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DOMESTIC FINANCIAL DEVELOPMENT IN EMERGING ECONOMIES

EVIDENCE AND IMPLICATIONS

Ettore Dorrucci, Alexis Meyer-Cirkel
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by Ettore Dorrucci,² Alexis Meyer-Cirkel³
and Daniel Santabarbara⁴



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² European Central Bank, ettore.dorrucci@ecb.int.

³ J. W. Goethe University Frankfurt and European Central Bank, acirkel@wiwi.uni-frankfurt.de.

⁴ Banco de España and European Central Bank, daniel.santabarbara@bde.es

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Address

Kaiserstrasse 29
60311 Frankfurt am Main
Germany

Postal address

Postfach 16 03 19
60066 Frankfurt am Main
Germany

Telephone

+49 69 1344 0

Website

<http://www.ecb.europa.eu>

Fax

+49 69 1344 6000

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ABSTRACT

We construct, on the basis of an original methodology and database, composite indices to measure domestic financial development in 26 emerging economies, using mature economies as a benchmark. Twenty-two variables are used and grouped according to three broad dimensions: (i) institutions and regulations; (ii) size of and access to financial markets and (iii) market performance. This new evidence aims to fill a gap in the economic literature, which has not thus far developed comparable time series including both emerging and mature economies. In doing so, we provide a quantitative measure of the – usually considerable – scope for the selected emerging countries and regions to “catch up” in financial terms. Moreover, we find evidence that a process of financial convergence towards mature economies has already started in certain emerging economies. Finally, we conduct an econometric analysis showing that different levels of domestic financial development tend to be associated with the building up of external imbalances across countries.

Keywords: Financial development, index construction, commodity and oil-exporting countries, G20, major emerging economies, financial catching up, global imbalances.

JEL codes: F3, F4, G1, G2, E21, E22, C82.

NON-TECHNICAL SUMMARY

- Where do emerging market economies (EMEs, hereinafter also referred to as emerging economies or emerging countries) stand in terms of *domestic financial development* compared with mature economies? Did we observe any financial catching-up of emerging countries towards mature economies in the recent past? Does econometric analysis support the idea that EMEs' financial underdevelopment has been one structural factor contributing to the accumulation of global external imbalances and, in particular, to the phenomenon of net capital flowing “uphill” from the South (certain emerging economies) to the North (certain mature economies) in recent years? And, if the reply to these questions is positive, what could the policy-relevant implications be?
- This paper addresses these questions by assessing the degree of domestic financial development (DFD) in emerging market economies, both in comparison with benchmark mature economies and over time. To this aim, a number of *quantitative measures and indices, as well as a final composite index*, are developed on the basis of an original methodology and large database. After conducting robustness checks, this evidence is then used for an econometric analysis of the link between DFD and macroeconomic variables such as savings, investment and current account balances.
- Our DFD indices are constructed in line with such objectives. In particular, our definition of DFD is based on the notion of *complete* domestic financial markets, i.e. the capability of one country to channel savings into investment efficiently and effectively within its own borders. This capability can be assessed by focusing on three broad dimensions of DFD, which we measure both separately and jointly: (1) the institutions and rules supporting DFD; (2) the relative size and diversification of financial markets in each economy, as well as the possibility for economic agents to access such markets efficiently; and (3) the “performance” of each financial system in terms of market liquidity, banking efficiency, and the degree of “crowding in” of the private sector in comparison with the relative weight of the government and the central bank. Given this definition of DFD, it should be emphasised that our paper treats *financial openness* as a separate dimension in the analysis, i.e. not as a component of DFD. Moreover, our index intentionally does not address *financial stability* issues. In this way we take account of the trade-off between financial risks and financial innovation/return by only focusing on the latter aspect. This allows us not to rank high those EMEs that achieve financial stability over the short run by means of financial repression and, on the other hand, to completely disregard financial stability issues which, as the ongoing financial crisis confirms, are extremely complex.
- Turning to the *main findings* of the paper, Table 3 on pp. 28-29 and, in greater detail, Table 4 on p. 41 rank our selected 26 EMEs in terms of degree of DFD and compare them with six benchmark mature economies belonging to the Group of Seven (all G7 members except Canada, with Germany, France and Italy grouped together in a weighted aggregate called “euro area-G3”). Owing to data availability at the time this paper was prepared, the year chosen is 2006 – a period which is particularly indicative of the degree of DFD across the globe prior to the financial crisis underway since summer 2007. We measure DFD on the basis of a composite normalised index. Tables 3 and 4 show that:
 - except for the three Asian financial centres (Hong Kong SAR, Singapore and Taiwan PoC) and South Korea, EMEs still need to make substantial progress in order to achieve a degree of DFD similar to the G7 benchmark economies, although the scope for “catching up” varies significantly from country to country;

- there is some variance between the three abovementioned broad dimensions of DFD that we have identified. This may either be a genuine feature of such economies or attributable to limitations in our database and/or methodology. For instance, an unexpected finding is that China ranks third on the performance side but only 21st as regards the institutional dimension and 16th for size and access measures. The high rank in performance, however, does not reflect market factors but rather factors such as a first-class “cost/income” ratio for the Chinese banking system, not only owing to low labour costs but also, more importantly, to the setting by the central bank of benchmark interest rates on loans and deposits, which artificially ensure high net interest income. This example suggests that interpretation of the quantitative rankings in Tables 3 and 4 should always be complemented with more qualitative analyses;
- in our analysis we also split the three dimensions of our index into eight more specific *sub-dimensions of DFD*, for which we also present and discuss country rankings. One interesting finding is that some financial systems, such as in Chile and Israel, have relatively strong institutions and regulations but this is not fully reflected in their size or performance scores. The question, therefore, arises why the successful institutional and regulatory environments of certain EMEs have not yet translated into good-sized and high-performing financial intermediaries and markets;
- besides focusing on individual countries, we also describe the *geographical distribution* of the scores in our composite DFD index across different EME groupings, such as BRICs (Brazil, Russia, India and China), the commodity exporters, emerging Asia or Latin America.
- Moreover, we attempt to assess *longer-term trends in DFD*, although hampered by serious data limitations. Our evidence, whilst far from conclusive, points to an accelerating pace of financial development in several EMEs and suggests that some of them may even have started a process of financial catching-up towards mature economies. We also show that past financial crises significantly affected the relative degree of DFD across countries, thus raising the question of how global DFD configurations will change in the wake of the ongoing financial crisis.
- Last but not least, we discuss the hypothesis that divergences in the degree of financial development between emerging and mature economies have been one of the (many) factors associated, during the past decade, with *capital moving ‘uphill from the South to the North of the world’*, i.e. with current account imbalances between certain emerging and certain mature economies. We review the related literature and find that this hypothesis is corroborated by an econometric analysis that we conduct using our DFD index. Among other things, we find that a relative increase in financial sector development is associated with a reduction of current account balances, an increase in gross capital formation and a decrease in private savings.
- We conclude our paper by suggesting a number of *open issues* for a more policy-oriented discussion that our analysis could inspire. Also, we identify avenues for *further research* related to the link between DFD and savings, investment and current account balances. To this end, we intend to update our database and indices regularly.

I INTRODUCTION

I.1 MOTIVATION: WHAT IS THE CASE FOR ANALYSING DOMESTIC FINANCIAL DEVELOPMENT IN EMERGING COUNTRIES?

Most emerging market economies (EMEs) have been experiencing staggering economic growth rates, especially over the past decade. The academic literature has sought to obtain a better understanding of the main drivers of rapid economic development in the benefiting countries, or the lack thereof in those developing countries with either negligible or even negative rates of growth. The factors supposedly contributing to growth are manifold, and the empirical findings seem to support the most diverse answers to this question. A paper by Xavier Sala-i-Martin on the determinants of economic development, with the suggestive title “I just ran two million regressions”, sheds some light on this vast field of research. More recent work, which we summarise in Section 2 and Boxes 1 and 2, emphasises the role that domestic financial markets and institutions play as one key driver of economic development and, more generally, in relation to a range of other macroeconomic variables including savings, investment and current account balances.

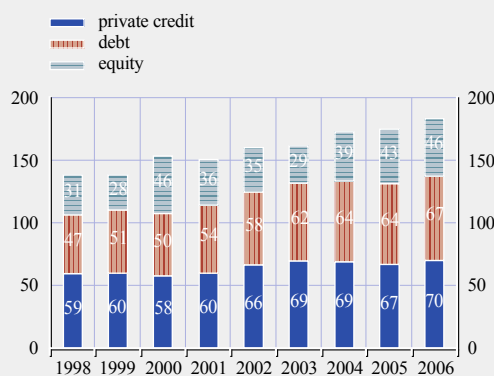
Yet the link between financial development and such macro variables remains only partially understood. Among other things, EMEs’ financial market development is often inadequately defined and, even more frequently, poorly measured. This paper contributes to filling these gaps by suggesting a comprehensive definition of domestic financial development (DFD), quantifying this definition with measurable variables and aggregating them so as to develop an inclusive measure of this phenomenon, i.e. a composite index of DFD.

A few stylised facts point to an accelerating pace of financial development since the late 1990s in most EMEs, suggesting that some of them may even have started a process of financial “catching up” towards mature economies:

- *First*, the ratio to EMEs’ gross domestic product (GDP) of their total *external and domestic funding* – defined as stock outstanding of private bank loans and debt-equity securities – is estimated to have increased from less than 140% to above 180% from 1998 to 2006 (Chart 1). The improved access to funding sources for local institutional sectors (government, corporate, household and financial sectors) is likely to have contributed to higher domestic demand in EMEs.
- *Second*, EMEs have been reducing their issuance of external debt since 2003, relying more on *domestic* debt – a process that has contributed to lower vulnerability to external shocks. Sovereign issuers and, to a lesser extent, banks, have been driving this development (Chart 2).
- *Third*, whilst of course starting from much lower levels, in the past decade the *funding of EMEs in domestic markets has been increasing at a much faster pace than in G3 economies* (defined as United States, EU14 and Japan), i.e. by 84% against 20%

Chart 1 Total external and domestic funding sources of EMEs

(in percentage of GDP)

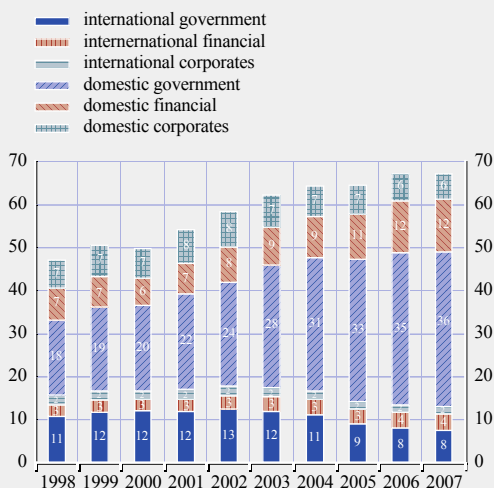


Sources: BIS and Datastream.

Notes: The 17 EMEs portrayed in the three figures above are: Argentina, Brazil, Chile, China, Hong Kong SAR, India, Indonesia, Malaysia, Mexico, Philippines, Singapore, South Africa, South Korea, Taiwan PoC, Thailand, Turkey and Venezuela. The EU14 aggregate is formed by Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden and United Kingdom (i.e., EU15 minus Luxembourg).

Chart 2 External versus domestic debt of EMEs

(in percentage of GDP)

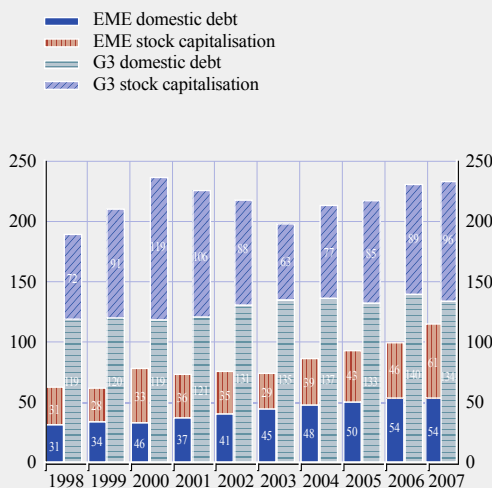


Sources: BIS and Datastream.

Notes: The 17 EMEs portrayed in the three figures above are: Argentina, Brazil, Chile, China, Hong Kong SAR, India, Indonesia, Malaysia, Mexico, Philippines, Singapore, South Africa, South Korea, Taiwan PoC, Thailand, Turkey and Venezuela. The EU14 aggregate is formed by Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden and United Kingdom (i.e., EU15 minus Luxembourg).

Chart 3 Domestic market funding in EMEs and G3 economies

(in percentage of GDP)



Sources: BIS and Datastream.

Notes: The 17 EMEs portrayed in the three figures above are: Argentina, Brazil, Chile, China, Hong Kong SAR, India, Indonesia, Malaysia, Mexico, Philippines, Singapore, South Africa, South Korea, Taiwan PoC, Thailand, Turkey and Venezuela. The EU14 aggregate is formed by Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden and United Kingdom (i.e., EU15 minus Luxembourg).

between 1998 and 2007. As a result, in 2007 the funding of EMEs in domestic markets accounted for 115% of their GDP (about half the G3 ratio), compared with 62% in 1998 (which was less than one third of the G3 ratio) (Chart 3).

These stylised facts raise a number of questions with regard to possible implications.

From a *financial stability* viewpoint, deeper, more liquid and better functioning markets in EMEs are likely to attract private foreign investors, as longer-run developments in EMEs' gross and net capital inflows confirm. This has implications not only in terms of efficiency but also financial stability, since greater cross-border financial exposures involve greater scope for heightened domestic market volatility in the presence of any financial turmoil, as experience fully corroborates. Whilst not overlooking the importance of this

perspective, this paper nevertheless takes a different, macroeconomic approach.

From a *macroeconomic* angle, a particularly interesting issue relates to the link between financial development, international capital flows and global imbalances. Differences in the degree of DFD across countries may indeed, according to one strand in the literature, be a structural factor which has been contributing to the accumulation of global internal and external imbalances, in the same way as the possible catching up of financially underdeveloped countries might in the longer run contribute to an unwinding of such imbalances. The core argument is that a high degree of financial development tends to relax borrowing constraints in a country, thereby supporting its domestic demand; in Box 1 we provide a detailed account of this argument by referring to the recent academic and policy debate.

EMES' FINANCIAL UNDERDEVELOPMENT, INTERNATIONAL CAPITAL FLOWS AND GLOBAL IMBALANCES

According to conventional models, financial integration between two economies with different levels of economic development – the North and the South, where South refers to the group of emerging economies – should lead to capital flows from the North, where the rate of return on capital and the expected growth are lower, to the South. This can be named as the “first order” effect. We know, however, that recent experience has partly contradicted the results of the standard model since, unlike private capital, *total net capital has flown from the South* – taken, of course, as a whole since there are many well-known exceptions – *to the North* (the “Lucas paradox”).

Bini Smaghi (2007) argues that a more important role than the first order effects may have been played by “second order” effects originating in the South, the absence of risk sharing mechanisms owing to *financial market incompleteness* and higher intrinsic risk aversion. Indeed, in the South trade development has preceded financial development. A complete financial system is not created overnight, and it is not surprising that, while over time several industries have migrated from the North to the South attracted by cheaper labour costs and other comparative advantages, the financial industry has not been subject to the same type of migration. As a result, the North is likely to continue to enjoy a comparative advantage in the provision of financial services for some time longer. If economic agents in the South face tighter domestic “borrowing constraints”¹ than in the North, globalisation can lead to a net outflow of capital from the South to the North. The asymmetry in borrowing constraints can help explain a current account constellation in which the South has a savings surplus and the North a deficit. With globalisation, net lenders in the South gain access to the global assets of the North, but only specialised investors and lenders in the North gain equal access to net *private* borrowers in the South, because the latter’s liabilities are more local in nature, thus engendering a problem of asymmetric information.

Caballero (2006) and *Caballero, Farhi and Gourinchas (2007 and 2008)* claim that the world has a *shortage of supply of financial assets* to which fast-growing EMEs have allegedly contributed by seeking to store value in financial assets that they do not produce. Unlike the situation in the past, these economies are now experiencing a large increase in their disposable income, but have not been able to sell in advance rights over their output, i.e. to create financial assets, owing to their financial underdevelopment. In this context, the fact that Anglo-Saxon economies have been supplying financial assets to those EMEs which are unable to produce them would help partly explain external imbalances, as well as the global increase in the value of financial assets – i.e. the decline in real long-term interest rates, or “interest rate conundrum” – that occurred until the correction triggered by the financial crisis started in summer 2007. In the same vein, the scarce supply of sound and liquid financial assets helps to explain the sub-prime crisis and the volatile oil and asset prices that followed it.

¹ The term “borrowing constraints” should be understood as a catchword referring to a broad and complex set of financial market features that are captured by the index of DFD presented in this paper. For instance: (i) low domestic financial market liquidity results in high domestic asset price volatility, thus creating incentives to invest abroad rather than domestically; (ii) information asymmetries (owing, e.g. to lenders’ insufficient knowledge of borrowers) reduce the investment opportunities that can be financed in a profitable way, thus forcing extra savings to be channelled abroad and (iii) limits to consumer credit also contribute to contain domestic demand by limiting consumer spending.

In contrast to the above authors, who focus on a country's ability to supply assets, *Mendoza, Quadrini and Rios-Rull (2007)* highlight the link between financial underdevelopment and savings, hence the demand for financial assets. Financial development, measured by the extent to which financial contracts are enforceable, varies sharply across countries, thus contributing to a secular reduction in US savings (via consumption smoothing) and an increase in emerging countries' demand for US assets.

Kroszner (2007) wonders why the bulk of EMEs were in the past recording current account deficits, despite even less developed local financial systems. *Dorrucci and Brutti (2007)* argue that this can only be understood in conjunction with a number of shocks on EMEs' output growth and total savings: (i) the Asian crisis in the late 1990s, which resulted in a negative demand shock followed by the promotion of export-led growth and (ii) two positive supply shocks in the 2000s – a productivity shock and rising commodity prices – to which EMEs' domestic demand has not reacted proportionally. The extra precautionary savings engendered by such shocks on EMEs' income have tended to be channelled abroad owing to the EMEs' financial underdevelopment, thus resulting in current account surpluses.

