FINANCIAL SECTOR DEVELOPMENT: POLICIES TO PROMOTE AND STRENGTHEN LOCAL CAPITAL MARKETS

Bilateral Assistance and Capacity Building for Central Banks programme
Proceedings of the Second Annual Conference | Geneva, October 2–3, 2014

THE GRADUATE INSTITUTE GENEVA

INSTITUT DE HAUTES ÉTUDES INTERNATIONALES ET DU DÉVELOPPEMENT
GRADUATE INSTITUTE OF INTERNATIONAL AND DEVELOPMENT STUDIES

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Departement of Economic Affairs, Education and Research EAER
State Secretariat for Economic Affairs SECO

FINANCIAL SECTOR DEVELOPMENT:
POLICIES TO PROMOTE AND STRENGTHEN LOCAL CAPITAL MARKETS

bcc@graduateinstitute.ch
Ch. Eugène-Rigot 2
CP 136, CH – 1211 Genève 21

↗ **http://graduateinstitute.ch/bcc**

Photos: Eric Roset.

May 2015
ISBN 978-2-940503-66-7

FINANCIAL SECTOR DEVELOPMENT: POLICIES TO PROMOTE AND STRENGTHEN LOCAL CAPITAL MARKETS

Bilateral Assistance and Capacity Building for Central Banks programme
Proceedings of the Second Annual Conference | Geneva, October 2–3, 2014

The views expressed by the authors of the following papers do not necessarily represent those of the institutions to which they are affiliated.

CONTENTS

1. Foreword

CÉDRIC TILLE
Professor at the Graduate Institute, BCC programme director, and Centre for Economic Policy Research (CEPR)

— Tille, C.,"Foreword", in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 7–9.

I am pleased to introduce this volume of proceedings from the second annual conference held by the Bilateral Assistance and Capacity Building for Central Banks programme (BCC). The conference addressed the theme of *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets*, and took place in Geneva on 2–3 October 2014.

The BCC programme[1] is jointly funded by the Swiss State Secretariat for Economic Affairs (SECO) and the Graduate Institute in Geneva (IHEID). It aims to support partner central banks in emerging and developing countries in building the analytical and technical expertise required for the efficient conduct of monetary policy, and builds on long-standing Graduate Institute expertise in providing technical assistance through missions to partner countries tailored to those countries' specific needs.

The conference brought together representatives of the central banks of the eight countries in the programme,[2] and prominent academics and delegates from policy institutions, with the purpose of sharing recent research and policy experiences. In total, 60 people attended.

---

1 http://graduateinstitute.ch/bcc.

2 The countries are: Albania, Azerbaijan, Bosnia and Herzegovina, Colombia, Ghana, Peru, Tunisia and Vietnam.

The conference was structured around two pillars. Following the welcoming address from Mr Martin Saladin, Head of Section at SECO, the first day hosted a research workshop where researchers from the central banks had the opportunity to present their work, and benefit from active discussions with conference participants. On the second day, I had the pleasure of welcoming all participants to a series of panel discussions on policy where country representatives shared their experiences pertaining to financial sector development. A keynote presentation by Prof. Luc Laeven outlined the main elements and was followed by three panels that resulted in active exchanges involving senior policymakers, prominent economists, and members of the audience. A keynote discussion by Prof. José De Gregorio offered a critical review of the issue and challenges facing policymakers.

The first policy panel brought a regional and international perspective on the development of financial markets. Given the high degree of international capital mobility, no country can consider the steps required to foster deeper domestic markets without bearing in mind the connection with international markets. This connection exposes countries to the volatility of international capital flows, and the design of policy tools to absorb such flows is paramount. The panellists offered a critical discussion of the potential benefits of controls applied to international capital flows, a tool that is currently attracting renewed interest. Several panellists stressed that instruments directly aimed at sources of vulnerabilities, such as excessive leverage, can potentially be more efficient than controls on international capital flows.

The second panel focused on access to financial services by small and medium-sized enterprises (SMEs). Panellists presented a thorough review of the evidence, and highlighted that such access remains limited, with the issuance of equity and bonds remaining heavily concentrated. This limited access is observed even though a majority of banks declare that reaching SMEs is one of their major objectives. Panellists presented evidence that small firms score low on a broad range of financial indicators, and that this issue is not limited to very small firms but extends even to medium-sized companies. Identifying the specific hindrances to accessing finance and addressing them remains a major issue for policymakers.

The final panel discussed the growing ability of emerging and developing economies to borrow in their own currencies, a striking change compared to previous years, during which the so-called "original sin" – the willingness of markets to lend only in the currencies of advanced economies – was a prominent feature of international financial markets. Panellists stressed the role of stronger policy frameworks and a better performance in terms of economic fundamentals in allowing countries to access markets in their own currencies. Participants actively discussed whether the use of hedging instruments makes the currency denomination of loans a secondary issue, and whether the move away from the "original sin" approach is likely to continue or only represents a temporary phase where global investors in search of yield are more accommodative.

The conference led to active and fruitful exchanges of views among representatives of the various central banks, as well as with academics and representatives of other policy institutions. The event thereby significantly contributed to the BCC goal of building a network of practitioners among the central banks involved in the programme, and strengthened the

momentum initiated during the first annual conference in October 2013, and the regional conference held at the Central Reserve Bank of Peru in November 2013.

This monograph offers a focused exposition of the points addressed at the conference. The article by Prof. Laeven provides an overview of the state of research into the impact of financial sector development, stressing the challenges encountered by policymakers. The lecture was followed by presentations and active discussion in the policy panels session, and we present the main points that arose during these panels. The presentation by Prof. De Gregorio offers a critical view of the current state of knowledge and remaining challenges. Finally, the monograph includes a concise overview of the papers presented in the workshop, and of the ensuing discussions.

I am very grateful to all the participants for having made this conference such an active and fruitful event, with particular thanks going to the senior representatives of the partner central banks, Mr Martin Saladin of SECO, Prof. Laeven, and Prof. De Gregorio for their contributions. I also express my gratitude to the staff of the BCC for their contribution to making the conference possible, and for their contribution to the broader programme through the year.

Geneva, 24 November 2014

2. Welcome Address

MARTIN SALADIN
Head of Section at the Swiss State Secretariat for Economic Affairs (SECO)

— Saladin, M.,"Welcome Address", in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 11–13.

Distinguished guests and participants in this year's BCC conference,

In the name of the organizers of the conference, the Graduate Institute of International and Development Studies, and the Swiss State Secretariat for Economic Affairs (SECO), which I am representing here, I would like to welcome you to Geneva for the second annual conference of the BCC programme.

We are looking forward to a very varied two-day programme filled with workshops, panel discussions, poster sessions and presentations on this year's topic: "Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets".

Local capital market development is a prevailing and important issue for emerging and developing economies. The need for well-functioning local capital markets is growing, as they are necessary to support areas such as infrastructure and housing, as well to finance micro-, small-, and medium-sized enterprises. These are all critical factors for economic growth and development.

Strengthening local capital markets has multiple positive impacts on the local economy. Local capital markets provide alternative sources of financing, enhance efficiency of capital allocation, and facilitate risk management through risk sharing among different groups of investors. Broader local capital markets also allow social-safety-net investors such as

pension funds and insurance companies to diversify their holdings and to invest in suitable long-term products.

Furthermore, through diversifying the domestic financial sector and mobilizing domestic savings, well-functioning local capital markets reduce reliance on foreign capital and lessen the vulnerability of economies to external shocks.

Central banks also have an interest in the development of local capital markets. Efficient local capital markets can enhance the effectiveness of monetary policy transmission and strengthen financial stability. At the same time, central banks also play a key role in supporting the development of local capital markets. An adequate supervisory and regulatory framework, enhanced transparency, market discipline, and enhanced risk management by financial institutions are necessary to ensure financial market stability and set the right framework for capital market development.

However, despite their importance for economic development, capital markets in many emerging countries are shallow, illiquid, and inefficient as well as poorly regulated and supervised. Challenges for capital market development are manifold. They range from unstable macroeconomic conditions and weak or overly stringent legal and regulatory frameworks to lack of capacity among market participants and regulators/supervisors – to name but a few.

The question of the right policies and framework to foster the development of local capital markets is therefore of increasing interest to policymakers in emerging and developing countries. There is also a growing demand for support in this area. Local capital market development has become an important area of SECO's financial sector activities: from the standpoints of legal and regulatory assistance and market infrastructure development to aspects related to market access, transaction support, and capacity building for market participants. There is furthermore a strong nexus to infrastructure financing and SECO's activities in the area of sustainable debt management. SECO is thus looking into ways of addressing the challenges to capital market development in a comprehensive manner encompassing all these different aspects.

The development of stable and efficient financial sectors is one of SECO's main areas of intervention. Central banks play a crucial role in ensuring financial stability and creating sound macroeconomic framework conditions. This is also SECO's motivation for supporting central banks through the BCC programme. While the main objective of the BCC programme is to build and strengthen capacities at our partner central banks, we think it is important to have a platform via which to stimulate exchanges and discussions between countries that might be facing similar challenges.

The annual conference in Geneva and the annual regional conference are therefore highlights of the BCC programme. They provide a platform for BCC partner countries to share experiences and knowledge with peers and with distinguished international academics and experts on current topics highly relevant to our partner central banks. Given the current context, we think it is the right moment to discuss and exchange views on how to best promote the development of local capital markets in the framework of the BCC programme.

I would like to invite you, dear guests, to actively participate in the discussions. Your contributions will nourish these exchanges with concrete experiences and challenges

encountered and add much substance to the debate. In this regard, we are particularly happy to have participants from all our partner central banks with us, which will further stimulate exchange. I also would like to invite you to benefit from the presence of international experts and academics, which I am sure, will enable you to gain new and interesting insights. In this regard, we are particularly honoured to have Prof. Luc Laeven with us and we are looking forward to his keynote presentation tomorrow.

I also would like to take this opportunity to thank the Geneva Graduate Institute for International Development Studies and in particular Prof. Cédric Tille and his team for the excellent preparation and organization of this year's conference. They have put a lot of work and energy into assembling an interesting programme for this event.

I wish you all two days full of lively discussions and insightful exchanges.

Thank you.

Geneva, 2 October 2014

3. Keynote Lecture

THE DEVELOPMENT OF LOCAL CAPITAL MARKETS: RATIONALE AND CHALLENGES

LUC LAEVEN
International Monetary Fund and
Centre for Economic Policy Research (CEPR)

— Laeven, L.,"Keynote Lecture – The Development of Local Capital Markets: Rationale and Challenges", in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 15–33.

Introduction

The development of local capital markets has been a long-standing policy issue. Over recent decades, many countries have implemented significant reforms in order to foster domestic capital market development. Such reforms were often preceded by, or part of, broader reform agendas to develop financial systems and make them more integrated with the global market, including the removal of restrictions and controls on banking and the capital account. This promotion of capital market development was actively encouraged by international organizations and standard setters such as the IMF, the World Bank, and the OECD. The view was that the development of local capital markets, by fostering financial development and financial integration, would promote economic growth through improving the efficiency of capital allocation and allowing for better risk sharing. Moreover, the development of local bond markets was seen as critical for

governments to be able to finance large fiscal deficits without having to resort to financial repression or foreign borrowing with exchange rate risk, and to facilitate the sterilization of large capital inflows (Turner, 2002).

However, despite these potential benefits and good intentions the performance of capital markets in these countries has been mixed. While some countries have been able to develop sizeable and liquid local capital markets, others have seen their markets stagnate or even collapse, despite well-intended and recurring government intervention. Moreover, many of these markets, especially in emerging-market economies, have been subject to volatile international capital flows, leading some to question the benefits of financial deepening and financial globalization more generally (see, for instance, Stiglitz, 2002; and Arcand, Berkes and Panizza 2012). The recent global financial crises that followed a prolonged boom in financial leverage, and the reversal of capital flows to emerging-market economies that ensued, have reinvigorated this debate (Milesi-Ferretti and Tille, 2011; Lane and Milesi-Feretti, 2012).

This paper reviews the state of the literature on the benefits and cost of developing local capital markets, giving an overview of the challenges faced in the development of such markets, including preconditions needed and potential undesirable consequences of local capital market development. Our focus will be on local bond markets, which have proven – in most countries – to be more difficult to develop than domestic equity markets (Herring and Chatusripitak, 2001), although much of the analysis also applies to equity markets and other capital markets, including derivatives markets.

The paper should not be read as a policy guide for the development of local capital markets as optimal policy will depend on country circumstances, including a country's stage of development and sequencing of other reforms. Moreover, the merits of local capital markets will have to be continuously re-evaluated going forward against the backdrop of technological advances and an increasingly globalized world that will make it easier to access international capital markets.

The paper proceeds as follows. The next section provides the rationale for local capital market development. Section 3 gives an overview of the current level of development of local markets around the world. Section 4 offers an overview of the challenges faced in the development of local capital markets. And Section 5 concludes with a set of policy recommendations derived from the literature.

The Rationale for Local Capital Markets

Local capital markets offer several benefits to borrowers and investors, including governments. They provide for better risk sharing and a more efficient allocation of capital, and they improve the implementation of fiscal, monetary, and exchange rate policies. These benefits occur through a number of complementary channels.

First, local bond markets allow governments to finance large fiscal deficits without having to resort to financial repression or foreign borrowing. Indeed, the impetus for the development of local bond markets has typically come from the government in order to

facilitate the financing of large deficits (Turner, 2002). Financing deficits through financial repression by forcing local banks to hold government paper retards the development of the domestic banking sector, and foreign borrowing in hard currency exposes countries to exchange rate risk.

Second, the development of money and bond markets supports the conduct of monetary policy. Money and bond markets provide instruments needed for the implementation of monetary policy and improve the transmission mechanism of such policy (IMF, 2004). Long term bonds also facilitate sterilization operations carried out by the central bank because sterilization that relies exclusively on short-term instruments tends to drive up short-term interest rates and encourage further inflows into such instruments. And long-term bond markets give valuable information for the conduct of monetary policy, including expectations about macroeconomic developments and reactions to monetary policy changes, and thus help the operation of monetary policy.

Third, the development of local capital markets can improve the availability of long-term financing, allowing households and firms to better manage interest rate and maturity risk associated with long-term investments (such as investments in equipment, machinery, land, and buildings) by allowing for a better match between the duration of financial assets and liabilities. This benefit applies foremost to the development of a local bond market and the derivatives markets that support it, but the development of equity markets can also improve firms' access to long-term capital.

Fourth, the development of local capital markets can improve access to local currency financing. Local currency bond markets can offer local currency investors, such as retail and institutional investors, a way to borrow or invest in local currency and better manage inflation and exchange rate risk. They also provide a safe alternative investment to local currency bank deposits. And relative to foreign currency markets they can make the country less vulnerable to sudden stops and exchange rate shocks (see Gormley et al., 2006). Governments are also major benefactors of local currency bond markets because they allow them to finance fiscal deficits by borrowing from domestic markets without exchange rate risk.

Fifth, local capital markets allow for financial deepening alongside the development of banking markets, improving the efficiency of capital allocation in the economy. Bond finance provides healthy competition to bank loans and offers relatively cheap financing to large, reputable firms that have the scale and credentials to tap long-term capital markets. And the discipline of the market will improve the quality and disclosure of information that firms provide to markets and firms' performance more generally.

Sixth, local capital markets, when opened to foreign investments, increase financial integration by attracting foreign capital, which can lower the cost of capital for local firms and households and improve risk sharing across countries. This could also improve market access and relieve credit constraints on small and medium-sized enterprises (see, for example, Eichengreen et al., 2006). However, the liberalization of financial markets can also result in the migration of trading to international financial sectors, hampering domestic market development. For example, high-quality firms may try to escape local markets, lowering the average quality of local issuances (see, for instance, De la Torre et al., 2006). Or local listing

or disclosure requirements may be relaxed to prevent trading activity from moving abroad, with negative implications for investor protection. The net effects of the internationalization of financial markets on the local development of markets in developing economies and emerging markets is therefore ambiguous[1].

Finally, the development of local capital markets can enhance financial stability by enhancing the ability of financial institutions to manage risk. For example, interest rate derivatives can be used to manage interest rate risk and credit derivatives can be used to manage credit risk. Moreover, a more diverse financial system that includes capital markets alongside banking markets tends to be more stable and better able to absorb shocks. For example, bond markets can act as a "spare tyre" to bank finance in case of banking crises, thus helping to absorb the shock of bank distress. For example, in the midst of the Korean financial crisis of 1998, corporate bond markets provided almost all the funds raised by firms, with firms bypassing a troubled banking system. However, this is generally the case only for large firms (see, for example, Gormley et al., 2006).

These benefits are not mutually exclusive and tend to reinforce one another. For example, the development of local currency markets, by providing for safe assets in local currency, can enhance economic stability both directly by improving the ability of investors to manage exchange rate shocks and indirectly by enhancing the stability of the financial system.

The Current State of Development of Local Capital Markets

Capital markets have expanded in many countries in recent decades, especially in emerging markets (as noted by Mihaljek et al., 2002). For example, total debt securities outstanding grew by over 50 percent from 47 percent of GDP in 1994 to 72 percent of GDP in 2010 globally, but this was outpaced by a fourfold increase from 13 percent of GDP in 1994 to 54 percent of GDP in 2010 in upper-middle-income countries. Similarly, the capitalization of stock markets (relative to GDP) saw an increase of about 50 percent globally but a more than twofold increase in upper-middle-income countries over this period. Domestic private bond markets saw the most rapid increase over this period among bond markets in upper-middle-income countries, increasing almost six fold from 2.4 percent of GDP in 1994 to 13.3 percent of GDP in 2010. By 2010, domestic bonds accounted for 79 percent and public sector bonds for 56 percent of bonds outstanding. Public sector bonds issued in domestic markets remain the most widespread type of bond (in both high-income and middle-income countries), followed by private sector domestic bonds and public and private sector international bonds (see Table 3.1).

However, there is much variation in the development of the local markets by income level, especially in the development of domestic private bond markets. For example, while domestic private bonds accounted for 30 percent of bonds outstanding in high-income countries and

[1] For a review of the literature on the benefits and costs of financial globalization more generally, see Kose et al. (2009).

25 percent of bonds outstanding in upper-middle-income countries, they only accounted for 4.5 percent of bonds outstanding in lower-middle-income countries.

Moreover, while local markets grew in most countries over this period, they contracted in some. For example, the capitalization of stock markets in low-income countries decreased from 24 percent of GDP in 1994 to 20 percent of GDP in 2010. And among this group of developing economies many have seen the number of listings and market liquidity decrease over the past two decades as a growing number of firms have raised capital abroad through cross-listings or international capital issuances. In many developing and emerging economies, local capital markets remain highly illiquid and segmented, with trading and capitalization concentrated on a few securities (see, for instance, De la Torre et al., 2008).

And while the focus of this paper is on local capital markets it is also noteworthy to point out that international debt issues have grown more rapidly than domestic bond issues, which indicates that international listings and security issuances remain a more attractive form of capital raising for many borrowers and investors in these economies and that there are factors hampering the development of local capital markets.

Table 3.1 – The development of international and domestic bond and equity markets, 1994 and 2010 (percentage of GDP)

As % of GDP	Total bonds outstanding		Outstanding domestic private debt securities		Outstanding domestic public debt securities		Outstanding international private debt securities		Outstanding international public debt securities		Stock market capital-ization	
	1994	2010	1994	2010	1994	2010	1994	2010	1994	2010	1994	2010
World	47.1	72.2	17.0	22.9	23.5	34.2	2.8	9.1	3.8	6.0	24.1	37.8
High income	66.8	109.6	27.5	33.3	28.1	35.0	7.3	33.5	4.0	7.7	34.1	58.2
Upper middle income	13.3	53.6	2.4	13.3	8.1	31.3	0.6	2.9	2.2	6.0	14.6	33.3
Lower middle income	42.0	35.3	0.9	1.6	35.0	29.2	2.1	2.1	3.9	2.4	18.6	20.0
Low income	…	…	…	…	…	…	…	…	…	…	24.1	19.9

Source: Bond market data from the Bank for International Settlements (BIS); GDP data from International Monetary Fund (IMF); stock market data from Global Stock Markets Factbook and Standard & Poor's.

Moreover, the upward trend in capital market development over the past two decades should be seen in historical perspective. For example, Rajan and Zingales (2003) show that many countries were more financial developed in 1913 than in 1980 and only recently have they surpassed their 1913 levels. They argue that local interest groups play an important role in driving reforms that foster or hamper local market development, with incumbents favouring more market-friendly and free-trade policies in the pre-1913 era and recent decades than in the interim period. This means that reversals in local market development are not uncommon and are driven by factors other than legal and institutional constraints.

