2008

Financial Development and Openness: Evidence from Panel Data

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ISSN: 1525-3066

Center for Policy Research
Working Paper No. 107

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June 2008

$5.00

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Abstract

This paper addresses the empirical question of whether trade and financial openness can help explain the recent pace in financial development, as well as its variation across countries in recent years. Utilising annual data from developing and industrialised countries and dynamic panel estimation techniques, we provide evidence which suggests that both types of openness are statistically significant determinants of banking sector development. Our findings reveal that the marginal effects of trade (financial) openness are negatively related to the degree of financial (trade) openness, indicating that relatively closed economies stand to benefit most from opening up their trade and/or capital accounts. Although these economies may be able to accomplish more by taking steps to open *both* their trade and capital accounts, opening up one without the other could still generate gains in terms of banking sector development. Thus, our findings provide only partial support to the well known Rajan and Zingales hypothesis, which stipulates that both types of openness are necessary for financial development to take place.

JEL Classification: F19 and G29

Keywords: Financial development, Trade Openness, Financial Openness, Financial Liberalization, Dynamic Panel Data Analysis.

We acknowledge financial support from the ESRC under the World Economy and Finance Research Programme (Award RES-156-25-0009). We are grateful to the editors and two anonymous referees of this journal for many helpful comments. We would also like to thank our discussant, Sebnem Kalemli-Ozkan, and other participants at the conference "New Perspectives on Financial Globalization" (IMF, 26-27 April 2007) for insightful comments. We would also like to thank participants at the 21st Annual Congress of the European Economic Association (Vienna, 24-28 August, 2006), the Money, Macro and Finance Research Group Annual Conference (York, 13-15 September 2006) and the Corporate Governance Workshop (Cambridge, 24-25 March 2007), where earlier versions of the paper were presented. We also thank seminar participants at the Universities of Canterbury, Leicester, Manchester and Otago for useful comments. Special thanks are due to Svetlana Andrianova, Danny Cassimon, Stijn Claessens, Simon Deakin, David Fielding, Alessandra Guariglia, Kyriakos Neanidis and Bob Reed. Naturally, all remaining errors are our own.

1. Introduction

It is now widely accepted that financial development constitutes a potentially important mechanism for long run growth (Levine, 2003; Demetriades and Andrianova 2004; Demetriades and Hussein, 1996; Goodhart, 2004).[1] The frontier of the literature in this field is, therefore, shifting towards providing answers to the question of why some countries are more financially developed than others. One influential contribution in this literature, which is the main focus of our paper, is the hypothesis put forward by Rajan and Zingales (2003). These authors argue that interest groups and, in particular, industrial and financial incumbents frequently stand to lose from financial development. This is because financial development creates opportunities for new firms to become established, which breeds competition and erodes incumbents' rents. They suggest that incumbents' opposition to financial development will be weaker when an economy is open to *both* trade and capital flows. Not only does trade and financial openness limit the ability of incumbents to block the development of financial markets but may also create incentives for them to adopt a different stance towards financial development. Importantly, Rajan and Zingales (2003) suggest that trade openness without financial openness is unlikely to deliver financial development. If anything, they argue that it is likely to result in greater financial repression and loan subsidies, so that industrial incumbents obtain sufficient cheap finance to face competition. Similarly, they also suggest that financial openness alone may allow the largest domestic firms to tap foreign funds – which they may not need – but will not allow small or potential domestic firms access to funds. The domestic financial sector may see its profits threatened since industrial incumbents have access to international finance and may therefore push for liberalising access. However, it will face opposition by industrial incumbents who will continue to oppose financial development in order to prevent competition. Thus, "…cross border capital flows alone are unlikely to convince both our interest groups to push for financial development."(Rajan and Zingales 2003, p.22). Their analysis, therefore, suggests that the simultaneous opening of *both* trade and capital accounts holds the key to successful financial development.[2] This is clearly an important prediction of their hypothesis that lends itself to rigorous empirical analysis using modern econometric methods and data.

[1] Other fundamental mechanisms of growth include economic institutions, such as property rights. Claessens and Laeven (2003), for example, provide firm level evidence which suggests that the effect of better property rights on growth is as large as the effect of improved access to financing due to greater financial development. It has also been argued that where property rights are weak, financial development may not be sufficient to promote growth. Weak property rights may discourage investment even when bank loans are available (see Johnson, McMillan and Woodruff, 2002).

[2] The Rajan and Zingales hypothesis, by highlighting the necessity of simultaneous current account and capital account openness for financial development to take place contrasts sharply with the sequencing literature, which advocates that trade liberalisation should

Albeit an important question, the empirical evidence on the openness hypothesis remains relatively thin. The evidence provided by Rajan and Zingales (2003) is geared towards their main aim of explaining reversals in financial development during 1913-1999. As a result, their investigation is limited to a sample of twenty four, mostly industrialised, countries for which they could get data prior to World War II. Limited data availability also meant that the techniques that could be used could not take advantage of the time series variation available in more recent samples. Notwithstanding the importance and contribution of their empirical exercise, their cross-country snapshots at specific points in time do not take full advantage of the time dimension to explain the variation of financial development over time. Other authors have examined some aspects of the hypothesis using larger samples but have not examined the openness hypothesis directly.[3]

This paper represents an attempt to provide direct evidence on the openness hypothesis using modern panel data techniques, which take full advantage of the time series variation available in recent samples. To this end, the paper addresses the empirical question of whether trade and capital account openness can help explain the recent pace in financial development, as well as its variation across countries in recent years.[4] It also addresses the related question of whether the simultaneous opening of both the trade and capital accounts is necessary to promote financial development.

Our empirical approach involves regressing two of the most important indicators of financial development - private credit and stock market capitalization - on measures of trade and capital

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precede financial liberalisation and that capital account opening should be the last stage in the liberalisation process (e.g. McKinnon, 1991).

[3] Chinn and Ito (2006) find that capital account liberalization spurs equity market development once a threshold level of legal development has been attained, but do not test the simultaneous openness hypothesis. Beck (2003) shows that countries with better-developed financial systems have higher shares of manufactured exports in GDP and in total merchandise exports. Svaleryd and Vlachos (2002) find that there is a positive interdependence between financial development and liberal trade policies. Levine (2001) finds that liberalising restrictions on international portfolio flows tends to enhance stock market liquidity, and allowing greater foreign bank presence tends to enhance the efficiency of the domestic banking system. Klein and Olivei (1999) show that capital account liberalisation has a substantial impact on growth via the deepening of a country's financial system in highly industrialised countries, but find little evidence of financial liberalisation promoting financial development outside the OECD. Huang and Temple (2005) focus on the relationship between financial development and trade openness, but do not take into account capital account openness. There is also a large micro-literature investigating peripheral questions such as the impact of foreign bank entry on domestic banks (Claessens et al, 2001), the effects of stock market liberalization on equity prices (Henry, 2000), the impact of capital account liberalization on economic growth (Bekaert, Harvey and Lundblad, 2001).