Differences in the degree of financial development can also explain portfolio composition, i.e. why private capital tends to flow to the South and official capital is directed to the North. *Mendoza et al. (2007)* maintain that the United States is able to invest in foreign risky assets (then financing this investment with debt) because the ability of an investing country to receive incomes generated abroad depends on the institutional, legal and contractual environment of this country regardless of the geographical location of the contracts owned. This view, however, is at odds with most of the literature, according to which it is the level of financial development in the countries where assets originate that makes the difference, and not in the countries where investors reside. *Eurosystem (2006)* argues that, whatever the origin of EMEs' excess savings, they still tend to be channelled abroad by the official sector (central banks or sovereign wealth funds) for three main reasons related to financial underdevelopment: (i) the central banks' attempt to "socialise", by means of foreign exchange intervention, the exchange rate risk produced by currency mismatches in the national balance sheets of certain EMEs (e.g. sizeable liquid assets in foreign currency not hedged on the liability side); (ii) the inefficiency of the private sector of most EMEs in channelling savings abroad and (iii) the presence, in countries such as China, of asymmetric capital controls discouraging portfolio capital outflows.

Regarding, finally, regional peculiarities, *Abiad, Leigh and Mody (2008)* focus on the case of European emerging economies, providing a counterexample supporting a more conventional textbook perspective. *Ohanian and Wright (2007)* observe that low return regions, such as Latin America, have over time received more capital than high return regions such as the "Asian Tigers". This finding would restate the Lucas puzzle "Why doesn't capital flow to poor countries?" to "Why doesn't capital flow to high return countries?".

1.2 OBJECTIVES: WHAT QUESTIONS DOES THIS PAPER ADDRESS?

On the basis of the motivations and background outlined above, the paper addresses issues related to domestic financial development in EMEs by first responding to two questions:

- (1) Where do EMEs stand in terms of domestic financial development compared with benchmark mature economies?
- (2) Did we observe any financial catching-up of emerging countries towards benchmark economies in the recent past?

We answer these questions on the basis of a number of indicators and indices, as well as a final composite index which we developed on the basis of an original methodology and large database. While in the final stages of this project, the World Economic Forum (WEF) published an index of DFD in September 2008 which, like ours, comprises emerging and mature economies. Unlike the WEF index, however, this paper attempts – although restricted by serious data limitations – to go beyond the stock-taking of latest data, reconstructing time series which often date back to 1985. It is the first time that a comprehensive index of financial development, based on 22 variables classified in a rigorous taxonomy, has been developed with the main focus on EMEs. In the previous literature, *either* composite indices were developed for mature economies only *or* time series analysis was conducted on the basis of individual variables used as a proxy for financial development in EMEs.

In addition, the findings presented in this paper allow two further questions to be addressed:

- (3) Does econometric analysis support the idea that EMEs' financial underdevelopment has been one structural factor contributing to the accumulation of global imbalances and, in particular, to the phenomenon of net capital flowing "uphill" from the South (certain emerging economies) to the North (certain mature economies) in recent years?
- (4) If the reply to questions (1) to (3) is positive, what could the policy-relevant implications be?

In line with these questions and the literature discussed in Box 1, we are interested in capturing the "predisposition" of an emerging country to produce net capital outflows (inflows) because of its domestic financial underdevelopment (high degree of financial development). By doing so, we contribute to the literature on linkages between DFD, global saving-investment imbalances and capital flows between mature and emerging economies. While

not being the core objective of this paper, our findings encourage further research on the role played by the asymmetric nature of financial globalisation in the emergence of widening current account positions between financially mature and underdeveloped economies.

The paper consists of two parts.

In the first part, Sections 2 to 4, we briefly review the literature and our methodological approach and database. The length of Section 3 on methodological issues and the related Annex A is justified, in our view, by the need to be as precise and transparent as possible on the line of reasoning backing our approach. The database and its main features are discussed in Section 4, and compared with the main other datasets available in this area of research.

The second part of the paper – Sections 5 to 7, to which those readers who are not interested in the methodological aspects can go directly – presents the findings. Section 5 focuses on the three dimensions constituting our index of DFD, while Section 6 sums up the main results. In Section 7 we present an econometric analysis consistent with the interpretation that divergences in the degree of financial development between emerging and mature economies have been associated with capital moving from emerging to mature economies during the past decade. Section 8 concludes by (i) suggesting a number of possible policy implications that could be drawn from our analysis and (ii) identifying avenues for further research.

2 LITERATURE REVIEW

Regarding the *conceptual background* to which this paper refers, we recommend an article in the ECB's Monthly Bulletin (2005) and the ECB's report on financial integration (2008), as well as Hartmann et al. (2007). Whilst these publications focus on mature economies, they also provide generally valid definitions of "financial system", "financial development" and "financial efficiency", as well as of their interrelation with "financial integration" and "financial stability": definitions which are broadly consistent with the approach taken in this paper. In particular, the concept of domestic financial development and the related literature are further discussed in Section 3 below.

Also, the links between financial development and a range of economic variables have not been overlooked in the literature. To our surprise, however, there have been no major attempts to *quantify* financial development, especially in emerging countries.

A particularly interesting contribution is provided by an IMF paper (2006), in which the authors measure financial development in mature economies by creating an ad hoc index composed of three dimensions: (i) "Traditional banking intermediation", where variables such as the volume of funds intermediated by banks, banking competition and disclosure of financial information play a key role; (ii) "New financial intermediation", which addresses non-traditional banking, non-bank intermediation and financial innovation and (iii) "financial markets", where access to finance, liquidity and contract enforcement are measured. While this is a comprehensive and well-considered project, unfortunately it can only cover a restricted group of twelve mature economies owing to data constraints.

A more recent work by Creane, Goyal, Mobarak and Sab (2007) sets up an index of financial development for a group of Middle East and North African countries. The authors collect information on six different "facets" of financial

development: 1) banking sector size, structure, efficiency; 2) development of non-bank financial sector; 3) quality of banking regulation and supervision; 4) development of the monetary sector and monetary policy; 5) financial sector openness and 6) institutional environment. The data was collected through a survey with a number of questions aimed at answering and measuring financial sector development. In addition, the authors have built a more concise index based on four quantitative variables,¹ out of which they extract the first principal component to serve as index value. This smaller index allows them to compare the evolution of financial development over the last four decades for the major developing regions across the globe.

There are several other studies analysing quantitative aspects of financial development. An interesting example is given by Yongfu Huang (2005), who disentangles financial development into four major pillars (institutions, policy, geography and other variables), measured through 39 variables whose significance is then scrutinised by Bayesian model averaging and general-to-specific methods. However, while this type of study is relevant to the evolution of this field of research, it does not quantify financial development in order to make it *comparable* across countries and over time – which is the main goal of our paper.

A relevant quantification of financial development in EMEs is provided in the abovementioned WEF report, published in September 2008, which was developed in parallel with and independently of this paper. Compared with the WEF report, our analysis: (i) attempts to go beyond the stock-taking of latest data, reconstructing time series which often date back to 1985; (ii) does not treat

¹ M2/GDP; assets of deposit money banks/total assets of the central bank plus deposit money banks; reserve ratio; credit to private sector by deposit money banks/GDP.

financial stability² as an integral part of the concept of DFD and (iii) delivers similar results in terms of the latest assessment of the overall degree of DFD in individual countries, as shown in Section 4.

The literature on the abovementioned *link between EMEs' financial underdevelopment, international capital flows and external imbalances* is reviewed in Box 1.

Regarding, finally, the specific *drivers and components* of DFD, we understand DFD as the capability of one country to channel savings into investment efficiently and effectively within its own borders owing to (i) the quality of the institutional and regulatory framework,

(ii) the size of the financial markets and private agents' ease of access to them and (iii) the financial markets' performance, e.g. in terms of efficiency and liquidity. In Box 2 we summarise the literature on each of these three broad dimensions, which are the main constituents of our index.

2 Our index captures the capability of institutions and regulations to promote financial development and innovation in order to better allocate resources to the investments with highest returns, *regardless* of financial stability implications. In this way we take account of the trade-off between risk and innovation/return by only focusing on the latter aspect. This allows us not to rank high those EMEs that achieve financial stability over the short run by means of financial repression, and, on the other hand, to disregard financial stability issues which, as the ongoing crisis stemming from the United States confirms, are extremely complex.

Box 2

LITERATURE ON THE VARIOUS DIMENSIONS OF DOMESTIC FINANCIAL DEVELOPMENT

Quality of institutions

The role of institutions in financial development was suggested by law and finance theory. This paradigm focuses on the role of institutions in explaining international differences in financial development (La Porta, Lopez-de-Silanes, Shleifer and Vishny, 1997, 1998, 2000a, as summarises Beck and Levine, 2003). This theory asserts that in countries where legal systems enforce private property rights, support private contractual arrangements and protect the legal right of investors, savers are more willing to finance firms, and financial markets prosper. In conclusion, the willingness of economic agents to participate in financial markets and the ensuing cross-country differences depend on (i) contract, company, bankruptcy and securities laws and the level of credibility and transparency of accounting rules; (ii) the emphasis of legal systems on private property rights and (iii) the efficiency of contract enforcement.

Turning to the empirical literature, Levine, Loayza and Beck (1999) investigate the extent to which the legal and regulatory environment affects DFD. La Porta et al. (1997, 1998) show that the national legal origin (e.g. English, French, German or Scandinavian) strongly affects the legal and regulatory environment underpinning financial transactions, thereby explaining cross-country differences in DFD. La Porta et al. (1997, 1998) and Levine (1999) show that low levels of shareholder rights are associated with poorly developed equity markets. In addition, Morck, Yeung and Yu (1999) study the connection between legal institutions and efficiency of equity markets, focusing on the relationship between legal institutions, the availability and precision of information on firms and the efficiency of stock prices. They find that the extent to which legal institutions protect private property rights and the rights of minority shareholders helps account for cross-country differences in stock market synchronicity. In countries where

legal institutions do not protect shareholders effectively, domestic stock prices largely tend to move together, implying lesser information on individual stock prices.

Financial markets' size and access to finance

The bulk of the literature on DFD focuses on variables measuring the size of financial markets, taken as proxies for the overall degree of DFD. This approach, however, has evidenced several shortcomings since the relationship between size and DFD is often blurred or may present non-linearities (see section 3.2.2). Bearing these caveats in mind, however, the size measures do have a strong explanatory power when it comes to analysing the level of financial development in a given economy and its implications. Without claiming to be exhaustive, we mention below some of the most often quoted papers in the recent literature.

Beck, Demirgüç-Kunt and Levine are among the authors who have delivered the most important contributions in this field of research. Particularly important is a joint work (1999) where they develop and interpret a new database on DFD for a large panel of countries, with a time span going back to 1960. Demirgüç-Kunt and Huizinga (1998) show that a positive relationship exists between stock market capitalisation and profitability. In a developed equity market environment the firms' funding possibilities are indeed larger and are usually associated with higher returns on equity. Chatusripitak and Herring (2000) stress the importance of a liquid bond market across the whole spectrum of maturities in order to provide households and firms with risk-pooling and risk-sharing opportunities. The authors point out that, without market-determined interest rates, firms would lack a true measure of the opportunity cost of capital, thereby possibly investing less. Rajan and Zingales (2003) look at the "politics" of financial development in the twentieth century. While their main focus is on the influence of "interest groups" in shaping patterns and speed of development, their work also provides a good example of how financial development is usually measured. Rajan and Zingales only employ size measures such as equity market capitalisation over GDP, the number of listed companies per million of population and security issues over GDP. Chinn and Ito have also published several influential papers, with their most cited contribution probably concerning the link between DFD and capital account openness. In their 2005 paper entitled "What Matters for Financial Development?", they look at the potential impacts of financial openness on DFD by making use of proxies for DFD mainly centred on size variables (e.g. private credit over GDP, stock market capitalisation and stock market total value).

Turning to the literature on access to finance, a good overview is provided in a policy report by the World Bank (2008) entitled "Finance for All? Policies and Pitfalls". The authors convincingly claim that the literature linking financial to economic development has overemphasised the importance of financial stability and efficiency, and overlooked to a large extent the necessity of providing greater access to finance as a means to promote economic and social progress.

Financial market performance

This first evidence on the positive effects of financial markets' performance on DFD was presented by Demirgüç-Kunt and Huizinga (1998). They find that low overhead costs over total asset ratios are typical of mature economies with higher levels of economic and financial development.

Besides traditional size measures, King and Levine (1993a) analyse the role of the public sector in financial markets, measured by the credit allocated by the private sector as a share of credit allocated by the central bank. Their conclusion is that private institutions are better at managing risk and gathering and managing information on investment opportunities and processes. In a subsequent paper, King and Levine (1993b) stress the importance of resource allocation, i.e. credit, being concentrated in the private rather than public sector, and suggest a model which describes how different financial systems affect entrepreneurial activity, thereby leading to different productivity outcomes. In their words, "...a more-developed financial system fosters productivity improvement by choosing higher quality entrepreneurs and projects, by more effectively mobilizing external financing for these entrepreneurs, by providing superior vehicles for diversifying risk of innovative activities, and by revealing more accurately the potentially large profits associated with the uncertain business innovation".

3 METHODOLOGY TO CONSTRUCT THE COMPOSITE INDEX OF DFD

We measure DFD on the basis of a composite normalised index ranging between 0 and 100 and based on the three dimensions (institutions, size of and access to financial markets and financial

market performance), eight sub-dimensions (quality of institutions, etc.), and twenty-two variables as summarised in Table 1. We have also constructed ad hoc indices for each of the individual dimensions and sub-dimensions to allow for a more focused analysis of specific facets of DFD.

Table 1 Index of domestic financial development: dimensions, sub-dimensions and variables

1. Institutions		2. Size of and access to markets			3. Market performance		
Quality of institutions	Regulatory and judicial framework	Size of "traditional" private financial markets	Financial innovation	Possibility for residents to access finance	Banks' efficiency and profitability	Liquidity (market turnover)	Distribution of domestic asset base between the private and the official sector
Level of corruption (-)	Strength, impartiality and the legal system (+)	Stock market value/GDP (+)	Gross issuance of ABS and MBS/GDP (+)	Number of bank branches per 100,000 inhabitants (+)	Banks' total operating costs over net interest income (-)	Value of shares traded as a ratio of equity market capitalisation (three-year moving average) (+)	Central bank claims on the private sector over total claims on the private sector (-)
Bureaucratic quality (+)	Investor protection (strength of minority shareholders) (+) Strength of collateral and bankruptcy laws in protecting the rights of borrowers and lenders (+)	Private bond market/GDP (+) Total bank claims/GDP (+)		Number of ATM machines per 100,000 inhabitants (+) Life insurance penetration (volume of life insurance premia/GDP) (+)			Amount of public sector funding over total bank claims (-) Domestic private debt over domestic government debt (-)
	Degree of information available in lending operations (+) Efficiency in enforcing contracts and resolving commercial disputes (+)	Assets of non-bank financial institutions/GDP (+)		Non-life insurance penetration (volume of non-life insurance premia/GDP) (+) Cost of maintaining a savings account (annual fees) (-)			

Note: Expected effect on DFD in parentheses.

We referred to the OECD's handbook (2005) as an assisting tool when deciding upon the order of steps to be taken in developing our index, as described below in detail.

3.1 GENERAL CRITERIA

Defining DFD

“What is badly defined is likely to be badly measured” (OECD 2005, page 12)

Given data constraints, “domestic financial development in EMEs” has in the past been measured on the basis of definitions singling out specific features of the financial market, used as a proxy for *overall* financial development. Two examples are:

- Chinn and Ito (2005, p. 21): “Financial development – measured as activity of the stock market – appears to depend upon capital account openness both individually and in interaction with the level of legal development.”;
- Mendoza, Quadrini and Rios-Rull (2007, p. 2): “Financial development is characterised by the extent to which financial contracts are enforceable”.

Such approaches have a number of advantages, but may prove disappointing in terms of precision and/or comprehensiveness. We therefore suggest the two following complementary definitions – one more theoretical in nature and the other more suitable to orient our empirical analysis – which seem more satisfactory given the purposes of this paper:³

Theoretical definition: A domestic financial market is developed when it consists of complete markets where: (i) an equilibrium price is determined for every asset in every state of the world; (ii) assets are available that protect against adverse shocks and (iii) other important features supplement completeness, such as transparency reducing asymmetric information problems, competition and the rule of law.

Empirical definition: Domestic financial development is the capability of one country to channel savings into investment efficiently and effectively within its own borders owing to (i) the quality of its institutional and regulatory framework, (ii) the size of its financial markets, the diversity of its financial instruments and private agents' ease of access to them and (iii) the financial markets' performance, e.g. in terms of efficiency and liquidity.

These definitions are broadly consistent with Hartmann et al. (2007), who define financial development as the process of financial innovation, as well as institutional and organisational improvements in a financial system, which reduce asymmetric information, increase the completeness of markets, add possibilities for agents to engage in financial transactions through (explicit or implicit) contracts, reduce transaction costs and increase competition.

When constructing the index, we have endeavoured to select dimensions and variables able to capture and measure the different facets of the DFD empirical definition laid out above.

Country coverage

We have selected the following four groups of countries:

- 1) *EMEs that are members of the Group of 20 (called “G20”):*
 - Argentina, Brazil, China, India, Indonesia, Mexico, Russia, Saudi Arabia, South Africa, South Korea and Turkey. This group is particularly interesting on account of its GDP size and systemic relevance, the outcome of a vigorous process of economic and social development in the past few decades.

³ In the literature, the closest definition to the one suggested can be found in Rajan and Zingales (2003).

2) *The group of main commodity exporters not already included in the first group (called “commodity” in the graphs):*

- Bahrain, Chile, Kuwait, Oman, Qatar, United Arab Emirates and Venezuela. This group is of interest given its important role as a provider of funding and investment to the rest of the world. The role of sovereign wealth funds in most of these countries, for instance, has been a much debated issue recently.

3) *Other key EMEs (called “other EME” in the graphs):*

- Egypt, Hong Kong SAR, Israel, Malaysia, Philippines, Singapore, Taiwan PoC and Thailand. This last group is composed of EMEs that do not fit into the above groupings, but which are nonetheless very important for their region and/or have experienced remarkable financial development as in the case of Hong Kong SAR, Singapore and Taiwan PoC. There are, of course, other EMEs which neither lack importance nor vigour in their economic development, but which had to be left out, often just for data availability reasons.