Challenges in the Development of Local Capital Markets

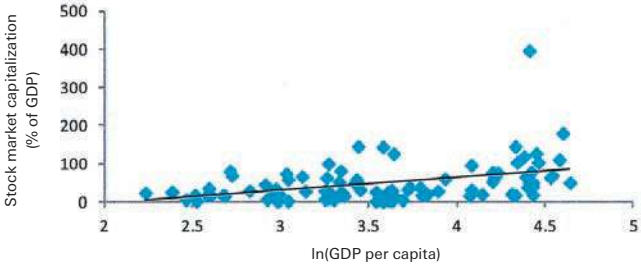
The proper functioning of local capital markets requires that several conditions be met. These preconditions can broadly be classified into three groups: sound macroeconomic policy, a strong institutional and legal setting, and a well-functioning financial infrastructure. Moreover, markets cannot flourish without reaching a minimum size. Without these preconditions, government efforts to develop local capital markets are bound to fail, resulting in shallow markets and duped investors, and it is therefore generally advisable to sequence financial reforms such that these conditions are sufficiently in place before local capital market are established.

Stable macroeconomic policies

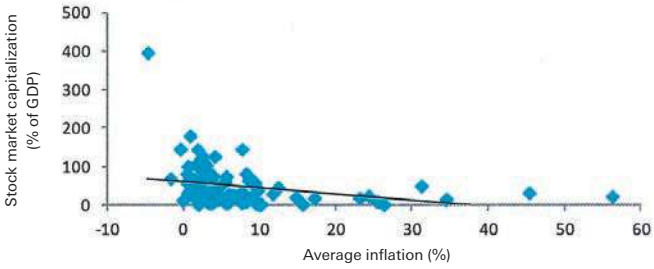
A sound macroeconomic framework and stable macroeconomic policy is needed to attract foreign capital and to ensure that monetary policy actions can be taken without causing excessive interest rate volatility that would interfere with the development of bond markets. And governments must adopt a clear issuance strategy and debt management framework so that investors can anticipate a reliable supply of fixed-income securities. For example, Burger and Warnock (2006) find that countries with stable inflation rates (a proxy for creditor-friendly policies) have more developed local bond markets and rely less on foreign currency-denominated bonds. Figure 3.1 confirms the findings in that research by showing that local capital markets are more developed (measured using market capitalization relative to GDP) in richer countries and in countries with lower inflation rates. This is the case both for equity markets and public and private bond markets.

Figure 3.1 – Local market development and macroeconomic conditions, 2013

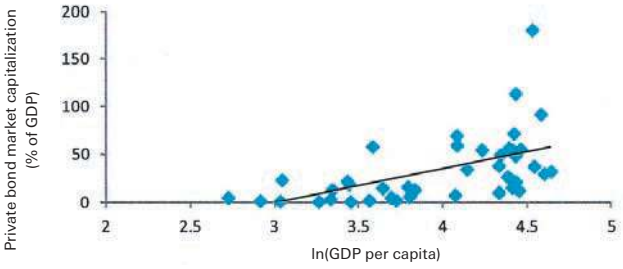
Stock market development and economic development



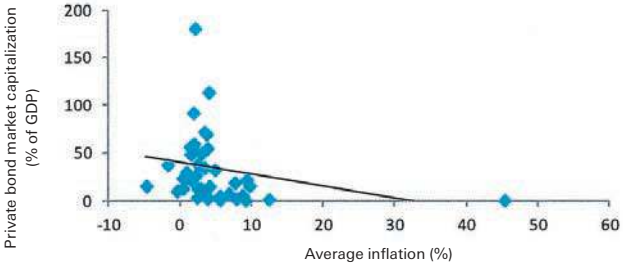
Stock market development and average inflation



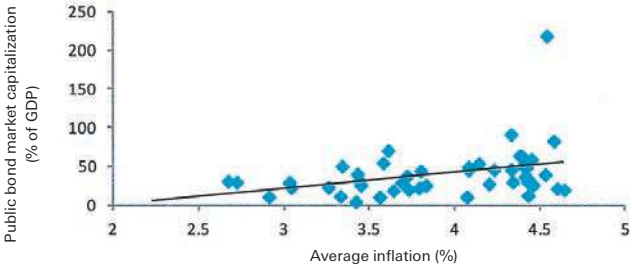
Private bond market development and economic development



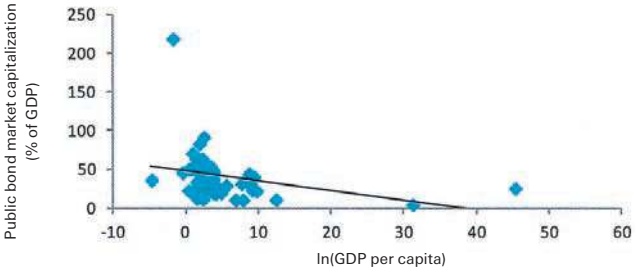
Private bond market development and average inflation



Public bond market development and economic development



Public bond market development and average inflation



Notes: Stock market capitalization, private bond market capitalization, and public bond market capitalization are measured at end-2013. GDP per capita is measured in 2003. Inflation is the average percentage change in the GDP deflator over the period 1999–2003.

Sources: World Bank Financial Structure Database; LaPorta (2006); Djankov, McLiesh and Shleifer (2007); and Djankov, LaPorta, Lopez-de-Silanes and Shleifer (2008).

The lack of sound macroeconomic policies is not only an impediment to the development of local capital markets but also becomes a major source of weakness for the economy once local capital markets are developing and become more integrated with global capital markets, making the country more vulnerable to volatile capital flows, exchange rate volatility, and financial crises. It is therefore critically important that countries continue to employ sound macroeconomic policies as they open up their capital markets to foreign capital.

Strong legal and institutional environment

Strong institutions and a well-functioning legal system are also critical for the development of local markets because they provide the basis for the protection of investor rights, including minority interests, in order to attract widespread interest from investors and to ensure that creditors are repaid in an orderly fashion. For example, Burger and Warnock (2006) and Burger et al. (2012) find that countries with creditor-friendly laws (i.e. strong

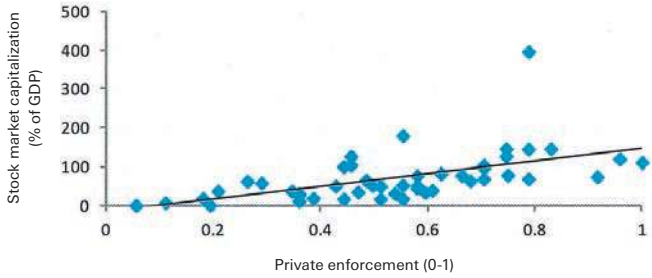
creditor rights) and stable macroeconomic policies have more developed local bond markets. Similarly, Eichengreen and Luengnaruemitchai (2006) find that Asian capital markets, where creditor and investor rights tend to be stronger and contract enforcement less costly, tend to be more developed than those in Latin America. More generally, economies with investor-friendly laws tend to have deeper capital markets (see, for instance, LaPorta et al., 1997 and 1998) and the firms in such economies tend to obtain higher stock market valuations (as shown by LaPorta et al. 2002).

Figure 3.2 corroborates these findings by showing that stock markets, public bond markets, and private bond markets are all more developed (in terms of market capitalization) in countries with stronger private enforcement of securities laws and regulations, stronger investor rights, and strong contract enforcement.

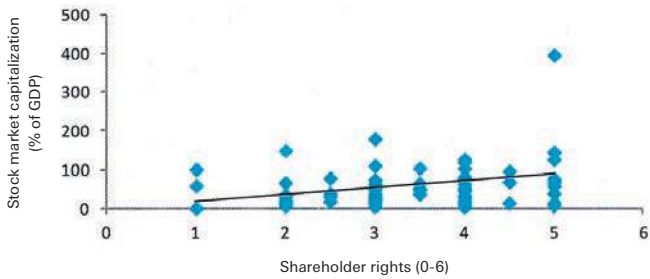
Investor-friendly laws can exist across a variety of legal systems. Whereas La Porta et al. (1997, 1998) find that over the period 1980–2000, common law countries tended to offer more legal protection for investors and that these countries had larger capital markets, Rajan and Zingales (2003) show that, in 1913, French civil law countries tended to have more developed capital markets than their common law counterparts. Additionally, Musacchio (2008) finds ample variation in the development of local capital markets in a single country – Brazil – with a French civil law tradition, which cannot be explained by legal origin alone. This implies that while the legal protection of investors has an important bearing on local capital market development, the link between legal origin and capital market development is not obvious.

Figure 3.2 – Local market development and institutional setting, 2013

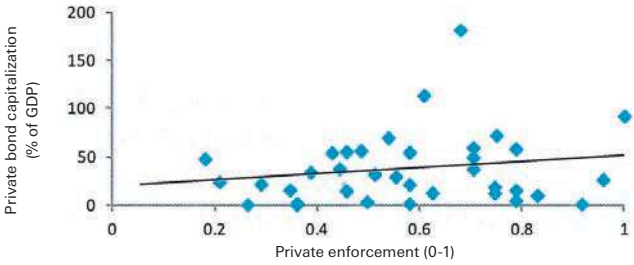
Stock market development and private enforcement



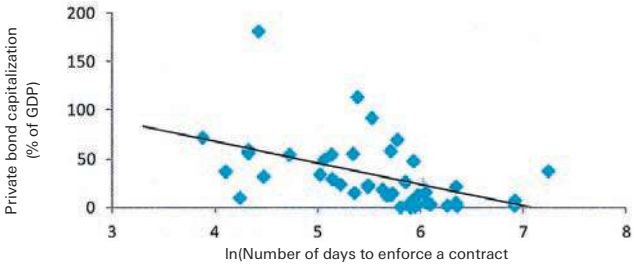
Stock market development and shareholder rights



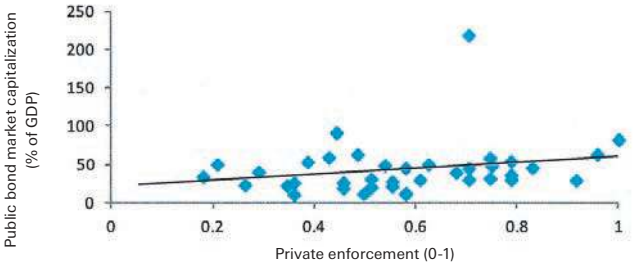
Private bond market development and private enforcement



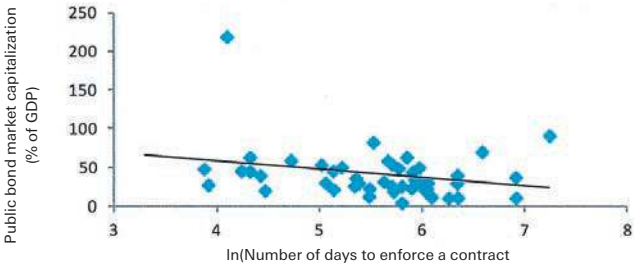
Private bond market development and contract enforcement



Public bond market development and private enforcement



Public bond market development and contract enforcement



Notes: Stock market capitalization, private bond market capitalization, and public bond market capitalization are measured at end-2013. Private enforcement is an index of private enforcement of securities laws and regulations from LaPorta, Lopez-de-Silanes and Shleifer (2006), ranges from zero to one, and is the arithmetic mean of (1) the disclosure index and (2) the burden-of-proof index. The index of disclosure equals the arithmetic mean of: (1) prospect; (2) compensation; (3) shareholders; (4) inside ownership; (5) contracts irregular; and (6) Transactions. And the burden-of-proof index is the arithmetic mean of (1) burden director; (2) burden distributor; and (3) burden accountant. Shareholder rights are the anti-directors index from Djankov, LaPorta, Lopez-de-Silanes and Shleifer (2008). The index of anti-director rights is formed by adding one when (1) the country allows shareholders to mail their proxy vote; (2) shareholders are not required to deposit their shares prior to the General Shareholders' Meeting; (3) cumulative voting or proportional representation of minorities on the board of directors is allowed; (4) an oppressed minorities mechanism is in place; (5) the minimum percentage of share capital that entitles a shareholder to call for an Extraordinary Shareholders' Meeting is less than or equal to 10%; or (6) when shareholders have pre-emptive rights that can only be waived by a shareholders' meeting. The range for the index is from zero to six. Number of days to enforce a contract is the number of days to resolve a payment dispute through the courts (i.e. to enforce a contract of unpaid debt worth 50% of the country's GDP per capita) from Djankov, McLiesh and Shleifer (2007). The variable is constructed as at January 2003 and is described in more detail in Djankov, LaPorta, Lopez-de-Silanes and Shleifer (2003).

Sources: World Bank Financial Structure Database; LaPorta, Lopez-de-Silanes and Shleifer (2006); Djankov, McLiesh and Shleifer (2007); and Djankov, LaPorta, Lopez-de-Silanes and Shleifer (2008).

Until the 1930s, securities markets were largely left unregulated and concentrated among private exchanges. A rise in reported market abuses in the "roaring" 1920s and the US stock market crash of 1929 led to the Securities Act of 1933 and the Securities Exchange Act of 1934, which together provided the legal and regulatory foundation to restore investor confidence.

Broadly speaking, securities laws exist to reduce the "promoter's problem" in security issuance, which is the risk that corporate issuers sell bad securities to the public (Mahoney, 1995). However, different views exist regarding the need for securities market regulation. Early research on the topic argued that securities markets should be left unregulated (Grossman and Hart, 1980; Grossman, 1981), with the market mandating optimal disclosure and monitoring compliance to facilitate trading (Benston, 1973; Fischel and Grossman, 1984) and auditors and underwriters certifying the quality of securities being offered (Chammanur and Fulghieri, 1994; De Long, 1991). More recent research argues that regulation is needed to standardize the private contracting framework and prevent investors from being duped, with laws mandating the disclosure of information for issuances and specifying the liability standards facing issuers and financial intermediaries in case investors seek payment for damages when information is inaccurate or material information is withheld (see, for instance, Easterbrook and Fischel 1984; LaPorta et al. 2006). It is now widely acknowledged that securities laws are critically important for the development of securities markets.

Yet securities laws differ a great deal between countries. LaPorta et al. (2006) find that laws mandating public disclosure and facilitating private enforcement through liability

standards benefit the development of securities markets, while public enforcement of securities laws has little impact. This suggests that securities laws that empower the market by setting mandatory disclosure and liability standards are to be preferred over laws that focus primarily on regulatory enforcement of laws.

At the same time, strong securities laws and investor rights may be insufficient for the development of local capital markets (notably equity and corporate bond markets) if corporate ownership is concentrated and corporate governance is weak. In such environments, corporate governance reforms may be needed to support investor rights. Such reforms could focus on encouraging stronger oversight of corporate boards or the removal of barriers to takeover threats.

Claessens et al. (2000) show that poor corporate governance (as reflected in high ownership concentration and poor oversight of institutional investors) together with high taxation on capital issuances constituted a major impediment to the development of equity markets in Brazil in the 1990s, with the value of corporate control from ownership concentration being estimated to be much higher than in most other countries. They argue that with stronger corporate governance, the cost of capital would be reduced. This would boost firms' valuations and make it easier to attract capital, including from abroad, with positive ramifications for local market development.

One challenge is that institution building takes time and requires a sustained and broad political consensus. In reality, announced market-oriented policies are often reversed or not fully credible initially (see, for instance, Eichengreen et al. 2006). The sustainment of market-oriented policies such as privatization and liberalization programmes represents a major test of political commitment to safer private property rights. This can have a significant effect on local market development through the resolution of policy risk and the building up of investor confidence (as shown by Laeven and Perotti, 2010).

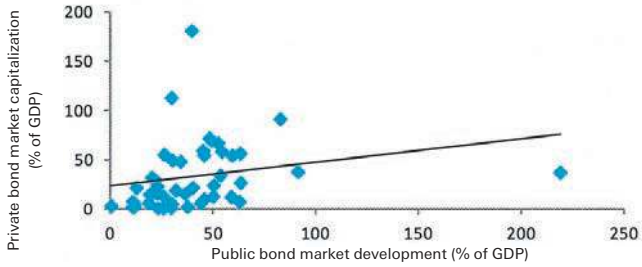
The same creditor-friendly policies and laws that foster the development of local bond markets also foster the development of the banking system. Depositors, just like bond investors, demand a stable, safe return on their investments. Moreover, in many countries, banks are major holders of local bonds, which are generally seen as safe assets or serve as collateral and are thus a captive market for government bonds (Hawkins, 2002). This implies that banking and bond market development feed each other, and policies to promote a sound banking system will support the development of local bond markets as well. Indeed, Burger and Warnock (2006) find that countries with more developed banking markets tend to have more developed local bond markets, suggesting that the two markets complement each other. Similarly, Eichengreen and Luegnaruemitchai (2004) show that economies with more competitive banking sectors tend to have more developed bond markets. Figure 3.3 confirms these findings that suggest a complementarity between the development of banking and local bond markets. Local capital markets (i.e. stock and bond markets taken together) tend to be more developed in countries with more developed banking markets (as measured using the ratio of credit to the private sector to GDP). Moreover, countries with a more developed banking sector tend to have stronger protection of creditor rights, just as the

protection of investor rights is an important predetermining factor in the development of local capital markets.

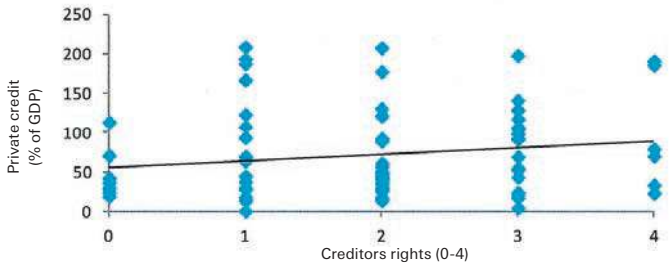
However, the co-development of banking and local bond markets can also be a double-edged sword. Local bond markets have often been developed by governments with a view to facilitating the placement of longer dated government paper at local banks to finance large fiscal deficits. Such directed lending to government by banks as a captive domestic audience is a form of financial repression that gives rise to an excessively close connection between government and banks (Reinhart and Sbrancia, 2011). Another example of an undesirable, close connection between banks and governments is the euro area today where large holdings of domestic government bonds create a vicious cycle between weak governments and weak banks (Gennaioli et al., 2014).

Figure 3.3 – Complementarities in the development of local markets, 2013

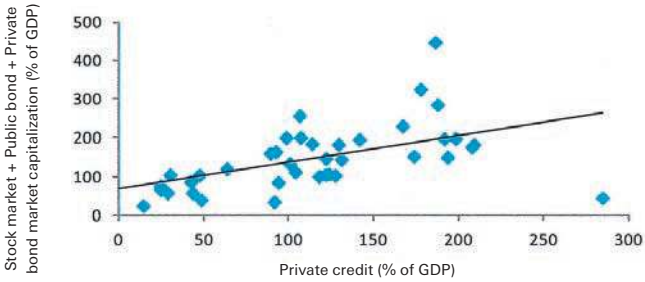
Public bond and private bond market development



Banking sector development and creditor rights



Market development and banking sector development



Notes: Stock market capitalization, private bond market capitalization, and public bond market capitalization are measured at end-2013. Private credit is credit to the private sector by provided banks and non-banking institutions (as a percentage of GDP), measured at end-2013. Creditor rights is an index of creditor rights, following La Porta et al. (1998) and obtained from Djankov, McLiesh and Shleifer (2007) for January 2003. A score of one is assigned when each of the following rights of secured lenders are defined in laws and regulations.

1) there are restrictions, such as creditor consent or minimum dividends, for a debtor to file for reorganization;

2) secured creditors are able to seize their collateral after the reorganization petition is approved, i.e. there is no "automatic stay" or "asset freeze";

3) secured creditors are paid first out of the proceeds of liquidating a bankrupt firm, as opposed to other creditors such as the government or employees; and

4) management does not retain administration of its property pending the resolution of the reorganization. The index ranges from 0 (weak creditor rights) to 4 (strong creditor rights).

Sources: World Bank Financial Structure Database; LaPorta, Lopez-de-Silanes and Shleifer (2006); Djankov, McLiesh and Shleifer (2007); and Djankov, LaPorta, Lopez-de-Silanes and Shleifer (2008).

Simple regression analysis that simultaneously considers the role of macroeconomic conditions, institutional quality, and banking sector development, confirms the patterns seen in Figures 3.1–3.3. When using the sum of the market capitalization of equity, private bonds, and public bonds divided by GDP as proxy for a country's local market development, we find that private enforcement of securities laws, shareholder rights, and the enforcement of debt contracts continue to be positively associated with local market development even after controlling for the level of economic development and average inflation rate in the country. Moreover, we find that the size of the domestic banking system continues to be positively associated with local market development after controlling for per capita income and inflation. The results are presented in Table 2. These findings suggest that the legal and institutional environment exerts an independent influence on local market development over and above the macroeconomic conditions in the country.