[4] The importance of understanding the factors behind the pace in financial development in recent periods, alongside those that shape the cross-country variation, cannot be overemphasised. Consider, for example, the case of South Korea, a well known success story in terms of financial and economic development. During 1960-2004, South Korea's ratio of private credit to GDP rose from 12.3 per cent to 98.21 per cent, representing an eight-fold increase in one of the most important indicators of financial development in less than half a century. This massive leap forward constitutes a significant closing of the gap between South Korea and the 15 high income OECD countries, whose private credit to GDP ratio climbed from 66 per cent of GDP in 1960 to 185 per cent of GDP in 2004. As a result, South Korea's credit to GDP ratio rose from 18% of the average of the world leaders in 1960 to 53% by 2004. While it may be argued that Korea's spectacular financial development was exceptional, even the worldwide average of private credit to GDP increased by 54% during the same period. This figure, however, masks wide regional variation from 435% in South Asia to 165% in North Africa-Middle East and 37% in the Latin American-Caribbean region.

account openness, conditioning on variables suggested by related literature. In order to provide evidence on the simultaneous openness hypothesis, we interact the two openness terms, which allows us to examine whether the impact of one type of openness depends on the degree of the other type of openness. We use annual data in order to maximise sample size and to identify the parameters of interest more precisely.[5] Because of this, it is essential that we allow for dynamics in the behaviour of the financial development indicators, to capture the possibility of partial adjustment towards the steady-state. We do this by entering a lagged dependent variable on the right hand side, which, in turn, has implications for the choice of estimator. The preferred estimator in these circumstances is dynamic Generalised Method of Moments (GMM) developed by Arellano and Bond (1991), which differences the model to get rid of any country specific time invariant variable. For comparison purposes we also report estimates using the fixed effects (within) estimator, even though in dynamic panels this is biased of order 1/T.

The openness hypothesis, as advocated Rajan and Zingales (2003), recognises that the decision to open an economy to trade and capital flows may be a political one. Thus, the correlation between openness measures – whether 'de facto' or 'de jure' - and financial development may reflect a common driving force, such as incumbents favouring both openness and financial development. Because of this, tests of the hypothesis should try to establish whether countries that happen to be more open to trade and capital flows due to factors beyond their control are also countries that are more financially developed. We therefore take several steps to ensure that our estimates capture the influence of the exogenous component of openness. To start with, the dynamic GMM estimator that we use eliminates any endogeneity that may be due to the correlation of country-specific, time-invariant, factors and the right hand side regressors. In addition, in the regressions in which we treat the openness terms as exogenous we use their lagged values to prevent simultaneity or reverse causality. Furthermore, we also report results in which we treat all the openness terms as endogenous using additional instruments suggested by related literature. These instruments include the trade openness of neighbouring countries and US capital flows, which are plausible exogenous drivers of a country's trade and financial openness, respectively, and are unlikely to be correlated with its financial development.

Our findings provide partial support to the Rajan and Zingales hypothesis. Specifically, while we find that both types of openness are statistically significant determinants of banking sector

[5] By contrast, Chinn and Ito (2006), who explore similar questions to ours, average out the annual data over five year periods, which results in an 80% reduction of their sample. This could explain why most of their variables are statistically insignificant.

development, our findings also suggest that the marginal effects of trade (financial) openness are negatively related to the degree of financial (trade) openness. Hence, while closed economies can benefit most by opening up both their trade and capital accounts, we do not find any evidence to suggest that opening up one without the other could have a negative impact on financial sector development. Indeed, we find that there are positive benefits to be had from doing so, particularly for the most closed economies in our sample.

The paper is organised as follows. Section 2 outlines our empirical strategy, which encompasses specifying an appropriate dynamic model and estimation method. Section 3 describes the various data sets that are utilised in the estimation of the model. Section 4 reports and discusses the econometric results, reports robustness checks, makes comparisons to related literature, and outlines the main policy implications of our findings. Finally, Section 5 summarises and concludes.

2. Empirical Strategy

A Dynamic Empirical Model

Our empirical specification is aimed at explaining the pace in financial development and its variation across countries by utilising an empirical model that allows the testing of the main hypothesis of interest. Given this aim, our empirical strategy endeavours to make maximum use of both the time and cross-country dimensions of available data sets, which dictates using data at an annual frequency in the estimation.[6] Using annual data for estimation purposes necessitates making an allowance for the possibility that the annual observations on financial development may not represent long run equilibrium values in any given year, because of slow adjustment to changes in other variables.[7] To allow for the possibility of partial adjustment, we specify a dynamic log-linear equation for financial development which includes a lagged dependent variable. Our empirical model is therefore as follows:

$$\ln FD_{it} = \beta_0 + \gamma \ln FD_{it-1} + \beta_1 \ln Y_{it-1} + \beta_2 \ln TO_{it-1} + \beta_3 \ln FO_{it-1} + \beta_4 \{\ln FO_{it-1} \text{ x } \ln TO_{it-1}\} + u_{it} \quad (1)$$

[6] Our empirical strategy differs from much of the empirical growth literature, which typically averages out data over five or ten year horizons, which is aimed at capturing the steady state relationship between the variables on hand. However, averaging out need not always capture the steady state equilibrium while the smoothing out of time series data removes useful variation from the data, which could help to identify the parameters of interest with more precision.

[7] Financial development indicators that are asset based are likely to display considerable persistence: the size of the banking system or the stock market in any given year is history dependent. Even flow variables, such as bank credit, are likely to display persistence from year to year. A bank's customer base largely determines the demand for loans and that is not expected to fluctuate much from year to year. The same is true of bank loan supply, which depends on the bank's scale of operations (e.g. size of balance sheet, number of branches etc), which is likely to display persistence.

where *FD* is an indicator of financial development, *Y* is per capita income, *TO* is trade openness, *FO* is financial openness and u is an error term that contains country and time specific fixed effects:

$$u_{it} = \mu_i + \varepsilon_t + \nu_{it}$$

where the ν_{it} are assumed to be independent and identically distributed with mean zero and variance σ_v^2.

Hypothesis Testing and Policy Implications

Equation (1) postulates that financial development is determined by the variables of interest – trade and financial openness – alongside a set of conditioning variables, which include: the past history of financial development, summarised by the lagged dependent variable, the stage of economic development, captured by per capita income, and all time-invariant country specific factors, including geography, climate, ethno-linguistic characteristics, as well as all unchanging political economy factors. In addition, we also include an indicator of institutional quality, as an additional conditioning variable suggested by related literature (e.g. Acemoglu *et al*, 2004; Andrianova *et al*, 2008).

The interaction term between trade and financial openness is expected to shed light on the simultaneous openness hypothesis. At the margin, the total effect of increasing trade and/or financial openness can be calculated by examining the partial derivatives of financial development with respect to each of the openness variables:

$$\frac{\partial \ln FD_{it}}{\partial \ln TO_{it-1}} = \beta_2 + \beta_4 \ln FO_{it-1} \qquad (2)$$

$$\frac{\partial \ln FD_{it}}{\partial \ln FO_{it-1}} = \beta_3 + \beta_4 \ln TO_{it-1} \qquad (3)$$

The loose version of the openness hypothesis – more of either type of openness increases financial development - is satisfied if both derivatives are positive. A small increase in either trade or financial openness would then result in greater financial development. This would certainly be the case if β_2, β_3 and β_4 are all positive. If on the other hand, one or more of these coefficients is negative while the others are positive – as indeed is suggested by our empirical results – the derivatives would need to be evaluated within the sample, given that they vary with the degree of openness.

The strict version of the openness hypothesis requires that the marginal effect of trade openness be non-positive when the capital account is relatively closed. This is because when an economy opens up to trade when its capital account is closed, Rajan and Zingales (2003) suggest that there will be calls for additional financial repression to protect industrial incumbents, which would prevent financial development from taking off. Similarly, the marginal effects of financial openness are expected to be negative or zero when an economy is not open to trade. These two predictions provide relatively straightforward tests of the strict version of the openness hypothesis. We examine these questions by calculating the partial derivatives at the minimum levels of trade and capital account openness within our sample. If the marginal effects of trade and financial openness turn out to be positive in the most closed economies in our (post-1980s) sample, then we can conclude that the strict version of the hypothesis is refuted (or, at least, is not relevant to contemporary economies).[8] Conversely, the evidence would be interpreted as supportive of the strict version of the hypothesis if the marginal effects of trade (financial) openness at the minimum levels of financial (trade) openness are found to be negative or zero.

