) and [Kaminsky and Schmukler \(2008\)](#) this data set covers wider number of countries and provides graded index for more dimensions of financial reforms. Recently many studies have used this data set to evaluate the impacts of financial reforms on the financial development ([Demetriades and Rousseau, 2011](#), [Tressel and Detragiache, 2008](#)).

[Abiad et al. \(2008\)](#) provide data on aggregated index of financial reforms for 91 countries over the period 1973-2005, capturing seven major dimensions of reform. These are credit controls and reserve requirements, interest rate controls, entry barriers, state ownership, policies on securities markets, banking regulations and restrictions on capital account. Six out of these seven components are coded in such a way that higher value of these dimensions on the scale of 0-3 shows the higher level of liberalisation.

However, only "Banking supervision" component is coded in reverse order, which shows that the higher the level of banking supervision the greater is the extent of financial reforms. This

¹²Figures are rounded off to the second decimal place.

weakness of the index can be addressed by reversing the banking supervision component and recalculating the index, which would not change the empirical results as we shall observe in section 4 on “further robustness”.

The aggregated index along with sub indexes is constructed after assigning raw score to each dimension and normalizing it to 0-3 scale. On this scale fully liberalised takes the value of 3, partially liberalised takes the value of 2, partially repressed takes the value of 1 and fully repressed takes the value of 0. The dimensions of the dataset comprise many important sub-dimensions that covers further important aspects of the financial reforms brought in those countries¹³.

These seven aspects of financial liberalisation are aggregated to calculate ‘a single liberalisation index’ that takes values from 0 to 21 as each dimension values between 0 and 3. The assigned values for the different dimensions of financial reforms are further used to construct an aggregated normalised index ranging between ‘0’ and ‘1’ with equal weights to all dimensions. Higher value on index means the country is more liberal. [Table 15](#) in the Appendix shows that all the sub-indices of financial reform index are positively and significantly correlated. This implies that the countries where the emphasis is say for example on the directed credit, they may also have the emphasis on the other components such as credit ceilings, interest rate controls, etc.

2.2 Summary Statistics and Correlations

[Table 13](#) in the Appendix provides summary statistics for variables used. The range of the data for different variables in [table 13](#) shows a wide variation among the values of the variables. For example, GDP per capita growth ranges from -45% to around 25%. Financial liberalisation index is normalised and ranges between zero and one. We also observe a wide variation in the measures of financial development. Private credit/ GDP ratio, the most widely used measure of financial development, varies between 3.94% for Uganda to 146.81% for Hong Kong. The same pattern is observed for other financial development indicators. [Table 16](#) shows correlation results where we observe positive and significant correlation between financial development and financial reform index.

[Table 2](#) shows frequency histogram of the liberalisation index for the period 1973-2005. We divide countries in five different groups based on the average level of liberalisation in the countries

¹³For detailed explanation of the index formation along with their sub-dimensions and coding, please refer [Abiad et al. \(2008\)](#).

over the period of 1973-2005. Not surprisingly, we observe that the developed countries tend to have more liberalised financial structure than the developing countries. The countries that stand out as the most liberal are United States, Netherlands, and Switzerland, while Ethiopia and China are the least financially liberal economy in our sample. The most interesting to note that the countries that have been hit the most during 2007-08 financial crisis and some of them are still facing looming threats of economic recession are amongst the most financial liberalised economy. For instance following the recession in the U.S., eurozone crisis since early 2009 has affected the financial structures of many central and eastern European economies.

Table 2: Financial Liberalisation Index

5th Quintile 0.71-1.00	4th Quintile 0.55-0.71	3rd Quintile 0.44-0.55	2nd Quintile 0.30-0.44	1st Quintile 0-0.30
Belgium	Australia	Albania	Colombia	Algeria
Canada	Bulgaria	Argentina	Dominican Rep.	Bangladesh
Denmark	Chile	Austria	El Salvador	Brazil
Estonia	Czech Rep.	Azerbaijan	Guatemala	Cameroon
Georgia	Finland	Belarus	Indonesia	China
Germany	France	Bolivia	Jamaica	Costa Rica
Hong Kong	Italy	Greece	Kenya	Ecuador
Hungary	Japan	Israel	Madagascar	Egypt
Ireland	Jordan	Kazakhstan	Morocco	Ethiopia
Latvia	Kyrgyz Rep.	Korea	Nicaragua	Ghana
Lithuania	Malaysia	Mexico	Peru	India
Netherlands	New Zealand	Nigeria	Senegal	Mozambique
Singapore	Norway	Paraguay	Sri Lanka	Nepal
Spain	Poland	Philippines	Thailand	Pakistan
Sweden	Romania	Portugal	Tunisia	Tanzania
Switzerland	Russia	Ukraine	Turkey	Uzbekistan
United Kingdom	South Africa	Uruguay	Uganda	Vietnam
United States		Venezuela	Zimbabwe	

Source: [Abiad et al. \(2008\)](#)

The countries are divided in 5 quintile on the basis of the level of liberalisation. The least liberal economies on the scale between 0 and 1 lie in the first quintile and the most liberal economies lie in the 5th quintile.

A cursory look at the data arranged in Tables 3-5 shows us some interesting relationship even before embarking on rigorous analysis: (i) the strong association between financial development and growth; (ii) the strong association between financial liberalisation and financial development; but (iii) no clear relation between financial liberalisation and growth. [Table 3](#) organises the countries in the data set in a matrix, grouping them by quintiles according to the average level of per capita GDP growth rate in those countries and the average level of financial development defined as private credit/ GDP ratio (PVT/Y). Most of our sample countries lie on the diagonal or near the

Table 3: GDP Per Capita Growth and Financial Development

		GDP Per Capita Growth Rate (Decreasing →)				
		5th Quint	4th Quint	3rd Quint	2nd Quint	1st Quint
FD (Decreasing ↓)	5th Quint	China Ireland Malaysia Singapore Thailand	Austria United Kingdom Italy Jordan Japan Portugal Spain	Canada France Germnay Netherlands	Switzerland	-
	4th Quint	Chile Korea Norway Tunisia Vietnam	Finland United States	Australia Belgium Denmark Greece Israel Sweden	Czech Republic New Zealand	South Africa
	3rd Quint	Egypt Estonia Indonesia Poland	Bulgaria Bangladesh Dominican Republic Hungry Morocco	Brazil Columbia	Algeria El Salvador Republic Phillipines Uruguay	Bolivia Jamaica Nicaragua Senegal
	2nd Quint	Latvia India Sri Lanka	Pakistan Turkey	Costa Rica	Argentina Cameroon Ecuador Guatemala Lithuania Mexico Nepal Paraguay	Keynea Madagascar Venezuela
	1st Quint	-	Belarus Uganda	Albania Kazakhstan Mozambique	Nigeria Romania Tanzania	Azerbaijan Ethiopia Georgia Kyrgyz Republic Peru Russia Ukrain Zimbabwe

¹ Source: [Abiad et al. \(2008\)](#) & World Bank's Financial Structure and Economic Development Database (2008)

² The financial development indicator is the average level of Prviate Credit/GDP ratio in sample countries. GDP per capita growth is the average over the period.

diagonal that shows a well established strong positive association between financial development and economic growth. The surprising fact, on the other hand, is that despite the high level of financial development—mainly as a result of high level of financial liberalisation— many developed countries have recently experienced recession, which raises questions about the established link between financial development and growth in the presence of liberalised financial systems.

[Table 4](#) shows another matrix that arranges countries in groups in quintiles on the basis of average level of financial liberalisation and average level of financial development in our sample countries. The table shows that most of the financially developed countries have the most lib-

Table 4: Financial Liberalisation and Financial Development

		Financial reforms (Decreasing →)				
		5th Quint	4th Quint	3rd Quint	2nd Quint	1st Quint
FD (Decreasing ↓)	5th Quint	United Kingdom Canada Germany Ireland Netherlands Singapore Spain Switzerland	France Italy Japan Jordan Malaysia	Austria Portugal	Thailand	China
	4th Quint	Belgium Denmark Sweden United States	Australia Chile Czech Republic New Zealand Norway South Africa	Greece Israel Korea	Tunisia	Vietnam
	3rd Quint	Estonia Hungary	Bulgaria Poland	Bolivia Philippines Uruguay	Columbia Dominican Republic El Salvador Indonesia Jamaica Nicaragua Senegal	Algeria Bangladesh Brazil Egypt
	2nd Quint	Latvia Lithuania	-	Argentina Mexico Paraguay Venezuela	Guatemala Kenya Madagascar Sri Lanka Turkey	Cameroon Costa Rica Ecuador India Nepal Pakistan
	1st Quint	Georgia	Romania Russia	Albania Azerbaijan Nigeria Ukraine	Peru Uganda Zimbabwe Tanzania	Ethiopia Ghana Mazambique

¹ Source: [Abiad et al. \(2008\)](#) & World Bank's Financial Structure and Economic Development Database (2008).