4) *The reference group: some benchmark mature economies (called “benchmark” in the graphs):*

- United States, Japan, United Kingdom and the euro area, the latter proxied by its three G7 member economies

(Germany, France and Italy, which we call euro area-G3⁴). These countries will serve as the benchmark for comparison purposes.

3.2 SELECTING THE VARIABLES

“A composite indicator is above all a sum of its parts...”

The strengths and weaknesses of a composite index depend mainly on the quality of the underlying variables, which should be selected on the basis of their relevance, analytical soundness, timeliness and accessibility.

3.2.1 THE CHOICE OF VARIABLES AND THEIR CLASSIFICATION

Our index captures three broad dimensions of DFD (see Table 2).

In the following sub-sections we outline the variables contained in these dimensions, while a detailed description of individual variables and the respective academic literature is provided in Annex A, which also specifies the availability of data and their frequency.

4 Unfortunately, data availability considerations partly affected the selection of countries, as in most empirical work. In particular, we would have liked to incorporate the whole euro area in our study as a benchmark, but the lack of data – mainly on the institutional variables for the smaller Member States – and the changes in the euro area aggregate composition have led us to include the three largest economies only.

Table 2 Dimensions of the DFD Index

Domestic Financial Development Index		
Institutional dimension	Market dimension (1): size and access to finance	Market dimension (2): performance
<ul style="list-style-type: none"> – Regulatory and judicial framework – Quality of institutions 	<ul style="list-style-type: none"> – Traditional measures of size – Financial innovation – Residents' access to finance 	<ul style="list-style-type: none"> – Technical efficiency – Liquidity – Distribution of domestic asset base

3.2.1.1 Institutional Dimension

Regulatory and judicial framework

- Law and order (“contract viability”)
- Investor protection index
- Legal rights index
- Credit information
- Enforcing contracts

Quality of institutions

- Corruption
- Bureaucratic quality

Some of the variables mentioned above are broad in nature, i.e. they capture phenomena that go beyond financial development per se. We nevertheless deemed it useful to include such variables as they are not only relevant but, in many respects, crucial for the orderly and smooth working of the financial sector. For the sake of clarity, in Annex A we denote such *broad* variables with “B”, and those *specific* variables which strictly pertain to the financial dimension with “S”.

3.2.1.2 Market Dimension (1): size and access to finance

Size – Traditional measures

- Stock market value/GDP
- Private bond market/GDP
- Total bank claims/GDP
- Other financial institutions assets/GDP

Residents’ access to finance

- Demographic branch penetration
- Demographic ATM (automated teller machine) penetration
- Life insurance penetration
- Non-life insurance penetration
- Annual fees for savings account

Size – Financial innovation and hedging

- Asset and mortgage-backed securities, gross issuance/GDP

3.2.1.3 Market Dimension (2): performance

Technical efficiency

- Cost/income: Banks’ total operating costs over net interest income

Liquidity

- Depth: stock market turnover velocity

Distribution of domestic asset base

- Central bank claims on private sector/total claims on private sector
- Bank claims on public sector/total bank claims
- Domestic private debt/domestic government debt

3.2.2 WHY DOES OUR INDEX OF DFD NOT INCLUDE CERTAIN VARIABLES TYPICALLY CONSIDERED IN THE LITERATURE?

3.2.2.1 Financial openness

An important assessment to be made in constructing the index concerns the link between DFD and financial openness (FOP)⁵ in EMEs and other developing countries. Should FOP be considered merely as a component of the DFD index? In other words, is it *necessarily* true that the more a country is financially integrated the greater its degree of DFD? And, more generally, is greater FOP *always* “good” for developing countries, for instance in terms of positive impact on growth, regardless of any other qualifications?

Whilst the answer to these questions is not straightforward – and indeed one can find different responses in the literature⁶ – it is also true that empirical evidence on the links between FOP and DFD and between FOP and growth is ambiguous and not necessarily in line with predictions of neoclassical models.

5 Measured by, e.g. the level, or a change in, foreign assets and liabilities over GDP. As discussed in Prasad, Rajan and Subramanian (2006), a de jure measure of openness (i.e. based on a compilation of restrictions on capital flows) cannot measure the true extent of financial integration of a country with the rest of the world, whereas an indicator based on capital flows may fail to capture the effect on long-term growth. Of course, it would be possible to construct a composite index of FOP. This, however, falls outside the scope of this paper.

6 For a review of the literature and a recent update see Kose et al. (2006), and Rodrik and Subramanian (2008).

Regarding the first link, Rodrik and Subramanian (2008; hereinafter RS) argue that lifting capital flow restrictions too early in financially underdeveloped economies may undermine DFD because (i) governments may be tempted to tap a larger pool of funds abroad, hence having little incentive to develop domestic markets,⁷ and (ii) local private investors would have fewer incentives to lobby for reforms at home if they are allowed to allocate their savings abroad.

Concerning the second link, several authors have recently argued that opening up to global capital may not necessarily be beneficial to developing countries. First of all, the empirical literature has thus far failed to confirm that freer capital flows are conducive to speedier economic development. Prasad, Rajan and Subramanian (2006; henceforth PRS) give evidence of the “puzzle” of FOP and growth being positively correlated in mature economies, but negatively in developing countries. Moreover, RS show that in most developing countries a decrease in US interest rates relative to domestic interest rates does not produce higher domestic investment financed with foreign savings, but – surprisingly – the opposite.

A number of explanations have been put forward to explain these puzzles. The most important one from our perspective is that opening to foreign capital is beneficial to the extent that a country performs sufficiently well in terms of property rights, contract enforceability, low corruption, absence of expropriation measures, etc. (i.e. the type of institutional variable captured by our index). Otherwise, RS argue, domestic investment demand will tend to be low and inelastic to impulses from interest rate differentials. In this case, which has been labelled as that of an “investment-constrained economy”, an increase in FOP owing to financial account liberalisation would only boost consumption, with foreign savings simply substituting for domestic savings.⁸

In the same vein, PRS show that there is a negative (positive) correlation between net capital flows (current account balances) and

growth in developing countries, and argue that this may be for two main reasons: (i) low DFD restricts the range of investment opportunities and private consumption whose financing is profitable and (ii) foreign capital absorption might lead to exchange rate overvaluation that is detrimental to growth.

For all these reasons, our DFD index does not incorporate FOP. In other words, in contrast to the IMF (2006) – whose abovementioned index only deals with mature economies – our index on EMEs does *not* focus on the behaviour of individual *local agents*, i.e. it does not consider whether they can gain access to finance in the most comprehensive and efficient way regardless of the origin (domestic or foreign) of fund sources. The index therefore does not include FOP variables; the approach followed in this paper is to single out the importance of *domestic financial markets*. This means considering the influence of foreign actors only to the extent that they are located *within* emerging domestic financial markets. In terms of market completeness, what matters here is whether and to what extent emerging markets are *relatively less complete* than mature markets. This may also help determine whether emerging markets have some bias to produce net capital outflows, as discussed in Box 1 (review of the relevant literature) and Section 7 (econometric analysis).

Such an approach does not mean, however, that we neglect FOP but rather that we prefer to use it as a *separate* explanatory variable in our analysis (see Section 7). The key issue in the above discussion is indeed the *speed and sequencing* of capital flow liberalisation: a gradual and well-sequenced process of liberalisation is

7 Of course, to the extent that this behaviour would eventually be conducive to a financial crisis, it could lead to the subsequent development of domestic financial markets as an indirect second-round effect.

8 If, on the contrary, the economy is characterised by plenty of potentially profitable investment projects but a part of them cannot be financed at reasonable cost owing to low DFD (“savings-constrained economy”), then firms which mainly rely on retained earnings would also benefit from an increase in FOP. In this case, capital inflows would also finance an increase in domestic investment.

expected to be conducive to DFD, make funds available more cheaply to poorer countries and encourage investment, thus boosting GDP and raising living standards. But since it would be extremely difficult to ascertain a measure of the “appropriate degree of liberalisation” of capital flows, we prefer to exclude FOP from the index and use it separately, since the sign of this variable is not predetermined in the case of developing countries.

3.2.2.2 Government bond markets

In the literature one can often find references to the importance of a large and liquid government bond market (e.g. Herring and Chatusripitak, 2000). Indeed, a liquid government bond market over a large maturity spectrum – especially on the long end of the yield curve – is a necessary condition for the development of private corporate bond markets. At the same time, however, an “excessive” level of public debt could also pose a risk to the development of private local bond markets, owing to (i) the possible crowding-out effect of public over private finance and (ii) the associated risk of government insolvency that could push interest rates up.

Against these considerations, and bearing in mind that our analysis does not focus on the poorest developing countries in the early stages of DFD but on relatively more developed EMEs, we have not included government debt in our DFD size indicators since we believe that its effect on DFD is highly non-linear. We have instead considered government debt in our sub-dimension focusing on the distribution of the asset base between the private and the public sector.

3.2.2.3 Banking sector profitability and concentration

Another interesting, and still open, debate relates to the concentration and profitability of the banking sector.

A line of argument is that an oligopolistic banking sector could lead to lack of competition, hence to monopolistic rents being extracted from savers and investors. In some developing countries, moreover, a high level of banking concentration

may be attributable to extensive regulation and state-owned banks. In such systems, the lack of competitiveness, low technology usage, bad information and risk management systems would facilitate a situation where overtly inefficient banks charge high fees in order to maintain their bureaucratic apparatus. All these factors would negatively affect DFD in a country.

On the other hand, a number of papers show possible positive effects of concentration in terms of efficiency gains, such as streamlined cost structures and synergy gains (see Demsetz 1973, 1974; Peltzman 1977; Lambson 1987; and Berger 1995). In conclusion, both strands of the literature on the effects of banking concentration give insightful ideas about what could be conducive to a better functioning financial industry. Whether to endorse one or the opposite argument very much depends on the particular market features of a country. As a result, the link between banking concentration and DFD is ambiguous, a conclusion which led us to exclude this variable from our index.

A similar conclusion applies to bank profitability. High profitability could either reflect high efficiency (thus positively affecting DFD) or indicate market power and a lack of efficiency (which would affect DFD negatively).

3.2.2.4 Financial derivatives

In the case of exchange-traded derivatives, one would expect an increase in DFD to be associated with an increase in the volume of derivative products used by market participants in order to hedge against risk. When DFD increases, however, financial institutions become more able to offer tailor-made solutions to a client’s hedging needs. This leads to an upsurge in over-the-counter (OTC) products and, possibly, even to a decline in exchange-traded derivative products, as an analysis of databases such as those of the World Federation of Exchanges and the Bank for International Settlements (BIS) seems to confirm. Moreover, data on, e.g. stock markets may reflect episodes of overvaluation, therefore calling for some adjustment (as we do in this paper).

3.2.2.5 Foreign bank penetration

Demirgüç-Kunt and Huizinga (1998) find a positive relationship between foreign bank presence and profitability, a finding that comes as no surprise since one would expect a foreign institution to enter a local market only where it is likely to achieve higher returns compared with local players. The authors also conclude that foreign banks serve as a means of technology transfer and, as such, are important for local market development. Conversely, Cull and Peria (2007) draw more mixed conclusions when studying the impact of foreign bank participation. Since the overall effects of foreign bank penetration on DFD – especially in a context where countries are confronted with a financial crisis – are still being debated in the literature, we have opted to exclude this variable from the analysis.

3.3 CONSTRUCTING THE INDEX

3.3.1 MULTIVARIATE ANALYSIS

How to select, group and weigh individual variables is a key question. The suitability of each variable has to be carefully checked, i.e. not only whether it is a good proxy for what we want to measure, but also whether it overlaps with other variables in terms of explanatory power. In the selection process, we also check an individual variable's relative weight compared with other variables.

Turning to the grouping of variables, if a full set of variables was available to measure one of the abovementioned sub-indices, the case could be made in favour of applying *principal component analysis* (PCA). In our case, however, we can only use a relatively limited amount of variables to mirror our three dimensions of DFD. Hence, we prefer not to use PCA. In addition, work by Djankov, Manraj, McLiesh and Ramalho (2005) shows that PCA is likely to lead to results similar to other aggregation methods.

3.3.2 NORMALISATION OF DATA

Make sure you avoid adding apples and oranges...

Before data can be aggregated into an index, it is necessary to normalise the values of all variables. In our case, we have a very heterogeneous set of variables ranging from “Law and Order” to quantitative indicators of market size, which are mutually incompatible if left in their original format.

A variety of alternative methods is available for normalisation, including ranking; standardisation (or z-scores); re-scaling; distance to a reference; categorical scale; indicators (above or below the mean are assigned -1, 0, or 1); methods for cyclical indicators and percentage for cyclical indicators. The final decision on the approach to be followed depends mainly on the structure of data and the aim of the index (see Ebert and Welsh, 2004).

Given the final objective of this paper (i.e. to shed some light on international capital flows, local borrowing constraints and speed of convergence with regard to financial development), we consider the *re-scaling* option to be the most appropriate. There are three main reasons for choosing this method. *First*, it gives us the opportunity to compare our country results with the values of the abovementioned index created by the IMF for developed economies (see Section 2), although this comparison should be made with some caution owing to differences in the choice of dimensions and variables. *Second*, in comparison with some other normalisation procedures, it allows for a more insightful analysis of index score developments over time. *Third*, although we could have opted for more sophisticated methods such as the PCA or an unobserved components model along the lines of the “Aggregating Governance Indicators” of the World Bank,⁹ we believe that there is value added in keeping the aggregation simple and straightforward, thus making it easier to pinpoint variables having particularly strong impacts on the overall index.

⁹ Kaufmann et al. (1999).

Re-scaling means normalising each indicator so as to achieve an identical range (0; 1). Extreme values or outliers, however, could distort the transformed indicator. Moreover, re-scaling could widen the range of indicators lying within a small interval (OECD handbook, 2005).

Our simple re-scaling formula is

$$I_{xct} = \frac{x_{ct} - \min(x_{ct}^{all})}{\max(x_{ct}^{all}) - \min(x_{ct}^{all})} \quad (1)$$

where the variable c stands for a selected group of benchmark countries (i.e. United States, euro area-G3, Japan and United Kingdom), and t^{all} stands for all time periods. Hence, $\max(x_{ct}^{all})$ chooses the largest value of variable x over all time periods from the pool of benchmark countries.

It should be stressed that we are not looking at the maximum value of a specific variable for all countries, but only for the *mature economies* we have selected; this is further discussed in Section 3.3.3 below. We also decided to use the maximum value for each variable over *all time periods* so that we can analyse its development across time, in both absolute and relative terms. In our transformation we set $\min(x)=0$ value because we find it more intuitive to only look at the relative achievements to benchmark countries, without implying that an individual minimum value directly means a complete absence of development in respect to that country's variable.

3.2.3 DEFINITION OF A BENCHMARK

The main problem in defining the benchmark is the lack of benchmark values that can be obtained from optimality conditions reflecting the literature. In addition, many of the variables might have ambiguous effects especially in the case of EMEs. For instance, in the case of stock market capitalisation over GDP, it is not clear whether “more” means necessarily “better”. Indeed there is an increasing volume of literature on the development of speculative bubbles in EMEs owing to factors such as deficient

institutional setting (see, e.g. Mei, Scheinkman and Xiong 2005). Hence, it would be impossible to identify a globally optimal level of stock market capitalisation over GDP. As a result, it seems more plausible to look at the levels of market capitalisation within *mature benchmark economies*, where financial markets have a track record spanning a longer period of development, as well as relatively lower volatility.

We therefore choose the *highest value achieved within our group of benchmark countries* as the reference maximum value for each variable.

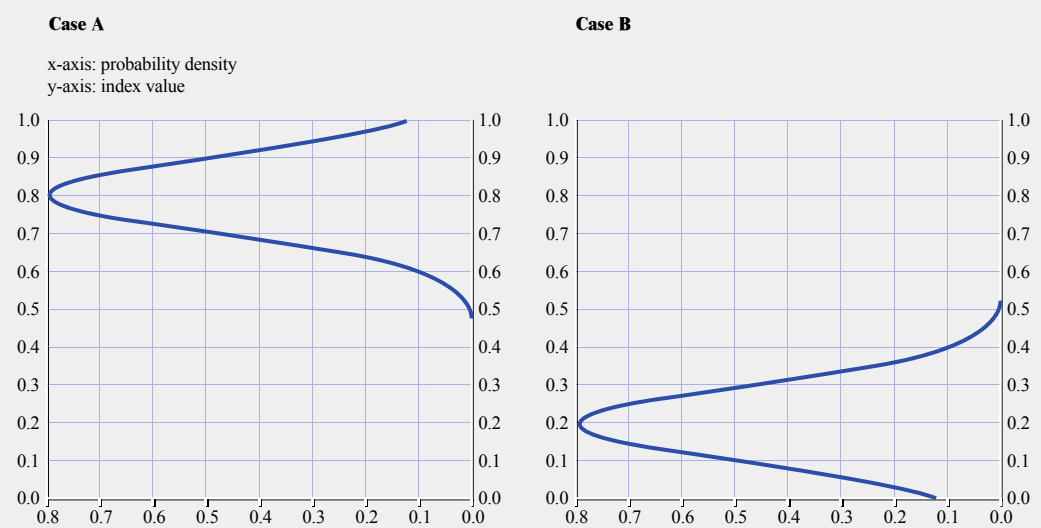
An alternative approach would have been to *pre-select one country* as our benchmark and then compute the normalisation using that country's values as the reference $\max(x)$. However, a complication with this approach stems from deep-rooted historical differences in the patterns of financial sector development. For instance, we would need to compare the US market-based system with the European bank-based one, thereby affecting the values of specific indicators as a result of the different modes of financial market evolution. For instance, if we selected as benchmark a country that has a market-based financial system, we would then be rewarding all countries with similar systems and penalising the countries with a bank-based system. Since the literature is open to debate about the relative benefits and drawbacks of each system, we prefer not to favour one side over the other. Accordingly, we have opted for a more pragmatic approach.

In conclusion, while acknowledging that our benchmark values reflect different country specificities, we believe that allowing for changing benchmarks has the advantage of not benefiting/penalising any particular financial system in a way that might turn out to be arbitrary.

3.3.4 DEALING WITH MISSING VARIABLES

When constructing indices, another major issue that arises relates to the problem of missing values. A first question concerns the patterns of such missing values, i.e. the degree to which

Chart 4 Dealing with missing values of index-components with different distributions



Source: Authors' calculations.

Note: The second and third moments of these probability distributions are equal, while the first moment differs.

they are randomly missing or, where there are reasons for them being missing, in which direction they might be biased.