Table 3.2 – Local market development, macroeconomic conditions, and institutional framework

Dependent variable: Local market development/GDP (%)	(1)	(2)	(3)	(4)
Private enforcement of securities laws	202.67*** (41.05)			
Shareholder rights		33.22*** (9.40)		
Debt contract enforcement			–37.27*** (12.46)	
Private credit/GDP (%)				0.89*** (0.24)
Average inflation (%)	–1.78 (1.33)	–2.77 (1.76)	–3.22* (1.87)	–2.15 (1.51)
ln(GDP per capita)	62.99*** (16.40)	63.77*** (17.63)	37.86** (18.39)	4.63 (20.40)
Observations	36	41	42	35
R-squared	0.57	0.51	0.41	0.52

Notes: The dependent variable is local market development, defined as the sum of stock market capitalization, private bond market capitalization, and public bond market capitalization expressed as a percentage of GDP. Private enforcement of securities laws is an index of private enforcement of securities laws and regulations from LaPorta, Lopez-de-Silanes and Shleifer (2006), ranges from zero to one, and is increasing in the degree of private enforcement. Shareholder rights is the anti-directors index from Djankov, LaPorta, Lopez-de-Silanes and Shleifer (2008), ranges from zero to six, and is increasing in the degree of property rights protection for shareholders. Debt contract enforcement is the natural logarithm of the number of days required to resolve a payment dispute through courts (i.e. to enforce a contract of unpaid debt worth 50% of the country's GDP per capita) from Djankov, McLiesh and Shleifer (2007). The variable is constructed as at January 2003 and described in more detail in Djankov, LaPorta, Lopez-de-Silanes and Shleifer (2003). Private credit is credit provided to the private sector by banks and non-banking institutions (as a percentage of GDP), measured at end-2013, from the World Bank Financial Structure database. Average inflation is the average percentage change in the GDP deflator over the period 1999–2003. ln(GDP per capita) is the natural logarithm of per capita GDP measured in 2003. Inflation and GDP per capita variables are from Djankov, McLiesh and Shleifer (2007). Reported coefficients are obtained using OLS regressions. Huber-White standard errors are reported between brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Financial infrastructure

Sound macroeconomic policies and a strong legal framework and institutional set-up alone are not sufficient for capital markets to flourish. They need to be complemented by a well-developed financial infrastructure to facilitate trading and the exchange of information.

"Financial infrastructure" refers to the physical underpinnings for a financial market exchange, including trading platform and trading system, as well as the regulatory apparatus and industry to process, evaluate, and validate the information being produced and used by the market. The trading platform can be physical or electronic. The regulatory apparatus will consist of a securities market regulator together with any self-regulation imposed by the market itself. The regulator's job is to issue and enforce public regulations and promote the private disclosure of information and private enforcement of rules. The rating process will be generated and supported by rating agencies and credit guarantors.

The efficiency and security, with which securities issues can be listed and traded on the exchange together with the quality and flow of information necessary to value securities will, to a large extent, determine the market's success. Unfortunately, for many small investors and small and medium-sized firms seeking to tap financial markets to raise additional capital, the large fixed costs associated with accessing such markets are too steep for such financing to be economical. Such fixed costs come in the form of listing requirements, transaction costs and taxes, and the costs associated with hiring an internationally recognized auditor.

Moreover, the quality of information disclosed to investors often leaves much to be desired. In principle, reputational concerns should provide incentives to issuers to disclose accurate information in a timely fashion and to their auditors to verify such information for accuracy. However, agency conflicts and short-term-oriented profit objectives can get in the way. For example, corporate governance at issuing firms may be weak or there may be conflicts of interest between issuers, rating agencies, and auditors. This is particularly problematic for the development of bond markets which requires reliable, publicly disclosed information.

A number of papers have found that investors value information disclosure, including when mandated by the regulator. For example, Greenstone et al. (2006) find that firms whose stocks are traded over the counter enjoyed positive abnormal returns following the 1964 amendments to the US Securities Act, which extended the mandatory disclosure requirements that had applied to listed firms also to firms traded over the counter. And Simon (1989) finds that the dispersion of abnormal returns was significantly reduced following the introduction of the 1933 Securities Act (even though Stigler (1964) and others find that the average return enjoyed by investors did not increase following the mandated disclosure of financial information).

The creation of a well-functioning financial infrastructure is not without hurdles. The development of local capital markets therefore typically evolves in stages, with the development of local equity markets and government bond markets preceding those markets that require a more developed financial infrastructure and a stronger legal framework and contract resolution, such as local currency and corporate bond markets. Corporate bond

markets also differ from government bond markets in that they require a more developed private sector, which is often weak in developing countries and emerging-market economies. Market development begins from the fiscal side, starting with a short instrument and then moving to longer dated instruments in government securities. While local government bond markets are often created by governments to finance large deficits, the development of equity and corporate bond markets typically start as private sector initiatives, with the government influencing the development through legislation, standard setting, supervision, and the provision of a financial infrastructure (Schinasi and Smith, 1998).

Unlike bond markets, equity markets can develop even in environments with weak financial infrastructures and weak investor rights because the unlimited potential upside return of an equity contract can compensate for the perceived riskiness of the claim in an environment with a weak financial infrastructure and weak property rights. Bonds, for which the upside is limited by the promised interest rate, require a much better financial infrastructure (including proper disclosure and reliable bond ratings) and a strong enforcement of creditor rights to attract potential investors (see, for instance, Herring and Chatusripitak, 2000).

Market size and complementarity

Even in the absence of institutional, legal, and technological barriers, local markets in many emerging economies often lack the critical mass of investors needed to provide for market depth and liquidity (see, for instance, Eichengreen et al. 2006). In such economies, governments can jump-start market development by opening up to foreign investors (though this has to be carefully weighed against the risks of financial integration). The development of local pension funds can provide another impetus to local market development, especially for bond markets (as shown by Giannetti and Laeven (2009) in the case of Sweden). Pension funds need to invest in longer date instruments for asset-liability management purposes and therefore can provide a stable market base for local bond and equity markets. A good example is Chile, which launched a funded pension system in 1981, which contributed to the development of local bond markets, making the Chilean bond market one of the most developed in Latin America over the two following decades (see, for example, Cifuentes et al., 2002). Moreover, the creation of an institutional investor base will have positive externalities for the development of local capital markets by stimulating financial innovation and the efficient functioning of these markets. Institutional investors will exert pressure for better accounting and auditing standards as well as for a more accurate and timely disclosure of information to investors. They will also encourage improved broking and trading arrangements and will help establish more efficient and reliable clearing and settlement facilities. Additionally, they can improve corporate sector performance by facilitating the privatization process and by promoting sound corporate governance and the dispersion of corporate ownership (Vittas, 1992). The contribution of private pension funds to the development of local capital markets in developing and emerging economies has long been limited because of investment regulations that favoured investment in government bonds, but their role is

increasing as these regulations are being relaxed and financial markets are being liberalized, and with that increase the impact on local capital market development is also increasing.

Moreover, the development of some capital markets critically depends of the existence of other capital markets. For example, local currency government bond markets can be a catalyst for the development of corporate bond markets by providing a yield curve benchmark against which to price bonds, market liquidity, and price revelation. Consistent with this, Figure 3.3 shows that private bond markets tend to be more developed in countries with deeper public bond markets. Similarly, derivatives markets cannot flourish without well-developed markets in underlying assets and in turn spur capital market development by completing markets. Moreover, bond markets require well-developed money markets so that monetary policy actions can be taken without causing excessive interest rate volatility that would interfere with the development of bond markets.

At the same time, it should be recognized that some economies simply lack the scale to support a flourishing local capital market, even in the absence of any economic or legal shortcomings, simply because of lack of market size. Such economies would be better served by promoting foreign listings and regional exchanges rather than investing in an illiquid, shallow market at home.

Conclusions

The development of local capital markets is not without its challenges, especially in developing economies and emerging-market economies where a small market size, weak institutions, and unstable macroeconomic policies often get in the way of providing an enabling environment in which local markets may flourish. Given the political hurdles and time required to overcome these constraints, one has to be realistic about the degree of local market development that can effectively be achieved in the short term without the creation of undue risks for investors arising from market illiquidity, securities fraud, and the mispricing of securities.

A number of conclusions emerge from our analysis; conclusions that can guide policymakers when making decisions about the pace and modality of local market development.

First, local markets cannot develop without sound macroeconomic policies and a legal environment that protects property rights. The mixed successes of local capital market development in developing and emerging countries can, to a large extent, be explained by recurring setbacks from macro imbalances and weak institutions. The government has an important role to play here. The government can provide for stable macroeconomic policies and an institutional framework that promotes investor rights. The government can also create the basic financial infrastructure needed for securities trading, including a trading platform and settlement system, and can establish the legal and regulatory framework for securities issuance, market conduct, monitoring and reporting, and clearing and settlement. Governments can also encourage the creation of rating agencies to provide the independent credit risk assessment needed for the development of local corporate bond markets.

Second, the development of local capital markets requires time and proper sequencing, as some markets require a more developed financial infrastructure and stronger legal protection if they are to flourish. Moreover, the economic and legal environment of the country needs to be sufficiently developed before investments in market infrastructure can be expected to pay off (De la Torre et al., 2008). This means there are no quick fixes: the development of markets is a gradual and interactive process, stretching over a long period of time. Additionally, many markets complement each other and this should also be taken into account when considering the optimal sequencing of capital market reforms. Finally, the sequencing of capital market reforms should be coordinated with financial liberalization, as opening up to foreign capital can invite excessive economic volatility if markets are not sufficiently developed, even when macroeconomic policies are generally sound.

Third, capital market development can be promoted by policies that increase market size, including pension reforms, financial liberalization, and tax reforms. The creation of private pension funds can generate a large and varied investor base of institutional investors, and opening the market to foreigners through financial liberalization can further enlarge and diversify the investor base (although one needs to be careful to manage the potential increase in volatility of capital flows that follow financial liberalization). Moreover, corporate governance reforms that protect the interests of minority investors can enlarge the base of retail and foreign investors, and tax reforms that make the tax treatment of securities issuance and investment more attractive to issuers and investors can increase market size by increasing the supply and demand for securities.

Finally, rules that promote the disclosure of information, the standardization of securities products, and the punishment of misbehaviour in securities dealings will promote the development of an efficient primary market for securities issuance and cultivate an efficient secondary market.

With these conditions in place, any country can – over time – develop a local capital market that efficiently allocates capital in order to support economic growth. Such a market would consist of a primary market for equity and bond issuances in a range of standard maturities; a secondary market where price information is continuously available, transaction costs are low and effective custodial and safekeeping services are available; and a local currency bond market that provides for a safe asset in the absence of exchange rate risk. However, in an increasingly globalized world, not every country needs to develop a fully-fledged physical capital market at home. The optimal balance between local capital market development and integration into global capital markets will depend on country circumstances, such as economic size and stage of development.

4. Panel Discussions

Panel discussions at the Second Annual BCC Conference in Geneva.

Panel participants

Mr Ardian Fullani
Governor, Bank of Albania

Mr Kemal Kozaric, Governor
Central Bank of Bosnia and Herzegovina

Mr Mohamed Rekik
Vice Governor, Bank of Tunisia

Mr Renzo Rossini
General Manager, Bank of Peru

Mrs Grace Akrofi
Head of Research, Bank of Ghana

Mr Bui Quoc Dung
Acting Director General, Monetary Forecast and Statistics Department, State Bank of Vietnam

Mrs Pamela Cardozo
Chief Officer of the Monetary and Reserves Division, Central Bank of Colombia

Dr Katrin Assenmacher
Swiss National Bank

Mr Dietrich Domanski
Head of Policy and Coordination, BIS

Prof. Harald Hau
University of Geneva

Prof. Peter Kugler
University of Basel

Prof. Kenneth Kuttner
Williams College

4.1 Panel 1

REGIONAL PERSPECTIVES ON FINANCIAL DEVELOPMENT

Chair: Prof. Alexandre Swoboda, the Graduate Institute

— "Regional Perspectives on Financial Development", Panel 1, in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 37–39.

Presentations by panellists

One panellist drew on his country's experience of using capital controls as a substitute for foreign exchange interventions, as these had limited effectiveness in managing the exchange rate. The panellist underscored a number of drawbacks of capital controls. These include distortionary effects on trade and competition, increase volatility in the exchange rate, and a hindrance to longer term (FDI) capital flows. Given these inefficiencies, the panellist was of the view that international capital controls coordination would be difficult.

Another panellist asked whether capital controls should be used at all. In the past, such controls were often used to support bad macroeconomic policies, and thus viewed negatively. Recent years have however seen a recognition by policymakers that these controls are effectively indistinguishable from so-called "macroprudential measures". It has thus become increasingly hard to argue in favour of instruments reducing the risk of excessive foreign lending while at the same time taking a sceptical view of capital controls which are effectively the same tool. On the question of international coordination, the panellist reminded the audience that coordination is not just about doing a favour to a neighbouring country, but that it also represents a gainful policy for the domestic economy. Hence there must not necessarily be a tension between international and domestic goals.

Another panellist asked whether another way to restrict capital inflows could be to threaten more volatility in taxes on international capital flows, rather than adjusting the level of these taxes. Higher potential volatility would effectively increase the risk associated with investing in the domestic currency, and thus have a similar impact as imposing capital control. Another comment pertained to the political economy issues. The panellist noted that the instruments nowadays labelled as macro-prudential tools have been seen in the past as financial repression tools. There is thus a worry that policymakers could use this new terminology to justify protectionist measures, leading to the perverse effect of increasing distortions rather than diminishing macroprudential risks.

One panellist disagreed with the notion that international policy coordination is a win-win policy for both the domestic and foreign economies. He also pointed out that there is a problem when regulation is being misused. If domestic institutions are weak and the people in charge of regulations are corrupt, then policies such as capital controls could create additional problems that are much bigger than the ones they solve.

One of the participants argued that monitoring and understanding the main actors of the domestic financial system was more important than putting a tax on capital flows. The tackling of financial stability risks crucially required a focus on banking regulation rather than capital controls. For example, higher capital ratios for all institutions as well as increased provisions on lending to riskier borrowers would make economies much more resilient to financial shocks.

One participant asked whether capital controls merely affect the composition of flows or their overall level. Another question was how effective capital controls are in practice.

Another participant questioned whether the policy implications would be similar if one coached the debate in terms of labour, and asked why we worried so much more about capital than labour.

On coordination, one participant asked whether cooperation among regulators of the banking sector, especially in an integrated area such as the Euro Area, is necessary in order to guarantee financial stability. Finally, one participant stressed that minimizing distortions is best achieved by addressing problems at their source rather than indirectly.

Replies from panellists

One panellist judged that capital controls needed to be assessed in terms of their objectives, namely to affect the exchange rate so as to give monetary policy more autonomy, as well as modify the composition of capital flows. The panellist argued that these objectives are not attained in practice: controls can be easily evaded and thus have little impact on the exchange rate, monetary policy autonomy, or the level of flows. There seems to be some positive impact on the composition of flows, but at the cost of higher volatility of capital flows and exchange rate. The panellist thus judged that overall the policy of capital controls has many more cons than pros, and was difficult to coordinate.

The next panellist agreed that one needs to keep the policy's objective in mind to assess it success. Most empirical research shows that capital controls mainly affect the composition of flows. The panellist argues that changing the mix from short term speculative to longer term more stable flows can be a worthwhile objective in itself. Also he noted that the case can be made that cross-border capital flows are inherently more risky than domestic ones. He pointed to issues of currency mismatch and the volatility of international flows. Thus from a prudential perspective, a tax on capital flows might be the optimal way to tackle these concerns.

Another panellist commented on coordination in a domestic context. In recent years

central banks have been given many responsibilities, including monetary stability, financial stability and in some cases exchange rate stabilization. While thy in principle have different policy tools to achieve each objective (the interest rate, macroprudential measures and foreign exchange interventions), in practice using one tool affects all objectives. Coordination within the central bank is then an important organizational issue. The overarching question is whether central banks are being overburdened with too many responsibilities.

The final panellist addressed the question of contrasting capital and labour flows and pointed that capital flows move much faster. In terms of financial stability, a rule of thumb is that any variable that grows by more than 10% annually is suspicious and potentially worrying. On banking regulation, even though international coordination would be ideal, it did not work very well in practice. During the 2008 crisis for example, some governments ring-fenced their own banking sector and did not consider spill-over effects of their policies on neighbouring economies. It is hard to make the banking regulatory bodies fully independent of national interests.

4.2 Panel 2

FUNDING SOURCES OF SMALL AND MEDIUM-SIZED ENTERPRISES

Chair: Prof. Cédric Tille, the Graduate Institute and Head of the BCC programme

— "Funding Sources of Small and Medium-Sized Enterprises", Panel 2, in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 41–44.

Presentations by panellists

The first panellist presented a comprehensive survey of financing patterns across capital markets with a view to evaluate the performance of the "U.S. model" of financial development in the context of small and medium enterprises (SME's). According to this model, savings are intermediated through capital markets and banks, which lend to firms, including SME's. The experience has however been rather varied as shown by data from early 1990's through early 2010's. The panellist highlighted a number of findings from three related studies on firms' financing.

Foremost, in response to the question of "what to expect of capital markets," the following results stood out. Financial development through capital markets does not appear to spread evenly to all firms. This is indicated by a stagnant and relatively low number of firms using equity and bond markets to obtain financing and a high concentration among top equity and bond issuers that account for most of the capital raised. In addition, these top issuers do not dominate sales, which show that the real sector is not the primary beneficiary of increased capital market activity. Another important finding is that issuing firms tend to grow faster than non-issuing firms. This establishes a strong positive relation between issuance and firm growth, with much of the expansion happening in the same year as the issuance.

Next, the panellist focused on the question of "what to expect of banks," in improving financing to SME's. Survey data collected through interviews with banks show that most of them want to serve SME's and are in the pursuit of expanding their businesses in this unsaturated segment. Although this pattern seems contrary to conventional wisdom, two further findings shed light on its causes. First, banks are developing lending technologies that go beyond relationship lending and business models that do not restrict their primary operations just to lending. Second, all types of banks (and not just small or niche banks dependent on relationship lending) are interested in catering to SME's. In fact, large and international banks are spearheading

the recent intensification of banks' involvement with SME's, and benefit from relative advantages such as global knowledge, economies of scale, diversified portfolios, and large branch networks.

Finally, the panellist alluded to the role played by policy-makers. He argued in favour of a pragmatic middle-ground pro-market activism view, as opposed to high interventionist or full laissez-faire views, as it provides a better framework to broaden access to finance.

The other panellist switched to a micro analysis of funding sources to SME's using a large firm-level dataset covering many developing countries and some emerging economies. Measuring firm size by number of employees, the firms below the median level (25 employees) were characterized by limited access to finance.

The panellist looked at the probability of several types of events across the broad data set, namely being banked, having an overdraft facility, and having a line of credit or a loan. Small firms have limited access to finance. Specifically, increasing firm's size from 10 employees to 25 employees raises the probabilities of being banked, having an overdraft facility, and having a line of credit or a loan by between 10% and 15%, leading to the conclusion that funding sources to SME's are limited.

The panellist then focused on the question of "how big an obstacle is access to finance" to measure the severity of financial constraints as perceived by firms. He pointed that the severity of financial constraints, as subjectively perceived by firms, is not evenly sensitive to firm's size across the distribution. Specifically, constraints are negatively correlated with firm's size along among firms that are above the median size.

The panellist argued that these finding point to a framework such as the Stiglitz-Weiss model of credit-rationing. In this model of adverse selection, the low risk borrowers' drop out of the market, leaving financial intermediaries with a higher risk portfolio than one would expect if all firms were represented. The three standard responses by policy-makers to this problem are to improve collateralization channels (e.g. giving property rights to slum dwellers) which has had mixed results, subsidize interest rates, which can have unintended consequences such as financial repression, or change the risk distribution of borrowers, for instance by pooling risk.

By contrasts, the strategy followed by governments and international organizations has been in the direction of making markets more complete. The panellist argued that this approach of piece-meal interventions in order to ultimately achieve complete markets through gradual steps is not necessarily appropriate from a theoretical point of view. This is because in the presence of several market failures; repairing one of them doesn't necessarily lead to an improvement in economic efficiency.

General discussion

One participant raised a question about causality regarding of the findings of the first panellist, who showed that issuance activity has a strong positive correlation with firm growth. The participant argued that causality might go the other way, as a positive

growth outlook for a firm enables it to access funding sources more easily.

Another participant added to this first comment by noting the puzzling pattern of firm's asset growth. A large spike in firm's asset growth at the time of issuance is followed by a sharp decline. While one might expect to see the growth rate peaking in the run-up to the issuance, as the firm signals their planned financing activities to the market, it is hard to find a justification in corporate theory for such a marked decline in the aftermath of the issuance event.

A participant asked the first panellist whether the role of regulations was explored in the study as it might have important impact on access to finance for small firms. One participant argued that from macroeconomic policy point of view, crowding out by the government financing a fiscal deficit or using capital controls discourages mainly small firms from borrowing. This phenomenon can have severe consequences for economic growth. The participant asked whether this link has been examined. Another participant asked both panellists on the effect of exchange rate volatility on exporting firms, referring to the hypothesis in policy circles that it has a particularly negative effect for firms in emerging and developing economies which don't have easy access to finance.