An interesting scenario with these tests – which, to anticipate our findings, is the most relevant for us - is the case in which both partial derivatives are positive in relatively closed economies but may be negative in economies that are already open. This means that as far as closed economies are concerned, opening *both* the trade and capital accounts will have a larger impact on financial development than opening one of the two accounts. In other words, 'simultaneous' opening could have a large positive impact on financial development, which is one of the main predictions of the hypothesis. On the other hand, opening one account without opening the other can still help to enhance financial development. Such a scenario suggests that the simultaneous opening of both trade and capital accounts is a sufficient but not a necessary condition for financial development to take place. We interpret such evidence as providing partial support to the Rajan and Zingales hypothesis.

A final comment that needs to be made on the interpretation of the estimated coefficients is that the presence of the lagged dependent variable in the model means that all the estimated beta

[8] These tests should be interpreted carefully given that our datasets start in 1980 and finish in 1996 or 2003, in contrast to the samples used by Rajan and Zingales, which include the early part of the 20th century. Our preferred interpretation of these tests is that they provide evidence whether the openness hypothesis is relevant to contemporary economies; even though the hypothesis may be refuted today, it could still explain what has happened in earlier periods.

coefficients represent short-run effects. The long-run effects can be derived by dividing each of the betas by 1- γ, the coefficient of the lagged dependent variable.

Dynamic Panel GMM Estimation

The inclusion of the lagged dependent variable in the empirical model implies that there is correlation between the regressors and the error term since lagged financial development depends on u_{it-1} which is a function of the μ_i - the country specific effect. Because of this correlation, dynamic panel data estimation of equation (1) suffers from the Nickell (1981) bias, which disappears only if T tends to infinity. The preferred estimator in this case is GMM suggested by Arellano and Bond (1991), which basically differences the model to get rid of country specific effects or any time invariant country specific variable. This also eliminates any endogeneity that may be due to the correlation of these country specific effects and the right hand side regressors.[9]

The moment conditions utilize the orthogonality conditions between the differenced errors and lagged values of the dependent variable. This assumes that the original disturbances in (1) – the ν_{it} - are serially uncorrelated and that the differenced error is, therefore, MA(1) with unit root. To this end, two diagnostics are computed using the Arellano and Bond GMM procedure to test for first order and second order serial correlation in the disturbances. One should reject the null of the absence of first order serial correlation and not reject the absence of second order serial correlation.

A special feature of dynamic panel data GMM estimation is that the number of moment conditions increases with T. Therefore, a Sargan test is performed to test the over-identification restrictions. There is convincing evidence that too many moment conditions introduce bias while increasing efficiency. It is, therefore, suggested that a subset of these moment conditions be used to take advantage of the trade-off between the reduction in bias and the loss in efficiency (See Baltagi, 2005, and the references cited there). For example, for the data set used in Table 3 with N=42 countries and T=22, we restrict the moment conditions to a maximum of two lags on the dependent variable. This yields a Sargan statistic that is asymptotically distributed as Chi-squared with 42 degrees of freedom, i.e., 42 over-identification restrictions.

The benchmark dynamic GMM estimation treats all the variables other than the lagged dependent variable as if they were exogenous, in that it assumes they are uncorrelated with the $\nu_{it.}$ In these

[9] An additional advantage of the GMM estimator is that by differencing it helps to ensure that all the regressors are stationary.

runs we therefore lag all the right hand side regressors by one period, which makes this assumption more innocuous. In so far as the v_{it} are independent of each other and uncorrelated across time – which we test for - this treatment of the regressors is sufficient to prevent any bias in the estimated coefficients due to simultaneous common shocks to financial development and the right hand side regressors. It is important to note here, at the risk of repetition, that the differencing that the estimator carries out already removes any correlation that may be due to unchanging common driving forces, including all time-invariant political economy factors.

We also report dynamic GMM estimates in which the openness terms are treated as endogenous, using also additional instruments suggested by related literature. These instruments include the average trade openness of neighbouring countries and the volume of US capital flows. Both these variables are plausible exogenous drivers of a country's trade and financial openness that are unlikely to be correlated with its financial development. Neighbouring countries' trade openness is likely to be a partial driver of a country's own trade openness because "…natural leakages across borders…. are likely to be high and make it hard for countries to remain closed." (Rajan and Zingales, p.8). In addition, the greater the volume of worldwide capital flows, an exogenous variable to any given country, the less likely it is that individual countries can remain closed to capital flows. The trade-off that we do face is that the number of moment conditions increases greatly with the additional instruments that are introduced, which may introduce additional bias. For these regressions we therefore restrict the moment conditions to just one lag on the dependent variable, while using the additional instruments. We continue to treat GDP per capita as exogenous in these runs and we therefore use its lagged value to avoid any bias due to simultaneous common shocks to financial development and GDP.

3. Data, Measurement and Sources

We utilise two data sets to estimate equation 1. In the case where private credit is the dependent variable we utilise (i) a dataset of 42 developing countries and (ii) a dataset that includes both industrialised and developing economies, totalling 32 countries. In the case where stock market

capitalization is the dependent variable, the number of countries declines to 21 and 31 respectively, due to limited data availability of this indicator.[10]

For the developing countries dataset we deploy two alternative measures of capital account openness, which may be distinguished by being considered as 'de facto' or 'de jure'.[11] The first one – the 'de facto' measure - is the financial globalization indicator constructed by Lane and Milesi-Ferretti (2006), which we collect for 42 developing countries during 1980-2003. This indicator is defined as the volume of a country's foreign assets and liabilities (% of GDP). At any given point in time, this measure provides a useful summary of a country's history of financial openness. For our purposes, this is an advantage over flow-based measures like the World Development Indicators (WDI) measure of gross private capital flows, which places all the emphasis on the current observation.[12] This is because the time-varying political economy factors which we are trying to capture with this measure, such as the power of financial incumbents, are unlikely to display as much variability as private capital flows.

Our second measure of financial openness – the 'de-jure' measure – is the Chinn and Ito (2006) index of capital account openness (KAOPEN).[13] This measure is constructed from four binary dummy variables that codify restrictions on cross-border financial transactions that are reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions. Chinn and Ito reverse these binary variables – so that they are equal to unity when capital account restrictions are non-existent – and derive the first principal component, which is their summary measure (KAOPEN).

[10] The limited availability of sufficiently long time-series of openness measures required for panel data analysis was also the factor which dictated the choice of countries for the private credit regressions.

[11] It could be argued that it may be preferable to employ 'de jure' measures of financial openness, because they are better grounded theoretically than 'de facto' measures, since they reflect more closely the decision to open an economy to capital flows. It could also be argued that 'de facto' measures of financial openness are the outcome of a large number of underlying forces, which may decrease their usefulness as economically meaningful measures of financial openness. However, we believe that 'de facto' measures of financial openness are less susceptible to endogeneity than 'de jure' measures, since the policy decision to open up or close down is liable to influence by interest groups. By contrast, the apparent weakness of 'de facto' measures of financial openness is also their strength. Besides being influenced by government policies, 'de facto' measures would normally contain a more substantial exogenous component than 'de jure' measures, precisely because they also reflect factors such as history, geography and international politics, which are normally outside the control of domestic policy makers, hence are less liable to influence by interest group politics. This makes 'de facto' measures more suitable for a pure test of the openness hypothesis, which stipulates that countries that happen – not choose – to be more open to trade and capital flows are more financially developed. Having said this, we recognise that any discussion of the theoretical pros and cons of 'de jure' and 'de facto' measures is difficult to settle because of the absence of a theoretical model in Rajan and Zingales (2003). Because of this, we utilise both 'de facto' and 'de jure' measures of financial openness.

[12] In an earlier version of the paper we did use the WDI measure of gross capital flows. The results were qualitatively not dissimilar even though, were somewhat less satisfactory in terms of diagnostics.