In this paper, a lack of data means that for certain countries we lack some of the indicators that ideally should be in the index. This creates problems when aggregating the existent variables in order to reach a value for our index.

Let us take the example of a specific sub-dimension composed of two variables, for which a given country has values for one variable but lacks values for the other. When plotting the distribution of such variables across all countries we could obtain the graphs above, where Case A represents the value distribution of one variable and Case B represents the value distribution of the other variable.

In cases where the index value for the sub-dimension is obtained by using simple averages of the two variables, then a country for which only the variable of Case A is available would be performing better than expected, given that

the probability density function for the other variable looks like Case B in our example.

When building up our database, the lack of data was evidenced in two different ways:

- 1) Data on a specific variable were available but missing at some point in the time series. In this case we used the last available data point for all following years.
- 2) Data were not available for a specific variable related to a given country. In this case, we decided to correct the lack by looking at the other existent variables in the same sub-dimension and taking the simple average of the rank achieved in those index values. We then considered the value achieved in the variable of interest for a country with the same rank, and used that value for the country of interest. Where there are no other variables in the same sub-dimension, we use the variable that seems to be closest to it on economic intuition grounds.

Example: We need the value for “fees” in Kuwait.

Step 1 Identifying the other variables in the “Access to Finance” sub-dimension, to which “fees” belongs. These are: “insurance”, “branch”, “atm”, “nonlife”.

Step 2 Taking the average of the achieved ranks: 4/26, 11/25, 16/24, 3/26, which is 0.344.

Step 3 Looking for the number of countries which have values for “fees”: 18.

Step 4 Calculating the comparable rank position Kuwait should achieve in “fees”: $x/18=0.344 \Leftrightarrow x=6.192$

Step 5 Rounding “down” and looking for the country in “fees” that attains the sixth rank, which is Mexico.

Step 6 Using the rank value achieved by Mexico in “fees”, which is 0.835, and inputting that as the value for Kuwait.

This approach obviously involves only a rough method of approximation for missing variables,¹⁰ and we are aware that it may have the effect of slightly biasing our results. Keeping that in mind, we analysed the individual missing variables for each country and assigned a value of zero where we believed there was enough evidence of biased information.

3.3.5 WEIGHTING AND AGGREGATION

The weighting scheme chosen also has a significant impact on the composite value of the index, and thereby on the ranking of countries. There are a number of rating mechanisms available, some of which are derived from statistical models such as factor analysis, data envelopment analysis and unobserved component models (UCM). “No matter which method is used, weights are essentially value judgements. While some analysts might choose weights based only on statistical methods, others might reward (punish) the components that

are deemed more (less) influential depending on expert opinion to better reflect the policy priorities or theoretical factors.” (OECD handbook, 2005, page 21.)

The majority of prominent indices (e.g. Human Development Index, IMF Financial Index) use an “equal weighting” policy. This means that every dimension of an index, or even all variables which make up the index, are assigned equal weighting. While on the one hand this could give the impression of a lack of understanding of the underlying relationship and strengths of causal mechanisms, on the other hand we could argue that the dimensions of a certain “object of research” are chosen in such a way as to be equally important. That has indeed been our approach when trying to measure DFD. We started with a broader set of dimensions and then began aggregating variables in order to reduce dimensionality to what we believed to be the core and essential facets of DFD in emerging economies. Hence, we assigned each of the three dimensions of our index an equal weight. Within each of the three sub-dimensions, individual variables also received equal weighting, with the exception of the cases highlighted in the text where different weighting patterns were required.

¹⁰ For a comprehensive survey on methods for coping with the missing data problem, see Little and Rubin (2002), and Little and Schenker (1994).

4 OUR DATABASE ON DFD

4.1 MAIN FEATURES

Whilst our database has on the whole a rather good coverage, data is partly lacking for some countries, especially the smaller oil-exporting economies for which several statistics are not available (e.g. on debt issuance, bank claims, insurance penetration and exchange sizes).

We provide below a simple, broad overview of the database in order to check its explanatory potential. We focus on some of our 22 variables by showing their simple mean within the four groups of countries presented in Section 3.1, namely the benchmark mature economies, G20 countries, non-G20 commodity exporters and a residual group of “other EMEs”. However, the arithmetic average is not very meaningful especially for the latter group, given its heterogeneity – with countries ranging from Egypt to Hong Kong SAR.

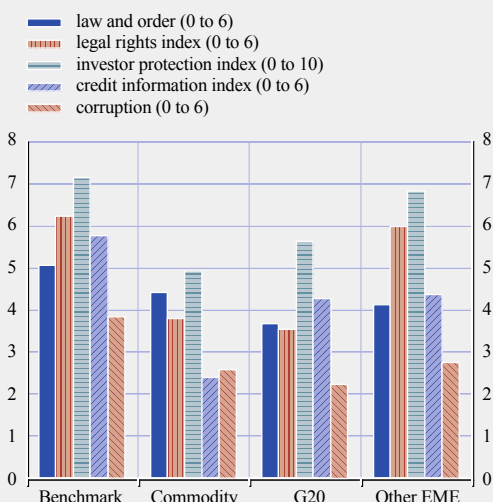
Starting with the institutional dimension, the simple average suggests good information content for the first three groups (Chart 5). In particular, the benchmark countries perform better than the other country groups as regards the different measures of the institutional dimension. Clearly, the chart points to a need to further break down the group of other EMEs.

Regarding the “traditional” measures of market size (Chart 6), most variables unsurprisingly present a pattern which is very similar to that of the institutional variables. However, market capitalisation in the benchmark countries is similar to that of commodity exporters, and lower than in other EMEs (the last result being mainly driven by a very high value for Hong Kong SAR). This calls both for an explanation and for further efforts to define the proper benchmark.

Turning to performance indicators, we focus on the sub-dimension “distribution of domestic asset base”, which, again, presents a pattern

Chart 5 Individual variables within the institutional dimension

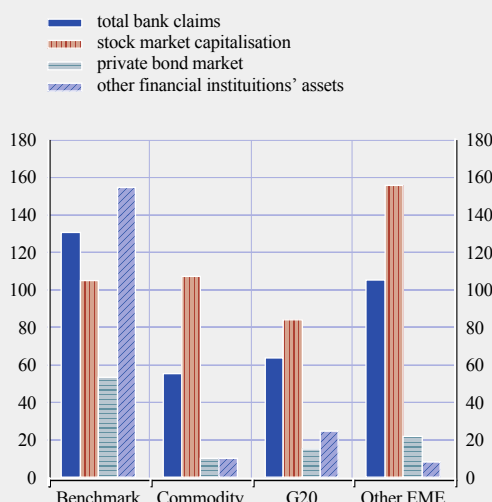
(average within each group)



Sources: *Doing Business* from the World Bank and *International Country Risk Guide* produced by PRS Group. The scale of each component is indicated in parentheses. Except for the Investor Protection Index, which has a scale from 0 to 10, the variables are scaled from 0 to 6. In all cases, higher numbers indicate a higher degree of DFD.

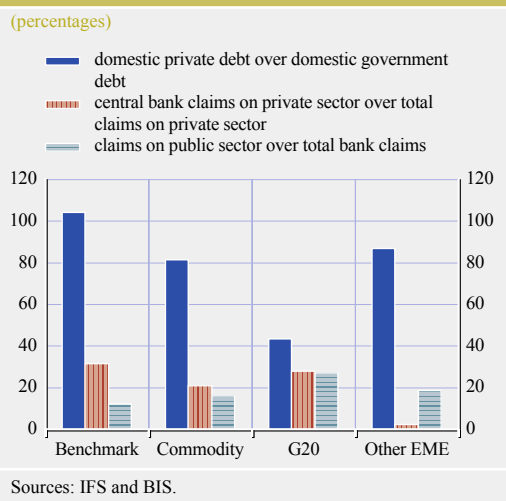
Chart 6 Traditional size measures of financial development, as a share of GDP

(average within each group; percentages)



Sources: BDL, BIS and International Financial Statistics (IFS).

Chart 7 Variables in the “distribution of domestic asset base” sub-dimension of the “performance” dimension



quite similar to that of institutional indicators (Chart 7).

In conclusion, the above evidence suggests that two methodological issues remain open to discussion. First, it is not always easy to choose a benchmark value. Second, there is a problem of missing values to be dealt with. We made our choices in full awareness of these problems (see previous Sections 3.3.3 and 3.3.4), and whilst our results are surely not immune to criticism, we believe that they reflect the best “trade-off” between different considerations.

4.2 COMPARISON WITH OTHER DATABASES OF FINANCIAL DEVELOPMENT

The bulk of the literature concerning financial development in EMEs has proxied for this variable by using only a handful of indicators. Among the most common are “stock market capitalisation”, “M2/GDP”, “bank claims over GDP” and “other financial institutions’ assets over GDP”. Nonetheless, there have also been attempts to develop composite indices, thus calling for a comparison with our index:

The Financial Development Report 2008: World Economic Forum (hereinafter WEF) provides the most comprehensive database possible, including up to 107 variables organised around seven so-called “pillars” of financial systems. WEF, however, focuses on the latest data available only, with the aim to revise and update the database in years to come. Our paper (Dorrucci, Meyer-Cirkel and Santabárbara, hereinafter DMS) attempts to reconstruct time series, which explains the lower number of variables used (22). Moreover, despite the different database coverage, the DMS and WEF final indices of DFD deliver rather similar results. Out of the 27 economies included in both databases, only four (Bahrain, Russia, Turkey and United Arab Emirates) present a rank which differs by more than five positions, as the table below illustrates:

Table 3 Comparison with other databases of financial development

Country/economy	Rank DMS (2006 data)	Rank WEF (latest data)
United States	1	1
Hong Kong SAR	2	4
United Kingdom	2 (same score as HK)	2
Japan	4	3
Singapore	5	5
South Korea	6	8
Euro area-G3	7	6 (i.e. individual scores for Germany, France and Italy suggest a weighted average ranking at 6)
Malaysia	8	9
Bahrain	9	15
Israel	10	10
South Africa	11	12
China	12	11
Chile	13	17

Table 3 Comparison with other databases of financial development (cnt'd)

Country/economy	Rank DMS (2006 data)	Rank WEF (latest data)
Kuwait	14	13
Saudi Arabia	15	14
Turkey	16	22
Thailand	17	16
United Arab Emirates	18	7
Mexico	19	24
India	20	18
Egypt	21	20
Brazil	22	23
Argentina	23	25
Philippines	24	26
Russia	25	19
Indonesia	26	21
Venezuela	27	27

Sources: Authors' calculations based on the sources quoted in Annex A; World Economic Forum.

A New Database on Financial Development and Structure: Beck, Demirgüç-Kunt and Levine (2000; hereinafter BDL), was the most prominent database of DFD prior to WEF (2008). A variety of indicators provided insights into the size, activity and efficiency of financial intermediaries and markets. BDL, however, leaves out important information such as that on the institutional dimension and access to finance, which both DMS and WEF cover.

Finance for All?: World Bank (2008) addresses the extent to which individual households in developing countries have access to financial services. The database comprises many countries and very detailed information, ranging from “loan accounts per capita” to “annual fees on savings accounts”. As in the case of WEF, however, the information is only available for a single year.

Doing Business: The World Bank has an ongoing data management project that comprises information on business regulations and their enforcement in a group of over 170 countries. The time span varies, but never goes beyond the period 2003-07 for each individual variable. This database mainly considers institutional performance, quality and transparency.

External Wealth of Nations: Lane and Milesi-Ferretti (2007) present estimates of

external assets and liabilities for 145 countries in the period 1970-2004. This database usefully complements those on DFD.

5 FINDINGS (I): WHERE DO EMES STAND IN TERMS OF DIFFERENT INDIVIDUAL DIMENSIONS OF DFD, AND HOW MUCH PROGRESS HAVE THEY MADE OVER TIME? A DESCRIPTIVE ANALYSIS

Our results are first presented for each of the three dimensions of our index – institutions, size of and access to markets, and market performance – and then in terms of the composite index, by using two different measures:

- a *broad index* that incorporates all our 22 variables but is only available since 2003. This index allows for more thorough cross-country analysis, which we conduct for 2006 (and intend to update in the future);
- a *narrow index* with a limited set of seven variables available since 1985 (also to be updated). This second measure permits an assessment of how the domestic financial sector evolves in individual countries over time, and whether a country is “converging” or not.

Although the two indices do not provide the same information and their results are not fully comparable, their correlation is above 0.98 for the institutional dimension and 0.91 for the dimension “size and access to markets”. However, the correlation is only 0.55 for the dimension “market performance” – a limitation which we take into due consideration in our analysis.

All the results presented in the graphs below show the individual index values (ranging between 0 and 1) for the year 2006, and have been calculated by choosing the max value of the benchmark countries for the entire period 1985-2006.

5.1 THE INSTITUTIONAL DIMENSION

5.1.1 THE BROAD INSTITUTIONAL INDEX AND ITS SUB-INDICES

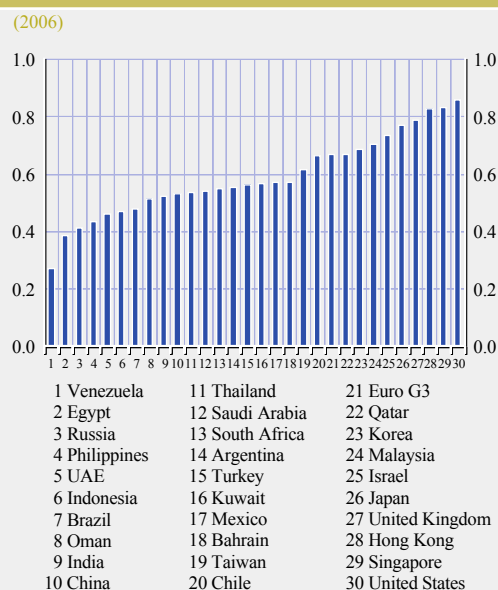
In 2006 the top performers for this dimension were three mature economies – United States, United Kingdom and Japan – and two Asian

financial centres, Hong Kong SAR and Singapore. Israel, Malaysia and South Korea were the other best-ranking emerging economies. On the opposite end of the spectrum we find Venezuela, Egypt, Russia and the Philippines. While the index ranges between nearly 0.3 (Venezuela) and almost 0.9 (United States), about half of the sample ranks between 0.5 and 0.7 (Chart 8).

As described above, this index is composed of two sub-indices, one for the quality of institutions and another for the regulatory framework. Regarding the former sub-index, Singapore, Israel and Chile are the countries ranking in the top positions, whereas Venezuela, Russia, China and Thailand present the lowest scores. 27% of the sample scores are above 0.6, 60% between 0.4 and 0.6, and only 13% are below 0.4 (Chart 9).

Turning to the sub-index on the regulatory framework, most of the sample ranges between 0.5 and 0.7. Among the emerging economies, Hong Kong SAR, Singapore, Qatar, Malaysia and South Korea present the best regulatory

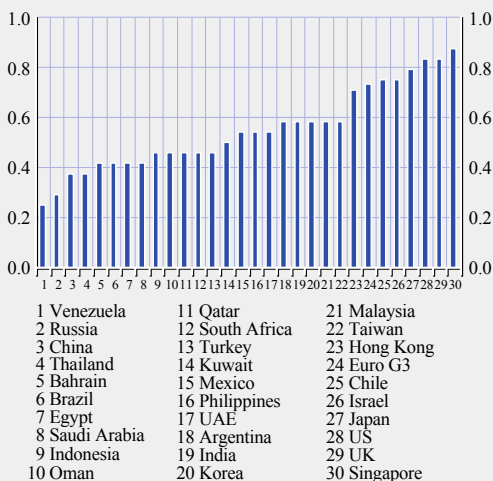
Chart 8 The overall institutional dimension of financial integration: Index



Sources: Authors’ calculations are based on the sources quoted in Annex A.

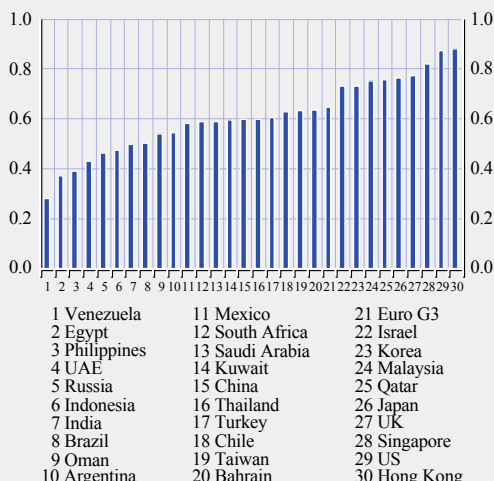
5 FINDINGS (1): WHERE DO EMES STAND IN TERMS OF DIFFERENT INDIVIDUAL DIMENSIONS OF DFD, AND HOW MUCH PROGRESS HAVE THEY MADE OVER TIME? A DESCRIPTIVE ANALYSIS

Chart 9 Quality of institutions



Source: Authors' calculations are based on the sources quoted in Annex A.

Chart 10 Regulatory framework



Source: Authors' calculations are based on the sources quoted in Annex A.

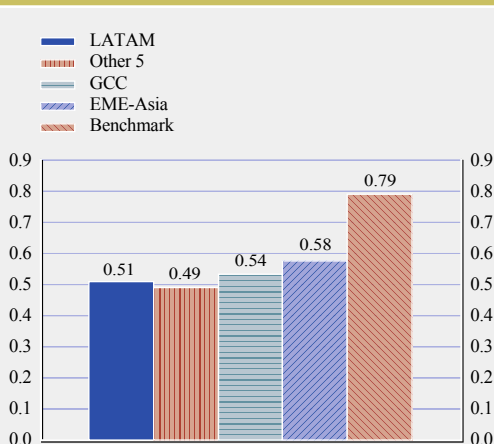
environment, while Venezuela, Egypt and the Philippines lack an appropriate framework (Chart 10).

Focusing on different emerging market regions, our group of benchmark mature economies (GDP-weighted score: 0.79) outweighs by far any regional group of emerging countries. The relatively higher score of emerging Asia (0.58) relies on the inclusion of its financial centres, while the residual group of five countries in the EU neighbouring regions (Egypt, Israel, Russia, South Africa and Turkey) presents the lowest score (Chart 11).