Another participant raised the point that access to bank financing might be dependent on the industrial structure of the economy. To understand this effect, it would be useful if the questionnaire contained information about mutual cooperative structures in lending or trade associations of small firms. Even in relatively more advanced stages of development, the access to bank finance might actually be depending on the industrial structure of the country.

In reference to the second presentation, a participant raised the caveat that questions about financing conditions constitute only one section of the World Bank Enterprise Survey questionnaire. When firms are asked to rank obstacles to their businesses, access to finance might not be the main hindrance to growth that smaller firms perceive, especially if they don't have a loan to begin with.

Lastly, a participant suggested scrutinizing the results from the enterprise survey by dividing the sample into developed and developing country groups as well as contrasting the results across the years before the financial crisis and subsequent years.

Replies from panellists

The first panellist agreed with the theoretical point made by the second panellist regarding piecemeal improvements in addressing market failures. He nonetheless pointed that it would be unrealistic to expect a government to address all issues in a systematic way at once. This contradiction between theory and practice presents a particular challenge for policy makers and academics and further work is necessary to reconcile the two sides.

The panellist, next, addressed the questions and comments from the audience. In response to the point on causality, he agreed that a firm might grow because of having good prospects, but stressed that the correct way to think about the relationship is that

capital markets enable this firm with good prospects to realize existing growth opportunities. Therefore, the causality goes from issuance of securities in the capital markets to the growth of the firm's assets. He underscored that the effect is not merely in terms growth of assets on the firm's balance sheet, but that there also is some evidence that the number of firm's employees is affected, with some of the effect being immediate.

Turning to the question on firms' reaching financial markets to signal their favourable prospects, the evidence suggests that the firms grow at a much faster rate thanks to raising capital. The opportunity to receive a large inflow of cash at the time of issuance translates into an increase in assets, which it followed by growth of the firm.

The panellist pointed out that although regulations vary across countries and time, the findings he presented have remained robust across both space and time. Even though many countries have become more market friendly, as reflected by macroeconomic policy and institutional changes, financial opportunities available to SME's haven't improved to the same extent. This lends support to the claim that the findings of the study are mostly driven by the structure of the markets, for example cost of issuance, cost of obtaining financing, how capital markets function or what type of firms investors want to allocate their funds to.

With regards to the comment on trade associations or cooperatives, the panellist mentioned that the survey on banks includes cooperative in some countries. Over time different bank types have tended to converge towards universal business practices and eventually look very similar in the way they are run.

The other panellist acknowledged the merit of extending the analysis along the suggestions from the floor but pointed to the limitations of the data as a drawback.

4.3 Panel 3

SUPERVISORY AND REGULATORY CHALLENGES IN EMERGING MARKETS: HAS THE "ORIGINAL SIN" BEEN REDEEMED?

Chair: Prof. Mathias Hoffmann, University of Zurich

— "Supervisory and Regulatory Challenges in Emerging Markets: Has the 'Original Sin' Been Redeemed?", Panel 3, in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 45–50.

Presentations by panellists

A first panellist ascribed the so-called "original sin" problem to two sources, namely a currency mismatch associated with the inability to borrow abroad in one's own currency and a maturity mismatches associated with a history of high inflation and exchange rate depreciation. Accordingly, the original sin can be redeemed through a shift towards higher share of domestic debt in total debt, through a shift towards more domestic long-term fixed rate debt in composition of domestic debt, or through borrowing from foreigners in local currency either by attracting foreigners to domestic local currency bond markets or issuing local currency denominated global bonds. Looking at the trends in emerging markets over the past few decades, the panellist concludes that although the original sin has not been fully redeemed, impressive progress has been made through traditional means (sound macroeconomic policies, low inflation, good governance, etc.) as well as through increased syndication and securitization domestically.

On the other hand, two alarming trends were highlighted. First, some frontier markets have increasingly large exposure to foreign currency as they tap international markets for the first time, and the corporate sector in emerging markets is issuing more hard-currency debt in record volumes. Second, the rising share of non-residents in local currency bond markets, itself an important aspect of original sin redemption, could have significant drawbacks. For instance, it could make countries more vulnerable to so-called "sudden stops" episodes, increase exposure to global financial conditions and contagion, and cause lending booms and risky borrowing. The panellist argued that the policy-makers should respond by first promoting larger local investor bases and deeper banking sectors and capital markets, second by supporting local currency bond market development while monitoring the size of non-resident participation, and

finally by establishing strong frameworks for assessing the risk of capital flow reversals and designing necessary macroprudential policies.

The next panellist focused his presentation on describing the underlying rationale behind the original sin and how this sheds light on the appropriate policy responses. The original sin can be rationalized as an insurance mechanism to share the burden of adjustment from a sharp depreciation. The panellist stressed that this should be kept in mind while drawing any conclusions from recent trends and new patterns emerging.

Although data are available on domestic-foreign split in the ownership of public debt, the same cannot be said for private debt, equity, and other financial instruments. This makes the evaluation of the extent of original sin or its redemption challenging. Another complication arises because of the unavailability of detailed data, particularly, on derivatives. As domestic corporations use them to hedge against currency risk from issuing debt abroad, it becomes critical for the domestic country to know the origin of the counterparties taking the other side of these hedges. If the counterparties are mainly of domestic origin, then all the currency risk is held domestically and the "original sin" problem has merely been transferred to other domestic agents.

The panellist called into question whether what the pattern observed in emerging countries is indeed original sin redemption, or whether it should be thought as a carry trade. This distinction is important, because a carry trade might quickly unravel in an episode of flight to quality, causing volatile movements in capital flows and exchange rates. The panellist then argued that FDI is a more stable approach to risk-sharing and hence the most natural form of original sin redemption.

The third panellist contrasted the experience in southeast European countries to other emerging market economies. A striking aspect is that foreign exposure of international banks to the region has remained stable around the 2008 levels (possibly due to Vienna initiative), whereas this figure for other emerging markets has been rising with only a recent slowdown in a few major economies. The panellist argued that the improvement in emerging markets does not necessarily point to original sin redemption, and could instead be attributed to abstinence. A recent study argues that better macroeconomic performance and expectations of price stability were the main reasons for the increasing share of home currency denominated international debt by firms in emerging markets.

Another contrast is that an increasing share of international debt in southeast Europe consists of public debt, whereas the share of private debt is on the rise in other emerging countries. The panellist concluded by noting that even with relatively limited foreign currency exposure, the sustainability of the current picture relies on how accurate market participants' expectations are about future price stability and macroeconomic performance in emerging economies. In addition, there are some moral hazard issues with private sector exposure to currency risk even if net external positions of these economies look healthy.

The fourth panellist shared his country's experience with local bond markets over the last decade. This period was marked by a surge of government and non-financial corporate bond positions and a significant decline in the share of foreign-currency denominated loans in both segments. The panellist argued that macroeconomic policy played an important and necessary role in shaping this trend. In particular, low inflation helped boost confidence in the domestic currency and reduced the inflation risk premium charged for bonds with longer maturities. Furthermore, improvements in the fiscal situation allowed for a large reduction in total and net external public debt, leading to lower sovereign credit risk and higher credit ratings. This environment naturally attracted foreign investors to the domestic bond markets, mainly consisting of government bonds, leaving the country with one of the highest foreign participation rates amongst emerging markets.

The panellist pointed to important remaining issues, mainly the narrow investor base and limited liquidity in the local private bond market. These conditions coupled with a globally low interest rate environment have led the corporate sector to use international markets for large bond issuances. Although some progress has been made, further development of local corporate bond market is needed to overcome the above limitations is necessary.

The next panellist presented his country's experience in turning the spotlight on development and current structure of the financial sector along with its challenges. Some important trends related to the original sin issue are a doubling in the number of banks under supervision, with the number of foreign banks almost tripling since 2000, and a huge increase in the number of non-bank financial institutions. This has led to a more integrated financial system while increasing exposures to foreign entities. The panellist highlighted a number of achievements that can contribute to original sin redemption. Amongst these are the consistent issuances of 3-year and 5-year government bonds in local currency, with close to three-quarters of these issuances held by foreign investors. In addition, the country has issued Euro bonds with longer maturities. Among the risks to this partially improved situation, the panellist pointed to the exposure to sudden or sharp withdrawals by foreign investors, which can cause significant distortions to the management of foreign exchange reserves. Another challenge is the need for supervision and regulation of the financial sector to keep abreast of a fast-changing structure of the banking system and a growing variety of financial products offered to customers.

The last panellist presented the situation of his country, which is at the earlier stages of market development. Although the share of foreign participation in both primary and secondary bond markets has been quickly rising since 2009, the market remains dominated by government bonds which account for approximately 90% of outstanding debt. Another area of weakness is the limited diversification of the investor base as banks hold most of the outstanding bonds. A number of institutional reforms have paved the way for further development of the markets. Most importantly, there was a change in the law to allow for issuances of local currency denominated bonds by international financial institutions.

Accordingly, there is a bond issuance in pipeline to be listed in a regional financial centre that will provide foreign investors access to local currency bonds.

The current exchange rate peg regime is an encumbrance for both foreign investors and domestic policy-makers and regulators equally. The downside exposure is a serious concern for foreign investors, whereas, maintaining the stability of the exchange rate could be very costly for policy makers in case of increased volatility of capital flows. Therefore, greater exchange rate flexibility would be needed to enhance the policy setting.

General discussion

A panellist pointed to what seemed to be a recent reversal in the trend for foreign exposure in one of the countries discussed, and asked whether this was a concern in terms of sufficiency of existing regulations. Another panellist highlighted the difficulty associated with distinguishing between de-dollarization and original sin redemption in a country that is highly dollarized at the outset.

Regarding the reversal in the trend of corporate sector's foreign currency exposure, the panellist explained that the firms accessing international markets for bond issuance are large companies in the traded goods sector. Furthermore, some of them hedge their exposure risk by purchasing swaps in derivatives markets. However, from a regulatory point of view, the panellist acknowledged the lack of detailed information on these companies' currency exposures due to the lack of reporting requirement on international transactions.

On the relationship between de-dollarization and original sin redemption, a panellist highlighted that both phenomena have been observed in his country. In the case of sovereign bonds, the government has demonstrated its ability to go to international markets and issue debt in domestic currency. Also, the high participation of foreigners contributes to the liquidity of the market. The panellist highlighted the macroeconomic stability with the support of the fiscally benign environment has allowed for these improvements.

One participant referred to the challenge associated with an increasing number of foreign banks arriving in one of the countries discussed. He suggested that if foreign banks come from a narrow set of countries, cooperation with the regulators of these countries could be a useful option.

One participant commented on the coming issuance of domestic currency bonds through a regional financial centre, and asked the Panellist to clarify his statement that the bonds were guaranteed against default risk.

Another participant made several comments on the original sin. The participant argued that while the domestic component of original sin might have been mostly redeemed, the same cannot be said about the international component as most emerging countries' issuances abroad appear to be in hard currencies. There might be valid reasons for countries to borrow abroad such as risk-sharing or addressing a financing gap. Referring to the rising share of corporations

issuing abroad, the participant mentioned that preliminary research in some countries indicate that these corporations issuing abroad might be involved in carry trade.

One participant raised the point that markets specialize in different type of products. For example, corporations in emerging countries tend to borrow abroad for large issuances with long-term maturities and choose their domestic markets for different purposes. This supports the view that markets will always serve different purposes and as long as there is demand for these services these markets will exist. In this sense, there might never be a complete redemption of original sin.

Another participant pointed that the attractiveness of emerging economies to foreign investors in the post-crisis period does not mean the vulnerabilities of these economies are now irrelevant. Foreigners with higher participation rates in local bond markets might be underestimating the risks, such as the ones associated with capital flow reversals, current account deficits, heavy dependence on natural resources, and fiscal imbalances.

A participant commented on the issue of the counterparty involved in the corporate sector's hedging of currency risk through derivative. He pointed to an analysis done in an emerging market economy, which found that hedging positions were among domestic banks, which different banks taking the opposite sides of the transaction. A big exchange rate movement would then cause half the banking sector to go under. The participant also pointed that the problem associated with the balance sheet effects of a sudden depreciation is just one part of a bigger picture. Additional aspects are the impact of exchange rate movements on the balance of imports versus re-exports.

Another participant asked the panellists to elaborate on the risks associated with increasing domestic debt as the ownership of debt in developing countries has shifted from foreign to domestic, particularly domestic institutional investors in the redemption process of original sin.

Lastly, a participant alluding to the shift from original sin to carry trade reminded that as one considers the risk-sharing benefits in the context of entire portfolio of the borrowing country, one should also look at the portfolio of lending parties to assess the overall risk. If one believes that lending parties, international banks or hedge funds, have better access to a diversification of securities, then the participant asked whether there could still be some overall benefit to be had from this shift to carry trade.

Replies from panellists

One panellist confirmed that there is ongoing collaboration with the regulators of source countries of the foreign banks increasingly active in his country. The challenge the panellist had pointed out was related to the introduction of new sophisticated products by foreign banks. This presented challenges for the supervisors since the risks associated with such products needed to be understood, particularly in the local context.

The other panellist clarified the guarantee on domestic currency bonds traded

through a regional financial centre, and pointed to the absence of credit risk for foreign investors as the bond is guaranteed by the issuer, which is an international financial institution with high credit ratings.

Another panellist highlighted the notion that the original sin was a discussion about whether countries could borrow in their own currency as borrowing in foreign currencies presented serious problems mainly because of sudden depreciations due to prevalence of managed and semi-fixed exchange rate regimes at the time. The panellist argued that the evaluation of original sin redemption should be done on the entire asset space covering all the liabilities of a country.

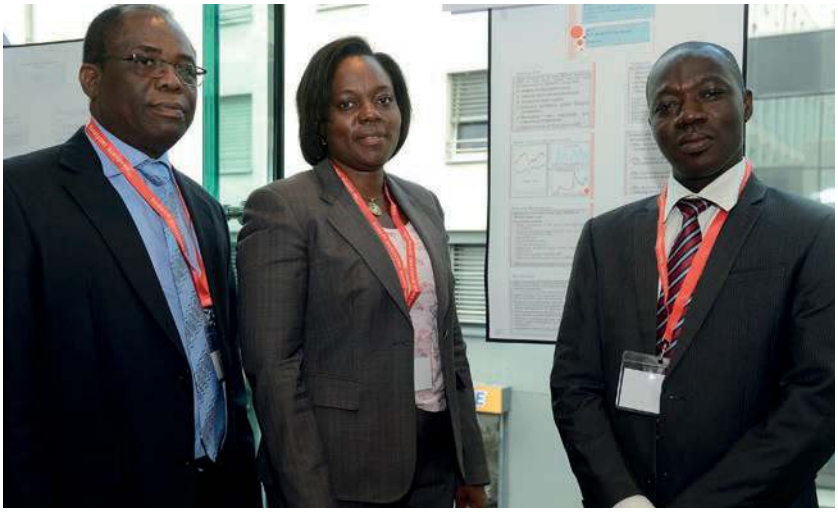
One panellist elaborated further on the question of shift to carry trade and the related counterparty issue of hedging. Although detailed data is not available, he pointed to some case studies showing that, particularly for smaller emerging economies, the counterparties to corporations hedging their currency exposures from their issuances abroad tend to be institutional investors from the same countries. The conclusion from such anecdotal evidence is that one should understand where risks ultimately lie.

Another panellist reframed this discussion of hedging by pointing that there is no original sin if a country can hedge against its borrowing abroad. If the country is hedging against itself however and then there is no hedging at the aggregate level which adds another layer of complication to the issue.

In response to the question on rising domestic debt levels, the panellist explained that defaulting on its domestic debt is costly for a country. The costs of defaulting on domestic debt are ultimately incurred by the government, as the majority of debt holders are domestic institutions that it will have to support. Issuing domestic debt can nonetheless represent a double-edged sword. On one hand, it contributes to developing the domestic financial system and the substantial associated benefits. On the other hand, if there is a big shock to the country, it can leads to an unsustainable fiscal path. The panellist argued that this interplay presents an interesting contrast between redemption, which is a more permanent solution to original sin, and fig leave, which is temporary. Therefore, one should ask how much of the redemption is truly permanent. For example one needs to carefully assess how much of the ability of governments to sell domestic debt to foreign participants is permanent. In this respect, the contrast between the experiences of the countries represented in the panel is very instructive. In assessing the solidity of redemption, one must also consider the current situation in global markets. It is certain that current world monetary conditions have driven investors to search for yield.

5. Poster Session

Poster session participants at the Second Annual BCC Conference in Geneva.



5.1 DEVELOPMENT OF A GOVERNMENT BOND MARKET IN VIETNAM
ASSESSMENT AND RECOMMENDATIONS

HOANG THI QUYNH MAI[1]

— Hoang, Thi Quynh Mai, "Development of a Government Bond Market in Vietnam: Assessment and Recommendations", in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 53–59.

Overview

Vietnam's government bond market comprises government bonds, government-guaranteed bonds, and municipal bonds, the latter of which make up more than 95 percent of Vietnam's total outstanding bond value.

Government bonds are issued by the Ministry of Finance (MOF) to raise funds for the state budget or for specific investment programmes or projects within the investment scope of the state. Government bonds include treasury bills with a maturity of less than one year (13, 26, and 52 weeks), and treasury bonds with a maturity of more than one year (2, 3, 5, 10, 15, and 30 years). Treasury bills are issued by auction through the State Bank of Vietnam (SBV). Treasury bonds are issued via the Hanoi Stock Exchange (HNX) through four methods (auctioning, underwriting, agency, and retail) with auctioning as the dominant issue method. Proceeds from government bond issuance are used to finance public service-related projects including those in such fields as energy, infrastructure, and education, and to finance the implementation of social welfare policies and monetary policies.

Government-guaranteed bonds are issued by state-owned enterprises, financial or credit institutions, or a state policy banks as per the Law on Public Debt Management; the payment of such bonds is guaranteed by the government with a maturity of one year or more. The main issuers include the Vietnam Development Bank (VDB), the Vietnam Bank for Social Policies (VBSP), and the Vietnam Expressway Corporation (VEC). Before 2010, bonds issued by the VDB were also called government bonds; however, beginning 1 January 2010 these have been classified as government-guaranteed bonds.

---

[1] The author is affiliated with the State Bank of Vietnam. The views expressed are those of the author and do not necessarily reflect those of the bank.

Municipal bonds are issued by "people's committees" of centrally-governed provinces or cities to raise funds for local investment projects, and typically have a tenor of one year or more.

When the Vietnam securities market launched in 2000, government bonds were the only major products listed for trading on the market. Before 2006, government bonds were issued via auction at both the Hanoi Stock Exchange (HNX) and the Ho Chi Minh Stock Exchange (HOSE). Since September 2009, government bonds are listed and traded exclusively on HNX through a specialized electronic bond-trading system for government bonds. This new platform helped enhance transparency and increase liquidity in the government bond market. Before August 2012, only treasury bills with a maturity of one year or more, VDB bonds, VBS bonds, and VEC bonds were allowed to be traded on HNX. Since August 2012, with the upgrade of the system, treasury bills with a tenor of less than one year are also listed and traded through specialized government bond trading system. Furthermore, in order to provide a highly precise bond benchmark yield curve to the market, which helps investors make better investment decisions; HNX has upgraded its information and trading system and built a bond benchmark yield curve in the first quarter of 2013. More than three years after the specialized government bond trading system was launched, the government bond market has seen positive changes such as increased convenience of bond trading and more transparent and professional information for investors.

In 2012, Vietnam enjoyed the fastest growing local currency (LCY) bond market of the emerging East Asian economies. The size of Vietnam's LCY bond market, although small by regional standards, almost tripled from USD 12.3 billion in Q1 of 2010 to USD 30.2 billion in Q1 of 2013. This growth, however, came entirely from the government sector as the corporate bond sector has declined in size in recent years to only USD1.1 billion. The government bond market saw an increase of 54.6 percent year over year. At the end of 2013, more than 478 bonds were listed at HNX with a total value of about USD 23 billion. There are currently 45 registered members trading bonds on the HNX specialized government bond trading system. However, Vietnam's government bond market is still very young and at an early stage of its development. The size of the market, at about 19 percent of GDP, is much lower than that of equivalent markets in other countries.

Main Drawbacks

There are still many limitations in the quality of bonds traded and in the market itself; limitations which can be broken down as follows.

The plan of issuance is not really effective. that is to say, the volume of issuance is not based on the actual situation of the market. Since 2011 the Ministry of Finance (MOF) has announced quarterly plans accompanied by terms of reference, but these plans have not been effective since volumes have been regularly adjusted. The frequency of the issue is quite high, leading to a decrease in demand for buy/sell bonds on the secondary market.