² The financial development indicator is the average of Private Credit/GDP ratio. Financial liberalisation index is the average of the indexes: credit controls and reserve requirements, interest rate liberalisation, entry barriers, restrictions on capital account, privatization of the financial sector, and banking sector supervision.

eralised financial structures. Here also the majority of the countries lie near the diagonal or on the diagonal that also depicts a fairly strong positive correlation between the countries' level of financial liberalisation and the level of financial development.

This suggests that there is an indirect relationship between financial liberalisation and growth through positive impact on financial development that is directly associated with GDP per capita growth rate. To inquire further, we investigate how financial liberalisation and economic growth are interrelated directly. In the ex-post crisis literature the investigation about the association between financial liberalisation and economic growth rate has received special attention both from policy

Table 5: GDP Per Capita Growth and Financial Liberalisation Index

		GDP Per Capita Growth Rate (Decreasing →)				
		5th Quint	4th Quint	3rd Quint	2nd Quint	1st Quint
FL (Decreasing ↓)	5th Quint	Estonia Hong Kong Ireland Latvia Singapore	United Kingdom Hungary Spain United States	Belgium Canada Denmark Germany Netherlands Sweden	Lithuania Switzerland	Georgia
	4th Quint	Chile Malaysia Norway Poland	Bulgaria Italy Finland Japan Jordan	Australia France	Czech Republic New Zealand Romania	Kyrgyz Republic Russia South Africa
	3rd Quint	Korea	Austria Belarus Portugal	Albania Greece Israel Kazakhstan	Argentina Mexico Nigeria Paraguay Phillipines Uruguay	Azerbaijan Bolivia Ukraine Venezuela
	2nd Quint	Indonesia Sri Lanka Thailand Tunisia	Dominican Republic Morocco Turkey Uganda	Columbia	El Salvador Guatemala	Jamaica Kenya Madagascar Nicaragua Peru Senegal Zimbabwe
	1st Quint	China Egypt India Vietnam	Bangladesh Pakistan	Brazil Costa Rica Mozambique	Algeria Cameroon Ecuador Nepal Tanzania	Ethiopia Ghana Uzbekistan

Source: [Abiad et al. \(2008\)](#) & World Bank's Financial Structure and Economic Development Database (2008)

makers and academics. For this purpose in [table 5](#) we arrange countries from our dataset in a matrix in quintiles on the basis of their average GDP per capita growth rate and average level of liberalisation. We observe that a large number of countries are off the diagonal showing weak relationship. The extreme cases include countries like China and India, two emerging economies showing the highest rate of growth rate despite the least level of financial liberalisation over our sample period. While on the one hand these countries have been able to achieve high level of financial development despite low level of financial liberalisation, and on the other hand have also been able to achieve higher growth rates.

[Allen et al. \(2005\)](#) recognises China's performance as an interesting case study. They argue that despite undeveloped financial sector, China has been able to grow at the fastest pace because of the available financing channels other than formal sources. [Guariglia and Poncet \(2008\)](#) explain

despite negative relationship between China-specific measures of state interventionism and growth and its sources, it has been able to achieve higher growth rates because of high level of FDI. India, another emerging economy is also among the group of the countries with least financial liberalisation and highest GDP per capita. On the other extreme there are countries like Georgia, Switzerland showing the least amount of GDP per capita growth despite the highest level of financial reforms. The other major countries showing uneven relationship between level of financial reforms and GDP per capita growth include United Kingdom, United States, Canada, and New Zealand.

2.3 Methodology

To analyse the impact of financial sector development on economic growth via financial liberalisation, we use an econometric model of the form employed by [Levine et al. \(2000\)](#), [Beck, Levine and Loayza \(2000\)](#), [Beck and Levine \(2004\)](#):

$$y_{i,t} - y_{i,t-1} = \alpha y_{i,t-1} + \beta' X_{i,t} + \eta_i + \varepsilon_{i,t} \quad (1)$$

Where, $y_{i,t}$ is real per capita GDP; $X_{i,t}$ shows vector of explanatory variables except initial level of per capita GDP and includes our indicators of financial liberalisation; $\eta_{i,t}$ shows country specific fixed effects and; ε_i shows idiosyncratic error, and the subscripts i and t show country and time period, respectively. To measure the time specific effects, we also include time dummies.

We use one-step and two-step versions of system GMM. The system GMM deals with the endogenous components by using lag of the variables as instruments. The one-step estimators assume error term ε_{it} to be i, i, d , whereas, the two-step estimators allows the error term ε_{it} to be heteroscedastic. The two-step procedure in the first step assume independent error term, and in the second step relaxes the assumption by establishing variance covariance matrix using error terms from the first step.

[Rousseau and Wachtel \(2000\)](#) use the same technique to study the relationship between stock market, banks and economic growth. [Roodman \(2006\)](#) also emphasises the use of these techniques for the models with a dynamic dependent variable, which depends on its past realizations, have independent variables that are not strictly exogenous, have fixed effects, and heteroscedasticity and autocorrelation within individuals but not across them.

According to [Arellano and Bond \(1991\)](#) differencing the equation 1 yield,

$$(y_{i,t} - y_{i,t-1}) - (y_{i,t-1} - y_{i,t-2}) = \alpha(y_{i,t-1} - y_{i,t-2}) + \beta'(X_{i,t} - X_{i,t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1}) \quad (2)$$

The model explained in equation 2 removes the country specific effects but introduces another bias due to correlation between new error term and lagged dependent variable. With the following two assumptions explained by [Arellano and Bond \(1991\)](#) we can overcome this new bias.

$$E[y_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \text{ for } s \geq 2; t = 3, \dots, T \quad (3)$$

$$E[X_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \text{ for } s \geq 2; t = 3, \dots, T \quad (4)$$

The first difference GMM estimators still can be misleading in the presence of persistent variables, as lagged levels of the series provide weak instruments for subsequent first differences. Therefore, we use system GMM as suggested by [Arellano and Bover \(1995\)](#) to deal with this problem more effectively. According to [Bond et al. \(2001\)](#) the system estimator is useful even for series that are persistent. We have the following stationary conditions.

$$E[y_{i,t+p}\eta_i] = E[y_{i,t+q}\eta_i] \text{ and } E[X_{i,t+p}\eta_i] = E[X_{i,t+q}\eta_i] \text{ for all p and q} \quad (5)$$

The further moment conditions are as under,

$$E[(y_{i,t-s} - y_{i,t-s-1})(\eta_i + \varepsilon_{i,t})] = 0 \text{ for } s = 1 \quad (6)$$

$$E[(X_{i,t-s} - X_{i,t-s-1})(\eta_i + \varepsilon_{i,t})] = 0 \text{ for } s = 1 \quad (7)$$

We use moment conditions given in equations 3, 4, 6 and 7 to get GMM system estimators. To check the consistency of the estimators derived from GMM we validate the assumption that the error terms do not show serial correlation and further validate the instruments. For this purpose we use Sargan test of over-identifying restriction and the second test is to check if the error term $\varepsilon_{i,t}$ is not serially correlated.

[Equation \(8\)](#) shows the exact specification for our model.

$$\begin{aligned}
PCG_{i,t} = & \beta_1(LY_o)_{i,t} + \beta_2FD_{i,t} + \beta_3FL_{i,t} + \beta_4(FD * FL)_{i,t} + \beta_5Investment_{i,t} \\
& + \beta_6Trade\ Openness_{i,t} + \beta_7Government\ Size_{i,t} + \beta_8Inflation_{i,t} \\
& + \beta_9Education_{i,t} + \varepsilon_{i,t} + \eta_i
\end{aligned} \tag{8}$$

where, PCG= Per capita growth; $(LY_o)_{i,t}$ = initial value of per-capita GDP; FL= Indicator of financial liberalisation; $(FD * FL)_{i,t}$ =Interaction showing financial development at different level of financial liberalisation. Investment= growth rate of investment; trade openness= import plus export as ratio of GDP; government size= government expenditure as a ratio of GDP; inflation= log of one plus consumer price index; education= log of secondary years of education; η = country specific fixed effects and; ε = idiosyncratic error.