Looking, finally, at some specific country groupings, it is interesting to observe that the score of the three Asian financial centres (Hong Kong SAR, Singapore and Taiwan PoC) is not distant (0.72) from that of the benchmark mature economies. Conversely, the BRICs (Brazil, Russia, India and China) still deliver a very low GDP-weighted score (0.50) if one considers their importance in world output and trade growth. This suggests that the still low degree of BRICs' institutional financial development makes it more difficult for them to smooth consumption over time by borrowing and/or lending. Even lower

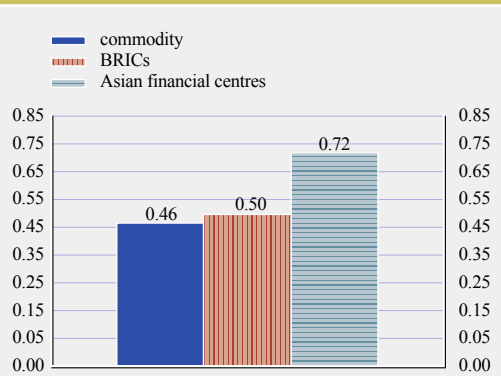
is the score of the group of oil exporters, whose underdevelopment in institutional financial terms may contribute to lower ex-post returns than those offered by mature economy financial assets, thus creating an incentive to recycle oil revenues by investing in such foreign assets.

Chart 11 Geographical breakdown of the overall institutional dimension



Source: Authors' calculations are based on the sources quoted in Annex A. Notes: "Other 5" includes Egypt, Israel, Russia, South Africa and Turkey. GCC stands for Gulf Cooperation Council, comprising Saudi Arabia, United Arab Emirates, Oman, Bahrain, Qatar and Kuwait.

Chart 12 Institutional dimension broken down by specific groups



Sources: Authors' calculations are based on the sources quoted in Annex A.

Notes: BRICs means Brazil, Russia, India and China. Russia is included twice in the BRICs group and in the group of commodity exporters. The Asian financial centres are Hong Kong SAR, Taiwan PoC and Singapore.

5.1.2 THE NARROW INSTITUTIONAL INDEX

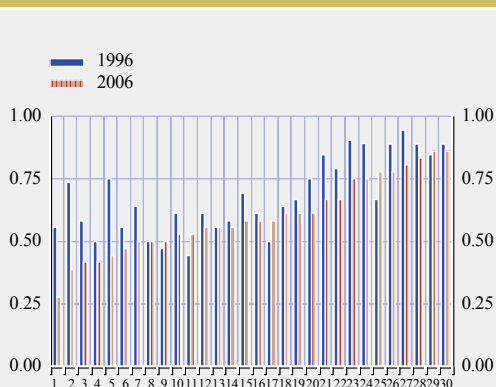
We use the narrow index to assess longer-term trends in financial development and the potential process of financial convergence of emerging countries towards benchmark mature

economies. As explained previously, however, the correlation of the narrow with the broad measure is high, the two indices are different and do not provide exactly the same rank.

Moreover, owing to lack of data, the narrow index for the institutions dimension can be built with only three out of the seven variables used for the broad index, namely bureaucratic quality and degree of corruption (i.e. all variables used for the sub-index "Quality of institutions"), plus only one of the five variables used for the sub-index "Regulatory and judicial framework", namely "Law and Order".

Surprisingly, the narrow index reveals that in most economies the three abovementioned institutional variables displayed a declining trend over the last decade, with only a few countries able to enhance their institutional framework in the period 1996-2006, namely Mexico, Chile, Singapore and a few oil exporters (Charts 13 and 14). Two important caveats should be borne in mind, however. *First*, the three abovementioned variables used for the narrow

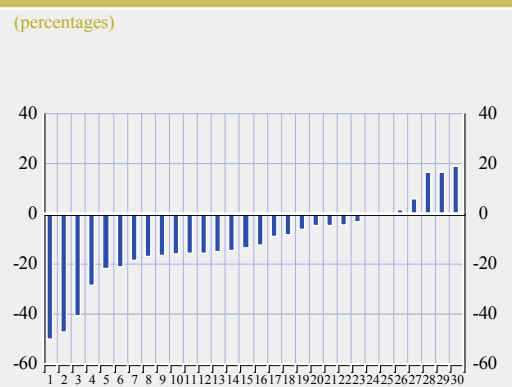
Chart 13 Narrow index of institutions dimension



- | | | |
|----------------|-----------------|-------------------|
| 1 Venezuela | 11 Mexico | 21 Korea |
| 2 Thailand | 12 Bahrain | 22 Taiwan |
| 3 Brazil | 13 Saudi Arabia | 23 Hong Kong |
| 4 Russia | 14 Turkey | 24 Euro G3 |
| 5 South Africa | 15 Oman | 25 Chile |
| 6 Indonesia | 16 Qatar | 26 Israel |
| 7 China | 17 UAE | 27 Japan |
| 8 Egypt | 18 India | 28 United States |
| 9 Philippines | 19 Kuwait | 29 Singapore |
| 10 Argentina | 20 Malaysia | 30 United Kingdom |

Sources: Authors' calculations are based on the sources quoted in Annex A.

Chart 14 Change in index of institutions dimension from 1996 - 2006



- | | | |
|----------------|------------------|-------------------|
| 1 Venezuela | 11 Euro G3 | 21 Qatar |
| 2 Thailand | 12 Taiwan | 22 India |
| 3 South Africa | 13 Indonesia | 23 United Kingdom |
| 4 Brazil | 14 Japan | 24 Egypt |
| 5 China | 15 Argentina | 25 Saudi Arabia |
| 6 Korea | 16 Israel | 26 Singapore |
| 7 Malaysia | 17 Bahrain | 27 Philippines |
| 8 Hong Kong | 18 Kuwait | 28 UAE |
| 9 Russia | 19 United States | 29 Chile |
| 10 Oman | 20 Turkey | 30 Mexico |

Sources: Authors' calculations are based on the sources quoted in Annex A.

index capture the *general* institutional and regulatory environment, but not the financial sector directly, as is instead the case with the broad index which includes variables such as investor protection and credit information. *Second*, one cannot rule out that the dataset from which our three variables are drawn – the “International Country Risk Guide” – does not present fully comparable data in its time series.

Bearing these caveats in mind, we look at the changes in the index rank in order to have an idea of the catching-up process of EMEs as far as the institutional dimension is concerned. To this aim, we calculate the difference in each country’s ranking between 1996 and 2006. Rankings are calculated on an annual basis. “1” means in this case that the country is the worst performer. Chart 15 shows that Mexico, Chile, Singapore and a few oil exporters are the countries with better performance not only in absolute, but also in relative terms. It would seem that a process of institutional catching-up has indeed been taking place in these countries. On the contrary, Thailand, South Africa, China and Brazil appear to have moved, according to this index, in the opposite direction.

5.2 THE MARKET SIZE AND ACCESS TO FINANCE DIMENSION

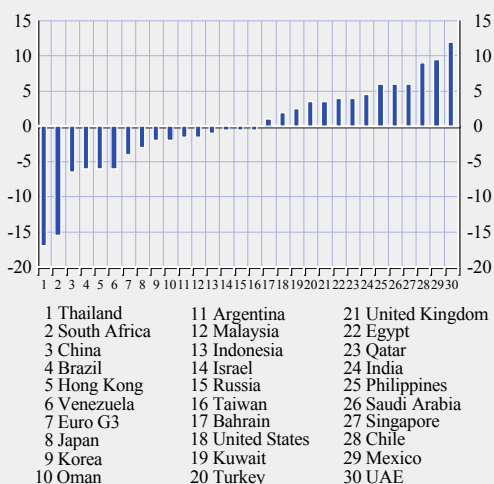
5.2.1 THE BROAD INDEX AND ITS SUB-INDICES

We now focus on our second broad dimension of DFD. Our index on the size of, and access to, financial markets¹¹ shows, not surprisingly, three benchmark economies – United States (0.79), Japan (0.60) and United Kingdom (0.54) – at the top of the ranking for the year 2006, with the weighted euro area-G3 in fifth place. The lowest part of the distribution presents low variance, ranging between 0.13 (Indonesia) and 0.23 (United Arab Emirates). The intermediate part exhibits instead a far steeper pattern, starting with Brazil (0.26) and moving up quickly to a value of 0.51 for Taiwan PoC. (Chart 16).

11 As explained in Section 2.2.1, the sub-dimensions of this index are: 1) the traditional measures of financial market size (stock market capitalisation/GDP, private bond market/GDP, total bank claims, other financial institutions’ assets/total assets); 2) financial innovation, proxied by ABS and MBS issuance; 3) residents’ access to finance (demographic penetration to bank branches and ATMs, life and non-life insurance penetration, and annual fees on savings accounts).

Chart 15 Institutional dimension of DFD: which countries have caught up between 1996 and 2006?

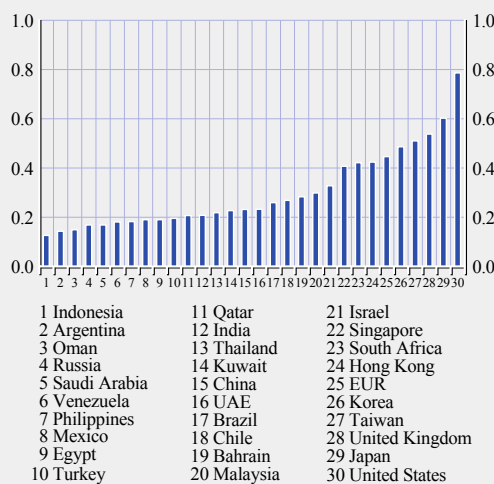
(relative change in the ranking from 1996 – 2006)



Source: Authors’ calculations are based on the sources quoted in Annex A.

Chart 16 Size of and access to financial markets: Index

(2006)



Source: Authors’ calculations are based on the sources quoted in Annex A.

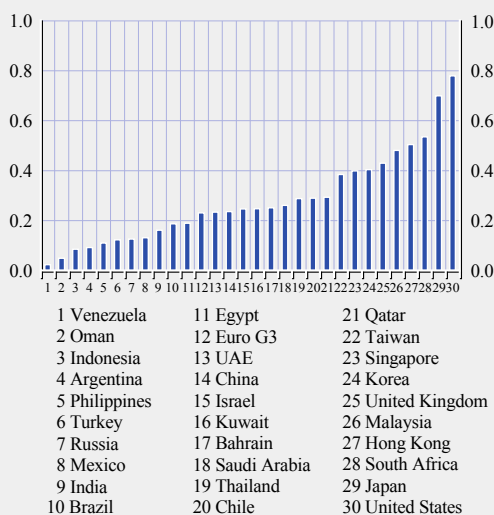
Chart 17 below presents the results for the sub-dimension we have labelled “traditional size measures”, which comprise the stock market, the private bond market, and the assets of banks and non-banks. These measures are “traditional” in the sense that they are the most widely quoted in the DFD literature. Besides the not surprising results for benchmark economies, the highest values are reached by South Africa, the three Asian financial centres, Malaysia and South Korea. After Qatar, Chile and Thailand – which present intermediate scores – the other economies are characterised by a gradual decline in values until we reach Venezuela’s value of 0.02 only.

Turning to our financial innovation proxy, given by the issuance of asset and mortgage-backed securities (ABS and MBS) over GDP, in 2006 the gap between the United States (0.83) and all the other economies was huge, with only the United Kingdom also displaying noteworthy

charts (Chart 18). These data, however, do not capture the other components of financial innovation – first of all the derivatives markets – and should be interpreted with caution. 2006 is the year preceding the start of the still ongoing financial crisis, which, as is well known, originated in the ABS and MBS markets. In many ways, this variable reflects the peculiarities of Anglo-Saxon financial markets, where the originate-and-distribute model is more developed and particular incentives were in place to promote the development of mortgage security markets. On the other hand, it should be taken into account that our index does not aim to capture financial stability issues, but rather phenomena such as the capability of one financial system to allow for consumption smoothing – an aspect that our financial innovation variable properly captures.

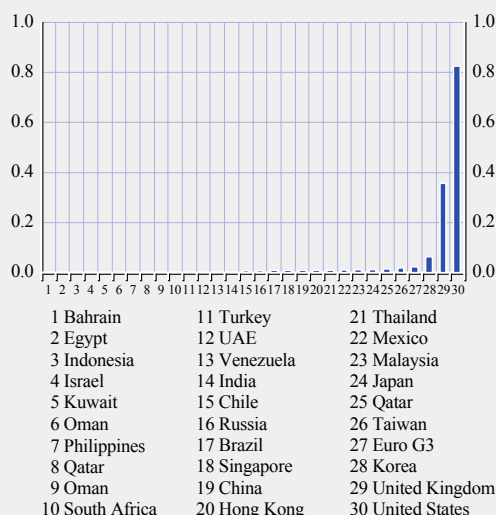
Moreover, it should also be stressed that, as already discussed in sub-section 3.2.2.4., it is

Chart 17 The traditional measures of financial market size



Sources: Authors’ calculations are based on the sources quoted in Annex A.

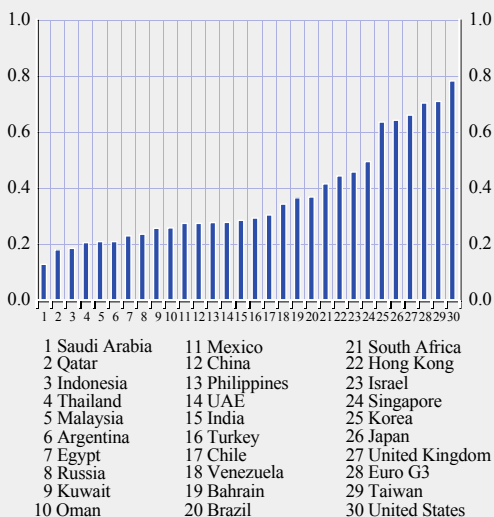
Chart 18 Financial innovation



Sources: Authors’ calculations are based on the sources quoted in Annex.

Notes: The traditional measures sub-dimension includes the following variables: stock market value/GDP, private bond market/GDP, total bank claims/GDP, and other financial institutions’ assets/GDP. The financial innovation sub-dimension includes: issuance of asset and mortgage-backed securities over GDP. The access to finance sub-dimension includes: demographic branch penetration, demographic ATM penetration, life insurance penetration, non-life insurance premium and annual fees for savings accounts.

Chart 19 Access to finance



Sources: Authors' calculations are based on the sources quoted in Annex A.

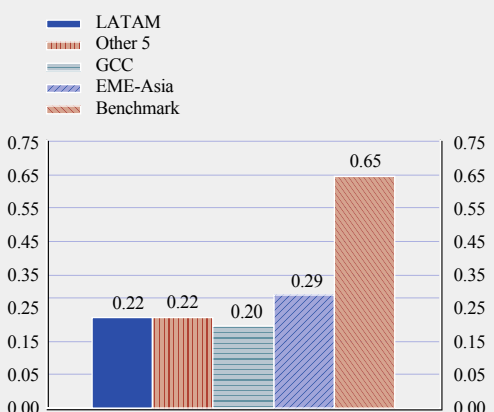
Notes: The traditional measures sub-dimension includes the following variables: stock market value/GDP, private bond market/GDP, total bank claims/GDP, and other financial institutions' assets/GDP. The financial innovation sub-dimension includes: issuance of asset and mortgage-backed securities over GDP. The access to finance sub-dimension includes: demographic branch penetration, demographic ATM penetration, life insurance penetration, non-life insurance premium and annual fees for savings accounts.

the volumes of foreign exchange derivatives may lead to information distortions since floating currencies by definition exhibit higher volumes than managed currencies. Similarly, choosing inflation-linked innovative products might lead to overstating DFD in high-inflation economies. In addition, exchange-traded data on derivative markets also present a number of ambiguities, as explained previously. All in all, and taking each alternative into consideration, we concluded that the annual volumes of MBS and ABS issuance, provided by the detailed Dealogic database, have provided some useful, although partial, insight.

Looking, finally, at the "access to finance" sub-dimension – which summarises the number of bank branches and cash machines per 100,000 people, life and non-life insurance penetration, and household expenditure to maintain savings accounts – results are led, once again, by the United States (0.78), closely followed by Taiwan PoC (0.71) and the euro area-G3 countries (0.70). A surprising result, given their performance in other dimensions, is that achieved by Thailand (0.20) and Saudi Arabia (0.13), the lowest performers in the sample. The group of best performers includes, besides some small emerging market financial

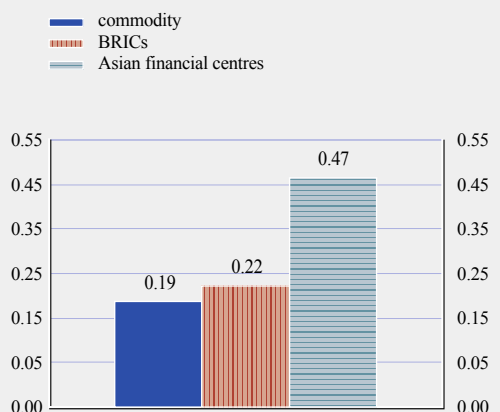
particularly difficult to capture comprehensive information on the financial innovation side for a wide group of economies. For instance, selecting

Chart 20 Size of and access to financial markets: geographical breakdown



Sources: Authors' calculations are based on the sources quoted in Annex A.

Chart 21 Size of and access to financial markets: breakdown by specific groups



Source: Authors' calculations are based on the sources quoted in Annex A.

centres, South Korea, Israel, South Africa, Brazil and, for once, Venezuela (Chart 19).

The geographical breakdown of our index illustrates that only the three Asian financial centres reach values comparable to those of the benchmark financial markets, whereas the scope for the other country groupings to catch up is still very large (Charts 20 and 21).

5.2.2 THE NARROW INDEX OF THE SIZE DIMENSION

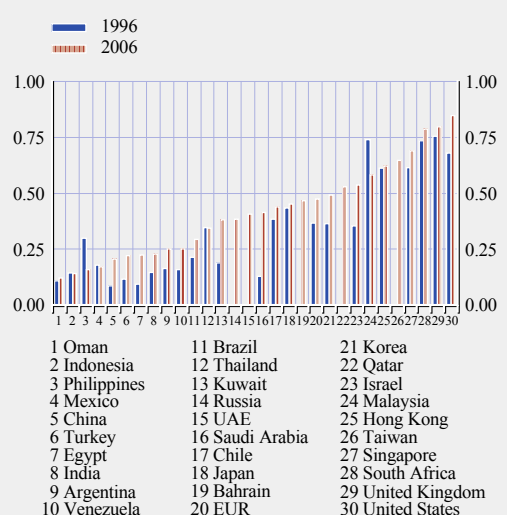
In order to capture developments over time, we now turn to a narrow measure of the size/access index, which, as mentioned, is highly correlated with the broad measure. This index comprises two variables, namely (i) market capitalisation over GDP (calculated as a three-year moving average in order to smooth out sudden spikes) and (ii) non-life insurance penetration. While an argument could be made in favour of having more variables to measure this dimension, the data availability restrictions would make this difficult.