[13] This is obtained from Menzie Chinn's website: http://www.ssc.wisc.edu/~mchinn/research.html

Summary measures of openness derived from 0-1 dummies using principal components analysis may suffer from measurement error in that some of the variation in the underlying economic variables may not be accounted for.[14] Moreover, they do not have an obvious economic interpretation, which obscures the derivation of policy implications from estimated coefficients. [15] Partly for these reasons, the choice of the second data set – which contains both industrialised and developing economies - is dictated by the availability of an alternative 'de jure' measure of financial openness that is not derived from the principal components methodology. Specifically, we deploy the financial liberalization index constructed by Abiad and Mody (2005) on an annual basis for a group of 34 developed and developing countries for the period 1980-1996. The Abiad and Mody measure captures six different aspects of liberalization, comprising credit controls, interest rate controls, entry barriers, regulations, privatisation, and international transactions. It has a much wider range than most other indicators of financial liberalization – from 0 to 18 – which is extremely useful for estimation purposes. Its main disadvantage is that it may be too broad for our specific purpose: 'international transactions' is just one of the six components of financial liberalization. However, it could be argued that even domestic financial liberalization contributes to financial openness; for example, removing entry barriers and regulations may create more competition for financial incumbents, even if it is from within. Moreover, the broadness of the indicator needs to be counter-balanced against its wide range: other 'de jure' measures of capital account openness are frequently little more than dummies taking the values 0 or 1.

The banking development indicator that we utilise in this paper is *private credit* provided by the banking sector while the capital market development indicator is *stock market capitalisation* (both indicators are expressed as percentages of GDP). The two indicators are respectively sourced from World Development Indicators (WDI) and Beck *et al* (2003). Clearly, each of these indicators captures a different aspect of financial development and has its own strengths and weaknesses. *Private Credit* is probably the most important banking development indicator, not least because it proxies the extent to which new firms have opportunities to obtain bank finance. In the words of Rajan and Zingales (2003), this indicator measures "the ease with which any entrepreneur or

[14] A good example of this problem in the Chinn and Ito index is the case of Thailand for which the index is constant at -0.06 throughout 1970-2004, suggesting no variation in capital account openness at all. It is, however, well known that Thailand took important steps to open its capital account from the late 1980s and into the mid-1990s, which included lifting restrictions on FDI and the liberalization of foreign borrowings. In the post-crisis period there have been reversals. This included the re-introduction of two-tier exchange rate system in 1997, which was nevertheless abandoned a year later.

[15] Moreover, 'de jure' measures of openness are susceptible to enforcement issues. If the right to engage in international financial transactions is not fully enforced, the lifting of capital account restrictions need not always translate into greater capital account openness. In these instances, a measure like Chinn and Ito's – even if it captures these changes well - may overstate real openness.

company with a sound project can obtain finance" (p. 9). *Stock market capitalisation* is defined as the stock market value of listed companies as a percentage to GDP and, as such, represents the size of the stock market relative to the economy. While this is perhaps the most important indicator of capital market development and is widely used in the literature, its main weakness is that it may fluctuate excessively over time, reflecting any excess volatility in stock prices. A related issue is that if the latter follow a random walk - as should be the case in an efficient market - this indicator may exhibit close to unit root behaviour, which could make dynamic modelling particularly challenging.

Annual data on real GDP per capita, converted to US dollars at constant 2000, is also from the WDI, as is trade openness, which is measured by the ratio of total trade to GDP. Institutional quality data is from the International Country Risk Guide (ICRG) – a monthly publication of Political Risk Services (PRS). Following Knack and Keefer (1995), five PRS indicators are used to measure economic institutions, namely: (i) *Corruption* (ii) *Rule of Law* (iii) *Bureaucratic Quality* (iv) *Government Repudiation of Contracts* and (v) *Risk of Expropriation*; higher values of these indicators - the first three of which are scaled from 0 to 6 and the other two from 0 to 10 - imply better institutional quality. Since all these aspects of the institutional environment are likely to be relevant for the security of property rights, we bundle them into a single summary measure by summing them up (after appropriate re-scaling).[16] Thus, the theoretical range of this index is 0 to 50.

The two additional instrumental variables that we utilise – neighbours' trade openness and US financial openness - are respectively drawn from WDI and the Lane and Milessi-Ferretti dataset.

The data sets are summarised in Tables 1 and 2. These tables provide the definition and source of all key variables, their units of measurement, means, standard deviations (overall, between and within countries), and minimum and maximum values. Additionally, they provide the correlation coefficients between all key variables which aid the modelling and help to confirm the choice of instruments. Tables 1a and 1b correspond to the datasets underlying the results in Tables 3 and 4 while Tables 2a and 2b correspond to the data sets used in the regressions reported in Table 5.

It can be seen that all the variables, including the institutions index, display considerable variation both between and within countries, justifying the use of panel estimation techniques, which should

[16] The scale of corruption, bureaucratic quality and rule of law was first converted to 0 to 10 (multiplying them by 5/3) to make them comparable to the other indicators.

allow the identification of the various parameters of interest. Moreover, the correlation coefficients are within plausible ranges and confirm the choice of both regressors and instruments. The correlation coefficients between the measures of trade and financial openness range between 0.20 in Table 2b and 0.52 in Table 1b, suggesting that the measure of financial liberalisation is much less correlated to trade openness than the 'de facto' financial openness measure. The correlation between institutions and GDP is around 0.41 in the developing countries datasets and 0.70 in the datasets that also includes industrialised countries; this is not surprising, but it would suggest that it may be more difficult to estimate the effect of institutions independently of GDP in the latter datasets. In terms of the key instrumental variables we use, it is noteworthy that neighbour's trade openness has excellent characteristics in that its correlation coefficient with trade openness is 0.41 in the developing countries dataset (Table 1a) and 0.24 in the mixed dataset (Table 2a) while its correlation with the financial development indicators, is pretty low, ranging from 0.03 to 0.21. Finally, it is noteworthy that the correlation between the 'de jure' and 'de facto' measures of financial openness in the developing countries dataset, while positive, is rather small: it is 0.11 in the full dataset containing 42 countries (Table 1a) and 0.22 in the subset that contains 22 countries (Table 1b). Thus, we should perhaps not be surprised to see quite different results with these two measures of financial openness.

4. Empirical Results

This section reports the results of estimating Equation (1) on the data sets described above using dynamic GMM estimation and outlines their implications for the hypotheses of interest. It also reports the results of a variety of robustness checks that check the sensitivity of the results to different estimation methods and time periods. Finally, it carries out tests of the openness hypothesis and discusses policy implications.

Estimation Results

The main results of the paper are presented in Tables 3, 4 and 5. The tables contain the estimates of banking and capital market development regressions using the dynamic GMM estimator in which the openness terms are treated either as exogenous or endogenous, in which case the additional instruments outlined in the previous section are utilised. It is worth emphasising that the moment

conditions utilize lags of the dependent variable in both cases.[17] Tables 3 and 4 present the results using the developing country data set with private credit and stock market capitalization as the dependent variables, respectively. Separate regressions are reported for each of the two alternative measures of financial openness in each instance. Table 5 reports results for both private credit and stock market capitalization using the developed and industrialised country dataset. These utilize the Abiad and Mody financial liberalization index to proxy financial openness.

Going straight to the hypothesis of interest, we note that in the private credit regressions utilising the 'de facto' measure of financial openness in Table 3, both types of openness enter with positive and statistically significant coefficients at the 1% level, while the interaction term enters with a negative coefficient that is also significant at the 1% level. Moreover, the estimated coefficients suggest that the impact of trade and financial openness is economically meaningful. Importantly, the treatment of the openness terms as endogenous does not change the qualitative nature of the results. Specifically, it does not alter the sign or the statistical significance of any of the variables. Only the magnitudes of the coefficients are affected. In particular, the coefficient of financial openness declines from 0.88 to 0.73, the coefficient of trade openness rises from 0.82 to 1.07, while the coefficient of the interaction term declines marginally from just over to just under -0.23.