We hypothesize $\beta_2 > 0$ and $\beta_4 < 0$, which means that individual effects of financial development is positive but the overall impact becomes less positive or negative with higher level of financial liberalisation.

Since our sample consists of a large heterogeneous group of countries over a long period of time between 1973-2005, there is a very strong likelihood of the presence of outliers in our sample. [Hadi et al. \(2009\)](#) argues the presence of outliers can affect the results of the regression analysis that assumes homogeneity of the data and no outliers. We use [Hadi \(1992\)](#) method for identifying multiple outliers to the main variables in our analysis, using 0.01 as the cut of significance level. Variety of analyses in economics literature use this method for detection and exclusion of outliers (see for instance, [Rajan and Subramanian \(2005\)](#))

3 Results

This section provides estimation results of the models used in this study. Employing one-step and two-step system GMM, unlike previous studies in finance-growth literature, we regress our model in [Equation \(8\)](#) that includes the measures of financial liberalisation and financial development along with their interactions in order to examine the conditional effects of financial liberalisation on the relationship between financial development and growth. We then investigate the same effects using the disaggregated components of financial liberalisation.

3.1 Aggregate Financial Liberalisation

One-step system GMM is preferred in literature due to its ability to correct small sample bias (Soto et al., 2009). For the two-step system GMM we remove small sample bias with Windmeijer corrected standard errors. As noted by Roodman (2009), before applying the Windmeijer's correction researchers draw inferences from one-step system GMM. We also present first the results for one-step system GMM and then use the two-step GMM methodology by applying Windmeijer's correction. The estimation results for each model are initially shown using all observations. Then at this stage, we perform robustness analysis in two ways. First, by excluding outliers. For this purpose we follow Hadi's (1992) method of multiple variable outliers that is 'distance based method' for omitting outliers. Second, by checking if our results remain the same for alternative definitions of financial development with and without outliers. We use full set of other co-variates in all regressions.

Table 6 displays the results for all observations in Panel A and the results without outliers in Panel B. Our main results are shown in the first two columns based on our main financial development variable constructed by PCA. The coefficient of financial development has expected positive signs with significance at 1% in both columns for PCA with or without outliers. The coefficient of financial liberalization is insignificant for all observations. But when we exclude outliers, we observe negative significant coefficient for financial liberalization. This is contrary to "financial liberalisation" hypothesis. However, in order to verify that our results are not particularly driven by PCA measure, we also ran the same set of regressions using two variables that are most frequently used in the finance-growth literature, i.e., private-credit to GDP ratio and liquid-liability ratio. Their results are shown in middle two columns and last two columns respectively. The coefficient of financial development has expected positive signs with significance at 1% in both columns for all financial development indicators with or without outliers. But financial liberalization turns out to have insignificant coefficients for both private-credit to GDP ratio and liquid liability ratio for estimations with and without outliers. This suggests that financial development has direct positive impact on economic growth, while financial liberalization doesn't have any robust direct relationship with growth.

Of most interest for our study, however, is the negative interaction between financial development and financial liberalisation, indicating that the growth effect of financial development is, as hypothesised in Section 2, conditional on the level of financial liberalisation. In the case of our

Table 6: Financial Liberalisation, Financial Development and Economic Growth

Panel A: All observations (Dependent Variable: GDP Per Capita Growth Rate)						
	(PCA)		(PVT/Y)		(LLR)	
	(1)	(2)	(3)	(4)	(5)	(6)
	One-step	Two-step	One-step	Two-step	One-step	Two-step
	SGMM	SGMM	SGMM	SGMM	SGMM	SGMM
Financial Development (FD)	2.688	2.549	0.093	0.082	0.070	0.067
	[0.648]***	[0.662]***	[0.028]***	[0.032]**	[0.024]***	[0.023]***
Financial Liberalization (FL)	0.877	1.454	2.085	1.862	1.797	1.405
	[1.940]	[1.890]	[2.121]	[2.001]	[2.311]	[2.131]
FD*FL	-2.804	-2.592	-0.102	-0.088	-0.081	-0.080
	[0.809]***	[0.796]***	[0.031]***	[0.038]**	[0.028]***	[0.025]***
Log of initial GDPPC	-0.568	-0.553	0.180	0.241	0.271	0.301
	[0.389]	[0.435]	[0.362]	[0.368]	[0.372]	[0.455]
Investment	0.249	0.234	0.298	0.286	0.303	0.279
	[0.044]***	[0.049]***	[0.045]***	[0.054]***	[0.046]***	[0.049]***
Trade openness	-0.011	-0.006	0.002	0.002	0.003	0.004
	[0.011]	[0.010]	[0.006]	[0.005]	[0.005]	[0.006]
Government size	-0.121	-0.124	-0.136	-0.151	-0.161	-0.161
	[0.079]	[0.086]	[0.094]	[0.086]*	[0.093]*	[0.071]**
Human capital	1.219	0.833	0.170	0.045	0.560	0.603
	[0.846]	[1.030]	[0.709]	[0.906]	[0.770]	[0.853]
Inflation(CPI)	0.223	0.241	0.689	0.773	0.668	0.646
	[0.324]	[0.408]	[0.386]*	[0.400]*	[0.419]	[0.389]
Constant	6.148	5.513	-3.495	-3.864	-3.838	-3.593
	[3.087]*	[3.555]	[2.306]	[2.720]	[2.263]*	[2.800]
Observations	339	339	361	361	354	354
F	9.917	9.286	11.378	13.285	10.459	12.223
Hansen p-value	0.333	0.333	0.423	0.423	0.666	0.666
AR1 test p-value	0.000	0.000	0.000	0.001	0.000	0.001
AR2 test p-value	0.667	0.715	0.623	0.715	0.795	0.863
No of countries/instruments	76/66	76/66	77/66	77/66	77/66	77/66
Panel B: Without Outliers (Dependent Variable: GDP Per Capita Growth Rate)						
	(7)	(8)	(9)	(10)	(11)	(12)
Financial Development (FD)	1.795	1.669	0.066	0.065	0.042	0.048
	[0.401]***	[0.504]***	[0.019]***	[0.022]***	[0.017]**	[0.028]*
Financial Liberalization (FL)	-3.573	-3.581	1.378	1.538	1.273	0.923
	[1.633]**	[1.455]**	[1.990]	[1.650]	[1.917]	[2.345]
FD*FL	-2.274	-2.074	-0.080	-0.073	-0.055	-0.056
	[0.626]***	[0.741]***	[0.023]***	[0.026]***	[0.024]**	[0.038]
Log of initial GDPPC	-0.102	-0.146	-0.082	-0.223	-0.189	-0.302
	[0.370]	[0.433]	[0.395]	[0.443]	[0.375]	[0.387]
Investment	0.280	0.275	0.264	0.266	0.266	0.257
	[0.034]***	[0.041]***	[0.039]***	[0.032]***	[0.039]**	[0.039]***
Trade openness	0.015	0.012	0.019	0.015	0.017	0.023
	[0.008]*	[0.011]	[0.009]**	[0.010]	[0.010]*	[0.014]
Government size	-0.012	-0.007	-0.041	0.004	0.003	-0.069
	[0.063]	[0.077]	[0.064]	[0.080]	[0.060]	[0.084]
Human capital	2.247	2.257	0.431	0.426	2.122	0.478
	[0.821]***	[0.905]**	[0.148]***	[0.188]**	[0.866]**	[0.173]***
Inflation(CPI)	0.264	0.270	0.547	0.333	0.429	0.486
	[0.257]	[0.326]	[0.296]*	[0.400]	[0.334]	[0.432]
Constant	1.100	1.536	-3.448	-1.971	-0.917	-2.188
	[2.318]	[2.832]	[2.166]	[2.388]	[2.744]	[2.765]
Observations	328	328	346	346	337	337
F	17.995	16.510	15.499	16.456	17.757	13.443
Hansen p-value	0.758	0.758	0.825	0.825	0.873	0.737
AR1 test p-value	0.001	0.001	0.005	0.003	0.003	0.004
AR2 test p-value	0.662	0.641	0.869	0.762	0.907	0.932
No of countries/instruments	73/66	73/66	75/66	75/66	75/66	75/66

Notes: The table reports regression coefficients (significant coefficients are written bold) for one-step and two-step system GMM with their respective robust standard errors in brackets (* p<0.10, ** p<0.05, *** p<0.01). All regressions include time dummies. Financial liberalisation index is taken from [Abiad et al. \(2008\)](#).

main specification (results reported in models 1, 2, 7 and 8) with and without outliers, the coefficients for financial liberalisation are negative and significant at 1% level. For the specifications with other two measures of financial development (reported in models 3-6 and 9-12), its coefficients are negative and significant at 1% or 5% levels, with the exception of model 12 for which the coefficient is negative but not significant.