Focusing on changes occurring between 1996 and 2006, we can clearly observe that – unlike the institutional and regulatory dimension – major progress has been made nearly everywhere, with the main exceptions being crisis-hit economies such as the Philippines and Malaysia. These two countries witnessed abnormally large net capital inflows in the years preceding the Asian crisis, a process which produced stock exchange overvaluations. On the other hand, China and two GCC countries, Saudi Arabia and Kuwait, made remarkable progress in the period considered.

5.3 THE MARKET PERFORMANCE DIMENSION

Variables such as market liquidity, banking efficiency and profitability, and the relative weight of the public sector – both government and central bank – in the domestic financial market, all have some explanatory power in understanding the degree of financial development of a given country. We seek to capture these variables in the third pillar of our index – the performance dimension – which is

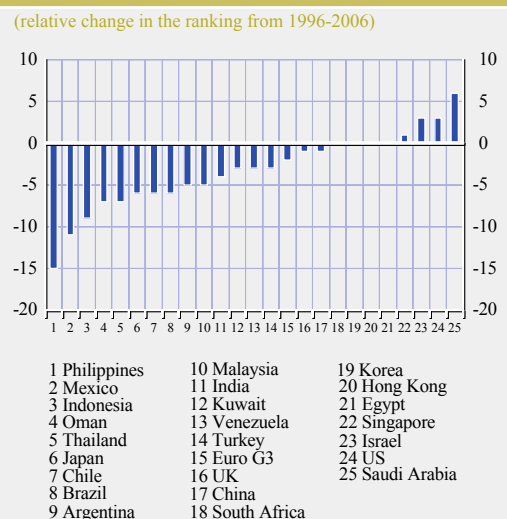
Chart 22 Narrow sub-index of size/access dimension



Source: Authors' calculations are based on the sources quoted in Annex A.

probably the most neglected in the literature on DFD. Nonetheless, each of the individual variables included in this dimension has been extensively analysed in the literature, for instance in the context of issues related to efficiency and

Chart 23 Narrow sub-index of size/access dimension: which countries have caught up between 1996 and 2006?



Sources: Authors' calculations are based on the sources quoted in Annex A.

profitability. A brief review of main studies in this field is provided in Section 2, Box 2.

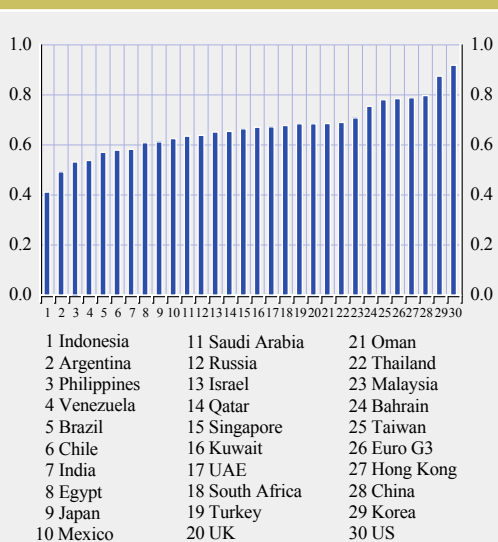
Regarding the robustness of our findings, one very important caveat is that we are here entering a more uncharted territory than the other dimensions. Hence, our conclusions in this section are more tentative in nature than those drawn in previous sections. In particular, three variables included in our database have been removed from our index for the reasons discussed in Section 3.2.2 and recapitulated below.¹² As a result, while the performance dimension we originally envisaged was based on eleven variables, robustness checks and analysis of the literature led us to reduce the number of variables to eight.

5.3.1 THE BROAD INDEX AND ITS SUB-INDICES

The results for 2006 are partly surprising. Whilst the United States remains the best performer also under this profile, with a score as high as 0.92, it is followed by South Korea (0.87) and strikingly, for the reasons spelled out below, China (0.80). The “middle field” is quite evenly spread without much variance, whereas there is a faster decrease in index values at the lower end of the spectrum, where Indonesia is the lowest performer (0.41), followed by Argentina (0.49) and the Philippines (0.53). In order to shed some light on these results, one needs to look at the various, quite heterogeneous, dimensions of the index: liquidity, distribution of domestic asset base between the private and the official sector, and banks’ efficiency.

The liquidity sub-index focuses on turnover velocity in equity markets, measured as the ratio between the value of traded shares and market capitalisation. This index exhibits a large variance of results, with a major drop between Bahrain (0.73) and Thailand (0.43), followed by a continuous decline in the values. Argentina, the worst performing country, scores only 0.04. The euro area-G3 countries and South Korea lead the group, both achieving an index value of 1. China (0.91) also presents a very high score. This, however, does not reflect the absorption capability of the Chinese equity

Chart 24 Index of performance of financial markets



Sources: Authors’ calculations are based on the sources quoted in Annex A.

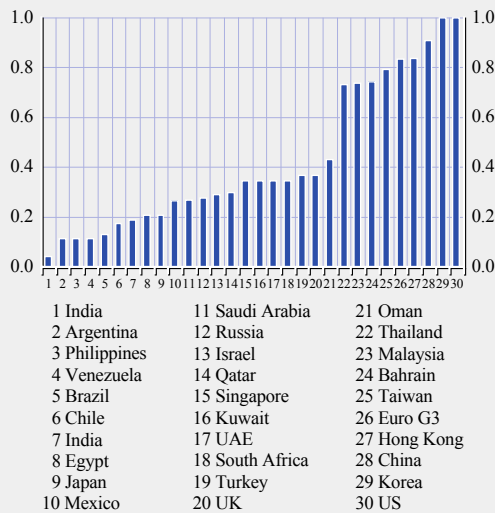
market, but rather its extraordinary expansion in 2006. Moreover, some emerging economies may show a high turnover value simply because of the small number of firms traded on the stock exchange, which may drive up the amount of related trades (Chart 25).

The distribution of the domestic asset base is portrayed by three variables: (i) central bank claims on the private sector over total claims on the private sector; (ii) the amount of funding

12 *First*, we decided *not* to include banks’ net interest margins in the index, because higher margins do not necessarily indicate high performance of financial markets. Profitability could be a measure of market power or administrative control. In countries such as China, for instance, the public authorities still set benchmark floor interest rates on banking loans and ceiling interest rates on bank deposits, so that banks’ profits are set independently of market rules. *Second*, we also decided not to consider the presence of foreign banks in the domestic financial system. We did not think it appropriate to penalise those countries where foreign bank participation is weak, merely because the literature is rather inconclusive about the strength of arguments such as the extent to which foreign banks serve as a means of technology transfer. *Third*, we realised that “banks’ overhead costs as a share of total assets” – a measure of operating costs across banking systems – is a variable with information content very similar to the variable “total operating costs over net interest income”. In order to avoid overlaps and for technical reasons, we used the latter variable for the broad index and the first variable only for the narrow index, given its better coverage in terms of time series.

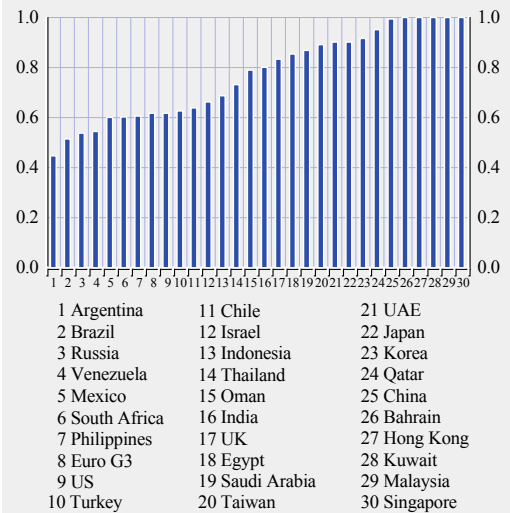
5 FINDINGS (I): WHERE DO EMES STAND IN TERMS OF DIFFERENT INDIVIDUAL DIMENSIONS OF DFD, AND HOW MUCH PROGRESS HAVE THEY MADE OVER TIME? A DESCRIPTIVE ANALYSIS

Chart 25 Sub-index on market liquidity



Sources: Authors' calculations are based on the sources quoted in Annex A.

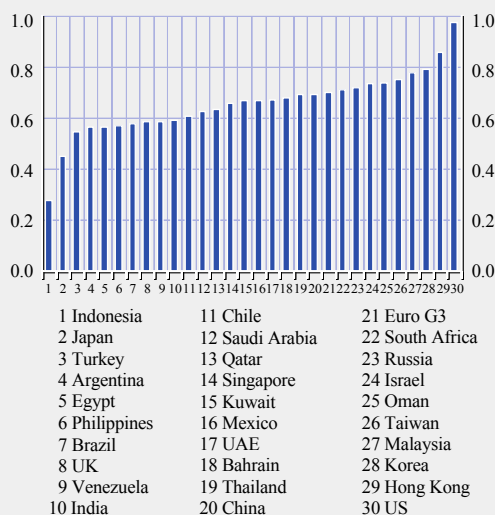
Chart 27 Sub-index on efficiency



Sources: Authors' calculations are based on the sources quoted in Annex A.

accruing to the public sector over total bank claims and (iii) domestic private debt over domestic government debt. This is a particularly important sub-dimension, as it captures possible "crowding out" effects stemming from the

Chart 26 Sub-index on distribution of the domestic asset base



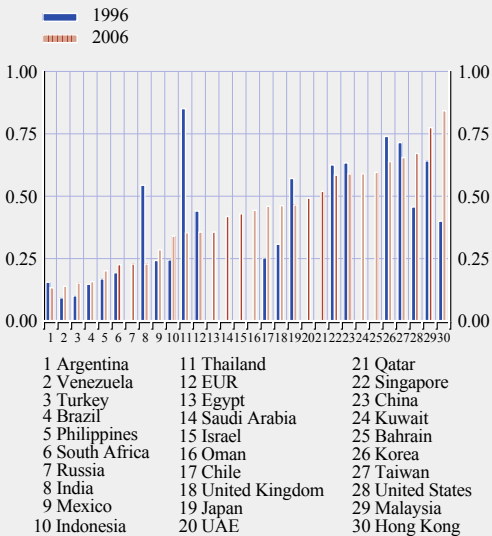
Sources: Authors' calculations are based on the sources quoted in Annex A.

public sector. Chart 26 below illustrates that the United States is the most economically liberal economy (value of 0.97), followed by Hong Kong SAR (0.86) and South Korea (0.79). At the bottom we find Indonesia (0.28), Japan (0.45), and Turkey (0.55). The relatively good ranking of China, eleventh, may reflect that Chinese statistics tend not to acknowledge that a majority of banks in the country are state run. As a result, the Chinese score should again be interpreted with a lot of caution.

Turning, finally, to the technical efficiency sub-dimension, the index shows very little variance¹³ (Chart 27). China's high ranking reflects in this case a very good cost/income ratio for the banking system which is not only attributable to low labour costs but also, more importantly, to the setting by the central bank of benchmark interest rates on loans and deposits, which artificially ensure positive interest rate margins to the banking system.

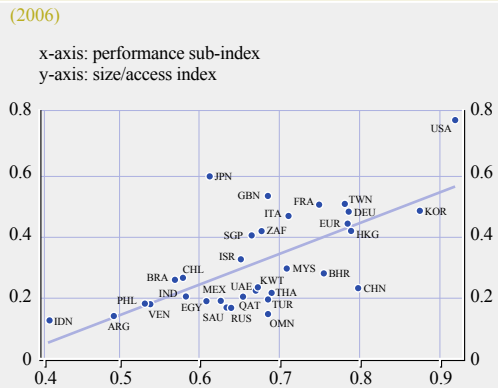
13 As explained previously, many countries achieve the highest value because we have taken as the benchmark value the best value achieved in our time series within the group of mature economies.

Chart 28 Narrow sub-index of performance dimension



Source: Authors' calculations are based on the sources quoted in Annex A.

Chart 29 Relationship between size/access and performance dimensions of the index



Sources: Authors' calculations are based on the sources quoted in Annex A.

5 FINDINGS (1): WHERE DO EMES STAND IN TERMS OF DIFFERENT INDIVIDUAL DIMENSIONS OF DFD, AND HOW MUCH PROGRESS HAVE THEY MADE OVER TIME? A DESCRIPTIVE ANALYSIS

5.3.2 THE NARROW INDEX OF THE PERFORMANCE DIMENSION

Using this index – based on overhead costs over total assets and domestic private debt over domestic government debt – we see that Chile (from 0.25 to 0.46) and Hong Kong SAR (from 0.4 to 0.84) recorded the largest improvements in the period 1996-2006. Conversely, Thailand and Indonesia recorded a large drop after the Asian crisis, and had not yet recovered in 2006, with Indonesia moving from 0.54 to 0.23 and Thailand from 0.85 to 0.35.

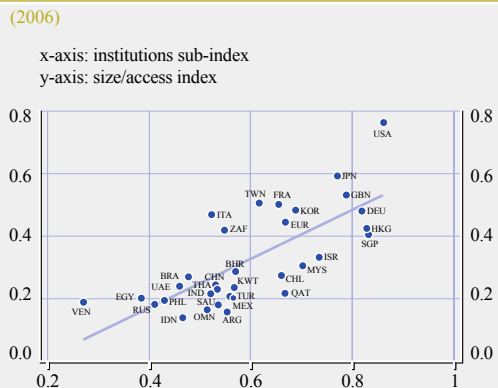
These results, however, appear to be less robust than those discussed in sub-sections 5.2.2 and 5.1.2 previously, also considering that the correlation between the narrow performance index and the broad index is only 0.55.

5.4 THE RELATIONSHIP BETWEEN THE THREE DIMENSIONS OF THE INDEX

Charts 29, 30 and 31 illustrate the positive relationship among the three main components of the index. Interestingly, this evidence also

suggests that in 2006 the United States tended to be “oversized” in relation to the institutional and performance indices, and “over-performing” in relation to the institutional and regulatory dimension. One may, therefore, provocatively wonder whether the expression “financial overdevelopment” could also be introduced.

Chart 30 Relationship between size/access and institutional dimensions of the index

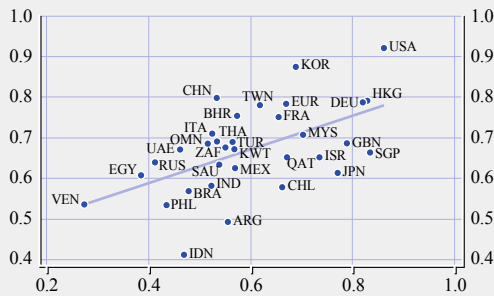


Sources: Authors' calculations are based on the sources quoted in Annex A.

Chart 31 Relationship between performance and institutional dimensions of the index

(2006)

x-axis: institutions sub-index
y-axis: performance index



Sources: Authors' calculations are based on the sources quoted in Annex A.

Conversely, financial systems such as those of Chile, Israel and Singapore have relatively strong institutions that are not fully reflected in their size and performance scores. The issue why the successful institutional and regulatory environments of certain EMEs have not yet translated into good-sized and high-performing financial intermediaries and markets is certainly one that deserves further inspection.

6 FINDINGS (2): THE FINAL COMPOSITE INDEX

6.1 WHERE DO EMES STAND IN TERMS OF DOMESTIC FINANCIAL DEVELOPMENT, COMPARED WITH BENCHMARK MATURE ECONOMIES?

After having presented the results for each of the three dimensions of our development index in Section 4, we can now aggregate such dimensions by assigning equal weights, in order to obtain our final composite index as described in Table 4 and Chart 32.

All in all, our DFD composite index shows that in 2006 the bulk of EMES still needed to make substantial progress to achieve a degree of DFD

close to the selected G7 benchmark economies. The latter presented a (non-weighted) average score of approximately 68, whereas the average score was below 48 for the emerging market group taken as a whole.

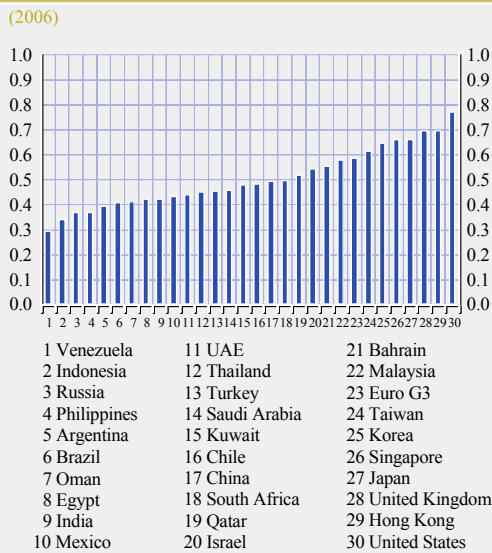
At the same time, the scope for catching up varies considerably from country to country. The three Asian financial centres (Hong Kong SAR, Singapore and Taiwan PoC) and South Korea present total scores comparable with those of the G7 benchmark economies. An intermediate group of countries, ranging between Malaysia and Kuwait, presents scores between 0.58 and 0.48. A final group with fourteen countries (54% of our sample) reaches low or very low scores, spanning from Saudi

Table 4 Index of domestic financial development: rankings and scores

(2006)					
Country/economy	Composite index of domestic financial development (DFD)		1st dimension: institutions and rules supporting DFD	2nd dimension: financial market size and access to finance	3rd dimension: selected proxies of financial market performance
	Rank	Score Scale 1 - 100	Rank	Rank	Rank
United States	1	77.3	1	1	1
Hong Kong SAR	2	69.8	3	7	4
United Kingdom	2	69.8	4	3	11
Japan	4	66.2	5	2	22
Singapore	4	66.2	2	9	16
South Korea	6	64.6	8	5	2
Taiwan PoC	7	61.7	12	4	6
Euro area-G3	8	58.6	10	6	5
Malaysia	9	57.9	7	11	8
Bahrain	10	55.4	13	12	7
Israel	11	54.4	6	10	18
Qatar	12	51.8	9	20	17
South Africa	13	49.8	18	8	13
China	14	49.5	21	16	3
Chile	15	48.4	11	13	25
Kuwait	16	48.1	15	17	15
Saudi Arabia	17	45.9	19	26	20
Turkey	18	45.5	16	21	12
Thailand	19	45.0	20	18	9
UAE	20	44.0	26	15	14
Mexico	21	43.2	14	23	21
India	22	42.4	22	19	24
Egypt	23	42.2	29	22	23
Oman	24	41.1	23	28	10
Brazil	25	40.8	24	14	26
Argentina	26	39.6	17	29	29
Philippines	27	36.9	27	24	28
Russia	27	36.9	28	27	19
Indonesia	29	34.1	25	30	30
Venezuela	30	29.4	30	25	27

Source: Authors' calculations are based on the sources quoted in Annex A.