Methods of issuance. Bond auctions are executed at HNX. The current method of auction is single price, so it does not really encourage competition among participants. Underwriting is executed by the State Treasury. However, the underwriting issuance is similar to auction; negotiations take place publicly and simultaneously with all participants, so this method is not particularly effective, especially for new products or long-term bonds. Retail selling through the State Treasury took place before 2008, especially for the issuance of infrastructure bonds. The scale of retail issuance is very small due to cost of printing and preserving certificates. Although covered by the provisions of the relevant legal instruments, the method of issuing through agencies (credit institutions) has not been used. Government-guaranteed bonds are mainly issued through auction and underwriting channels. The operating mechanism for issuing government-guaranteed bonds is similar to that for government bonds. Municipal bonds are issued through auction, underwriting, or issuance agents on the basis of the monthly reference interest rate frame (setting a band for the interest rate), which is decided by the government. By the end of 2011 there were three municipal bond issuers (Hanoi, Ho Chi Minh City, and Dong Nai) with a total nominal value of VND[2] 13.3 trillion. The value of municipal bonds outstanding at the end of 2011 was VND 6.055 trillion, equivalent to about 0.34 percent of 2011 GDP.

Issuance technique. Before 2011 the method of additional issuance had not been used, despite the fact that it is considered to be one of the simplest techniques. Therefore, the bond market had too many codes outstanding**,** bond trading was not centralized, and liquidity was thin. This has been improved since 2011 by consistently using the method of issuing large lots and of additional issuance.

The mechanism to determine the winning price at auction. The State Treasury currently applies a single price mechanism in order to determine the winning price at auction. The multi-price mechanism has not yet been applied, although it is provided for by law. The single price mechanism, in many cases, leads to higher operating costs and a lower volume of the winning bid than does the multi-price mechanism. Besides, since all members are entitled to the same winning interest rate, the bidding interest rate might not reflect the actual level of the market.

Interest rate management. Currently, the MOF issues the periodical interest rate frame to the State Treasury as a basis for determining the interest rate bid at issuance. This mechanism helps to control operating costs. However, in many cases, when the market interest rate fluctuates, the frame becomes rigid and limits the ability of the State Treasury to set the rate freely. Besides, as the ceiling rate is controlled by the Ministry of Finance, the winning interest rate does not reflect the market level in some cases.

Terms and conditions. Currently, the structures of bonds are very simple. They are mainly fixed-rate bonds, with interest paid in arrears annually and the principal paid at maturity. The State Treasury has not issued bonds with floating interest rates (with the exception of a number of bond issuances in the form of certificates with interest rates indexed to inflation plus the prime rate). Maturities are mainly two, three, and five years; ten and 15-year bonds

2 1 USD= 21335 VND (Vietnamese Dong), on February 10, 2015.

have limited volume. Bonds with interest and principal to be repaid once, on the maturity date, have not been issued.

The liquidity of the secondary market is thin. The daily transaction value of bonds is relatively small; on average VND 200–300 billion per day prior to 2011. Since 2012, liquidity has improved with a transaction volume of VND 600–700 billion per day. However, liquidity is still moderate, with an annual transaction volume of less than 50 percent of the total value of outstanding bonds. Most transactions are reported as outright transactions, but many of them are actually repo contracts with a term of up to six months.

Besides, there is no derivatives market for bonds as there is not yet the necessary legal framework for it. Hence, investors cannot use derivatives tools to hedge for their portfolio when investing in the Vietnam government bond market. This discourages professional investors', and especially foreign investors', participation in the market.

Intraday trading and short selling are currently not permitted in Vietnam, and neither is lending against securities as collateral. Generally, intraday trading, short selling, and securities lending are methods or techniques used by short-term traders in order to take advantage of changes in the market. In Vietnam, as there is no legal framework for this kind of transaction, investors cannot profit when the bond price goes down (yield goes up). This leads to low liquidity in some periods when the market is unfavourable.

No standard long-term yield curve. The Vietnam Bond Market Association (VBMA) has been developing market curves for Vietnam bond markets since 2012. Currently, six members enter a VBMA chat room under the "Market Maker Agreement" to act as market makers, with firm bid/offer quotations on standard tenors (one year, two years, three years, and five years). However, the standard amount handled in the chat room is small at only VND 20 billion, and the number of members in this chat room is only moderate. Hence, this yield curve is purely for reference, and is not the standard benchmark for the whole market.

Limitations of Intermediaries and Market Services

The number of securities companies has risen gradually in recent years, from 14 in 2005 to nearly 70 in 2007 and 105 in late 2012. However, there are still limitations in how such companies operate. The infrastructure of securities companies lacks the full safeguards and the synchronization necessary to deal with even small changes in the transaction method, and this may lead to problems when integrating the transactions of these securities companies into the system of exchanges. The real obstacle to the development of these firms is the high expenditure necessary to secure the information system required. The legal requirement of level of equity capital of securities firms, levels that are necessary to ensure the required capital availability, and in turn ensure solvency for clients in securities transactions, has not been improved significantly. The branch network of securities companies in large cities, necessary for providing investors with quick access to transactions, has not been improved.

The Vietnam Securities Depository (VSD) was established and opened in May 2006 with the role of registrar and depository, and the task of clearing securities from the stock

exchange. The biggest drawback of the current VSD model is the absence of central payment partners, which limits options for controlling settlement risk and does not facilitate a shortening of the process of bond transfer. Moreover, the slow depository procedure often prevents investors from taking advantage of a favourable stock price movement. The application procedure for foreign investors' trading codes is also rather complicated, which might discourage such investors from entering the market. The communication of information (such as the number of investors, or the ratio of trading foreign investors to the total of registered ones) has not been conducted in a sufficiently appropriate way to satisfy investors' requirements.

Currently, there is no domestic credit rating agency in Vietnam. Global rating agencies such as Standard & Poor's (S&P), Moody's Investors Service, Fitch Ratings, and Rating and Investment Information (R&I) have assigned credit ratings to Vietnam. Vietnam's first credit rating agency, Vietnam Credit Ratings Central, opened in June 2005, but closed after less than one year.

In recent years, domestic savings have continued to achieve high levels, reaching 28–30 percent of GDP during the period 2001–2005, and 26.5–31.4 percent in the period 2006–2011. A part of domestic savings is invested through the stock market, including the bond market. The accessibility of savings through bonds directly from retail investors is relatively small, mainly in the form of retail and infrastructure bonds prior to 2008. Most bonds are issued to institutional investors, of which financial institutions provide the majority of funds for investment in the economy and also constitute the main sources of demand for bonds.

The participation of foreign investors in the Vietnam government bond market is still moderate. Vietnam currently has more than 50 domestic and foreign investment funds actively traded in the Vietnamese capital market. However, only 6–7 percent of outstanding government bonds are held by foreign investors, compared to 86 percent held by domestic financial institutions.

Recommendations for Developing the Government Bond Market in Vietnam

Developing the primary market

- Establish a clear and stable issuance schedule: Issuance policy should be predictable, stable, market-friendly, benchmark-oriented, and transparent. Issuance plans should be consistent with the borrowing needs from the state budget, and take the costs of investment and development into consideration. Issuance schedules should be published on monthly, quarterly, and yearly bases. The frequency of issuance in the primary market should be reduced in order to encourage the development of the secondary market.
- Auctions should be the main issuance mechanism and the issuance of benchmark securities should be promoted.

- Enhance the additional bond issuance method in order to ensure a sufficiently large volume of bonds in circulation, contributing to liquidity/secondary trading and gradually standardize the methods across bond issuances.
- Apply multiple price methods in determining the results of the bidding price of bonds in order to improve competitiveness, reduce costs, and increase the volume of bond issuance.
- Establish a primary dealer system with selected commercial banks, financial institutions, securities companies, and foreign entities operating in Vietnam and construct the standard long-term yield curve for government bonds.
- For Government-guaranteed bonds, in the short term, the Ministry of Finance should collaborate with two policy banks – which issue government-guaranteed bonds regularly – to establish reasonable issuance schedules, avoiding duplication and competition between government bonds and government-guaranteed bonds. The government-guaranteed bonds should be issued using the additional mechanism to increase the total number of bonds and create more favourable conditions for transactions in secondary markets. In the medium and long term, in order to increase the size of the government bond market and reduce the cost of issuing, government-guaranteed bonds should be replaced by government bonds issued by the Ministry of Finance. Funds from government bonds can be used to re-lend to government-guaranteed entities.

Developing the secondary market

- Set up conventional market transactions in order to unify the pricing method, price quotation, and the means of conducting transactions on the secondary market.
- Develop a multi-level form of bond transactions, including transactions between members and primary dealers, transactions between bond investors, and transactions between institutional investors and retail investors.
- Allow intraday trading and short selling as well as develop the ability to borrow using securities as collateral.
- Oblige primary dealers to quote two-way with the difference in interest rates and committed volume in accordance with state management agencies in each period.

Developing bond investment

The investor base should be expanded to insurance companies, Vietnamese social insurance and private pension funds, stock funds, bond funds, and mixed funds. Attracting indirect foreign investment is also considered an incentive for the development of the government bond market.

Developing intermediaries and market services

To develop intermediaries, the focus should be on the following measures: (i) securities companies must respect available capital requirements in order to ensure solvency for clients engaged in securities transactions; (ii) expanding the scope and increasing the scale of operation of business dealings, underwriting, and the issuance of advisory notices and financial advice regarding restructuring for securities companies; (iii) applying diverse forms of underwriting securities under the general rules of international capital markets and removing regulations that limit the underwriting of securities companies; (iv) gradually expanding the implementation of the stock listing process in the centralised stock market in order to promote public transparency and increase investors' ability to monitor securities companies; (v) allowing foreign financial institutions and foreign investment corporations to set up fund management companies in Vietnam in the form of joint ventures. Encouraging fund management companies to establish investment funds overseas to raise capital abroad for investment in Vietnam's capital market.

Besides developing intermediaries, expanding the scope of the central securities depository (CSD) is also necessary. The first step is to centralize the custody of government bonds. Subsequent steps include improved linkages between the bond market and the money market, with the aim to unify a depository centre that would provide clearing services for both markets.

5.2 FINANCIAL SECTOR DEVELOPMENT: STRENGTHENING LOCAL CAPITAL MARKETS AND PROMOTING ACCESS TO FINANCE IN GHANA

RICHARD C. HOMIAH AND NANA K. AKOSAH[1]

— Homiah, R. C., and N. K. Akosah, "Financial Sector Development: Strengthening Local Capital Markets and Promoting Access to Finance in Ghana", in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 61–66.

Background

Ghana undertook its "Economic Recovery Programme" (ERP)[2], which included the "Financial Sector Adjustment Programme" (FINSAP) in 1983 to correct weaknesses in the financial system including inadequate capitalization, high risk concentration, a shallow financial sector dominated by a few expatriate banks, overexposure to a few clients, poor credit administration leading to a high level of non-performing loans, poor supervisory mechanisms, and weak regulatory frameworks. Developments in the financial sector at the time were set against the backdrop of financial repression. The financial system was highly controlled. Interest rates were set by the Bank of Ghana (BOG) while banks were subjected to sectoral lending guidelines with the bulk of credit going to government or inefficient, state-owned enterprises. Banks were required to hold government instruments that paid little or no interest and were subject to high reserve requirements, and real interest rates were generally negative. As a result, mobilization of financial resources declined precipitously. The financial system reforms were therefore implemented at a time at which the financial system was severely distressed.

The main objectives of the financial reforms were as follows:

- to enhance the soundness of the banking system through an improved regulatory and supervisory framework;

1 Both authors are affiliated with the Research Department of Bank of Ghana. The views expressed are those of the authors and do not necessarily reflect those of the bank.

2 Following the implementation of ERP, real GDP growth improved, averaging 5% per year, compared to the contraction of 2–3% per year recorded in the years preceding implementation of the reform policies.

- to restructure and institute reforms in the operations of financially distressed banks;
- to improve the mobilisation and allocation of financial resources, including the development of money and capital markets (Bank of Ghana (BoG), 2001).

As part of FINSAP, efforts were made to bridge the savings-investment gap and the shortfall in credit delivery by setting up the Ghana Stock Exchange (GSE). The GSE was incorporated in July 1989 as a private company under the Ghana Company's Code (Act 179), and became a public company in April 1994.[3] Commencing with 11 listed companies in 1990, the GSE had 35 listed companies by 2009, its membership declining to 34 listed companies at the end of December 2013. Market capitalisation of the GSE rose astronomically from GHS[4] 3.1 million (1.5 percent of GDP) in 1990 to GHS 61.58 billion at the end of 2013 at which point it represented 70.2 percent of GDP compared with the mean market capitalisation of 20.5 percent for African economies (excluding South Africa). In 2004, the GSE was voted the best performing stock exchange in the world. In addition, the exchange recorded growth in its composite index and profitability of over 78 percent in 2013.

In spite of the GSE's impressive performance in terms of growth in its market capitalization and profitability, most firms in Ghana still did not see the exchange as a source of long term finance and therefore continued to rely on other sources of finance.[5] The GSE remains very illiquid after over two decades of operation, with about five companies (including Tullow Ghana, AngloGold Ashanti, Ecobank Ghana Ltd, Ecobank Transnational Ltd, and Ghana Commercial Bank), controlling almost 86 percent of total market capitalisation. The liquidity of the stock exchange, as approximated by the relationship of its turnover to GDP (value of trade/GDP), stood at 0.52 percent in 2013 (0.08 percent in 1993), while the overall trading activity relative to the size of the market, measured by value of shares to market capitalisation ratio, also remains very low at about 0.75 percent as of December 2013.

---

3 It is worth noting that the idea of establishing a stock market in Ghana had been on the drawing board as far back as 1968. A government sponsored study at the time concluded that, to facilitate the economic development of the country, a stock exchange should be established. This conclusion led to the promulgation of the Stock Exchange Act of 1971, laying the foundations for the establishment of Accra Stock Market Limited (ASML) in 1971. The idea of establishing a stock market, however, met with difficulties as a result of the unfavourable political environment of the time (Yartey, 2006). As Yartey and Adjasi (2007) rightly put it, "The rapid increase in the number of stock exchanges in Africa was produced by the extensive financial sector reforms undertaken by African countries in the last couple of decade. It seems any program of financial liberalisation in Africa was incomplete without the establishment and development of stock markets."

4 1 USD = 3.33 GHS (Ghanaian Cedi), on February 10, 2015.

5 Moss (2003) points out that over two decades after the establishment of the GSE, the domestic private sector still seems not to be overly enthusiastic about using the exchange to raise capital and domestic investor participation has been low. In addition, a study of the formal financial markets in Ghana by Aryeetey et al. (1994) also establishes the overwhelming importance of equity finance in the start-up of SMEs, as start-up loans from formal financial institutions are scarce.

Research Question

Against this background, the lingering fundamental questions that required policy attention were:

- **i.** Why was the GSE still illiquid after three decades of operation?
- **ii.** What was the link between the stock market and financial sector development in Ghana?
- **iii.** What is the direction of causality between the financial sector and the stock market, if any?
- **iv.** What are the factors that have hindered the development of the stock market in Ghana?

These fundamental questions coupled with the peculiar characteristics of Ghana, regarding high and persistent budget deficits, high inflation and high interest rates, and the pervasiveness of exchange rate depreciation, underscored the need – in order to proffer policy recommendations – to examine the factors that have hindered the growth of Ghanaian real GDP.

The Literature

The extant literature is replete with research into economic growth and capital market development, but most of these studies have focused on how the latter impacts on the former. For instance, Levine and Zervos (1996) establish a positive relationship between measures of stock market development and long-term growth rates. Likewise, Beck and Levine (2004) examine whether an independent link exists between economic growth and stock market and bank development, finding that stock market liquidity (turnover ratio) and banking development (private sector credit to GDP) had strong positive relationships with economic growth. McKinnon (1973, 1991), Gelb (1989), and Fry (1998) – among others – also stress the positive contribution of capital markets. Kenny and Moss (1998) see the stock markets as "enhancing the operations of the domestic financial system in general and the capital market in particular". Empirical work by Demirguc-Kunt and Levine (2008) also establishes the fact that stock market indicators are highly correlated with banking sector development and that countries with well-developed stock markets tend to have well-developed financial intermediaries. Yartey (2007) likewise notes that, in Africa, one percentage point increase in banking sector development increases stock market development by 0.59 percent controlling for macroeconomic stability, economic development, and the quality of legal and political institutions. Others however, including Singh (1999), differ regarding how efficient stock markets would be in developing countries' markets.

Empirical studies of Ghana have, unfortunately, remained shallow and – like mainstream studies – mainly focused on the impact of stock markets on economic growth

(see, for example, Osei, 2005; Yartey, 2008; Yartey and Adjasi, 2007). Consequently, we have endeavoured to close this knowledge gap by investigating, using Ghanaian data, the factors that influence capital market development. The study sought, for example, to find answers as to why, after three decades of financial development, a long-term financing gap is ubiquitous in Ghana. In tackling such questions, the paper employed Granger causality and autoregressive distributed lag (ARDL) estimation techniques to examine the influence of key macroeconomic variables on capital market development in Ghana.

Model Specification

The paper used an autoregressive distributed lag (ARDL) model to investigate the effects of interesting macroeconomic variables on capital market development in both a long and a short run analysis. Quarterly data was used covering the period 2000 Q2–2014 Q1. The dataset was obtained from Bank of Ghana and the Ghana Stock Exchange.

An ARDL co-integration model was chosen because the approach is indifferent to the data generation process (i.e. stationarity or otherwise) of the variables under consideration and is thus best suited for variables with different orders of integration.

The ARDL cointegration (long run) model for stock market development was employed in the following form:

$$MCAPGDP_t = \alpha_0 + \alpha_i Z_t + v_t \quad (1)$$

where Z_t is a vector of explanatory variables including *M2GDP, PSCGDP, STDGDP, FCDTD, INF, TBR91, DEP, INTBANK, GOVT,* and *OPNESS*. Here, $MCAPGDP_t$ is the stock market development indicator (i.e., market capitalization).

If the long-run stock market development function is a valid co-integration function, it will also have an equivalent short-run error correction model (ECM). The short run ECM is shown in equation (2) as follows:

$$\Delta MCAPGDP_t = \delta_0 + \sum_{i=1} \phi_i \Delta MCAPGDP_{t-1} + \sum_{i=0} \beta_i \Delta Z_{t-i} + \varphi_1 ECM_{t-1} + v_t \quad (2)$$

where Δ denotes the first difference operator and ECM_{t-1} is the lagged error term from the co-integration equation shown in equation (2), while δ_0, ϕ_i, β_i and φ_1 are parameters to be estimated. Accordingly, the ARDL approach is used to estimate equations (1) and (2) given the time series properties of most macroeconomic data and the need to avoid a spurious regression analysis.

Empirical Results

The error correction term was negative and significant indicating a long run relationship between the dependent variables and the independent variables. The parameter estimate of the error correction term averaged 0.54. This suggests that long-run disequilibrium would be restored after about 1.84 quarters or five and a half months of disequilibrium caused by shocks.

From the results, the long-run model indicates that almost all the independent variables – M2GDP, PSCGDP, INF, RGDP, DEP, GOVT, TBR91, OPNESS, and INTBANK – significantly influenced the development of capital market in Ghana (with growth in MCAPGDP as a proxy). Only FCDTD does not significantly influence market capitalization in the long run, which also confirms the result of the Granger causality. As expected, the financial deepening indicator (M2GDP) had a positive long-run influence on stock market development, consistent with the findings of Demirguc-Kunt and Levine (1996), as well as, Yartey (2007). Suggesting that financial deepening tends to complement, rather than substitute for, capital market development in the long run. However, the long-run effect of financial intermediation in the banking sector (with PSCGDP as a proxy) on capital market development was mixed. This is not surprising as easy access to credit from the banking sector for private investors/companies could be a disincentive to source funds from the capital market.

Economic growth (RGDP) and rising inflation (INF) both had long-run, positive effects on capital market development, while exchange rate depreciation (DEP) and the rising money market (INTBANK) and treasury bill (TBR91) rates posed significant threats to capital market development in the country. Openness to international trade (OPNESS) generally had a positive impact on capital market development, suggesting that increased integration of the domestic economy into global markets potentially enhanced foreign participation in the domestic capital market. The results show that M2GDP and PSCGDP also have contemporaneous, positive influences on market capitalization in the short run, while the lagged values of M2GDP have a negative short run effect on the latter.

Significantly, the short-run, contemporaneous changes in inflation have a positive effect on market capitalization, but lagged changes in inflation exert a negative effect on the latter while exchange rate depreciation also has a significant adverse effect on capital market development in the short run. Short-run changes in both government expenditure and the treasury bill rate exhibit a positive effect on stock market development.

Some Policy Recommendations

In view of the above findings, this study proffers the following policy suggestions in order for the stock market to take full advantage of the range of opportunities open to it and cope adequately with the challenges it faces:

- The independence of the central bank should be vigorously strengthened in order for the bank to continue to pursue policies that will ensure a stable macroeconomic environment. Essentially, strong coordination between fiscal and monetary policies is critical to helping to rein in both the depreciation of the exchange rate and rising inflation, while ensuring sustained economic growth to boost the confidence of external investors in the economy.
- The secondary bond market should be developed to encourage increased patronage of private sector.
- Ghana Alternative Market (GAX) should be vigorously pursued in order to encourage the listing of small and medium-sized enterprises (SMEs) on the Ghana Stock Exchange.

There must be strong coordination between the Central Security Depository (CSD) and GSE to ensure the rapid validation and completion of transactions.