The results that utilise the 'de jure' measure of openness in Table 3 are, however, somewhat weaker. When the openness terms are treated as exogenous, albeit lagged[18], the estimates are qualitatively very similar to those obtained using the 'de facto' measure of openness. Specifically, both trade and financial openness are positive and significant at the 1% level. Similarly, the interaction term is negative and also significant at the 1% level. However, when we treat the openness variables as endogenous, the Chinn and Ito measure loses significance and so does the interaction term, while trade openness remains positive and significant at the 1% level. Thus, the 'de jure' measure seems more susceptible to endogeneity bias than the 'de facto' measure. This is perhaps not too surprising given that the former is more likely the outcome of a political process that to some extent may reflect the polity's desire for financial development, while the former is by definition the outcome of a large number of factors, many of which are exogenous to this process.

It is also worth noting that in all the private credit regressions reported in Table 3 all the diagnostics are satisfactory, irrespective of the treatment of the openness terms. Specifically, the Sargan test

[17] In order to keep the number of moment conditions under control, the maximum number of lags of the dependent variable is restricted to two or one, depending on whether the openness terms are treated as exogenous or endogenous, respectively.
[18] In this run we had to use the second lag of trade openness to obtain statistically satisfactory results, which explains why T=21.

does not reject the over-identification restrictions, the absence of first order serial correlation is rejected and the absence of second order serial correlation is not rejected. Moreover, the lagged dependent variable in both cases is positive and significant. Although its coefficient is quite high, suggesting considerable persistence, it is statistically different from unity in both cases. We therefore conclude that Dynamic GMM is an appropriate estimator and can therefore be relied upon to carry out statistical inference relating to the hypothesis of interest. Furthermore, we also note that GDP per capita enters with positive and significant coefficients in both regressions, suggesting that banking development is positively correlated with the level of economic development. The quality of economic institutions is positive and statistically significant except in the second regression where the openness terms are treated as endogenous.

Examining now the regressions relating to capital market development in Table 4 that utilise the 'de facto' measure of financial openness, we first note that the effects of openness terms appear to be qualitatively similar to those obtained for private credit, although they are now more sensitive to the treatment of the openness terms. Specifically, when these terms are treated as endogenous the level of significance of trade openness drops from 5% to 10% while that of financial openness increases from 5% to 1%. However, the interaction is negative and significant at the 1% level in both cases. The results that utilise the 'de jure' measure of financial openness are qualitatively not too dissimilar, but, once again are more sensitive to how the openness terms are treated. When the openness terms are treated as exogenous, trade openness is positive and significant at the 5% level, while financial openness is positive but not significant and the interaction term, while negative, is also not significant. When the openness terms are treated as endogenous, trade openness loses significance while financial openness and the interaction term retain their estimated coefficients and signs and become significant at the 10% level. However, the results presented in Table 4 must be treated with a fair amount of caution because the serial correlation diagnostics are not satisfactory. This invalidates the use of the lagged dependent variable as an instrument, which is at the heart of the GMM method.

We now turn our attention to Table 5, where both N and T are smaller than in Table 3, reflecting the limited availability of the Abiad and Mody measure of financial liberalization. In the private credit regressions financial liberalization enters with a positive and significant coefficient of around 0.4 while the interaction term enters with a negative and significant coefficient of around -0.1 in both regressions. However, trade openness is significant only when the openness terms are treated as

endogenous. Moreover, its coefficient is smaller than in Table 3, suggesting that in this sample, which includes industrialised as well as developing countries, the effects of trade openness are smaller than in the developing country sample. For the regressions relating to capital market development, both trade openness and financial liberalization are positive and significant at the 5% level or higher, irrespective of how they are treated. The interaction term is negative but its level of significance drops from 1% to 10% when the openness terms are treated as endogenous.

Table 5 gives satisfactory diagnostics for both financial development indicators, not just for private credit. Specifically, in both private credit regressions, all three diagnostics are satisfactory, irrespective of the treatment of the openness terms. The lagged dependent variable is once again positive and significant in both cases; even though it continues to display considerable persistence, it is statistically different from unity in both cases. As far as the stock market development regressions are concerned, it is important to note that it was necessary to enter a second lag of the dependent variable to capture the richer dynamics of this variable.

By and large, the findings from both data sets suggest that trade and financial openness are statistically significant determinants of banking sector development, even though the evidence on financial openness is somewhat fragile when we use the Chinn and Ito index to proxy financial openness. The marginal effects of trade (financial) openness on private credit appear to be negatively related to the degree of financial (trade) openness. This suggests that the effects of openness may be larger in relatively closed economies than in relatively open ones. We explore this finding further in the policy section below.

Our findings also suggest that openness may have similar effects on capital market development. However, the diagnostic statistics in the developing countries data set cast some doubt on the robustness of these findings, suggesting that they should be treated with a fair degree of caution. We therefore focus the rest of this paper on checking the robustness of the results on private credit and analysing their policy implications.

Robustness Checks

A large number of robustness checks were carried out to examine the sensitivity of the results to alternative estimation strategies and methods. Here we only report a subset of the checks carried out.

The first set of robustness checks involves using an alternative estimation method. To this end we report below the results of estimating the private credit equation in the largest of our two samples using the fixed effects (within) estimator, in which country and time dummies are included (but are not reported to save space)[19].

$$LnFD_{it} = \underset{(0.02)}{0.837^{***}} \ln FD_{it-1} + \underset{(0.05)}{0.152^{***}} \ln Y_{it-1} + \underset{(0.04)}{0.110^{***}} \ln INS_{it-1} + \underset{(0.10)}{0.421^{***}} \ln TO_{it-1} + \underset{(0.09)}{0.243^{***}} \ln FO_{it-1} \underset{(0.02)}{-0.079^{***}} \ln\{FO_{it-1}\ln TO_{it-1}\}$$

The F-test for the significance of country dummies is F(41,896) with an observed value of 2.95, which is statistically significant at the 1% level. These results are qualitatively very similar to those obtained using the Dynamic GMM estimator that are reported in Table 3. Specifically, the coefficient of lagged dependent variable is remarkably close to what is obtained with the GMM estimator. While all the other coefficients are smaller than those obtained with the GMM estimator, they have the same sign and are highly significant, as is the case with the GMM estimator.

We also estimated the same equation using Fixed Effects IV estimator, with a similar instrument set to that used in Table 3. The qualitative nature of the results, which are not reported here to save space, is very similar to that obtained using the Dynamic GMM estimator. Specifically, the lagged dependent variable remains positive and significant with a coefficient of about 0.8. Both conditioning variables are positive and significant, albeit with smaller coefficients. Trade openness has a somewhat larger coefficient compared to that obtained with Dynamic GMM and remains highly significant. Financial openness and the interaction term have very similar coefficients as those obtained under Dynamic GMM and remain significant at the 1% level.

We therefore conclude that the qualitative nature of our results is robust to alternative estimation methods. However, we do not pursue either of the fixed effects (within) estimators any further since they are biased when a lagged dependent variable is present.