Chart 32 Financial Development Index



Sources: Authors' calculations are based on the sources quoted in Annex A.

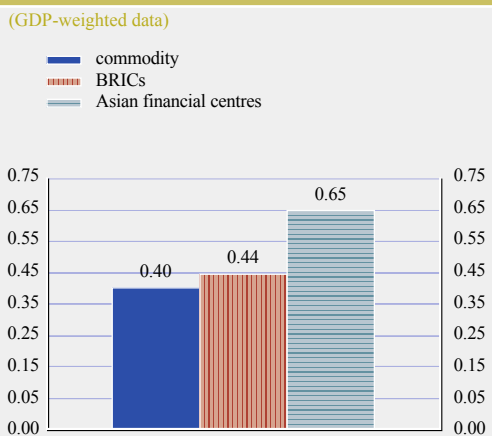
Arabia (0.46) to Venezuela (0.29). Regarding G7 members, in 2006 the United States ranked first under all dimensions of DFD, although the ongoing financial crisis has of course raised

serious doubts about certain aspects of its financial model. The euro area-G3 score may look relatively poor, but this is largely a result of data on Italy which are fully consistent with the WEF findings.¹⁴

Whilst thus far we have been focusing on individual countries, it is interesting to also briefly describe the geographical distribution of the scores in the composite DFD index across different EME groupings. Starting with the so-called "BRICs" (Chart 33), on the whole they already appear to be "giants" in the global economy in terms of, e.g. trade in goods and/or services, as well as contribution to world GDP growth, but are still "dwarfs" in financial terms. Brazil (25th in the overall ranking) presents relatively satisfactory scores in terms of size of financial markets and access to finance, but low scores on the institutional side owing to a heavy legal and regulatory system. Russia (27th only)

14 In our index, Italy ranks among the top ten economies in terms of size and performance, but only 24th in terms of institutions underpinning DFD. In the same vein, Italy is placed only 22nd in a rank of 52 countries according to the abovementioned WEF index (2008).

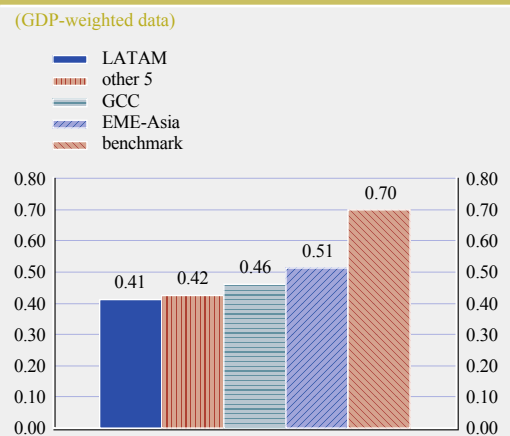
Chart 33 Final composite index of DFD: breakdown by selected country groupings



Sources: Authors' calculations are based on the sources quoted in Annex A.

Notes: Key commodity exporters are Chile, Venezuela, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates and Russia. The BRICs are Brazil, Russia, India and China. The Asian financial centres are Hong Kong SAR, Singapore and Taiwan PoC.

Chart 34 Final composite index of DFD: geographical breakdown



Source: Authors' calculations are based on the sources quoted in Annex A.

Notes: Latin American economies are Argentina, Brazil, Chile, Mexico and Venezuela. Gulf Cooperation Council (GCC) economies are Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates. Emerging Asian economies are China, Hong Kong SAR, India, Indonesia, Malaysia, Philippines, Singapore, South Korea, Taiwan PoC and Thailand. The "other 5" economies are Egypt, Israel, Russia, Turkey and South Africa.

displays an even weaker institutional environment, an insufficient degree of market access and still underdeveloped banks and financial markets, as its high vulnerability during the ongoing financial crisis clearly confirms. India (22nd) performs relatively better as regards its financial markets and non-bank institutions, but requires improvements in the business environment, as well as bigger and more efficient banks. Finally, as already discussed in Section 5.3, an unexpected finding that calls for further inspection is China's ranking (14th), which should be interpreted with a lot of caution.

Turning to other country groups, emerging Asia presents the best total marks, largely because of the three abovementioned financial centres. South Korea and Malaysia also rank high, and Indonesia and the Philippines are the countries with the largest scope for financial development. In Latin America, whilst Chile and Venezuela are the best and worst performers respectively, the region as a whole appears to be slightly less developed than the other regions under consideration. The countries participating in the Gulf Cooperation Council also present very different levels of DFD, stretching between Bahrain and Oman. On the whole, further progress in domestic financial development in this region would contribute to the domestic absorption of its net savings, thus limiting the need to re-invest the windfall of oil exports into financial assets of mature economies, thereby helping unwind global external imbalances. Similar considerations apply to the broader group of commodity exporters (Charts 33 and 34).

6.2 ARE EMES CATCHING UP IN FINANCIAL TERMS TOWARDS BENCHMARK MATURE ECONOMIES?

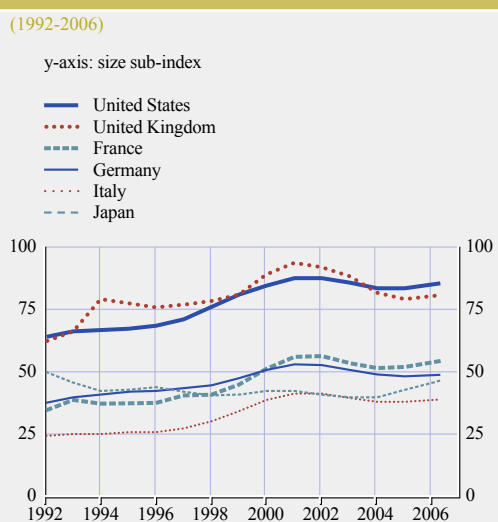
In this section we endeavour to assess longer-term trends in DFD. The core question is whether there are any signs of a process of financial convergence of (some) emerging countries towards benchmark mature economies.

To reply to this question, we use the narrow index measure based on the size/market access dimension, i.e. the one with the best data coverage.

Charts 35-37 show interesting results with regard to the size dimension:

- Chart 35 focuses on our G6 benchmark economies and illustrates the impact of the Japanese crisis in the 1990s and the burst of the stock market bubble in 2001;
- Chart 36 highlights that, in terms of financial markets' size, EMEs taken as a whole have since 2002 begun a process of financial convergence towards mature economies, i.e. subsequent to the "dot.com bubble" episode;
- Chart 37 focuses on selected EMEs and shows that: (i) most grew in relative size between 1992 and 2006 and (ii) South Korea, Saudi Arabia, United Arab Emirates and India have been noticeably converging towards the G6 benchmark in recent years.

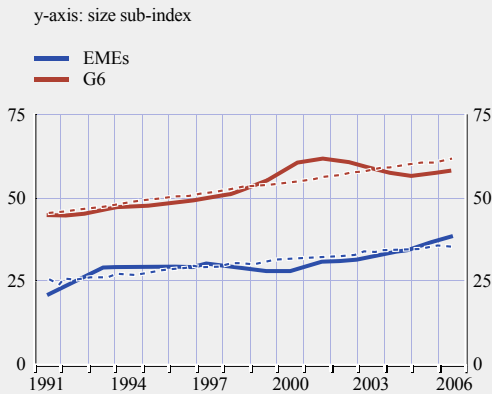
Chart 35 Narrow index of size: mature economies



Sources: Authors' calculations are based on the sources quoted in Annex A.

Chart 36 Narrow index of size: EMEs compared with benchmark mature economies (G6)

(1992-2006)



Sources: Authors' calculations are based on the sources quoted in Annex A.

These findings complement the stylised facts presented in Section 1 (see Charts 1-3 and related comment), thus corroborating the view that some financial convergence of EMEs towards mature economies has indeed been taking place. This process seems to have been significantly influenced by financial crisis episodes affecting either mature or emerging economies. The question, therefore, arises of

how the picture will look following the ongoing financial crisis.

6.3 A FEW FURTHER ROBUSTNESS CHECKS

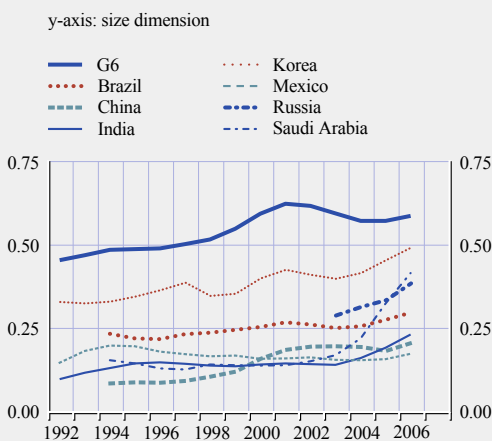
As discussed in Section 3, we had to take a view on many issues that arose while constructing the index, such as the set of countries to be compared, the dimensions and respective variables to be used, the data normalisation method to be adopted, how to deal with missing data, and the choice of aggregation method. Every decision was preceded by discussions on appropriateness and accompanied by robustness checks.

These types of problem are not unique to our project; they are rather an integral part of most index-building exercises, as can be inferred from the following statement made in the United Nations (UN) World Development Report (1992): “No index can be better than the data it uses. But this is an argument for improving the data, not abandoning the index.”

While it is not within the scope of this section to further elaborate on the different checks mentioned in Section 3, below we consider

Chart 37 Narrow index of size: selected EMEs compared with benchmark G6 economies

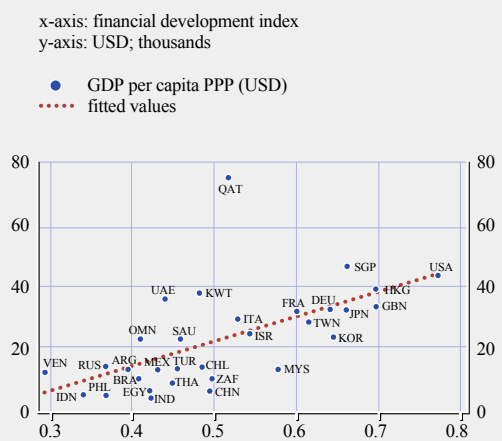
(1992-2006)



Sources: Authors' calculations are based on the sources quoted in Annex A.

Chart 38 GDP per capita (PPP) and financial development

(2006)



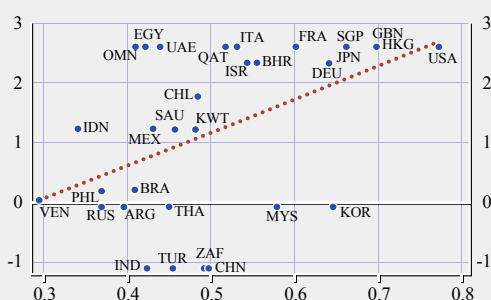
Sources: Authors' calculations are based on the sources quoted in Annex A.

Chart 39 Financial openness and financial development

(2006)

x-axis: financial development index
y-axis: financial openness

● Chinn-Ito Financial Openness index
..... fitted values



Sources: Authors' calculations are based on the sources quoted in Annex A.

whether our findings on the composite DFD index seem meaningful using some good economic intuition.

The most obvious link that comes to mind is the one between financial development and economic development, most commonly measured by per capita income to GDP. A vast empirical literature has indeed confirmed the link between DFD and economic growth. Chart 38 confirms that GDP per capita is higher not only in mature economies, but also in those EMEs which present the most developed financial systems. Higher levels of DFD also tend to be associated with higher levels of financial openness (Chart 37). However, as discussed in Section 3.2.2.1 above, this is likely to be true for relatively more developed economies such as those considered in this paper, whose level of DFD has already surpassed a given *threshold*. The role of financial openness is further discussed in the next section.

7 TWO EMPIRICAL APPLICATIONS ON THE RELEVANCE OF EME DFD FOR GLOBAL IMBALANCES

According to the recent literature summarised in Box 1, the existence of immature financial markets tends to feed private savings and hold back domestic demand, since consumers face liquidity constraints impeding consumption smoothing and part of the investment opportunities are not financed. As a result, economies with underdeveloped, and sometimes even closed, financial markets tend to channel their excess savings abroad.

In this section we present two preliminary attempts to empirically investigate the role of financial development in explaining global imbalances – an issue which has received considerable attention in the literature and policy debate.

We set up a series of econometric models to test whether progressing financial development and its interaction with the degree of financial openness (FO) has been associated with declining current account surpluses or increasing current account deficits. We conduct two exercises:

- First, we analyse how changes in DFD influence current account balances, allowing for an asymmetric impact of DFD on borrowing and lending countries. In this exercise we also study the effect of DFD in combination with FO to test any potential substitution/complementary effect between DFD and FO.
- Second, we assess how DFD affects the domestic determinants of the current account, i.e. savings and investment. We also contrast the effects of financial development on private agents and public institutions respectively, which could differ in the process of removing liquidity constraints and reducing transaction costs. The effects of DFD on private as opposed to public savings and investment are, therefore, also scrutinised.

7.1 MODEL SPECIFICATION AND DATA ISSUES

In our general framework, the current account is driven by savings and investment and, therefore, the factors that affect both variables are taken into account. Following Chinn and Prasad (2003) and Chinn and Ito (2008), we estimate two adaptations of this general equation:¹⁵

$$y_{i,t} = \alpha + \beta_1 DFD_{i,t} + \beta_2 FO_{i,t} + \beta_3 (DFD_{i,t} \times FO_{i,t}) + \sum_j \phi_j \text{Control variables}_{i,t}^j + u_{i,t} \quad (2)$$

- The dependent variables (y) are the current account balance to GDP, national savings to GDP and gross capital formation to GDP. In addition, we analyse the determinants of public and private savings and investment over GDP.
- Our main explanatory variable is DFD, proxied by the “narrow” DFD index discussed in Section 3 of this paper. We also focus on FO ¹⁶ and the interaction between DFD and FO .
- As control variables, we introduce the determinants of current account balances, savings and investment which are mostly used in the literature: government balance and net foreign assets to GDP; income per capita relative to the United States; output growth rates; dependency ratio;¹⁷ trade openness; dummies for GCC and other commodity-exporting countries, as well as for the Asian financial centres; and time fixed effects.

¹⁵ We have preferred not to use a fixed effects specification, following Chinn and Prasad (2003). They argued that, if one wants to understand cross-country variation in current accounts, savings and investment, including fixed effects would impair most of the economically meaningful parts of the analysis.

¹⁶ Financial openness is here measured with the index provided by Chinn and Ito (2007), which captures capital controls existing in each economy. This index hence does not necessarily capture actual financial openness as measured, e.g. by the ratio of external assets and liabilities over GDP.

¹⁷ Defined as the ratio between dependents and working age population.

The database covers annual data in the period 1985-2006 for the 26 EMEs and the six benchmark G7 members discussed in this paper. We transformed annual data into non-overlapping three-year averages in order to limit measurement errors in the EMEs under scrutiny and to focus on the medium-term effects net of more cyclical effects. All variables are expressed as ratios.

7.2 METHODOLOGY

We estimate these models through the Generalised Method of Moments (GMM) estimator in order to tackle potential endogeneity problems. This estimator goes beyond the methodology currently in use in the empirical literature on savings gluts and global imbalances (mainly ordinary least squares, fixed effects or the instrumental variables estimator). The GMM estimator employed uses lagged values of the regressors which could potentially suffer from endogeneity (considered as predetermined variables). The variables treated as endogenous and instrumented are shown in italics in the result tables below, otherwise they are considered as strictly exogenous.¹⁸

All in all, this estimator should yield consistent estimations of the parameters. In addition, the estimated coefficients are the most efficient since all possible instruments are considered jointly.¹⁹ In order to permit a comparison with similar studies, we have conducted robustness tests with the ordinary least squares estimator. The results are similar suggesting that endogeneity is not a relevant issue in this context.²⁰ Estimates are available upon request.

7.3 FIRST APPLICATION: HOW DO CHANGES IN DFD AND FO AFFECT THE CURRENT ACCOUNT OF LENDING AND BORROWING COUNTRIES?

In this application of our DFD index we analyse the effect of *DFD* on the current account of lending and borrowing countries, i.e. with positive or negative current account balances respectively. We study this effect *in combination with* FO, allowing for DFD and FO to either substitute or complement one another. In other

words, if we did not allow for interaction between DFD and FO, we would be assuming that one country would provide/obtain the same amount of external financing independently of the relative level of such variables.

To conduct this exercise for both lenders (*L*) and borrowers (*B*) without splitting the sample, we modify the equation (2) as follows:

$$CA_{i,t} = \alpha + \beta_1^L DFD_{i,t}^L + \beta_1^B DFD_{i,t}^B + \beta_2^L FO_{i,t}^L + \beta_2^B FO_{i,t}^B + \beta_3^L (DFD_{i,t} \times FO_{i,t})^L + \beta_3^B (DFD_{i,t} \times FO_{i,t})^B + \sum_j \theta_j \text{Control variables}_{i,t}^j + u_{i,t} \quad (3)$$

The variables with superscript *L* (*B*) take their actual value if the country is a lender (borrower), otherwise they take the 0 value. Hence, the coefficients should be interpreted as the actual effect of changes in DFD, FO and their interaction on the current account to GDP of lending (borrowing) countries. We use as a sample our 26 EMEs and six benchmark G7 countries.

The results are shown in Table 5 and suggest the following conclusions:

- Growing DFD is very much associated with a reduction of *current account* surpluses for lending countries and a widening of deficits for borrowing countries.²¹ In other words,

18 We decided to treat all explanatory variables *potentially* correlated with the error term as endogenous. This approach led to a significant number of instruments that might lower the power of the Hansen tests for instruments validity. We tried to reduce the instruments dimensionality, testing whether some of the potentially endogenous variables could be considered exogenous through the Hausman test. Unfortunately, in most of the cases, the Hausman test could not even be computationally implemented because the sample was too small to match the asymptotic distribution.