Taking model (7) of Table 6 as the preferred representative of these results after the exclusion of outliers using one-step system GMM, where both the coefficients are significant at 1% level, the partial derivative of GDP per capita Growth with respect to a unit increase in financial development is given by:

$$\frac{\partial \text{GDP per capita Growth}}{\partial FD} = 1.795 - 2.274(FL) \quad (9)$$

The negative coefficient for the interaction term between financial liberalisation and financial development shows the declining impact of financial development on growth as the level of financial liberalisation increases. After certain point the net effect of financial development on growth becomes negative when financial liberalisation reaches to very high level. A threshold value for the financial liberalisation can be determined after plugging in the values for financial liberalisation index that ranges between 0 to 1 in Equation (9). We find that the values higher than 0.79 of the financial liberalisation index make the effect of financial development on economic growth negative.

There are a number of other points of interest in this table. Among these, it is notable that outliers play an important role. The removal of outliers, as appropriate, has a substantial impact on the size and significance of the variables that are our focus of interest. For example, the size of our main variables (FD and its interaction with FL) is reduced due to the exclusion of outliers, though the coefficients do not lose their significance. Human capital has positive coefficient, which gains the size and significance substantially after the removal of outliers in all specifications. Investment, as expected, is another variable that turns out to be positive and highly significant (at 1% level), and its size even increases after the exclusion of outliers. However, the coefficient of initial GDP per capita does not show any significance, although its coefficients are consistently negative for the models without outliers. Trade openness does not appear to play a robust role, with a positive significant coefficients only after removal of outliers. Government size generally shows negative

sign without significance. Finally, inflation sometimes shows positive and significant coefficient, which is contrary to popular belief.

To validate the consistency of the estimates under GMM-system, we use tests introduced in (Roodman, 2006) command of `xtabond2` for exogeneity. Arellano and Bond (1991) propose two approaches to tests for the exogeneity of the instruments used in GMM-system. The first test is related to the issue of serial correlation, and the second tests named as Hansen test is suggested to test for the over-identification. The test for serial correlation hypothesizes no serial correlation in errors ($\varepsilon_{i,t}$). The AR(1) p-values for all specifications are less than 0.01, that suggest that there is autocorrelation in the first difference, whereas, the second order no serial correlation between errors can not be rejected as all values are greater than 0.01.

The Stata output reports (Hansen, 1982) J statistic instead of the Sargan test when we use robust option with our GMM-system. Therefore, our results report (Hansen, 1982) J statistic that has null hypothesis that “the instruments as a group are exogenous”. The reported p-values over all of our specifications has sufficiently higher p-values than 0.01, which confirms the exogeneity of the instruments in our models and shows that the instruments are not correlated with disturbance process.

3.2 Disaggregated components of Financial Liberalisation

Table 7 reports the results for financial development and the seven components¹⁴ of financial liberalisation index one at a time, using our preferred method of one-step system GMM without outliers.¹⁵ All interaction terms for components of financial liberalisation with financial development are negative and except for credit control reforms all are highly significant, showing a declining impact of financial development with higher levels of financial liberalisation irrespective of its components. Most interestingly, when we use the other two measures of financial development in Table 8 and Table 9 for robustness check, we observe that these interaction effects remain the same.

All financial development indicators in all three tables (Table 7, Table 8, and Table 9) show

¹⁴These seven components include banking supervisory reforms, relaxation of entry barriers, lessening of credit controls, liberalisation of stock market, privatization, lessening interest rate controls, and capital controls.

¹⁵We have also run two-step system GMM without outliers and the results are essentially similar with different size of the coefficients, where banking supervision loses its significance although the positive sign remains intact. Also for interaction terms, only difference we observe in the case of stock market reforms which become insignificant for two-step system GMM. The results are available upon request.

Table 7: Financial Liberalisation, Financial Development, and Economic Growth, one-step system GMM without Outliers

	Dependent Variable: GDP Per Capita Growth Rate						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FD	1.193	1.521	1.057	1.151	1.046	1.604	1.273
	[0.316]***	[0.388]***	[0.632]*	[0.517]**	[0.353]***	[0.422]***	[0.347]***
Banking supervision	0.795						
	[0.395]**						
Banking supervision*FD	-0.518						
	[0.149]***						
Entry barriers		-0.342					
		[0.264]					
Entry barriers*FD		-0.499					
		[0.153]***					
Credit controls			-0.718				
			[0.267]***				
Credit controls*FD			-0.279				
			[0.224]				
Stock markets				0.441			
				[0.407]			
Stock markets*FD				-0.390			
				[0.224]*			
Privatization					-0.247		
					[0.199]		
Privatization*FD					-0.454		
					[0.163]***		
Interest rate liberalisation						-0.364	
						[0.260]	
Interest rate liberalisation*FD						-0.541	
						[0.180]***	
Capital controls							-0.875
							[0.391]**
Capital controls*FD							-0.397
							[0.186]**
Log of initial GDPPC	-0.505	-0.244	-0.216	-0.599	-0.193	-0.291	-0.434
	[0.319]	[0.346]	[0.311]	[0.386]	[0.318]	[0.358]	[0.334]
Investment	0.269	0.254	0.280	0.268	0.284	0.275	0.292
	[0.042]***	[0.038]***	[0.038]***	[0.041]***	[0.041]***	[0.036]***	[0.039]***
Trade openness	0.011	0.012	0.015	0.005	0.012	0.011	0.009
	[0.010]	[0.008]	[0.010]	[0.010]	[0.008]	[0.007]	[0.007]
Government size	-0.082	-0.052	-0.095	-0.006	-0.036	-0.027	0.003
	[0.065]	[0.061]	[0.072]	[0.067]	[0.070]	[0.061]	[0.064]
Inflation(CPI)	0.214	0.207	0.621	0.190	0.317	0.149	0.331
	[0.250]	[0.222]	[0.295]**	[0.251]	[0.246]	[0.245]	[0.261]
Human capital	0.676	1.478	1.593	1.613	1.461	2.080	2.570
	[0.832]	[0.906]	[0.866]*	[0.986]	[0.970]	[0.777]***	[0.708]***
Constant	3.116	1.986	0.907	2.855	0.232	1.834	2.467
	[2.487]	[2.212]	[2.490]	[2.777]	[2.260]	[2.327]	[2.141]
Observations	328	328	328	328	328	328	328
F	17.216	18.507	13.696	14.110	13.513	21.434	14.297
Hansen p-value	0.482	0.911	0.891	0.580	0.855	0.808	0.774
AR1 test p-value	0.000	0.000	0.001	0.000	0.001	0.002	0.001
AR2 test p-value	0.990	0.890	0.596	0.874	0.829	0.436	0.655
No of countries/instruments	73/66	73/66	73/66	73/66	73/66	73/66	73/66

The table reports regression results (significant coefficients are written bold) for one-step system GMM after excluding outliers using Hadi (1992) method and robust standard errors are in brackets. * p<0.10, ** p<0.05, *** p<0.01. Financial Development index here is obtained using PCA measures on six measures of financial development: Log of liquidity liability/GDP, log of deposit money bank assets/ deposit bank assets plus central bank assets, log of private credit/GDP, log of central bank assets/GDP, log of deposit money bank assets/ GDP, and log bank credit/bank deposit. Financial liberalisation index is taken from Abiad et al. (2008).