The second set of robustness checks that we report here involves using non-overlapping five year average data instead of annual data in the estimation. Given the need to use first differences and lags in the estimation, this was only feasible for the first data set for which we have 24 annual observations. Even with this dataset, with the averaging, differencing and lagging, the number of time series observations declines to just 3. We continue to use the dynamic GMM estimator, which

[19] For the regressions reported in this sub-section we utilise the 'de facto' measure of financial openness.

yields the following results (the regression includes time dummies which are not reported to save space):

$$LnFD_{it} = 0.412^{***} \ln FD_{it-1} + 0.596^{***} \ln Y_{it-1} + 0.858^{***} \ln INS_{it} + 3.504^{***} \ln TO_{it-1} + 2.157^{**} \ln FO_{it-1} - 0.625^{**} \ln\{FO_{it-1} \ln TO_{it-1}\}$$
$$(0.12) \qquad (0.17) \qquad (0.25) \qquad (1.241) \qquad (1.14) \qquad (0.26)$$

Sargan test = 5.54 (0.35)

First order serial correlation= -1.93 (0.05) Second order serial correlation = -0.07 (0.94)

The results are similar to those in Table 3 in terms of sign and significance, but the magnitudes are different, as would be expected, since the lagged dependent variable now captures a longer time period and cyclical fluctuations are dampened by averaging. Not surprisingly, the lagged dependent variable now enters with a much smaller coefficient than in the estimation using annual data. It remains, however, highly significant. All three diagnostics are satisfactory, suggesting that the models are well specified and dynamic GMM is an appropriate estimator. Lagged GDP is positive and highly significant, suggesting that the level of economic development is an important determinant of the degree of banking development. The other conditioning variable is also positive and significant, as are both openness terms. Also, the interaction term is negative and significant. While the coefficient estimates are higher compared to those obtained with annual data, the differences are much smaller when the implied long-run coefficients are calculated in both cases. Importantly, the qualitative nature of the results remains unaltered.

We have also carried out a large number of sensitivity checks using alternative financial development indicators, such as liquid liabilities, domestic credit and number of listed companies. It is worth noting that the results obtained for the number of listed companies were, if anything, econometrically superior to those reported here using the stock market capitalization indicator, in that: (a) the diagnostics were satisfactory throughout; (b) the estimated coefficient of the lagged dependent variable was well below unity; and (c) the openness parameters were qualitatively very similar to those obtained for private credit.[20]

Comparisons with earlier studies

Our results, particularly those relating to the private credit indicator can be compared with those of Chinn and Ito (2006) who also use the same indicator. However, some caution should be exercised

[20] Most of these results are reported in an earlier discussion paper version of this paper (Baltagi *et al*, 2007).

in making such comparisons not least because the model specifications are not identical, the estimation procedures are not the same and the datasets and data frequencies used for estimation are different. Moreover, the Chinn and Ito indicator of financial openness – their own capital account liberalization index – is vastly different from two of the three indicators of financial openness that we utilize. Notwithstanding these important differences, it is still useful to carry out such a comparison, not least because it would help to clarify the extent of the current contribution in the context of related literature.

In their private credit equation in Table 3.3, Chinn and Ito identify only two statistically significant determinants of private credit at the conventional 5% level, namely (i) their capital account liberalization index, and (ii) the lagged level of private credit. Trade openness, per capita income, their institutional/legal variable and their interaction variable are all insignificant. In their private credit equations reported in Table 3.4, which use four different legal indicators, but do not report the estimated parameters of the conditioning variables, none of the variables is shown to be statistically significant at conventional levels. In sharp contrast, in all the private credit regressions we report in Table 3 of this paper, both trade openness and GDP per capita are positive and significant at the 1% level. The same is also true for financial openness and the interaction terms, in the two regressions utilizing the financial globalization indicator. Although financial openness and the interaction term are sensitive with respect to the treatment of the openness terms, on balance we get better results when using the Chinn and Ito measure of capital account openness than Chinn and Ito themselves. These are, of course, important differences that we believe reflect the superiority of our empirical strategy, i.e. using annual data and the Arellano and Bond estimator.

Hypothesis Testing and Policy Implications[21]

In order to shed light on the openness hypothesis we evaluate the partial derivative of private credit with respect to each type of openness using equations (2) and (3). Given that these derivatives vary within the sample depending on the level of financial or trade openness, respectively, we calculate them at the mean, minimum and maximum values of financial (trade) openness. As explained in Section 2, the derivatives at the minimum values of openness allow us to comment on the strict version of the hypothesis.

[21] The discussion in this sub-section – like any policy implications drawn from reduced form regressions - is subject to the usual caveat of the Lucas critique. To the extent that this critique is valid, a reduced form relationship may well evaporate into thin air if the policy maker attempts to exploit it.

Using the estimated coefficients in column one of Table 3 and all the years in the sample, the derivative of private credit with respect to trade openness at the mean level of financial openness is -0.23. The same derivative evaluated at the minimum level of financial openness is 0.36. At the other end of the spectrum, when financial openness is at its maximum value, the same derivative takes a negative value of -0.54. At the mean level of trade openness, the derivative of private credit with respect to financial openness is -0.05. When evaluated at the minimum level of trade openness, this derivative takes the value of 0.46, suggesting that financial openness has a greater impact on banking development than trade openness. At the opposite end of the spectrum, when trade openness is at its maximum value, the derivate with respect to financial openness takes on its minimum value of -0.34.

It is therefore clear that while the loose version of the openness hypothesis receives empirical support from the most closed economy-years in the sample[22], the strict version of the hypothesis is refuted (or is not relevant in a contemporary setting). Since both partial derivatives are positive for the most closed economy-years in the sample, we can conclude that, within the sample, the opening of both the trade and capital accounts will have a larger impact on financial development than opening one of the two accounts. Hence, our finding suggest that while simultaneous opening of both the trade and capital accounts may be a sufficient condition for financial development to take place in relatively closed economies, it is not a necessary one. This is very much the scenario we alluded to hypothetically in Section 2. We, therefore, conclude that our findings provide partial support to the Rajan and Zingales hypothesis.

Our results seem to suggest that the least open countries could benefit most in terms of banking development by opening up either their trade or their capital account and that the effects are likely to be larger if they open both. At the other end of the spectrum, the most open countries stand to benefit least from additional openness. However, further examination of the variation of the values of these derivatives over time suggests that at least the first, if not both, conclusions may need to be qualified further if they are to be used to inform future policy making. This is because the values of both derivatives have been steadily declining during the sample period as a result of increased openness over time. Using the dataset described in Table 1a, we find that the cross country mean of this derivative declined from -0.11 in 1980 to -0.29 in 2003 and that by 2003 there are no countries

[22] In our developing country dataset, the most closed economies are India and Bangladesh.

for which it takes a positive value. Hence, these calculations suggest that further opening of trade is unlikely to deliver any additional gains in banking sector development.

On the other hand, the derivative of private credit with respect to financial openness in 2003 remains positive for a number of countries, even though the cross country mean is negative at -0.08. The countries for which it takes a positive value in 2003 ranked in descending order, with the value of the derivative in parenthesis, are as follows: India (0.10), Bangladesh (0.08), Pakistan (0.04), Niger (0.03), Guatemala (0.02), Venezuela (0.01) and Zimbabwe (0.01). On the basis of these calculations, we could expect that further opening of capital accounts could deliver some additional benefits in terms of banking sector development in some developing countries in the future. This deduction should, however, be treated only as an informed conjecture, rather than a foregone conclusion, not least because of the usual problems of making out of sample predictions.

5. Concluding Remarks

The results presented in this paper, which, by and large, are robust to a range of alternative measures, datasets and estimation methods, suggest that trade and financial openness are statistically significant determinants of banking sector development. Our findings suggest that the marginal effects of trade (financial) openness are negatively related to the degree of financial (trade) openness, indicating that relatively closed economies may benefit from opening up their trade and/or capital accounts. Although these economies can benefit most by opening *both* their trade and capital accounts, opening up one without the other could still deliver benefits in terms of banking development. Thus, our findings provide partial support to the Rajan and Zingales hypothesis, which stipulates that both types of openness are necessary for financial development to take place.

Our results offer mixed blessing for policy makers in low income countries aspiring to develop their economies by developing their financial systems. There may be good news for policy makers in low income countries that are relatively closed, since opening up their capital accounts may provide an effective stimulus to financial development. In our developing country data set examples of such countries are India, Bangladesh, Pakistan, Niger, Guatemala, Venezuela and Zimbabwe. At the other end of the spectrum, opportunities to promote financial development through additional openness in countries that are already very open may be limited.