5.3 HOUSE PRICES IN ALBANIA: DEVIATIONS FROM THE EQUILIBRIUM?

ENDRIT YZEIRAJ[1]

— Yzeiraj, E., "House Prices in Albania: Deviations from the Equilibrium?", in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 67–74.

Introduction

Many economists interpreted the global financial crisis of 2008 as the final outcome of an asset bubble that had been developing throughout most of the developed world during the early part of the decade. The key element that exacerbated the crisis was an overheated housing market. While they were fuelled by an expanding economy, housing prices were increasing at a much quicker rate than other key economic indicators such as household income.

House prices play an important role in a household's financial decisions. A house represents the largest purchase that will be made by households during their lifetime. Houses are also part of a household's equity, and are used as collateral in order to borrow. Changes in house prices will directly affect other economic decisions taken by the said households. Policymakers and researchers alike are very keen to understand the dynamics of the housing market precisely due to this special role it occupies. Historically, rent-to-price and income-to-price ratios were seen as potential indicators that could reveal overheating in the housing market. Current research though has tried to go beyond those indicators to determine whether price levels are justified.

Housing prices in Albania have also experienced a rapid increase during the last decade. While they were fuelled by some fundamental factors such as rapid economic growth and the development of the financial sector, a traditional indicator such as the rent-to-price ratio suggests that there were periods where the actual housing price level showed signs of overheating. This paper aims to understand these dynamics by using some of the recent developments in the housing market literature. The results obtained suggest that following 2006 there are signs of house prices moving away from the levels predicted by the fundamentals. The degree to which these prices differ from the actual ones depends mostly

[1] The author is affiliated with the Bank of Albania. The views expressed are those of the author and do not necessarily reflect those of the bank.

on the type of variables used to construct the index for fundamental prices. During more recent years there are signs that prices could be moving closer to their fundamental level.

Model and Data

This paper attempts to create a fundamental house price index, which relies on the imputed rent concept – that is to say, the sum of implied costs that arise from owning a house in a given period. Theoretically these costs should equal the cost of renting per period. To begin with, every homeowner has to bear the cost of the interest rate on a mortgage, r_t. The second factor is the maintenance cost, ρ. On the other hand homeowners will benefit from future price increases, which are affected by the depreciation rate, δ. Similar to Poterba (1992), the imputed rent per period, H_t, can be written as

$$H_t = (r_t + \rho + 1)P_t - (1 - \delta)E_t(P_{t+1}) \quad (1)$$

Rearranging in terms of, the price of the house, and through forward iteration, equation (1) can be written as

$$P_t = E_t\left[\frac{H_t}{R_t} + \frac{(1-\delta)H_{t+1}}{R_t R_{t+1}} + \frac{(1-\delta)^2 H_{t+2}}{R_t R_{t+1} R_{t+2}} + \ldots\right] = E_t\left[\sum_{i=0}^{\infty} \frac{(1-\delta)^i H_{t+i}}{\prod_{j=o}^{i} R_{t+j}}\right] \quad (2)$$

House prices in the present are driven by – predictably in a world with rational expectations and market clearing conditions – expected future imputed rents and expected future user cost. This result is similar to Shiller (1981), equations (2) and (3).

Actual rents might also differ from their fundamental values due to the same factors that cause disruption and volatility for house prices. Following Hott (2009), rents are assumed to be driven by the demand for, and supply of, housing for one period. It is assumed that the market is made up of homogenous agents that derive utility from consumption and housing in any one period. The Cobb-Douglas utility function can be written as

$$U_t = d_t^{\alpha} c_t^{1-\alpha} \quad (3)$$

where U_t is the utility at time for the representative agent; d_t is the amount of housing the agent wishes to occupy; c_t is consumption in period t; and the parameter α is the elasticity of substitution. It is subject to the budget constraint

$$y_t = H_t d_t + c_t \quad (4)$$

where y_t is the representative agent's income per period, t. Setting up and solving the f.o.c. and multiplying for the total population number to obtain the optimal demand across the entire market,

$$D_t = \frac{\alpha Y_t}{H_t} \tag{5}$$

where Y_t is the total income of the economy, otherwise known as GDP, and D_t is the aggregate housing demand. Similar to Hott (2009), the housing supply is given by

$$S_t = (1-\delta)S_{t-1} + N_{t-1} = (1-\delta)^t S_0 + \sum_{i=1}^{t}(1-\delta)^{i-1}N_{t-i} \tag{6}$$

where S_t is the supply of housing per period; N_t represents the new constructions which were approved in the previous period; and δ, as mentioned earlier, is the depreciation parameter. Finally, a market clearing condition can be stated by equating the demand function with the supply function of the equation

$$H_t = \frac{\alpha Y_t}{S_t} = \frac{\alpha Y_t}{(1-\delta)^t S_0 + \sum_{i=1}^{t}(1-\delta)^{i-1}N_{t-i}} \tag{7}$$

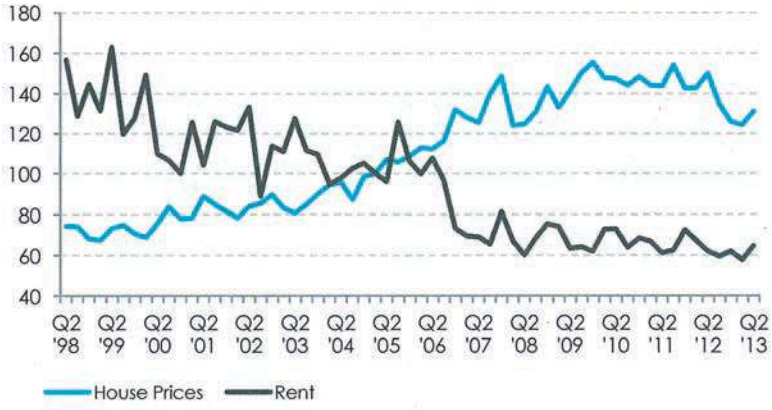
The last step in solving the model requires rearranging equation (2) by substituting in equation (7). This yields a fundamental house price value

$$P_t = E_t\left[\sum_{i=0}^{\infty}\frac{(1-\delta)^i \alpha Y_{t+i}}{S_{t+i}\prod_{j=0}^{i}R_{t+j}}\right] \tag{8}$$

Equation (8) is a forward-looking function, which suggests that fundamental house prices are driven by past as well as expected future development of income, user costs, and housing supply.

As for the data, indices on house prices and rent are calculated by the Bank of Albania's Monetary Policy Department. One noteworthy drawback of the indices is that the data are gathered only for the city of Tirana, the capital of the country. However, it is important to note that most of the Albanian construction boom has been centred on Tirana. The CPI index can also be obtained from Albania's National Statistics Institute, INSTAT. Figure 5.3.1 summarizes the development of the real house price and rent indices.

Figure 5.3.1 – Real House Prices and Rent Indices



Source: Bank of Albania, INSTAT

In market equilibrium, prices and rents should move in tandem, as reflected by the imputed rent theory. Figure 5.3.2 shows how the ratio has evolved. While a constant rise has been associated with the ratio ever since data was collected, it is noticeably more evident beginning in 2004 until the around 2011. These developments justify a more thorough examination of the dynamics of the housing market.

Figure 5.3.2 – Price-to-Rent Ratio

Source: Author's calculations

The Albanian 12-month bond yield was used, as by most of the Bank of Albania's working paper series, as a proxy for the interest rate. Other interest rates lead to very similar results. Quarterly data on nominal and real national GDP is also available from INSTAT. INSTAT also publishes data on building permits in the country until 2013.

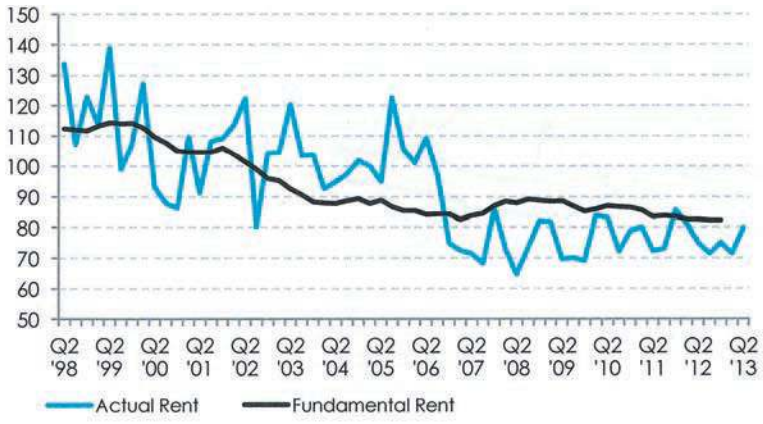
Empirical Estimation

Using the theoretical model obtained in the previous section, a calibration is performed to calculate fundamental rents and house price values. Before estimating the values for fundamental house prices, a series for fundamental rent will initially be calibrated. To do so, equation (7) is used. To obtain the fundamental rents the following minimization problem needs to be solved:

$$\min \sum_{t=0}^{T} \left[\frac{\alpha_1 Y_t}{(1-\delta)^t S_0 + \sum_{i=1}^{t} (1-\delta)^{i-1} N_{t-i}} - H_t^a \right]^2 \qquad (9)$$

where H_t^a is the actual rent series. To solve the minimization of equation (9), it is necessary to find the optimal values for the parameters. One possible approach would be to allow the parameters to take on any value. However, economic theory and intuition can restrict the said values to a more reasonable range. The minimization problem of equation (9) is therefore solved subject to the following restrictions: $\alpha_1 \geq 0$; $\delta \geq 0$; $S_0 \geq 0$, with results displayed in Figure 5.3.4. Table 5.3.1 summarizes the results of the calibration. The values obtained from the parameter calibration compare well to the results obtained from the literature. The initial stock is also similar to results obtained from the literature.

Figure 5.3.3 – Actual versus Fundamental Rent



Source: Bank of Albania; Author's calculations

Table 5.3.1 – Fundamental rent coefficients

Coefficients	α_1	δ	S_0
	9.12	0.01%	8887

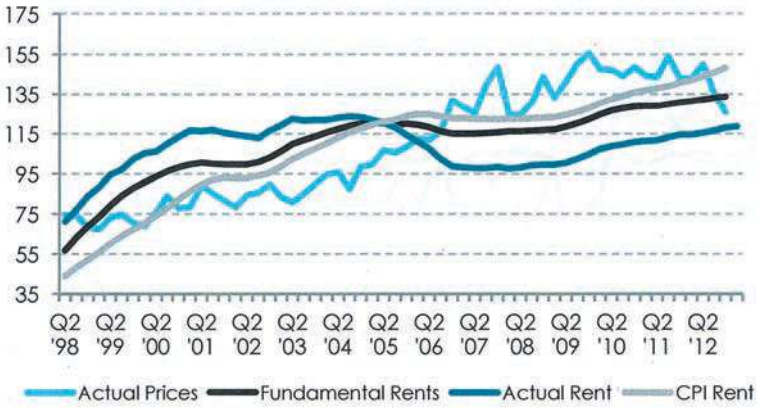
Source: Author's calculations

To calibrate a fundamental house price index a similar methodological approach is chosen. The minimization problem is based on equations (2) and (8) as follows:

$$\min \sum_{t=0}^{T} \left[\frac{a_2 H_t^* + (1-\delta) P_{t+1}^*}{1+\rho+r_t} - P_t^a \right]^2 \qquad (10)$$

There are two further issues to address. First, as can be seen, equation (13) relies on a rent series to perform the minimization. In order to provide more robust results, three different series will be used: the actual rent; the fundamental rent calculated above; and a series obtained from the CPI. Its evolution since 1998 suggests that it closely resembles the house price index. The second issue to address is the evolution of fundamentals. Underlying the attempt to build a fundamental house price index is the assumption of forward-looking rational agents. For time periods included in the data set, this requires replacing expected fundamentals with their actual values. For future developments a simple calculation made by forecasting for the fundamentals with an ARIMA model is used. The average value of the forecast for the following 12-month period is then used as a constant growth rate for the rent indicators and for the mortgage rate. In the T+1 period rent will be equal to $(1+g)H$, where g is the constant growth rate; whereas the future interest rate will be equal to the constant value $\bar{r}$. Again, using economic theory and intuition the constraints for the parameters are $\delta \geq 0$; $\alpha_2 \geq 0$; $-0.01 \leq \rho \leq 0.09$. The results from the calibrations for all three indicators for rent prices are shown in Figure 5.3.4. Table 5.3.2 provides a summary of the calibrated coefficients.

Figure 5.3.4 – Actual versus Calibrated House Prices



Source: Bank of Albania; Author's calculations

As shown during the calibration of the fundamental rent, this methodology provides indices that are less volatile than actual prices. The use of different rent series has a clear

effect on the calibrated fundamental price. Higher rent levels also imply higher fundamental house prices. Table 5.3.2 shows that the parameters obtained from the calibration are well within the constraints, except the risk and maintenance cost. Further calibrations show that, in the case of a larger range, the parameter would change, but this would be in turn countered by shifts in the other parameters. The basic shape and trend of fundamental house prices is not, therefore, subject to significant changes.

Table 5.3.2 – Fundamental price coefficients

Fundamental price	α_2	δ	ρ	$\bar{g}$	$\bar{r}$
H_t^*	0.091	0.01%	–0.01	–1.5%	5%
H_t^a	0.096	0%	–0.01	1%	5%
H_t^{CPI}	0.257	4%	0.09	0.1%	5%

Source: Author's calculations

As for the development of fundamental prices, all three series seem to suggest that the Albanian housing market has experienced a period of overvaluation and that housing prices, just like assets, tend to be volatile even in developing countries. The three series differ regarding the extent to which this overpricing has been present and how much of it is currently undergoing a correction. Some of the most recent actual house price data has consisted of slow but constant growth.

Building on the insights provided by the literature, and on the results obtained in the previous section, one would expect to find a relationship between the actual data and the fundamental price. As Campbell and Shiller (1988) show, given a long enough time frame asset prices will return to fundamentally justified levels. The econometric methodology that is preferred by the literature for conducting such testing is vector error correction modelling (VECM). The Johansen co-integration procedure is followed for all three series. The results are shown in Table 5.5.3, and – as can be seen – a long-term relationship could not be established at this time for each of the three fundamental price series. Different specifications were also tried – namely, a shorter time frame, however the results did not significantly differ. This result is not uncommon in the literature. Cambpell and Shiller (1988) warn that long data is often required to establish a relationship between fundamentals and actual asset prices. Egert and Mihaljek (2007) also suggest that countries undergoing a transition period are characterized by large structural changes.

Table 5.3.3 – Johansen co-integration test

Fundamental price	Trace statistic	0.05 CV	Prob.
H_t^*	8.45	15.49	0.41
H_t^a	9.96	15.49	0.28
H_t^{CPI}	9.18	15.49	0.34

Source: Author's calculations

Concluding Remarks

This paper attempts to shed light on some of the developments in the Albanian housing market in the last decade and a half. More specifically the paper attempts to provide guidance on whether housing prices have been over- or even undervalued during this time. To accomplish this goal, an attempt to build a "fundamental" housing price index – an index that measures how house prices should evolve according to some fundamental variables – is made. Using Poterba's (1984, 1992) imputed rent definition and a methodology presented by Hott and Monin (2008) a simple two-step model for estimating fundamental house prices is employed. According to the series obtained from the model, house prices in Albania were overvalued during the period 2006–2010 but there are signs in the most recent data that the market is undergoing a correction. Lastly, an attempt to find a long-run relationship using a VECM model is made. However empirical tests suggest that as of now such a relationship does not exist and should be the focus of further research.

There might be various reasons for this result. First, the quality of the local data could be improved upon. The model could benefit from the addition of other data. Which theoretical model is correct is an open-ended question in the literature. The findings of many empirical studies suggest that other variables tend to play an important role in explaining house price fluctuations but such variables are yet to be included in theoretical models. As for the policy implications, the recent development of house prices would suggest that the risk of a housing bubble burst is reduced since prices are mostly at levels predicted by the fundamentals.

5.4 INDICATOR-BASED FORECASTING OF BUSINESS CYCLES IN AZERBAIJAN

FUAD MAMMADOV AND SHAIG ADIGOZALOV[1]

— Mammadov, F., and S. Adigozalov, "Indicator-Based Forecasting of Business Cycles in Azerbaijan", in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 75–81.

In last few decades cyclical indicators, composed of a range of statistical indicators sensitive to changes in business cycles, have been used extensively for analysing patterns of economic (short-term) fluctuations, particularly for assessing the current state of the economy and for predicting turning points in order to provide early warning of economic down- or upturns. In this context business cycle indicators particularly have become a very important and useful empirical tool for policymaking. The objective of this study is to identify cyclical indicators and make predictions regarding the future state of the Azerbaijani non-oil economy.

An extensive number of empirical studies have documented a comprehensive catalogue of the empirical features of the business cycles of advanced economies, inspired by the seminal work of Burns and Mitchel (1946). However, only few research papers can be found for developing-country cases. These include Van der Walt (1983) on South Africa and Mongardini and Saadi-Sedik (2003) on Jordan. However, few of these studies are devoted to oil-exporter countries. Even when documenting economic fluctuations in oil-rich countries such as Kazakhstan and Russia, researchers generally focus on the whole economy and ignore the distinct dynamics of the non-oil sector. The rationale behind focusing on the non-oil part of the economy is based on the exogenous behaviour of the oil sector. The exogenous nature of the oil sector with respect to monetary policy and the excessive weight of the sector in the overall economy pose challenges to monetary authority when it is necessary to absorb shocks and to forward-planning policy decisions. In comparison, the non-oil part of the economy is endogenous, in the sense that it responds to the decisions made by the monetary authority, and to other market fundamentals.

Azerbaijan is an oil-exporting country regularly exposed to terms-of-trade shocks. Though less than 1 percent of those employed work in the oil sector, they produce approximately half of the country's GDP. The economy exhibits a low degree of diversification, economic

[1] Both authors are affiliated with the Macroeconomic Research Department of the Central Bank of the Republic of Azerbaijan. The views expressed are those of the authors and do not necessarily reflect those of the bank.

activity mainly concentrated on the service sector and 95 percent of exports being oil exports. Consequently, the export volumes and earnings of non-oil commodities shrank between 2004 and 2008 (from 52.5 percent to 4.7 percent of total exports) due to dramatic oil price increases. Worsening non-oil export performance triggered heated debates among domestic and national economists on the possible ways of promoting non-oil exports and decreasing economic dependence on the oil sector. Hence, a proposed cyclical barometer of non-oil output of Azerbaijan allows the Central Bank of Azerbaijan (CBAR) to identify levels of capacity utilization, therefore making it possible to predict the future state of the economy in order to take necessary policy decisions.

Construction of a Composite Leading Indicator

The business cycle literature is very diverse on which cyclical indicator should be used. In the economic literature classical and growth business cycles are the most commonly discussed concepts. Classical cycles are fluctuations in the level of the series, whereas growth cycles refer to a fluctuation around some trend. There are some limitations (or rationales) as to why we cannot apply the classical cycle approach. First, time interval limitation – that is to say, classical cycles span approximately seven to eleven years, and our time interval is hence very short for the empirical observation of classical cycles. Thus, growth cycles – which span around 3–5 years – make it empirically possible to adopt a cyclical approach. The second rationale is that, even if classical cycles are observable, they are less interesting in terms of the monetary policy perspective, because CBAR does not have the tools necessary to influence a 7–10 years business cycle. As growth cycles last approximately 3–5 years, it is possible to observe enough of such cycles. This allows us to construct a turning point chronology of non-oil output in Azerbaijan, which in turn could be used to identify cyclical indicators. The existence of this type of cycle enables the central bank to implement a "push and pull" policy when the economy is in an undesirable state.

In order to estimate (business) growth cycle indicators we employed an OECD (2010) methodological framework. For predicting turning points we used the probit model suggested by Estrella and Mishkin (1998). The methodological framework for the indicator-based prediction of the turning points of business cycles involves four main steps. The first step covers the identification of reference series and the dating of turning points. The second stage comprises the selection of proper leading indicators. The third stage consists of constructing a composite leading indicator. The fourth and final stage predicts turning points using that composite leading indicator.

Turning Point Chronology

As a reference series we use the non-oil real output (GDP) gap[2] series covering the period from January 2000 to March 2014. Some empirical literature uses the industrial production index (IIP) as an alternative reference series for business cycles. However, due to our lack of confidence in the quality of the IIP, we preferred to use non-oil real GDP. The turning points in the Azerbaijan non-oil real GDP series are detected by Bry and Boschan's (1971) algorithm and Tables 5.4.2A and B provide the principle statistics regarding the duration of business cycles in Azerbaijan.