Table 8: Financial Liberalisation, Financial Development, and Economic Growth, one-step system GMM with PVT/Y without outliers

	Dependent Variable: GDP Per Capita Growth Rate						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FD	0.024 [0.013]*	0.051 [0.022]**	0.044 [0.031]	0.058 [0.030]*	0.031 [0.020]	0.057 [0.020]***	0.048 [0.025]*
Banking supervision	0.989 [0.466]**						
Banking supervision*FD	-0.011 [0.004]***						
Entry barriers		0.336 [0.388]					
Entry barriers*FD		-0.018 [0.008]**					
Credit controls			-0.247 [0.493]				
Credit controls*FD			-0.017 [0.011]				
Stock markets				1.117 [0.499]**			
Stock markets*FD				-0.021 [0.010]**			
Privatization					-0.016 [0.432]		
Privatization*FD					-0.017 [0.008]**		
Interest rate liberalisation						0.122 [0.401]	
Interest rate liberalisation*FD						-0.019 [0.007]***	
Capital controls							-0.358 [0.486]
Capital controls*FD							-0.016 [0.009]*
Log of initial GDPPC	-0.421 [0.354]	-0.292 [0.371]	-0.248 [0.393]	-0.563 [0.400]	0.049 [0.384]	-0.253 [0.371]	-0.255 [0.385]
Investment	0.262 [0.044]***	0.240 [0.041]***	0.269 [0.041]***	0.247 [0.041]***	0.268 [0.040]***	0.251 [0.039]***	0.265 [0.039]***
Trade openness	0.010 [0.009]	0.015 [0.009]	0.015 [0.010]	0.006 [0.010]	0.019 [0.009]**	0.016 [0.007]**	0.016 [0.009]*
Government size	-0.076 [0.080]	-0.043 [0.068]	-0.110 [0.066]*	-0.071 [0.066]	-0.037 [0.077]	-0.077 [0.070]	-0.087 [0.070]
Inflation (CPI)	0.539 [0.285]*	0.377 [0.265]	0.775 [0.347]**	0.409 [0.259]	0.521 [0.334]	0.569 [0.296]*	0.687 [0.271]**
Human capital	0.213 [0.183]	0.389 [0.183]**	0.522 [0.212]**	0.424 [0.223]*	0.301 [0.213]	0.400 [0.199]**	0.585 [0.196]**
Constant	-0.678 [1.979]	-2.267 [2.166]	-3.170 [2.229]	-1.343 [2.239]	-4.443 [2.175]**	-2.727 [2.092]	-3.587 [2.213]
Observations	346	346	346	346	346	346	346
F	14.287	14.410	12.464	16.384	14.549	16.165	13.547
Hansen p-value	0.749	0.560	0.969	0.906	0.934	0.653	0.775
AR1 test p-value	0.001	0.002	0.003	0.001	0.004	0.004	0.005
AR2 test p-value	0.889	0.947	0.535	0.984	0.827	0.645	0.841
No of countries/instruments	75/66	75/66	75/66	75/66	75/66	75/66	75/66

The table reports regression results (significant coefficients are written bold) for two-step system GMM after excluding outliers using Hadi (1992) method and robust standard errors are in brackets. * p<0.10, ** p<0.05, *** p<0.01. FD here is private credit/GDP ratio. FL index is taken from Abiad et al. (2008).

Table 9: Financial Liberalisation, Financial Development, and Economic Growth, one-step system GMM with LLR without outliers

	Dependent Variable: GDP Per Capita Growth Rate						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FD	0.023 [0.012]*	0.042 [0.019]**	0.010 [0.023]	0.045 [0.019]**	0.028 [0.013]**	0.051 [0.016]***	0.045 [0.018]**
Banking supervision	0.575 [0.604]						
Banking supervision*FD	-0.009 [0.007]						
Entry barriers		0.497 [0.475]					
Entry barriers*FD		-0.019 [0.009]**					
credit controls			-0.627 [0.567]				
Credit controls*FD			-0.001 [0.009]				
Stock markets				0.849 [0.505]*			
Stock markets*FD				-0.016 [0.008]**			
Privatization					0.204 [0.418]		
Privatization*FD					-0.016 [0.007]**		
Interest rate liberalisation						0.284 [0.445]	
Interest rate liberalisation*FD						-0.017 [0.006]***	
Capital controls							-0.063 [0.455]
Capital controls*FD							-0.016 [0.008]*
Log of initial GDPPC	-0.521 [0.368]	-0.359 [0.366]	-0.338 [0.380]	-0.414 [0.445]	-0.238 [0.344]	-0.324 [0.355]	-0.297 [0.357]
Investment	0.249 [0.042]***	0.237 [0.035]***	0.260 [0.040]***	0.248 [0.040]***	0.266 [0.041]***	0.258 [0.036]***	0.268 [0.040]***
Trade openness	0.011 [0.012]	0.015 [0.010]	0.008 [0.011]	0.008 [0.011]	0.016 [0.009]*	0.018 [0.009]*	0.013 [0.009]
Government size	-0.026 [0.077]	0.004 [0.067]	-0.045 [0.072]	-0.013 [0.069]	0.043 [0.073]	0.004 [0.069]	0.016 [0.063]
Inflation(CPI)	0.401 [0.303]	0.288 [0.318]	0.700 [0.374]*	0.274 [0.302]	0.262 [0.331]	0.315 [0.330]	0.406 [0.312]
Human capital	1.491 [0.922]	1.992 [0.902]**	2.021 [0.927]**	1.888 [0.982]*	1.833 [0.974]*	1.617 [0.908]*	2.240 [0.878]**
Constant	0.903 [2.867]	-0.522 [2.902]	0.659 [3.051]	-0.535 [3.228]	-1.520 [2.661]	-1.042 [2.673]	-1.224 [2.675]
Observations	337	337	337	337	337	337	337
F	16.828	18.788	12.637	17.433	16.501	18.618	18.605
Hansen p-value	0.607	0.685	0.724	0.760	0.783	0.832	0.874
AR1 test p-value	0.001	0.001	0.003	0.001	0.002	0.002	0.001
AR2 test p-value	0.947	0.807	0.697	0.945	0.850	0.940	0.921
No of countries/instruments	75/66	75/66	75/66	75/66	75/66	75/66	75/66

The table reports regression results (significant coefficients are written bold) for one-step system GMM after excluding outliers using Hadi (1992) method and robust standard errors are in brackets. * p<0.10, ** p<0.05, *** p<0.01. FD here is liquid liability ratio. FL index is taken from Abiad et al. (2008).

the same positive significant effect as in [Table 6](#). For our main FD indicator in [Table 7](#), it remains significant at 1% level for all seven components of financial liberalisation. This remains intact for two-step system GMM as well.

But unlike the aggregate measure of financial liberalisation, three out of seven of its components show direct significant impact on economic growth in [Table 7](#). While the coefficient of banking supervision is positive and significant at 5% level, credit control and capital control reforms show negative significant impact at 1% and 5% levels respectively. The rest of the components show no significant role in generating economic growth directly. In the case of private credit/GDP ratio, as reported in [Table 8](#), the signs and significance remain the same for banking supervision and capital control reforms, but credit control reforms lose its significance. Instead stock market shows positive effect at 5% significance level. For liquid liability ratio, the results are again different as shown in [Table 9](#). Here, banking supervision does not show any significant effect, while we again observe negative significant effect for capital control reforms. Like in the private credit/GDP ratio case, stock market reforms again shows positive significant effect.

The positive individual significant coefficient of banking supervision along with its negative interaction effect shows that a higher regulation up to a certain level has positive effects on economic growth, which shows that implementation of financial liberalisation policies with certain level of monitoring entails positive results in terms of higher level of long-run economic growth. This result makes perfect sense as certain level of banking supervision is necessary, but a very high level of the regulations may have adverse effects on the ability of banking sector to extend credit and to play its role in the economy and, therefore, may affect growth negatively. The negative significant coefficients for capital control reforms also suggest that there should be some control on capital movement internationally in order to achieve better effect of financial development and financial liberalisation.