The empirical evidence presented in this paper confirms the quantitative importance of the mechanisms of financial development that have been highlighted by recent literature that emphasises political economy factors. However, it also suggests that these mechanisms are not working in precisely the ways envisaged by this literature, suggesting that more nuanced political economy explanations may be needed. To this end, formal economic modelling may be called for, not only to guide future empirical work in the area but also to deepen our understanding of the political economy mechanisms that help to shape financial and economic development.

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Table 1a: Summary Statistics and Correlations Matrix
Banking Development in Developing Countries Dataset
Annual data: 1980-2003 Observations = 1008

Variable	Source	Unit of measurement	Mean	Overall Standard Deviation	Between Standard Deviation	Within Standard deviation	Minimum	Maximum
Private credit	WDI	% of GDP	31.33	24.80	21.99	11.93	1.54	165.72
Real GDP per capita	WDI	US Dollars at 2000 prices	1800.00	1856.10	1791.86	554.70	74.74	12235.67
Trade openness	WDI	% of GDP	63.62	27.09	23.89	13.28	6.32	209.49
Financial openness ('de facto')	Lane and Milesi-Ferretti (2006)	% of GDP	111.28	54.02	41.18	35.50	7.35	378.48
Financial openness ('de jure')	Chinn and Ito (2006)	Capital account openness index	-0.39	1.24	0.85	0.92	-1.76	2.60
Institutional Quality	ICRG	Sum of corruption, rule of law, bureaucratic quality, government repudiation of contracts, risk of expropriation (each scaled 1 to 10).	27.22	8.43	5.65	6.32	8	45
Neighbour's average trade openness	WDI	% of GDP	57.68	27.26	21.77	16.74	8.76	262.50
Countries N=42	Algeria, Bangladesh, Bolivia, Botswana, Cameroon, Chile, Costa Rica, Ecuador, Egypt, El Salvador, Ethiopia, Gabon, Ghana, Guatemala, Honduras, India, Indonesia, Jamaica, Jordan, Kenya, Korea, Malawi, Malaysia, Mexico, Morocco, Nigeria, Niger, Pakistan, Paraguay, Philippines, Senegal, Sri Lanka, Syria, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, Uruguay, Venezuela, Zambia, Zimbabwe.						

Correlations Matrix

	Private credit	**Real GDP per capita**	**Trade openness**	**Financial openness**	**Financial openness ('de jure')**	**Institutional quality**	**Neighbour's trade openness**
Private credit	1.0000						
Real GDP per capita	0.3375	1.0000					
Trade openness	0.5162	0.1746	1.0000				
Financial openness ('de facto')	0.0913	0.0320	0.4884	1.0000			
Financial openness ('de-jure')	0.2550	0.2879	0.2396	0.1065	1.000		
Institutional Quality	0.3909	0.4183	0.3653	0.2090	0.3424	1.0000	
Neighbour's trade openness	0.0889	0.1124	0.4131	0.1531	0.1788	0.2530	1.0000

Table 1b: Summary Statistics and Correlations
Capital Market Development in Developing Countries Dataset
Annual data: 1980-2003 Observations = 504

Variable	Source	Unit of measurement	Mean	Overall Standard Deviation	Between Standard Deviation	Within Standard deviation	Minimum	Maximum
Stock Market Capitalization	WDI	% of GDP	25.73	35.57	27.32	23.53	0.07	282.61
Real GDP per capita	WDI	US Dollars at 2000 prices	2455.51	2205.79	2121.48	755.39	222.05	12235.67
Trade openness	WDI	% of GDP	62.11	35.56	32.54	15.93	12.50	228.89
Financial openness ('de facto')	Lane and Milesi-Ferretti (2006)	% of GDP	97.75	50.65	41.14	30.83	16.45	299.34
Financial openness ('de jure')	Chinn and Ito (2006)	Capital account openness index	-0.15	1.42	1.05	0.99	-1.77	2.60
Institutional Quality	ICRG	Sum of: corruption, rule of law, bureaucratic quality, government repudiation of contracts, risk of expropriation (each scaled 1 to 10).	29.16	8.39	4.91	6.89	10	45
Neighbour's average trade openness	WDI	% of GDP	55.02	31.60	24.88	20.18	8.76	262.50
Countries N=21	Bangladesh, Chile, Egypt, India, Indonesia, Jamaica, Jordan, Korea, Malaysia, Mexico, Morocco, Nigeria, Pakistan, Peru, Philippines, Thailand, Trinidad &Tobago, Turkey, Uruguay, Venezuela, Zimbabwe.							

Correlations Matrix

	Stock Market Capitalization	Real GDP per capita	Trade openness	Financial openness (de facto)	Financial openness ('de jure')	Institutional Quality	Neighbour's average trade openness
Stock Market Capitalization	1.0000						
Real GDP per capita	0.1563	1.0000					
Trade openness	0.6995	0.1507	1.0000				
Financial openness ('de facto')	0.3592	0.1847	0.5245	1.0000			
Financial openness ('de jure')	0.2329	0.2651	0.2235	0.2227	1.0000		
Institutional Quality	0.4997	0.4079	0.3454	0.2998	0.3318	1.0000	
Neighbour's average trade openness	0.2136	0.0621	0.4161	0.2833	0.2358	0.2366	1.0000

Table 2a: Summary Statistics and Correlations
Banking Development in Developing and Industrialised countries
Annual data: 1980-1996 Observations = 544

Variable	Source	Unit of measurement	Mean	Overall Standard Deviation	Between Standard Deviation	Within Standard deviation	Minimum	Maximum
Private credit	WDI	% of GDP	51.33	38.81	36.15	15.42	0.96	184.65
Real GDP per capita	WDI	US Dollars at 2000 prices	7325.42	8447.34	8479.72	1253.91	181.01	36650.89
Trade openness	WDI	% of GDP	46.82	24.94	23.53	9.20	6.32	192.11
Financial liberalization	Abiad and Mody (2005)	Integer values from 0 to 18 (1 added to take logs)	9.36	5.49	4.57	3.15	1	19
Institutional Quality	ICRG	Sum of corruption, rule of law, bureaucratic quality, government repudiation of contracts, risk of expropriation (each scaled 1 to 10).	30.98	10.51	9.49	4.79	10	50
Neighbour's average trade openness	WDI	% of GDP	55.98	25.32	24.27	8.31	8.76	148.87
Countries N=32	Argentina, Australia, Bangladesh, Brazil, Canada, Chile, Colombia, Egypt, France, Germany, Ghana, India, Indonesia, Israel, Italy, Japan, Korea, Malaysia, Mexico, Morocco, New Zealand, Pakistan, Peru, Philippines, South Africa, Sri Lanka, Thailand, Turkey, United Kingdom, United States, Venezuela, Zimbabwe.							