Table 5.4.2.A is a statistical summary of each phase of the business cycles. Due to a lack of information regarding the starting point of the first contraction and the ending point of the last contraction we were unable to calculate their duration and amplitude.[3] Overall, we found six turning points – three peaks and three troughs – in non-oil real GDP over the 14 years studied. These turning points correspond to three periods of expansion and periods of contraction, respectively. The oil boom period, from 2005 to 2008, seems to be that associated with the highest output gain (4.1 percent) in non-oil GDP with quite a long, 40-month duration. The longest duration of a period of expansion in the non-oil economy occurred from July 2009 to October 2013. The duration of contraction periods, however, is more subtle, with each fully observed contraction lasting for ten months. The highest gain in output was immediately followed by the highest loss in output; a loss of around 4.4 percent in non-oil GDP, which took place between September and July 2009.

Table 5.4.2.A – Turning point chronology

	Phase	Start	End	Duration (months)	Amplitude
1	Contraction	–	2001M11	–	–
2	Expansion	2001M11	2004M7	32	2.3%
3	Contraction	2004M7	2005M5	10	2.1%
4	Expansion	2005M5	2008M9	40	4.1%
5	Contraction	2008M9	2009M7	10	4.4%
6	Expansion	2009M7	2013M10	57	2.7%
7	Contraction	2013M9	–	–	–

2 In order to extract the cyclical component of the series we employ a Hodrick-Prescott filter.
3 Single amplitude is calculated from peak point to trough point.

Table 5.4.2.B summarizes the average statistics on turning points. The average amplitude of expansion phases is 3 percent, their average duration being 43 months. Contractions however, exhibit amplitude of 3.3 percent on average with a 10-month average duration. One important fact is obvious – that an extreme asymmetry exists between the different phases – that is to say, expansions last longer than contractions. In total, expansion lasted approximately 3.6 years, whilst contraction did not even last, in total, for one year. This asymmetry is also noted in other emerging countries by several authors, including Pallage and Robe (1998), Agenor et al. (2000), and Rand and Tarp (2002). All of these authors say that it would be very useful to validate forecasts and cycle indicators chosen.

Table 5.4.2.B – Turning point chronology

	Amplitude	Duration (months)
Exp. =]T;P]	3%	42.7
Contr. =]P;T]	3.3%	10

Composite Leading Indicators

The second step is to select appropriate economic and financial indicators as predictors of the turning points of business cycles. Summary results for composite leading indicators are provided in Table 5.4.3, which summarizes the statistical properties of four possible candidates.

Table 5.4.3 – Composite leading indicators

Name	Turning points			Mean lead	Peak lead (corr. value)	Std. dev. lead
	Targeted	Missed	Extra			
CLI 1	6	2	0	4	4 (0.601)	6.04
CLI 2	6	1	1	6.8	5 (0.623)	5.88
CLI 3	6	1	0	4.6	5 (0.571)	5.85
CLI 4	6	1	0	7.2	5 (0.584)	6.11

The first composite indicator (CLI 1) leads the reference series with four months mean lead and misses two turning points, but did not flag any false signals. The peak lead is 4 with a 0.601 correlation and a standard deviation of lead of 6.04. The second composite leading indicator (CLI 2) leads the reference series by 6.8 (or 7) months and misses' one turning point, but flags one false signal. The peak lead is 5 with a 0.623 correlation and a standard deviation of lead of 5.88. When we compare these two indicators, the second appears to be the better in terms of higher leading (7.0) and its comparatively lower standard deviation (5.88), but flags one false signal. While, the first doesn't flag a false signal, but has a lower mean lead (4) and higher standard deviation (6.04).

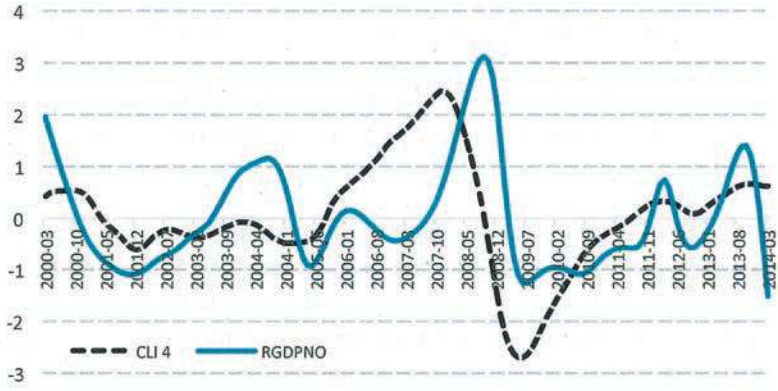
The first composite indicator is composed of domestic variables such as the spread between the volume of domestic and foreign deposits, state budget current expenditures, long deposits in domestic currency, transport turnovers (excluding pipelines), and non-food retail. The second composite indicator is comprised of the spread between the volume of domestic and foreign deposits, state budget current expenditures and some foreign demand variables such as European Union real GDP, Russian real GDP, and Turkish real GDP. Surprisingly, the inclusion of the foreign demand variables increased the statistical performance of the composite indicator.

The third composite indicator (CLI 3) does not flag any false signals either, but lead time appears short at 4.6 months with a high standard deviation of 5.85. We included the spread between the volume of domestic and foreign deposits, state budget current expenditures, long deposits in domestic currency, transport turnovers (excluding pipelines), non-food retail, tax revenue, and Russian and European Union real GDP. Inclusion of these variables could only eliminate false signals and also caused lead time to decrease.

In the fourth and final composite indicator (CLI4) we used mostly international variables such as Russian, European Union, Turkish, and US real GDP, and only two domestic variables – the spread between the volume of domestic and foreign deposits and transport turnovers (excluding pipelines). It appears that the inclusion of all demand factors increased the leading performance of this composite indicator. Among the four composite indicator candidates, CLI 4 has the highest lead time at 7.2, but also the highest standard deviation of lead time. It should be noted that the spread between the volumes of domestic and foreign deposits and transport turnovers (excluding pipelines) appears in all composite indicators; excluding it reduces the predictive power and the statistical performance of the composite indicator, indicating a good leading indicator.

Figure 5.4.1 plots CLI 4 and the reference series and shows that the second aggregate (broken line) leads more than the first (solid, blue line). Apparently CLI 4 leads the reference series, and it is easily noticeable that leading performance decreased after the onset of the 2008 financial crisis.

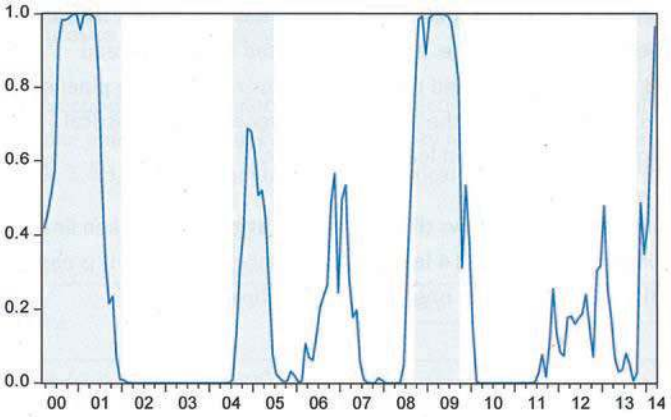
Figure 5.4.1 – Composite Indicator versus Non-oil Output Gap



Predicting Turning Points

After constructing variables of interest we can use them to predict economic activity. In order to quantify the predictive power of the variables examined with respect to future recessions, we use the probit model proposed by Estrella and Mishkin (1998). The principal measures are t statistics, and pseudo R^2 developed in Estrella (1995). In-sample predictive performance tests usually encompass comparing fitted values with the actual contraction (expansion) dates. Figure 5.4.2 depicts the in-sample predictive performance of a selected composite leading indicator, CLI 4.

Figure 5.4.2 – In-Sample Predictive Performance for CLI 4



The results clearly indicate that the fourth composite leading indicator has better in-sample predictive performance. Particularly, CLI 4 has a higher pseudo R^2 value, in the 10-month a head forecast with a 21 percent fit and is significant at the 1 percent level, whilst other composite leading indicators do not exceed 13 percent.

Out-of-Sample Performance

For the case of out-of-sample forecast, t statistics are no longer available. We therefore use just only pseudo R^2 to evaluate out-of-sample performance of composite indicators. Again, the fourth leading indicator has higher pseudo R^2 implying higher predictive power. Negative out-of-sample R^2 implies a very poor out-of-sample fit and, therefore, is not very informative. The fourth composite leading indicator becomes, after the fifth month, informative regarding the future state of the non-oil economy.

Concluding Remarks

This paper has attempted to construct leading indicator systems and, based on such systems, to predict the future contraction periods of the Azerbaijan non-oil economy, these using more than 100 pieces of publicly available economic and financial data. Our results show plausible and significant performance of the composite leading indicator system.

Using a dynamic profit model we estimated the contraction probability of the non-oil output gap for the future period. To assess the predictive performance of the composite leading indicator we performed in-sample as well as out-of-sample performance tests. In-sample forecasting performance gave quite good fitting results. The reasonable value of pseudo R^2 in out-of-sample forecast performance also suggests that the leading indicator systems have significant predictive power and could be used as a useful tool for economic forecasting.

5.5 INNOVATIVE FINANCIAL INSTRUMENTS FOR CATASTROPHIC RISK MANAGEMENT IN BOSNIA AND HERZEGOVINA

BOJAN BASKOT[1]

— Baskot, B., "Innovative Financial Instruments for Catastrophic Risk Management in Bosnia and Herzegovina", in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 83–88.

Introduction

Catastrophes occur infrequently. Natural catastrophes are disasters originating from nature or natural forces, and such risks have low frequency. In this paper, the focus is on weather-related risks – one of the most pervasive forms of risk. Weather risk impacts all aspects of the agricultural supply chain. Insurance is the one of the ways of transferring such risk.

Things go wrong in agriculture on a very regular basis. Climate phenomena tend to affect large areas. So, when things do go wrong, a lot of people are affected. For farmers, flooding is simply another dimension of risk that can be considered and managed in a loss-financing framework.

Risk in Agriculture, Insurance, and Weather-Index Insurance

Conventional, non-life insurance products are based on a Poisson process. Lundberg (1903) realized that Poisson processes lie at the heart of non-life insurance models via a suitable time transformation (a so-called operational time).

Index insurance products do not remunerate actual loss and the insured does not actually have to have an insurable interest as a condition for purchasing a weather-index insurance policy. Therefore, we can generally talk about agricultural insurance products that are index-based on one side, and on the other side we have insurance products that are based on

[1] The author is affiliated with the Central Bank of Bosnia & Herzegovina. The views expressed are those of the author and do not necessarily reflect those of the bank.

actual production history (APH). Further, we can distinguish weather-index based products and area-yield-index based products.

In the case of parametric insurance, or – to be precise – weather-indexed flood insurance, the insurer issues a policy that commits to pay the insured a certain sum of money if flooding occurs in a certain area. The intensity of the flooding is defined in the policy. Intuitively, it is reasonable to look on the weather index as an "underlying asset". Therefore, if flooding occurs in the specified area, to a certain level, and during a certain predefined time interval, the insured (for example, a farmer) has the right to receive compensation (indemnity) from the insurer, as defined in the insurance policy. Let us set flood insurance as index-related insurance. In this case, when the water level reaches a certain point (and/or exceeds that point) the insurer has to pay a certain amount of money to the insured. So, if the water level at some hydrological station reaches the level that has been defined as the "trigger", the insurer is obligated to pay a certain sum of money to the insured (for example, our farmer) because of the insurance agreement (policy). This kind of insurance should also be related to a certain geographical area, because every region has its hydrological or meteorological station.

Parametric insurance provides the possibility for moral hazard and adverse selection is reduced. One of the challenges in designing and implementing an index insurance product is minimizing basis risk.

The World Bank's Commodity Risk Management Group (CRMG) has been involved in many weather-risk management projects for commercial entities in the developing world (the first index-based weather-risk management transaction took place in India in June 2003). Many weather-risk management projects are in their development phase. Some of the projects have been concluded as pilot projects (in Ukraine, Ethiopia, and Malawi). Some of the projects are still being considered and their implementation, on a pilot basis, is yet to come (Kenya, Tanzania, Thailand, and Central America).

Index-Based Flood Insurance in Bosnia and Herzegovina

Index-based flood insurance can improve the process of agriculture risk management in Bosnia and Herzegovina. Farmers in Bosnia and Herzegovina will benefit from the implementation of agriculture risk management and providing instruments for adequate weather risk management is crucial for such a process.

In Bosnia and Herzegovina, index-based insurance against flood-related risks can be implemented as a public agricultural insurance plan designed as a three-pillar insurance plan. This agricultural risk management approach will result in more farmers benefiting than would a simple ad hoc implementation of a solution considering weather-index-based insurance that has been implemented previously in other countries.

First, two pillars are established as index-based insurance and these pillars are supported by the state[2]. The third pillar is commercial insurance and it would cover those flood-related risks that do not have broader structural impacts (e.g. full revenue coverage). The third pillar deals with more specific flood-related risks that cannot be covered through index-based insurance (some agricultural activity has some specific related risks that cannot be covered with parametric insurance), and therefore it will not be examined during this research. The third pillar should not have any premium subsidies due to its coverage of less severe flood-related damage and it would be more market-oriented. Flooding can induce some damages that cannot be covered by such a generalized approach as that typified by index-based insurance.

The implementation of an encompassing public agricultural insurance plan against flood-related risks in Bosnia and Herzegovina can be conducted using an innovative premium-modelling approach.

The potential for agricultural growth is undisputable and agriculture insurance is at a low level of development. Index-based insurance is imposed as perfect for the insurance market in Bosnia and Herzegovina – a large agriculture potential and low level of insurance infrastructure development. A key feature of index-based insurance is its immediacy, and directness is what is needed as a response to a situation that is present in the insurance market (the insurance market in Bosnia and Herzegovina certainly is in its early phase of development).

There is a need for an objective analysis of the risk management benefits that arise under different combinations of crop insurance products and different premium modelling approaches.

Implementation and Methodology

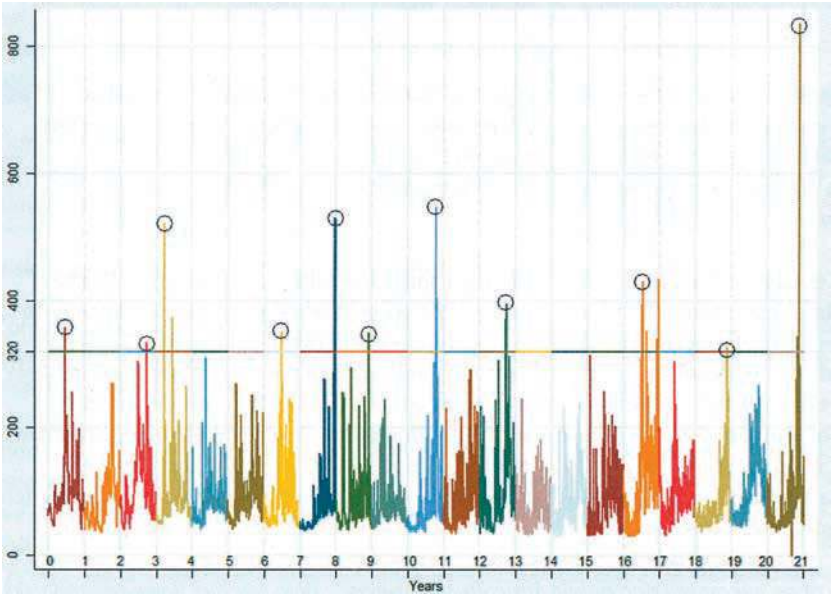
For every insurance product, the pricing method is crucial – the cost and price of insurance and the method for their calculation must all be defined. Traditionally, there is an understanding that the insurance market can exist if there is free choice with significant risk aversion. Considering crop insurance as mandatory is one possibility. The premium rate is a critical parameter of any insurance contract.

Data used are daily water levels recorded at the Delibašino selo hydrological station, located on the Vrbas river.

---

2 Reinsurance provided by an agency at state level could be conducted using stop-loss contracts, for example. Stop-loss contracts propose insuring damages up to a given sum of money. A value at risk for a given confidence level is a way of determining the stop-loss level. The less prudent – for example – the driving, the higher the potential damages, and the higher the remaining amount left at the charge of the insured. Further studies are possible regarding reinsurance. We could study two classes of optimal reinsurance models by minimizing the total risk exposure of an insurer under the criteria of value at risk (VaR) and conditional value at risk (CVaR).

Figure 5.5.1 – Water level at the Delibašino selo hydrological station (01.07.1993–30.06.2014)



Source: Author's calculations

Let us present a pricing model, as it will be examined during this research. It is important to emphasize that a risk-free world is assumed.

The focus will be on defining the technical premium – the part of the gross premium that is related to the pure risk that is the object of the insurance. Therefore, for a flooding and excess rainfall insurance product with fixed pay-out we have:

- O, the fixed sum of money, which becomes payable at the end of an insurance period if the water level reaches the predefined level at a certain hydrology station;
- P_F, the insurance premium;
- W, the water level at the certain hydrology station that triggers the insurer's obligation to pay O;
- r, the risk-free rate; and w, a variable that stands for water level at the certain hydrology station.

In this paper we will present two basic pricing approaches to parametric flood insurance.

The first approach assumes that interest is compounded continuously and that the insurance contract is closed at the beginning of the year and that insurance coverage is valid throughout the year.

So, in our case, if the water level at *i*, the hydrology station in question, is equal to or greater than *w*, then $X = 1$, and otherwise $X = 0$.

The premium for insurance that provides a pay-out of the fixed sum *O* if the water level exceeds the predetermined point at the certain hydrology station is:

$$P_F = OE\,(X)e^{-r} \tag{1}$$

This type of pricing approach can be used for coverage included in first pillar of a public agricultural insurance plan. A minimum of data is required and the indemnity in this case would have a minimal compensation effect. The main goal is to maintain a minimal level of standard of living for small farmers.[3] Therefore, if we have a repeated Bernoulli trial, we are dealing with binomial distribution. In this case, if have some time period that is defined as the sum of *n* days then we will have *n* Bernoulli trials where success is defined with the probability *p*.

Hence, we can write

$$P_F = \left[1 - \left(\binom{n}{0}(1-p)p\right)\right] e^{-r\frac{n}{365}}$$

where *n* represents the number of days covered by insurance.

If we analyse the possibility of implementing the first pillar in the context of an agricultural insurance plan, then calculating a premium that has pure actuarial meaning is pointless. The first pillar provides a sum that has no relation to the damage caused by floods. The main task is to provide disbursement that is sufficient for the maintenance of a certain standard of living. Therefore, the first pillar should provide benefits that are calculated in proportion to the minimal needs of farmers and their families and not to the actual damage caused by floods.

It is reasonable to take the next step and consider an insurance product that provides coverage each time flooding occurs. Such an insurance product should provide a certain proportional relationship between indemnity and flood intensity. This approach should result in the product that is embodied in the second pillar.

Let us define the premium for the parametric flood insurance period, where that period is a sum of *n* days (successive dates). Suppose that we can set water level as the asset price, and the premium that provides o_i pay-out as daily compensation (compensation pay-out is triggered for the i^{th} day if $w_i \geq W$) as a cash-or-nothing call option.

The premium for i^{th} day insurance against a situation in which the water level at a certain hydrology station exceeds the predetermined point, is given by

$$P_{F_i}^1 = e^{-r(T-t)}N(d_2) \tag{2}$$[4]

---

3 This product pay-out could be the replacement for some types of social welfare benefits.

4 *N(X)* is the cumulative probability distribution function for a standardized normal distribution and

$$d_2 = \frac{\ln\left(\frac{w_0}{W}\right) + \left(r + \frac{\sigma^2}{2}\right)T}{\sigma\sqrt{T}}$$

The premium for whole-year insurance is defined as, $P_T^1 = \sum_{i=1}^{n} P_{Fi}^1$, where *n* stands for all of the days covered by insurance and is defined with relation (2).

Note that everything needs to be discounted to the present date (when the insurance agreement is signed and the premium needs to be paid). It is obvious that now, as opposed to in relation (1), we have established a certain *relationship between flood intensity and total indemnity*.

5.6 MACROPRUDENTIAL POLICIES IN A COMMODITY EXPORTING ECONOMY

ANDRES GONZALEZ,[1] FRANZ HAMANN, AND DIEGO RODRIGUEZ[2]

— Gonzalez, A., F. Hamann, and D. Rodriguez, "Macroprudential Policies in a Commodity Exporting Economy", in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 89–93.

Colombia, like other emerging-market economies, is a small, open, commodity exporting economy. While the predominant type of commodity exported has varied, from coffee in the past century to oil in the present one, the importance of the commodity exporting sectors for the Colombian business cycle is prominent. In the last 40 years, empirical evidence has shown a strong and positive association between the cyclical component of the real price of Colombian exports and the cyclical component of real GDP. Periods of high export prices coincide with economic booms, while periods of lower than usual prices are associated with recessions. In addition, besides contributing significantly to the GDP cycle's volatility, the effects of these shocks are widespread as they affect real variables, like consumption and investment, as well as other financial variables, like credit.

In this study we perform an oil price shock identification analysis in which we analyse how a key set of macroeconomic variables behave around oil price shocks. We are interested in studying large increases in international oil prices. Once we identify the shocks, we observe how country risk, output, private consumption, domestic credit, trade balance, and the real exchange rate evolve during the commodity price surge and during its collapse.