4 Further Robustness

The foregoing analysis used the financial reform index calculated by [Abiad et al. \(2008\)](#) as the proxy for financial liberalisation where they calculated all components except banking supervision on the scale of 0-3, with higher value representing higher liberalisation (or, reform). But for banking supervision, they considered higher value as higher supervision (i.e., lower liberalisation). For this

reason, financial reform index may not fully represent financial liberalisation. In order to address this and to check for further robustness, we re-calculate the financial liberalisation index that includes all seven of the components used in our original index calculated by [Abiad et al. \(2008\)](#), but this new index scales banking supervision in reverse order. That is, higher value on 0-3 scale on new index shows lessening of banking supervision rather than increasing the banking supervision as reform– as proposed by [Abiad et al. \(2008\)](#) in their original index. As our main index of financial reform uses banking supervision in reverse order, showing higher value of supervision as reform, we reverse this component to construct an index to get pure liberalisation perspective. For our new index higher values for all components including banking supervision show higher level of openness/liberalisation.

Table 10: Estimates using financial liberalization index

	(1) One-step System GMM	(2) Two-step System GMM
FD	2.903 [0.918]***	3.146 [0.870]***
FL	0.324 [2.143]	-0.545 [1.752]
FL*FD	-3.290 [1.190]***	-3.569 [1.132]***
Log of initial GDPPC	-0.416 [0.481]	-0.391 [0.377]
Investment	0.239 [0.043]***	0.257 [0.044]***
Trade openness	-0.002 [0.011]	-0.008 [0.010]
Government size	-0.098 [0.096]	-0.113 [0.080]
Inflation (CPI)	0.368 [0.463]	0.399 [0.339]
Education	0.949 [1.079]	1.282 [0.827]
Constant	3.777 [4.141]	4.472 [3.138]
Observations	339	339
F	7.856	8.706
Hansen p-value	0.327	0.327
AR1 test p-value	0.000	0.001
AR2 test p-value	0.490	0.449
Number of countries	76	76
Number of instruments	66	66

Financial Liberalisation index is the normalised index incorporating our new supervision component. The reverse banking supervision is calculated by subtracting the actual value of the banking supervision indicator from its maximum value. The new banking supervision component ranges from 0-3. The value 0 shows the least highest amount of banking supervision and 3 shows the least banking supervision. Standard errors in brackets. * p<0.10, ** p<0.05, *** p<0.01

Table 10 shows the results for the financial liberalisation index using reversed banking supervision component without outliers using one-step and two-step system GMM in columns 1 and 2 respectively. As expected the coefficient of financial development is highly significant for both models showing positive relationship between financial development and long-run economic growth. The interaction term between the new financial liberalisation index and our measure of financial development consistently shows negative significant coefficient, which supports our main results that higher level of liberalisation reduces the positive effect of financial development on economic growth. The financial liberalisation index on its own is not significant and most of the controls appear with similar signs and significance as before.

5 Conclusion

In this paper we investigate the conditional effects of financial development on economic growth, using financial sector liberalization as a conditioning variable. More specifically, we study the implications of financial liberalization interacting with financial development in impacting on economic growth. Our aim is to combine financial development, financial liberalization and growth through two testable hypotheses: *first*, the relationship between financial development and economic growth is conditional upon the level of liberalization in the financial sector; and *second*, an excessive level of liberalization is associated with a weak or negative effect of financial development on economic growth.

We employ a comprehensive measure of financial development by applying PCA on the frequently used measures of financial development across the time, while for robustness we use two most prominent among them: private credit to GDP ratio and Liquid-Liability ratio. Further, we use a multiplicative interaction model to capture the conditional effects of financial development on growth which is estimated by employing one-step and two-step system GMM estimators to take account of country specific characteristics, as well as dynamics and endogeneity. We take care of influential outliers by applying the Hampel Identifier to the residuals obtained from each model.

Our regression results show that the marginal effects of financial development on economic growth is positive and significant, while the marginal effect of financial liberalization is generally insignificant. Further, the relationship between financial development and growth is conditional upon the level of financial liberalization; that is, it decreases as the level of liberalization increases

and even becomes negative at very high levels of liberalization. Thus, the negative interaction between financial development and financial liberalization suggests that at a very high level of liberalization adding more financial development may not be a growth promoting policy.

The results are consistent across all specifications with different definitions of financial development and for majority of the components of financial liberalisation index. Our results are also robust to the elimination of outliers and for our new index of financial liberalisation. The findings in this paper adds to the growing empirical work analysing the causes of the breakdown of the finance-growth relationship, particularly during the recent financial crisis. It suggests that relaxing the rules and regulations have amplified the impacts of inherent weaknesses in the financial system on the economies. The countries where financial liberalisation crosses a certain level the effect of financial development vanishes and can also become negative if financial liberalisation increases unabatedly.

On the policy front, our study suggests the followings: *first*, the governments should not go for excessive liberalization of the financial sector by removing the regulations too much in order to promote financial sector development with an expectation to foster growth; *second*, deregulation in the financial sector does not have automatic positive effect, instead government should always be watchful so that excessive liberalization does not take place.

References

- Abiad, A., Detragiache, E. and Tressel, T. (2008). A new database of financial reforms.
- Acharya, V. and Richardson, M. (2009). Causes of the financial crisis, *Critical Review* **21**(2-3): 195–210.
- Aghion, P., Howitt, P. and Mayer, D. (2005). The effect of financial development on convergence, *Quarterly Journal of Economics* .
- Allen, F., Qian, J. and Qian, M. (2005). Law, finance, and economic growth in china, *Journal of financial economics* **77**(1): 57–116.
- Ang, J. B. (2008). A survey of recent developments in the literature of finance and growth, *Journal of Economic Surveys* **22**(3): 536–576.
- Ang, J. and McKibbin, W. (2007). Financial liberalization, financial sector development and growth: evidence from malaysia, *Journal of Development Economics* **84**(1): 215–233.
- Arcand, J., Berkes, E. and Panizza, U. (2012). Too much finance, *Technical report*, IMF Working Paper WP/12/161 <http://www.imf.org/external/pubs/ft/wp/2012/wp12161.pdf>.

- Arellano, M. and Bond, S. (1991). Some tests of specification for panel data: Monte carlo evidence and an application to employment equations, *The Review of Economic Studies* **58**(2): 277–297.
- Arellano, M. and Bover, O. (1995). Another look at the instrumental variable estimation of error-components models, *Journal of econometrics* **68**(1): 29–51.
- Arestis, P. (2006). 21 financial liberalization and the relationship between finance and growth, *A Handbook of Alternative Monetary Economics* p. 346.
- Arestis, P. and Demetriades, P. (1997). Financial development and economic growth: Assessing the evidence*, *The Economic Journal* **107**(442): 783–799.
- Ayhan Kose, M., Prasad, E. and Terrones, M. (2009). Does openness to international financial flows raise productivity growth?, *Journal of International Money and Finance* **28**(4): 554–580.
- Bandiera, O., Caprio, G., Honohan, P. and Schiantarelli, F. (2000). Does financial reform raise or reduce saving?, *Review of Economics and Statistics* **82**(2): 239–263.
- Barro, R. J. and Lee, J. W. (2013). A new data set of educational attainment in the world, 1950–2010, *Journal of development economics* **104**: 184–198.
- Beck, T., Demirguc-Kunt, A. and Levine, R. (2009). Financial institutions and markets across countries and over time-data and analysis.
- Beck, T. and Levine, R. (2002). Industry growth and capital allocation:: does having a market-or bank-based system matter?, *Journal of Financial Economics* **64**(2): 147–180.
- Beck, T. and Levine, R. (2004). Stock markets, banks, and growth: Panel evidence, *Journal of Banking & Finance* **28**(3): 423–442.
- Beck, T., Levine, R. and Loayza, N. (2000). Finance and the sources of growth, *Journal of financial economics* **58**(1): 261–300.
- Beck, T. et al. (2000). *Financial structure and economic development: Firm, industry, and country evidence*, Vol. 2423, World Bank Publications.
- Bekaert, G., Harvey, C. and Lundblad, C. (2011). Financial openness and productivity, *World Development* **39**(1): 1–19.
- Bencivenga, V. and Smith, B. (1991). Financial intermediation and endogenous growth, *The Review of Economic Studies* **58**(2): 195–209.
- Benhabib, J. and Spiegel, M. M. (2000). The role of financial development in growth and investment, *Journal of economic growth* **5**(4): 341–360.
- Bond, S., Hoeffler, A. and Temple, J. (2001). Gmm estimation of empirical growth models.
- Caprio, G., Klingebiel, D., Laeven, L. and Noguera, G. (2005). Banking crisis database, *systemic financial crises: containment and Resolution* pp. 307–40.
- Cojocar, L., Hoffman, S. and Miller, J. (2011). Financial development and economic growth in transition economies: Empirical evidence from the cee and cis countries.