19 The validity of the selected instruments is tested through the Hansen test. The large number of instruments in comparison to the degrees of freedom might reduce the power of this test. We have not employed the Sargan test since it requires an assumption of homoskedasticity that seems to be unrealistic in a country-based panel.

20 Such simple models also help explain why a large sample is needed for the properties of the GMM estimator to hold asymptotically.

21 For borrowing countries, the negative sign indicates a further decline in the current account balance, namely a growing deficit.

Table 5 Results of the GMM estimation

	Current account/GDP	
	Coefficient	p-value
<i>Narrow DFD Index (L)</i>	-0.1550***	(0.008)
<i>Narrow DFD Index (B)</i>	-0.2560***	(0.000)
<i>Financial openness (L)</i>	-0.0183*	(0.100)
<i>Financial openness (B)</i>	-0.0342***	(0.001)
<i>Narrow DFD*Financial openness (L)</i>	0.0200	(0.464)
<i>Narrow DFD*Financial openness (B)</i>	0.0662***	(0.005)
<i>Net foreign assets/GDP</i>	0.0280	(0.211)
<i>Government balance/GDP</i>	-0.0370	(0.782)
<i>Relative per capita income to US</i>	0.0370	(0.311)
<i>Age dependency ratio</i>	-0.1040**	(0.010)
<i>Real GDP growth</i>	-0.0220	(0.797)
<i>Trade openness</i>	0.0358***	(0.000)
Gulf Cooperation Countries	0.3990***	(0.000)
Commodity exporters	0.0257**	(0.016)
Asian financial centres	-0.0360	(0.361)
Constant	0.1340***	(0.001)
Observations		93
Number of countries		23
Hansen test		(1.000)

Robust p-values in parentheses, *** p<0.01, ** p<0.05, * p<0.1.
 Variables in italics are instrumented through the GMM procedure with their first lags.
 Time dummies not reported.

increasing *DFD* within lending countries seems to have helped channel savings from abroad to their domestic market. In borrowing countries, growing *DFD* also tends to attract foreign capital, thus contributing to even higher current account deficits.

- Higher *financial openness* is also significantly related to lower lending by surplus countries and higher borrowing by deficit countries.
- We also find some evidence of substitutability between *DFD* and *FO* in borrowing countries but not in lending ones, as shown by the coefficient of the *interaction between FO and DFD*, which is significantly positive (i.e. the opposite sign to *DFD* and *FO* coefficients). One possible interpretation is that lending countries tend to increase their financing capability in the presence of higher *DFD* or higher *FO*, but jointly these two processes may turn out to be counterproductive.

7.4 SECOND APPLICATION: HOW DO CHANGES IN *DFD* AND *FO* AFFECT THE DETERMINANTS OF CURRENT ACCOUNT IMBALANCES?

In this second application of the *DFD* index, we analyse how *DFD* and *FO* affect the determinants of EMEs' current account imbalances, i.e. savings and investment. In addition, we test their effects on private agents and public institutions respectively, which could differ in the process of removing liquidity constraints and reducing transaction costs.

Table 6 summarises the results²² and confirms some of the conclusions that one would have drawn from simple stylised facts (i.e. by plotting *DFD* together with our dependent variables):

- Growing *DFD* is significantly related to increases in *gross capital formation*, which

²² The results regarding control variables are consistent with previous literature. We do not highlight such results in this section since they are not the main objective of our analysis.

Table 6 Results of the GMM estimation

	Savings/ GDP	Investment/ GDP	Public savings/ GDP	Private savings/ GDP	Public investment/ GDP	Private investment/ GDP
<i>Narrow DFD Index</i>	0.023 (0.844)	0.223** (0.048)	-0.005 (0.956)	0.027 (0.667)	-0.068 (0.219)	0.247*** (0.009)
<i>Financial openness</i>	0.0433** (0.045)	0.047 (0.192)	-0.001 (0.940)	0.0443*** (0.005)	0.003 (0.790)	0.037 (0.210)
<i>Narrow DFD*Financial openness</i>	-0.115* (0.063)	-0.088 (0.365)	0.006 (0.860)	-0.121*** (0.008)	0.003 (0.905)	-0.072 (0.376)
<i>Net foreign assets/GDP</i>	0.055 (0.328)	0.013 (0.684)	0.003 (0.916)	0.052 (0.194)	0.110*** (0.001)	-0.027 (0.216)
<i>Government balance/GDP</i>	-0.504* (0.058)	-0.213 (0.405)	0.239 (0.172)	-0.744*** (0.005)	-0.409** (0.027)	0.251 (0.355)
<i>Relative per capita income to US</i>	-0.141 (0.102)	-0.191** (0.017)	-0.057 (0.441)	-0.084 (0.448)	-0.254*** (0.000)	-0.010 (0.903)
Age dependency ratio	-0.606*** (0.001)	-0.450*** (0.002)	-0.199** (0.026)	-0.406** (0.028)	-0.356*** (0.005)	-0.095 (0.312)
<i>Real GDP growth</i>	0.706*** (0.001)	0.960*** (0.000)	0.280** (0.019)	0.427** (0.028)	0.140 (0.243)	0.804*** (0.001)
<i>Trade openness</i>	0.0854*** (0.000)	0.025 (0.368)	0.0630*** (0.007)	0.022 (0.122)	0.0556** (0.029)	-0.035 (0.125)
Gulf Cooperation Countries	0.461*** (0.000)	-0.006 (0.937)	0.203*** (0.004)	0.258*** (0.003)	0.123* (0.070)	-0.136 (0.192)
Commodity exporters	0.0716* (0.053)	0.030 (0.273)	0.0584* (0.077)	0.013 (0.365)	0.0398** (0.011)	-0.016 (0.321)
Asian financial centres	-0.135 (0.356)	-0.067 (0.603)	-0.194* (0.065)	0.059 (0.507)		
Constant	0.510*** (0.000)	0.349*** (0.000)	0.099 (0.106)	0.411*** (0.001)	0.280*** (0.001)	0.114* (0.066)
Observations	63	63	63	63	52	52
Number of countries	18	18	18	18	14	14
Hansen test	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)

Robust p-values in parentheses, *** p<0.01, ** p<0.05, * p<0.1
Variables in italics are instrumented through the GMM procedure with their first lags.
Time dummies not reported.

seems to be mainly driven by private investment. This is in line with the idea that more developed financial markets allow firms and households to better implement their investment decisions.

- DFD has also the expected negative impact on *private savings*, but requires to be accompanied by financial openness.
- *Financial openness* tends to increase private savings and total savings significantly, possibly because households and firms tend to save more to protect against external shocks. However, the positive effect on EMEs investment is not significant.

8 CONCLUSIONS: SOME OPEN ISSUES FOR DISCUSSION AND AVENUES FOR FURTHER RESEARCH

In this paper we have constructed, on the basis of an original methodology and database, composite indices to measure domestic financial development in 26 emerging market economies, using mature economies as a benchmark. Twenty-two variables have been used and grouped according to three broad dimensions. With our evidence we have intended to fill a gap in the economic literature, which has not thus far developed comparable time series including both emerging and mature economies.

Regarding the main findings, we have presented evidence consistent with the hypothesis that financial underdevelopment has been *associated with* capital moving “uphill” from the South to the North of the world in recent years. We have also seen that, while the scope for EMEs’ financial catching up is still substantial, there is some indication that this process has already started in some emerging countries.

Looking forward, one way to interpret such findings is against the background of the current financial crisis and its possible outcomes.

The ongoing crisis has shown that the financial sector in several economies, notably mature economies and the United States in particular, is deleveraging and, ultimately, needs to shrink – a process which is indeed taking place. At the same time, once the negative spillover effects of the financial crisis on emerging economies have faded away, it is very possible that investors will look with renewed interest at their financial markets.

As a result, the distance between the “benchmark” mature economies and EMEs in terms of DFD might narrow further in the coming years.

If this scenario were to prove correct, with financial globalisation becoming more symmetric in nature, it is possible that the scope for any financially developed country to borrow

extensively from the rest of the world, and the ensuing ability to accumulate massive levels of external debt indefinitely, would diminish over time. Under this scenario, the belief may come to an end that it would be optimal for some countries to borrow from the rest of the world (and for other countries to accumulate claims on other countries) *indefinitely*, i.e. under whatever circumstances and time horizons.

Against this background, a number of open issues for policy discussion arise:

- First, looking backward, would those internal and external imbalances that were a symptom of the upcoming financial crisis have been less pronounced in a context of complete financial globalisation? Would have been equally feasible for financially developed economies to considerably weaken, if not even break, the link between current income and current expenditure, enabling such economies to smooth consumption, share risk abroad and finance increasingly larger current account deficits?
- Second, looking ahead is it to be expected that, the higher the degree of financial convergence across countries, the greater the incentives for policy discipline will be? After all, one ultimate lesson of the current crisis is that the excesses that characterised the so-called “Bretton Woods II” years eventually led to a credit crunch and to tightening, rather than relaxing, borrowing constraints. Such excesses, however, would no longer be possible in a context where creditors not only worry about the ability of debtors to repay their debt, but also have credible investment alternatives.
- Third, should further development of domestic and/or regional finance in local currency be understood as a strategic objective for emerging countries, also because such development would make it easier for them to run (moderate) current account deficits without repeating the bad experiences of the 1980s and 1990s?

Finally, regarding avenues for future research, we believe that a more thorough analysis of incomplete financial globalisation as a structural factor underlying global imbalances is an issue that deserves further examination. Our DFD index could be used to this aim. For instance, the fact that increasing DFD tends to reduce borrowing constraints, as pointed out in this paper, should have implications for consumption smoothing and consumption volatility that deserve ad hoc analysis.

**8 CONCLUSIONS:
SOME OPEN ISSUES
FOR DISCUSSION
AND AVENUES FOR
FURTHER RESEARCH**

ANNEX

DESCRIPTION OF VARIABLES USED IN OUR ANALYSIS

Institutional Dimension (See Section 3.2.1.1)

Regulatory and judicial framework

- *Law and Order (B)*: Assessment of the strength and impartiality of the legal system, as well as its observance. This can be interpreted as a contract viability measure. The dataset is from the “International Country Risk Guide” (ICRG) and encompasses the years 1985-2006. Index is published monthly. References in the literature are: Levine, Loayza and Beck (1999); Chinn and Ito (2005).
- *Investor Protection Index (S)*: This is a measure developed in the framework of the “Doing Business” assessment by the World Bank. It is intended to measure the strength of minority shareholders against management misuse of corporate assets. Publication release at the beginning of the year; data collection refers to the previous year. References: Djankov and others (2003); Beck and Levine (2003); Chinn and Ito (2005). The dataset is from the World Bank “Doing Business” project and encompasses the years 2005-2007.
- *Legal Rights Index (S)*: It measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders, thus facilitating lending. Publication release at the beginning of the year; data collection refers to the previous year. References: Beck and Levine (2003); Chinn and Ito (2005). The dataset is from the World Bank “Doing Business” project and encompasses the years 2004-2007.
- *Credit Information (S)*: This index measures the degree of information availability, through either a public registry or a private bureau, so as to facilitate lending decisions.

Publication release at the beginning of the year; data collection refers to the previous year. References: Djankov and others (2007). The dataset is from the World Bank “Doing Business” project and encompasses the years 2003-2007.

- *Enforcing Contracts (B)*: This index measures “the efficiency of the judicial system in resolving a commercial dispute” (quotation from the World Bank “Doing Business” project). Publication release at the beginning of the year; data collection refers to the previous year. References: Djankov and others (2003). The dataset is from the World Bank “Doing Business” project and encompasses the years 2004-2007.

Quality of institutions

- *Corruption (B)*: This index captures the level of corruption within the political system. Published monthly. References: Gray and Kaufmann (1998). The dataset is from the ICRG and encompasses the years 1985-2006.
- *Bureaucratic Quality (B)*: It is another broad measure of institutional strength and the quality of institutions. Published monthly. References: Beck and Levine (2003). The dataset is from the ICRG and encompasses the years 1985-2006.

Market Dimension (1): Size and access to finance (See Section 3.2.1.2)

Size - Traditional measures

- *Stock market value/GDP*: This measure enables assessment of the possibility for local firms to access stock markets, thus reducing their dependency on traditional banking relationships. High values imply enhanced households’ investment opportunities, since larger stock markets also tend to increase firm and risk diversity. References: Arestis and Demetriadis (1997); Rajan and Zingales (2003); Chinn and Ito (2005). The

dataset is from Beck, Demirgüç-Kunt and Levine (1999) – hereinafter BDL – and encompasses the years 1960-2006. We have constructed three-year moving averages in order to smooth out sudden spikes. Data are deflated. Data have been updated relatively regularly (every year), with approximately a one year lag.

- *Private bond market/GDP*: Among other things, a higher value implies reduced dependency on the banking sector and equity markets.²³ References: Herring and Chatusripitak (2000). The dataset is from BDL and Bank for International Settlements (BIS) and encompasses the years 1985-2006. Data are deflated. Data have been updated relatively regularly (every year), with approximately a one year lag.
- *Total bank claims/GDP*: Total amount of banking loans available to economic agents. The dataset is from International Financial Statistics (IFS) and encompasses the years 1985-2006. Data is deflated. Data updated regularly on a yearly basis, with few months of lag in publishing.
- *Other financial institutions assets/GDP*: This data gives an insight into the diversity of financial institutions and their relative strength. References: BDL (2001); King and Levine (1993b). The dataset is from the IFS and encompasses the years 1985-2006. Data are deflated. Data have been updated relatively regularly (every year), with approximately a one year lag.

Financial innovation

- *Issuance of Asset and Mortgage-Backed Securities (ABS and MBS) over GDP*: ABS and MBS issuance is a measure of the availability and usage of alternative financing instruments as opposed to traditional banking. The dataset is from Bondware and encompasses the years 1960-2006. Updated frequently (usually monthly), while the database (CD) is updated yearly with few

months of lag in publishing. While it would be interesting to include further measures of traded derivative products in order to capture hedging possibilities for households and firms, the data availability is still very restrictive for EMEs.

Residents' access to finance

- *Demographic branch penetration*: It consists in the number of bank branches per 100,000 inhabitants, and indicates how easy it is for a household to borrow money or protect its savings. References: World Bank – Finance for All (2008). The dataset is from the World Bank and encompasses the year 2007. Data from World Bank research project. Continuity of data update unclear.
- *Demographic ATM penetration*: It provides the number of cash machines per 100,000 inhabitants. This variable gives some further insight into how widespread the access is to financial services and, therefore, into the possibility to protect income streams. References: World Bank – Finance for All (2008). The dataset is from the World Bank and encompasses the year 2007. Data from World Bank research project. Continuity of data update unclear.
- *Life insurance penetration*: It consists in the life insurance premium volume as a share of GDP. Life insurance protects households against negative shocks, such as job loss and early mortality. The dataset is from BDL/Swiss Re and encompasses the years 1960-2006. Reports published regularly by Swiss Re (usually once a year), with approximately a one year lag.

²³ In the literature we often find reference to the importance of a large and liquid government bond market (e.g. Herring and Chatusripitak, 2000). We have not included government debt here since we believe that its effect is highly non-linear on development. In other words, after a certain level of indebtedness more debt will be harmful for financial markets as it signals a loss in manoeuvrability of a government's fiscal and public policy and thereby an increase in the risk of default. Hence, we have included a measure for the relationship between government and private debt in the performance dimension.

- *Non-life insurance premium*: It complements the previous indicator by reflecting the remaining insurance coverage. The dataset is from BDL/Swiss Re and encompasses the years 1960-2006. Reports published regularly by Swiss Re (usually once a year), with approximately a one year lag.
- *Annual fees for savings accounts*: It is a measure of how much income has to be spent as a percentage of GDP per capita in order to maintain a savings account, and reflects the affordability for a household to protect its income. Important references: World Bank – Finance for All (2008). The dataset is from the World Bank and encompasses the year 2007 only. Data from World Bank research project. Continuity of data update unclear.

Market Dimension (2): Performance (See Section 3.2.1.3)

Technical efficiency

- *Banks' total operating costs over net interest income*: The cost/income ratio, here specifically applied to banks, is an expression of their total operating costs over net interest income. It is therefore commonly interpreted as an efficiency indicator for the banking sector. The dataset is from Bankscope and encompasses the years 2000-2006. Updated frequently (usually monthly), while the database (CD) is updated yearly; less than a year lag.

Liquidity

- *Turnover velocity*: It reflects the ratio of the value of shares traded and market capitalisation, and may deliver some indication of market absorption capabilities. References: Huang (2006); Chinn and Ito (2005). The dataset is from the World Federation of Exchanges and encompasses the years 2006-2007. Yearly report; the publication lag can be up to one year.

Distribution of domestic asset base between the private and public sector

- *Central bank claims on private sector/total claims on private sector*: It measures central bank claims on the real private sector to total claims on the real private sector.²⁴This variable should give an indication of public sector participation in the financial market. Banks and other financial institutions are likely to offer better risk management and investment information than the central bank. References: BDL (1999), King and Levine (1993a); King and Levine (1993b); Huang (2006). The dataset is from IFS and encompasses the years 1985-2006. Quarterly data with lag of one quarter in publishing.
- *Claims on Public Sector/Total Bank Claims*: It measures the amount of funding that is channelled to the public sector. We have introduced this variable in the database in order to capture the crowding out effect on the loan market side. The dataset is from the IFS and encompasses the years 1985-2006. Quarterly data with lag of one quarter in publishing.
- *Domestic private debt/domestic government debt*: This variable measures the share of bond issues absorbed by government debt. We have introduced this variable in the database in order to capture the crowding out effect on the bond market side. The dataset is from BIS and encompasses the years 1985-2006. Yearly data with a lag of less than one year.

²⁴ This is obtained as the ratio of (IFS lines 12d) over (sum of IFS lines 12d, 22d and 42d). Most studies using this type of measure add all values of IFS line 12 from a up to d. However, as the aim is to capture the extent to which central banks in EMEs finance local real private activity (which means that we exclude claims to banks and only consider the real sphere), we only use the value for line 12d ("Claims on the private sector"). In the original ratio the problem is that government bonds on the asset side of the central bank balance sheet reduce the effectiveness of the results as a lot of these bonds are de facto used in central bank liquidity operations.

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