Correlations Matrix

	Private credit	**Real GDP per capita**	**Trade openness**	**Financial liberalization**	**Institutional Quality**	**Neighbour's average trade openness**
Private credit	1.0000					
Real GDP per capita	0.7577	1.0000				
Trade openness	0.1298	-0.1243	1.0000			
Financial liberalization	0.5978	0.5802	0.2213	1.0000		
Institutional Quality	0.6146	0.7025	0.0262	0.6191	1.0000	
Neighbour's average trade openness	0.0315	-0.0112	0.2345	0.1503	-0.0409	1.0000

Table 2b: Summary Statistics and Correlations
Capital Market Development in Developing and Industrialised Countries
Annual data 1980-1996 Observations=527

Variable	Source	Unit of measurement	Mean	Overall Standard Deviation	Between Standard Deviation	Within Standard deviation	Minimum	Maximum
Stock Market Capitalization	WDI	% of GDP	29.28	37.75	31.59	21.37	0.07	282.61
Real GDP per capita	WDI	US Dollars at 2000 prices	7554.94	8483.90	8518.25	1274.01	222.05	36650.89
Trade openness	WDI	% of GDP	47.13	25.05	23.86	8.71	11.55	192.11
Financial liberalization	Abiad and Mody (2005)	Integer values from 0 to 18 (1 added to take logs)	9.53	5.47	4.54	3.15	1	19
Institutional Quality	ICRG	Sum of: corruption, rule of law, bureaucratic quality, government repudiation of contracts, risk of expropriation (each scaled 1 to 10).	31.23	10.48	9.54	4.65	10	50
Neighbour's average trade openness	WDI	% of GDP	55.72	25.64	24.63	8.32	8.76	148.87
Countries N=31	Argentina, Australia, Bangladesh, Brazil, Canada, Chile, Colombia, Egypt, France, Germany, India, Indonesia, Israel, Italy, Japan, Korea, Malaysia, Mexico, Morocco, New Zealand, Pakistan, Peru, Philippines, South Africa, Sri Lanka, Thailand, Turkey, United Kingdom, United States, Venezuela, Zimbabwe.							

Correlations Matrix

	Stock Market Capitalization	**Real GDP per capita**	**Trade openness**	**Financial liberalization**	**Institutional Quality**	**Neighbour's average trade openness**
Stock Market Capitalization	1.0000					
Real GDP per capita	0.3294	1.0000				
Trade openness	0.4201	-0.1378	1.0000			
Financial liberalization	0.5439	0.5717	0.2041	1.0000		
Institutional Quality	0.3902	0.7029	0.0012	0.6065	1.0000	
Neighbour's average trade openness	0.0417	-0.0025	0.2479	0.1686	-0.0272	1.0000

Table 3: Openness and Banking Development in Developing Countries
Dependent Variable: Logarithm of Private Credit

	Measure of Financial Openness			
	Financial Globalization (Lane and Milesi-Ferretti)		Capital Account Liberalization (Chinn and Ito)	
Openness variables				
Trade Openness	0.816*** (0.300)	1.067*** (0.371)	0.143*** (0.017)	0.400*** (0.073)
Financial Openness	0.881*** (0.227)	0.730*** (0.292)	0.201*** (0.041)	0.014 (0.144)
Interaction **Trade Openness x Financial Openness**	-0.228*** (0.061)	-0.234*** (0.081)	-0.047*** (0.010)	0.006 (0.035)
Conditioning variables				
Lagged Dependent Variable	0.829*** (0.045)	0.836*** (0.063)	0.928*** (0.032)	0.902*** (0.048)
Real GDP per capita (lagged)	0.575*** (0.075)	0.563*** (0.147)	0.466*** (0.056)	0.433*** (0.147)
Economic Institutions (lagged)	0.229*** (0.052)	0.073 (0.088)	0.148*** (0.045)	0.115** (0.057)
Treatment of Openness Variables	Lagged	Endogenous	Lagged	Endogenous
Number of observations	924	924	882	924
Sample period	1980-2003		1981-2003	1980-2003
Number of time periods (T)	22		21	22
Number of countries (N)	42		42	
Sargan Test (p-value)	26.71 (0.97)	28.50 (1.00)	34.82 (0.74)	38.74 (1.00)
First order serial correlation test (p-value)	-3.66 (0.00)	-3.83 (0.00)	-3.79 (0.00)	-3.88 (0.01)
Second order serial correlation test (p-value)	0.71 (0.48)	0.73 (0.46)	0.36 (0.72)	0.16 (0.87)

Notes

1. All regressions are estimated using the Dynamic GMM estimator (Arellano and Bond, 1991).
2. Figures in parentheses are standard errors.
3. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.
4. Significant time dummies are included in all regressions.

Table 4: Openness and Stock Market Development in Developing Countries

	Measure of Financial Openness			
	Financial Globalization (Lane and Milesi-Ferretti)		Capital Account Liberalization: (Chinn and Ito)	
Openness variables				
Trade Openness	2.742** (1.384)	2.536* (1.423)	1.190** (0.606)	-0.281 (0.417)
Financial Openness	3.324** (1.538)	3.359*** (1.187)	1.368 (1.313)	1.388* (0.854)
Interaction **Trade Openness x Financial Openness**	-0.696** (0.331)	-0.857*** (0.290)	-0.345 (0.328)	-0.364* (0.212)
Lagged Dependent Variable	0.868*** (0.053)	0.826*** (0.216)	0.932*** (0.098)	0.701*** (0.216)
Real GDP per capita	0.088 (0.671)	2.812* (1.518)	4.066** (1.911)	0.005 (0.769)
Economic Institutions (lagged)	-0.923** (0.426)	0.077 (0.555)	-2.650*** (1.039)	0.029 (0.412)
Treatment of Openness Variables	Lagged	Endogenous	Lagged	Endogenous
Number of observations	399	399	399	399
Sample period **Number of time periods (T)**	1984-2003 19		1984-2003 19	
Number of countries (N)	21		21	
Sargan Test **(p-value)**	15.70 (0.99)	7.64 (1.00)	9.60 (1.00)	12.79 (1.00)
First order serial correlation test **(p-value)**	-2.15 (0.03)	-0.97 (0.33)	-1.18 (0.24)	-0.29 (0.77)
Second order serial correlation test **(p-value)**	-2.63 (0.01)	-2.45 (0.02)	-0.42 (0.68)	-2.16 (0.03)

Notes

1. All regressions are estimated using the Dynamic GMM estimator (Arellano and Bond, 1991).
2. Figures in parentheses are standard errors.
3. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.
4. Significant time dummies are included in all regressions.

Table 5: Openness and Financial Development in Developing and Industrialised Countries

	Dependent Variable			
	Banking Sector Development: Private Credit		Capital Market Development: Stock Market Capitalisation	
Openness variables				
Trade Openness	-0.060 (0.060)	0.386*** (0.141)	0.527** (0.272)	0.486** (0.248)
Financial Liberalization	0.400*** (0.165)	0.436* (0.271)	1.666*** (0.538)	1.283** (0.657)
Interaction **Trade Openness x Financial Liberalization**	-0.090** (0.045)	-0.121* (0.074)	-0.464*** (0.149)	-0.305* (0.179)
Conditioning variables				
Lagged Dependent Variable: **First lag**	0.716*** (0.026)	0.792*** (0.026)	1.296*** (0.060)	1.320*** (0.054)
Second lag			-0.552*** (0.040)	-0.531*** (0.069)
Real GDP per capita (lagged)	0.467** (0.208)	0.738*** (0.224)	-0.656** (0.305)	0.727 (0.866)
Economic Institutions (lagged)	0.095** (0.040)	0.049 (0.059)	-0.024 (0.095)	-0.187** (0.090)
Treatment of Openness Variables	Lagged	Endogenous	Lagged	Endogenous
Number of observations	480	480	434	434
Sample Period	1980-1996		1980-1996	
Number of time periods (T)	15		14	
Number of countries	32		31	
Sargan Test **(p-value)**	14.60 (0.98)	16.89 (1.00)	22.24 (0.68)	18.96 (1.00)
First order serial correlation test **(p-value)**	-2.38 (0.02)	-2.30 (0.02)	-2.46 (0.01)	-2.28 (0.02)
Second order serial correlation test **(p-value)**	-0.71 (0.48)	-0.76 (0.45)	-1.64 (0.10)	-1.37 (0.17)

Notes

1. All regressions are estimated using the Dynamic GMM estimator (Arellano and Bond, 1991).
2. Figures in parentheses are standard errors.
3. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.
4. Significant time dummies are included in all regressions.