- Crotty, J. (2009). Structural causes of the global financial crisis: a critical assessment of the 'new financial architecture', *Cambridge Journal of Economics* **33**(4): 563–580.
- Deidda, L. and Fattouh, B. (2002). Non-linearity between finance and growth, *Economics Letters* **74**(3): 339–345.
- Demetriades, P. and Hussein, K. (1996). Does financial development cause economic growth? time-series evidence from 16 countries, *Journal of development economics* **51**(2): 387–411.
- Demetriades, P. and Rousseau, P. (2011). The changing face of financial development.
- Diaz-Alejandro, C. (1985). Good-bye financial repression, hello financial crash, *Journal of development Economics* **19**(1): 1–24.
- Easterly, W., Islam, R. and Stiglitz, J. E. (2001). Shaken and stirred: explaining growth volatility, *Annual World Bank conference on development economics*, Vol. 191, p. 211.
- Edison, H. J. and Warnock, F. E. (2003). A simple measure of the intensity of capital controls, *Journal of Empirical Finance* **10**(1): 81–103.
- Favarra, G. (2003). An empirical reassessment of the relationship between finance and growth, *Technical report*, International Monetary Fund.
- Gabel, I. (1995). Speculation-led economic development: a post-keynesian interpretation of financial liberalization programmes in the third world, *International Review of Applied Economics* **9**(2): 127–149.
- Grant, J. (2010). What the financial services industry puts together let no person put asunder: How the Gramm-Leach-Bliley Act contributed to the 2008-2009 American capital markets crisis, *Albany Law Review*.
- Greenwood, J. and Jovanovic, B. (1990). Financial development, growth, and the distribution of income, *The Journal of Political Economy* **98**(5 Part 1): 1076–1107.
- Guariglia, A. and Poncet, S. (2008). Could financial distortions be no impediment to economic growth after all? evidence from China, *Journal of Comparative Economics* **36**(4): 633–657.
- Hadi, A. S. (1992). Identifying multiple outliers in multivariate data, *Journal of the Royal Statistical Society. Series B (Methodological)* pp. 761–771.
- Hadi, A. S., Imon, A. and Werner, M. (2009). Detection of outliers, *Wiley Interdisciplinary Reviews: Computational Statistics* **1**(1): 57–70.
- Hansen, L. P. (1982). Large sample properties of generalized method of moments estimators, *Econometrica: Journal of the Econometric Society* pp. 1029–1054.
- Hellmann, T. and Murdock, K. (1995). *Financial Sector Development Policy: The Importance of Reputational Capital and Governance*, Graduate School of Business, Stanford University.
- Holzmann, R. (1997). Pension reform, financial market development, and economic growth: preliminary evidence from Chile, *Staff Papers-International Monetary Fund* pp. 149–178.
- Huang, Y. (2011). *Determinants of Financial Development*, Palgrave Macmillan.

- Jappelli, T. and Pagano, M. (2000). Saving, growth, and liquidity constraints, *The Quarterly Journal of Economics* **109**(1): 83–109.
- Jarrow, R. A. (2014). Financial crises and economic growth, *The Quarterly Review of Economics and Finance* **54**(2): 194–207.
- Kaminsky, G. and Schmukler, S. (2008). Short-run pain, long-run gain: Financial liberalization and stock market cycles*, *Review of Finance* **12**(2): 253–292.
- King, R. and Levine, R. (1993a). Finance and growth: Schumpeter might be right, *The Quarterly Journal of Economics* **108**(3): 717–737.
- King, R. and Levine, R. (1993b). Finance, entrepreneurship and growth, *Journal of Monetary economics* **32**(3): 513–542.
- Laeven, L., Igan, D., Claessens, S. and Dell’Ariccia, G. (2010). Lessons and policy implications from the global financial crisis, *Technical report*, International Monetary Fund.
- Levine, R. (1997). Financial development and economic growth: views and agenda, *Journal of economic literature* **35**(2): 688–726.
- Levine, R., Loayza, N. and Beck, T. (2000). Financial intermediation and growth: Causality and causes, *Journal of monetary Economics* **46**(1): 31–78.
- Lucas, R. (1988). On the mechanics of economic development, *Journal of monetary economics* **22**(1): 3–42.
- McKinnon, R. (1973). *Money and capital in economic development*, Brookings Institution Press.
- Móczár, J. (2010). Anatomy and lessons of the global financial crisis, *Public Finance Quarterly* **55**(4): 753–775.
- Odedokun, M. (1996). Alternative econometric approaches for analysing the role of the financial sector in economic growth: Time-series evidence from ldc’s, *Journal of Development Economics* **50**(1): 119–146.
- Porta, R., Lopez-de Silanes, F., Shleifer, A. and Vishny, R. (1996). Law and finance, *Technical report*, National Bureau of Economic Research.
- Rajan, R. G. and Subramanian, A. (2005). What undermines aid’s impact on growth?, *Technical report*, National Bureau of Economic Research.
- Rioja, F. and Valev, N. (2007). Finance and the sources of growth at various stages of economic development, *Economic Inquiry* **42**(1): 127–140.
- Roe, M. and Siegel, J. (2008). Political instability’s impact on financial development, *Harvard Law and Economics Discussion Paper* (570).
- Roodman, D. (2006). How to do xtabond2: An introduction to difference and system gmm in stata, *Center for Global Development working paper* (103).
- Roodman, D. (2009). A note on the theme of too many instruments*, *Oxford Bulletin of Economics and Statistics* **71**(1): 135–158.

- Rousseau, P. and Wachtel, P. (2000). Equity markets and growth: Cross-country evidence on timing and outcomes, 1980–1995, *Journal of Banking & Finance* **24**(12): 1933–1957.
- Rousseau, P. and Wachtel, P. (2011). What is happening to the impact of financial deepening on economic growth?, *Economic Inquiry* **49**(1): 276–288.
- Schumpeter, J. (1934). *The theory of economic development: an inquiry into profits, capital, credit, interest and the business cycle* (R. Opie, Trans.), Harvard University Press, Cambridge, MA.
- Shaw, E. (1973). *Financial deepening in economic development*, Vol. 39, Oxford University Press New York.
- Sinha, A., Kumar, R. and Dhal, S. (2012). Financial sector regulation and implications for growth, *BIS Papers* (62).
- Soto, M. et al. (2009). System gmm estimation with a small sample.
- Stulz, R. (1999). Globalization of equity markets and the cost of capital, *Technical report*, National Bureau of Economic Research.
- Tressel, T. and Detragiache, E. (2008). Do financial sector reforms lead to financial development? evidence from a new dataset, *IMF Working Papers* pp. 1–42.

6 Appendix

Table 11: List of Sample Countries

1	Albania	45	Kazakhstan
2	Algeria	46	Kenya
3	Argentina	47	Korea
4	Australia	48	Kyrgyz Republic
5	Austria	49	Latvia
6	Azerbaijan	50	Lithuania
7	Bangladesh	51	Madagascar
8	Belarus	52	Malaysia
9	Belgium	53	Mexico
10	Bolivia	54	Morocco
11	Brazil	55	Mozambique
12	Britain	56	Nepal
13	Bulgaria	57	Netherlands
14	Cameroon	58	New Zealand
15	Canada	59	Nicaragua
16	Chile	60	Nigeria
17	China	61	Norway
18	Colombia	62	Pakistan
19	Costa Rica	63	Paraguay
20	Czech Republic	64	Peru
21	Denmark	65	Philippines
22	Dominican Republic	66	Poland
23	Ecuador	67	Portugal
24	Egypt	68	Romania
25	El Salvador	69	Russia
26	Estonia	70	Senegal
27	Ethiopia	71	Singapore
28	Finland	72	South Africa
29	France	73	Spain
30	Georgia	74	Sri Lanka
31	Germany	75	Sweden
32	Ghana	76	Switzerland
33	Greece	77	Tanzania
34	Guatemala	78	Thailand
35	Hong Kong	79	Tunisia
36	Hungary	80	Turkey
37	India	81	Uganda
38	Indonesia	82	Ukraine
39	Ireland	83	United States
40	Israel	84	Uruguay
41	Italy	85	Uzbekistan
42	Jamaica	86	Venezuela
43	Japan	87	Vietnam
44	Jordan	88	Zimbabwe

Table 12: Data Appendix

Variables	Definition	Source
GDP per capita growth rate	GDP growth per capita at constant pricess in local currency	World Bank
Financial Reform Index		
Credit Controls	Credit restriction to certain sectors and high reserve requirements from central bank	Abiad et al.(2008)
Interest Rate Controls	Whether interest rates are “administratively set including whether the government directly controls interest rates, or whether floors, ceilings, or interest rate bands exist.”	Abiad et al.(2008)
Entry Barriers	Whether there is restrictions on entry of foreign banks , scope of banks and geographic areas	Abiad et al.(2008)
State Ownership in the Banking Sector	Whether the state owns banks. The database is coded as “threshold of 50 %, 25% and 10% to delineate the grades between full repression and full liberalisation”	Abiad et al.(2008)
Capital Account Restrictions	Whether restrictions on international financial transactions are imposed	Abiad et al.(2008)
Prudential Regulations and Supervision	Whether “country adopts risk-based capital adequacy ratios based on the Basel I capital accord”	Abiad et al.(2008)
Sec Market Policies	Whether government encourages or restricts development of securities markets	Abiad et al.(2008)
Liquid Liabilities/ GDP (%)	Ratio of liquid liabilities to GDP	Beck et al. (2009)
Dep bank assets/dep bank+central bank assets	Ratio of deposit money bank claims on domestic nonfinancial real sector (as defined above) to the sum of deposit money bank and Central Bank claims on domestic nonfinancial real sector (as defined above)	Beck et al. (2009)
Bank Pvt Credit/GDP	Private credit by deposit money banks to GDP	Beck et al. (2009)
Cent bank asset/GDP	Claims on domestic real nonfinancial sector by the Central Bank as a share of GDP	Beck et al. (2009)
Deposit Money bank asse/ GDP	Claims on domestic real nonfinancial sector by deposit money banks as a share of GDP	Beck et al. (2009)
Bank Credit/Bank Dep	Private credit by deposit money banks as a share of demand, time and saving deposits in deposit money banks	Beck et al. (2009)
Government size	General government final consumption expenditure (% of GDP)	World Bank
Trade openness	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product	World Bank
Investment Growth	Gross capital formation at constant price in local currency (annual % growth)	World Bank
Inflation	Log of 1+Consumer price index (2005 = 100)	World Bank
Human capital	Log of average year of secondary schooling	Barro and Lee (2013)

Table 13: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
GDP per capita growth rate	1.864	4.769	-45.32	25.113	2644
Financial Reform Index	0.496	0.304	0	1	2572
Financial Development					
Liquid Liabilities/ GDP (%)	48.534	34.513	0.025	255.936	2259
Dep bank assets/dep bank+central bank assets	81.956	18.358	9.122	100	2397
Bank Pvt Credit/GDP	40.316	34.926	0.005	200.988	2331
Cent bank asset/GDP	7.428	8.964	0	77.092	2239
Deposit Money bank asset/ GDP	49.933	40.11	0.001	251.553	2337
Bank Credit/Bank Dep	102.612	53.623	5.962	615.721	2478
Control Variables					
Government size	14.98	5.819	1.375	43.479	2573
Trade openness	66.689	48.757	6.320	430.563	2595
Investment Growth	4.896	19.079	-376.2	223.084	2354
Inflation	47.253	34.904	0	115.871	2426

Table 14: Cross-correlation table for components of FD

Variables	LL/Y	BA/BCBA	PVT/Y	CBA/Y	DBA/Y	BC/BD
LL/Y	1.0000					
BA/BCBA	0.3747 (0.0000)	1.0000				
PVT/Y	0.8722 (0.0000)	0.5473 (0.0000)	1.0000			
CBA/Y	0.2181 (0.0000)	-0.5610 (0.0000)	-0.0704 (0.1679)	1.0000		
DBA/Y	0.9390 (0.0000)	0.4929 (0.0000)	0.9433 (0.0000)	0.1079 (0.0341)	1.0000	
BC/BD	0.1163 (0.0236)	0.2660 (0.0000)	0.5281 (0.0000)	-0.2475 (0.0000)	0.3042 (0.0000)	1.0000

¹ LL/Y=Log of Liquid Liabilities to GDP Ratio

² BA/BCBA =Log of Deposits money bank assets to deposit money bank assets and central bank

³ PVT/Y=Log of Bank private credit to GDP ratio

⁴ CBA/Y=Log of Central bank assets to GDP ratio

⁵ DBA/Y=Log of Deposits money bank assets to GDP ratio

⁶ BC/BD=Log of bank credit to bank deposit ratio

⁷ p-values in bracket

Table 15: Cross-correlation table

Variables	D.Credit	Cr. Ceilings	Cr. Controls	I.R controls	Entry Barriers	Supervision	Privatization	Int.Capital	Sec. Markets
D. Credit	1.000								
Cr. Ceilings	0.408 (0.0000)	1.000							
Cr. Controls	0.972 (0.000)	0.686 (0.000)	1.000						
I. R controls	0.619 (0.000)	0.576 (0.000)	0.658 (0.000)	1.000					
Entry Barriers	0.538 (0.000)	0.403 (0.000)	0.577 (0.000)	0.560 (0.000)	1.000				
Supervision	0.581 (0.000)	0.471 (0.000)	0.611 (0.000)	0.584 (0.000)	0.571 (0.000)	1.000			
Privatization	0.487 (0.000)	0.297 (0.000)	0.496 (0.000)	0.442 (0.000)	0.426 (0.000)	0.485 (0.000)	1.000		
Int. Capital	0.556 (0.000)	0.469 (0.000)	0.595 (0.000)	0.598 (0.000)	0.513 (0.000)	0.573 (0.000)	0.521 (0.000)	1.000	
Sec. Markets	0.601 (0.000)	0.502 (0.000)	0.639 (0.000)	0.624 (0.000)	0.553 (0.000)	0.641 (0.000)	0.496 (0.000)	0.676 (0.000)	1.000

D.Credit=Directed Credit

Cr. Ceilings= Credit Ceilings

I.R.Controls=Interest Rate Controls

Table 16: Cross-correlation table

Variables	GDPPCG	LLYo	FL	FD	Inv	TO	G	Inflation	Education
GDPPCG	1.0000								
LLYo	0.0742 (0.1082)	1.0000							
FL	0.2074 (0.0000)	0.5640 (0.0000)	1.0000						
FD	0.2666 (0.0000)	0.6378 (0.0000)	0.3740 (0.0000)	1.0000					
Inv	0.5462 (0.0000)	-0.1577 (0.0011)	0.0152 (0.7554)	-0.1220 (0.0192)	1.0000				
TO	0.1513 (0.0009)	0.2388 (0.0000)	0.3528 (0.0000)	0.1959 (0.0001)	0.0107 (0.8242)	1.0000			
G	-0.0962 (0.0362)	0.4509 (0.0000)	0.3073 (0.0000)	0.2743 (0.0000)	-0.1849 (0.0001)	0.1123 (0.0151)	1.0000		
Inflation	0.3163 (0.0000)	0.2597 (0.0000)	0.6637 (0.0000)	0.4062 (0.0000)	0.1133 (0.0239)	0.2585 (0.0000)	-0.0339 (0.5034)	1.0000	
Education	0.0252 (0.5894)	0.7116 (0.0000)	0.6584 (0.0000)	0.3814 (0.0000)	-0.1184 (0.0157)	0.2333 (0.0000)	-0.2605 (0.0000)	0.3774 (0.0000)	1.0000

Note: GDPPCG=GDP per capita growth rate; LLYo =log of initial GDP per capita; FD=Financial Development; FD=Financial Development; Inv=Investment; TO=Trade openness; G=Size of Government. p-values in bracket.