Our sample runs from 1988 to 2012. The event analysis is carried out at a quarterly frequency. However, not all variables are available for the full sample, neither are they observed with same frequency. In particular, we take monthly data for the oil price and the country risk measured by EMBI-Colombia. Our measure of oil prices is the Europe Brent Spot Price FOB (US Dollars per Barrel) 1988m1 to 2012m12 adjusted using the United States' CPI. The remaining variables are quarterly and are taken from the national accounts and the balance of payments statistics. The observed sample for these last variables is 1999Q2 to 2012Q4.

We follow Hamilton (2003) to find the quarters during which there were oil price shocks. Hamilton defines an oil price shock as a large increase in the oil price. Specifically, an oil

---

1 The author is affiliated with the Universidad de los Andes, Peru. The views expressed are those of the author and do not necessarily reflect those of the university.

2 The authors are affiliated with the Central Bank of Colombia. The views expressed are those of the authors and do not necessarily reflect those of the bank.

price shock is the maximum value of the oil price during the previous 36 months. An oil shock event occurs when the oil price shock is larger than two standard deviations. At a quarterly frequency there is an event if at least one monthly shock event occurs.

Our main findings are that before the peak of large and steady oil price hikes, country risk falls, output rises, private consumption increases, domestic credit booms, trade balance improves, and the real exchange rate appreciates. In general, after a sudden oil price reversal all these patterns shift back in the opposite direction.

These facts are consistent with the intuition shared by many economists who study small, open economies in which resource sectors are important. As the oil price grows, income from the resource sector increases and risk premium falls with the improved overall creditworthiness, creating a surge in demand for tradable and non-tradable goods, inducing a real exchange rate appreciation and a shift of economic resources from the tradable sector to the non-tradable sector. Credit expands, especially in those sectors favoured by the real appreciation. Overall economic activity and demand boom, in tandem with asset prices. However, sharp oil price reversals truncate this process and a rapid reallocation of resources occurs together with a collapse in asset prices and the currency.

To explain these facts, we develop a New Keynesian DSGE model for financial policy analysis that takes into account these key empirically relevant features of the Colombian economy. Our baseline model is a three-sector economy (resource, tradable, and non-tradable sectors) populated by households, entrepreneurs, retailers, capital producers, private banks, the government, and the central bank. Households receive revenues from the resource sector, supply labour to firms, and consume final goods and save in the form of bank deposits. Output is produced in several stages, including a monopolistic, competitive, non-tradable sector with nominal rigidities. Entrepreneurs, both in the tradable and non-tradable sectors, face financial frictions and their external financing cost is decreasing with their net worth, as in Bernanke et al. (1999).

In the baseline specification of the model, the central bank sets the nominal interest rate using a monetary policy rule. We also enhanced the model further to consider exchange rate and credit policies. We model the first as the sales/purchases of international reserves, which adjust in response to real exchange rate misalignment, and the second as any financial regulation instrument that responds to aggregate credit dynamics by enlarging or compressing the external financing premium in the economy. The complete set of equations is available upon request.

In sum, we construct a set-up with a commodity-driven transfer problem, in which high oil prices increase export revenues and cause higher demand for tradable and non-tradable goods. The model includes three productive sectors – commodity, non-tradable, and tradable – and uses the Bernanke, Gertler, and Girlchrist setup to introduce an external financing premium relating the net worth of entrepreneurs in the tradable and non-tradable sectors to their financing costs, also modelling separately the central bank and commercial banks.

The economy's long-run, net foreign assets are pinned down by assuming that the external interest rate is an exogenous, increasing function of the ratio of external debt to the stock of oil. We interpret this as representing a form of collateral for credit provided by

foreign lenders. The model allows us to show that the dynamics of the proposed transfer problem can be the efficient response of the economy to exogenous terms-of-trade shocks.

However, the adjustment is inefficient because the equilibrium is distorted by financial frictions. In the commodity boom phase, credit growth and real appreciation transfer net worth from the tradable to the non-tradable sector, which enhances borrowing capacity in the latter, and then a sudden reversal in commodity prices causes a reallocation back to the tradable sector and causes the non-tradable sector to experience a credit crunch.

Moreover, a pecuniary externality is also at work in this process, because in the Bernanke, Gertler, and Girlchrist financing premium the value of net worth depends on equilibrium sectorial relative price movements that individual agents do not internalize when they make borrowing decisions.

We enhance the model to account for the role of macroprudential policy. Our model introduces policy rules governing central bank foreign exchange intervention and a regulatory premium incorporated as a multiplicative factor of the external financing premium banks charge to entrepreneurs. These rules are ad hoc, but they make an interesting contribution because they are formulated as functions of the deviations of the real exchange rate from its long-run target (for the foreign exchange intervention rule) or of private sector credit from its steady-state value (for the regulatory premium). Hence, these rules try to approximate the prudential nature of the policy because, by their construction, they induce larger adjustments in the policy instruments in boom times (i.e. when the real exchange rate and/or credit exceed their long-run levels), and converge to turning off both instruments in the long run, when their driving variables settle at their steady-state values.

We use the estimated model (using Bayesian techniques) to perform several quantitative exercises. First, we perform a shock decomposition analysis. We quantify the historical importance of external and domestic shocks in the Colombian data. Although our focus is commodity export shocks, we also study the relative importance of the remaining shocks. Second, we compute the Bayesian impulse-response functions. The objective is to visualize in more detail the macroeconomic impact of one-off commodity shocks and the policy response of the central bank. The third exercise is a counterfactual experiment to assess the effects of an unexpected reversal of a commodity shock. There, agents take decisions based on the idea that the value of commodity production will increase persistently for several quarters. However, they do not anticipate the possibility of a sudden reversal. Our interest is in using the model to analyse the role of conventional monetary policy and macroprudential policies when the sudden commodity collapse takes agents by surprise.

Our first quantitative experiment is a shock decomposition analysis. The model considers 12 shocks. We label three of them as external and the rest as domestic. The external shocks are one to the external interest rate spread that the economy faces when borrowing abroad, a foreign inflation shock, and a shock to commodity exports, the latter expressed either in commodity prices or quantities. The domestic shocks are shocks to productivity, investment, and interest rate spreads (all to both tradable and non-tradable sectors), and to mark-up, as well as a monetary policy shock. Our aim is to gauge the estimated contribution of the

considered shocks to the observed movements of tradable and non-tradable output and credit, aggregate consumption, inflation, the real exchange rate, and nominal interest rates.

The shock decomposition of these time series confirms a conventional finding in many of the models used in the international macro literature. The role of foreign interest rate spread shocks appears to be small. Also the role of foreign inflation shocks is negligible. Most of the importance of foreign shocks in the Colombian macro series stems from commodity export movements, as we suspected from the evidence documented in the first part of this paper.

Despite these large real effects on sectoral output and relative prices, commodity export shocks make a smaller contribution to tradable and non-tradable credit and consumption. Credit fluctuations are mostly dominated by investment-specific shocks, especially in the case of non-tradable credit. The inter-sectoral effects of specific shocks go from non-tradable credit shocks to tradable credit, but not the other way around. More precisely, tradable investment shocks have no impact on non-tradable credit, while non-tradable investment shocks spill over to tradable credit. This type of credit is much more responsive to interest rate credit spread shocks than is non-tradable credit. Thus, based on these findings, we are inclined to conclude that the importance of commodity export shocks appears to rest more on its sectoral effects than on its impact on aggregate activity. GDP fluctuations may mask the reallocation effects that commodity export shocks entail. Preference shocks appear to be an important source of macroeconomic fluctuations, as they affect GDP through non-tradable output, consumption, inflation, and the policy rate. However, they do not affect both types of credit. Their contribution to real exchange rate and tradable output fluctuations has also been small. Put together, these results suggest that credit cycles in Colombia do not appear to be driven by aggregate domestic shocks, nor by foreign shocks, but mostly by sectoral specific shocks and their interaction.

The mechanism that we have in mind to explain the response of the economy to commodity booms, approximated by the model's impulse responses, is as follows: besides the standard channels in the tradable and non-tradable, small, open economy models, a key mechanism works through the external interest rate risk-premium. This premium has an endogenous component, which depends not only on net external debt but also on the stock of the real commodity resource. A commodity price shock raises the value of this real asset lowering the risk premium that the economy faces in international financial markets. Thus, the income effect on households' budget constraints may be small but the wealth effect, especially since overall the economy has a negative net foreign asset position, may be large. Without this mechanism, the effects of a commodity boom on the real exchange rate in a three-sector model would be smaller.

There is an additional channel in our model, the existence of which is induced by the presence of the sectoral financial accelerator. The appreciation of the exchange rate also leads to a fall in the value of the assets of the tradable sector, lowering the value of its collateral and, consequently, raising the external financing premium that tradable firms pay to commercial banks. This increase in financing costs coupled with the lower demand for domestically produced tradable goods further drives down employment in this sector. In contrast, the non-tradable sector benefits from an exchange rate appreciation. This channel

is present in the model but it is quantitatively small in the Colombian data as the shock decomposition also revealed.

Finally, the effectiveness of macroprudential policy is evaluated by studying how the response of the economy to an oil price hike lasting six quarters, followed by an unexpected reversal, differs with and without macroprudential policy rules. In the case without such rules, the only policy rule at play is the Taylor rule standard of New Keynesian DGSE models.

The results show only small differences with or without the policy rules governing currency intervention and the regulatory premium. These results could be interpreted as indicating that the model's financial frictions are not the empirically relevant ones, but they may also suggest again that the perturbation approach to smoothing the convex borrowing costs implied by the financial frictions is weakening their real effects. The results also suggest that it would be useful to explore the implications of varying the values of the parameters that characterize the elasticities of the macroprudential policy instruments to their corresponding determinants. Intuitively, it seems that if the elasticities take very high values, the financial sector should have strong real effects because of large changes in financing costs via the regulatory premium, and large adjustments in the central bank's balance sheet via the foreign exchange interventions.

5.7 STATE CONTINGENT ASSETS, FINANCIAL CRISES, AND PECUNIARY EXTERNALITIES IN MODELS WITH COLLATERAL CONSTRAINTS

ROCIO GONDO MORI[1]

— Gondo Mori, R., "State Contingent Assets, Financial Crises, and Pecuniary Externalities in Models with Collateral Constraints", in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 95–104.

Introduction

This paper analyses the benefits and policy implications of financial innovation as a source of insurance against vulnerabilities faced by emerging countries and the likelihood of financial crises and default episodes. State-contingent assets are introduced into the model to quantify their benefits in terms of risk sharing and capital flow stabilization, and the ability to reduce spillover effects due to credit externalities. Different types of state contingent financial instruments are introduced, in the spirit of instruments such as GDP-linked bonds and future contracts. To do so, the effects are analysed in terms of risk sharing, the frequency of financial crises, and especially the size of spillover effects of individual debt on the valuation of the collateral of other agents in the economy.

This paper compares the results of an environment with a single bond with a fixed interest rate with those of an environment with state-contingent assets, in a world where borrowing is subject to collateral constraints that depend on the valuation of this collateral. The model mechanisms show the effects in terms of risk sharing in two margins: i) inter-temporally between current and future consumption, and ii) intra-temporally between consumption in periods of high and low endowment. The results show that non-state-contingent debt allows for inter-temporal risk sharing for highly impatient agents, but does not allow for risk sharing across states. However, risk sharing is improved when there is access to an additional state-contingent asset. In an environment with i.i.d. shocks, full risk sharing can be achieved by using the state-contingent bond to perfectly hedge against income fluctuations and using the regular bond to engage in inter-temporal risk sharing. With persistent shocks,

[1] The author is affiliated with the Central Reserve Bank of Peru. The views expressed are those of the author and do not necessarily reflect those of the bank.

it is only possible to partially hedge against the income shock, so that agents accumulate some precautionary savings, but in smaller amounts compared to the case with bonds only.

In terms of the frequency of financial crises, it is concluded that access to state-contingent debt lowers the likelihood of default and financial crises, as repayment becomes less costly in bad states. It is observed that, when a country faces a bad shock, a GDP-linked bond reduces the amount of resources needed for debt rollover. As financial crises are related to high levels of debt, there is a lower probability of crisis and smoother drops in consumption. The lower frequency of financial crises benefits the borrower because crises are extremely costly in terms of the reduction in output and consumption and in terms of loss of access to financial markets.

One of the main contributions of this work is related to the normative implications of the interaction between the risk sharing properties of contingent assets and the spillover effects of individual debt through the valuation of the collateral of other agents in the economy. The results show that state-contingent debt provides additional insurance through its effect on the valuation of the non-tradable collateral of all agents. During bad times, lower repayment through the GDP-linked bond is reflected in smaller capital outflows, which leads to a milder real depreciation. This reduces the size of spillover effects through the debt-deflation mechanism, as a milder depreciation reduces the fall in the valuation of the non-tradable collateral of all other agents in the economy.

In an environment with i.i.d. shocks, agents can fully insure against income shocks by using the state-contingent asset and borrow up to the collateral constraint using the non-state-contingent bond to increase current consumption. There is no pecuniary externality as it is optimal to borrow at the binding collateral constraint due to the impatience factor. In comparison, in an environment with persistent income shocks, agents cannot fully hedge against these shocks. Partial exposure to income fluctuations creates a need for accumulating precautionary savings, but in a smaller magnitude than in an environment with bonds only. A constrained social planner considers the spillover effect of diversifying the debt portfolio towards the state-contingent bond, as it provides additional insurance by relaxing the collateral constraint in bad states without tightening it in good states. Therefore, state-contingent repayment reduces capital outflows, dampens real exchange depreciation, and reduces the size of the spillover effect on collateral valuation.

From a normative perspective, private agents do not internalize the insurance properties of the state-contingent instrument in terms of relaxing the collateral constraint. Higher individual borrowing reduces the price of non-tradable collateral and therefore tightens the collateral constraint of other agents. A private agent would therefore accumulate less precautionary savings than a constrained social planner. Compared to the environment with bonds only, partial insurance through the state-contingent asset dampens the size of the pecuniary externality.

A quantitative analysis is performed to measure the benefits of having access to financial instruments with state-contingent interest payments and its effect on risk sharing, the frequency of financial crises, and the reduction in the pecuniary externality that arises through the valuation of collateral. We calculate the optimal holdings of both types of assets and

the frequency of financial crises in the decentralized equilibrium and compare them to the solution of a constrained social planner who internalizes the spillover effects of individual borrowing on the collateral valuation of other borrowers. We calculate the size of the spillover effect in an environment with access to non-state-contingent bonds only, and in one where agents have access to both non-state-contingent and state-contingent bonds. Results show that private agents take higher levels of total debt and face a lower frequency of financial crises when they have access to both state-contingent and non-state-contingent bonds.

Comparing the decentralized equilibria with and without state-contingent bonds shows that a more stable debt service reduces the requirement for new borrowing in bad times, hence being financially constrained less often. By comparing the size of the spillover effects on the valuation of collateral, we find that the difference in the distribution of debt and the frequency of financial crises between decentralized equilibrium and the constrained social planner's problem is smaller in an environment with a pro-cyclical debt service. This is related to the milder incidence of exchange rate depreciations on the collateral constraint in bad states.

Qualitative Results

With pro-cyclical interest payments, where borrowers make higher interest payments in good states and lower ones in bad states, the results show that state-contingent assets allow borrowers to partially hedge against the borrowing constraint in bad states, which are exactly the states in which they need to borrow more in order to smooth consumption. By being less credit constrained, collateral prices drop less than in the case with only non-state-contingent bonds and, therefore, the spillover effects on the valuation of the collateral of other agents are reduced.

In an environment with two bonds and i.i.d. tradable income shocks, where state-contingent interest payments can be used to offset the fluctuations in tradable income, debt with pro-cyclical interest payments allows agents to improve the intra-temporal transfer of resources from periods of high GDP to periods of low GDP, hence smoothing consumption across states. We observe that agents can perfectly hedge against uncertainty in the income shock across states with state-contingent debt and use the non-state-contingent bond to engage in risk sharing between periods. We show that if the tradable income shock is i.i.d., state-contingent bonds are used to perfectly hedge against uncertainty in the income shock, whereas the non-state-contingent bond is used for inter-temporal risk sharing.

In an environment with two bonds and persistent shocks, it is shown that state-contingent debt provides partial hedging against income shocks across states, even though it is not possible to achieve full risk sharing. Partial exposure to tradable income requires agents to accumulate some precautionary savings, which makes it suboptimal to borrow up to the binding collateral constraint. State-contingent debt provides two benefits: it provides partial hedging to reduce consumption fluctuations and it reduces the tightness of collateral constraints in bad states.

From a normative perspective, we find that a constrained social planner accumulates more precautionary savings (or equivalently takes lower debt) as he or she internalizes the fact that higher debt leads to a fall in the value of collateral of other agents as well, consistent with the results in an environment with bonds only. The pecuniary externality arises because agents fail to internalize the effect of their decisions in the valuation of collateral, and hence the whole economy faces financial crises more frequently.

In terms of debt composition, a constrained social planner also internalizes the fact that state-contingent debt allows for partial hedging against the tightening of the collateral constraint, as it dampens exchange rate depreciation in bad states. Lower interest payments allow for more debt rollover, which reduces the fall in tradable consumption and hence the size of the real depreciation. It is socially optimal to take more state-contingent debt than that observed in the private equilibrium.

By partially hedging against the tradable income shock, agents do not need to borrow as much in bad states, so that they hit the collateral constraint less frequently, which allows for better consumption smoothing and risk transfer. This is consistent with the results in Caballero and Panageas (2008) and the idea behind the rationality of introducing GDP-indexed bonds to stabilize the debt service ratio, as expressed in Borensztein et al. (2004).

From the constrained social planner's perspective, the planner chooses lower debt to insure against the fact that a higher level of debt lowers the price of non-tradable collateral, and therefore further tightens the borrowing constraint. By comparing the size of spillover effects with both contingent and non-state-contingent bonds, and with bonds only, the pecuniary externality is smaller with two types of bonds because state-contingent debt provides partial hedging against hitting the collateral constraint in bad times, so that the amplification mechanism given by the spillover effects of debt through collateral prices is dampened. This result is consistent with the result in Bianchi (2011) and Korinek (2011a), that a constrained social planner that internalizes the effect of debt on relative prices chooses lower levels of debt than decentralized private borrowers.

The pecuniary externality is smaller because agents are allowed to borrow more in bad states, which is precisely when they need to borrow more to smooth consumption, at the expense of facing tighter constraints in good states, where they do not need to borrow as much. Given that agents can borrow more in bad states, they face a milder drop in relative prices compared to the case in which there is only access to non-state-contingent bonds. The smaller drop in relative prices and smaller amplification mechanism in the tightening of the collateral constraint reduces the size of the pecuniary externality. This results in a lower need for precautionary savings and the constraint is binding in fewer states of nature as well.

Quantitative Results

We analyse the distribution of debt, the frequency of financial crises, and the size of the pecuniary externality in an environment with access to non-state-contingent and state-contingent bonds. The results are consistent with the qualitative results in the previous section. To perform a quantitative analysis, we obtain the policy rules, the distribution of debt levels, the size of the pecuniary externality, and the price of non-tradable goods under each state.[2]

Figure 5.7.1 – Policy Functions for Net Foreign Assets under the Constrained Social Planner

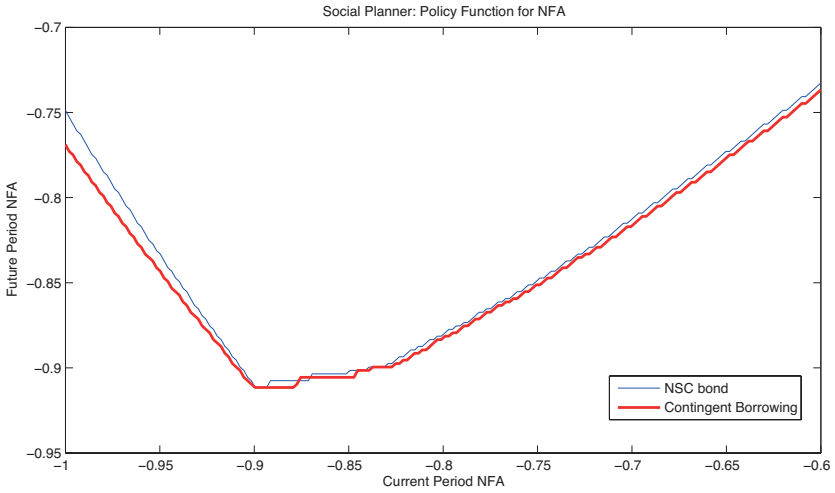


Figure 5.7.1 shows the policy functions for net foreign assets chosen by a social planner who faces a tradable endowment shock that is one standard deviation below the mean, with and without access to contingent bonds. The line labelled "NSC bond" shows the total asset position chosen by a constrained social planner with access to regular bonds only and the line labelled "contingent borrowing" is the total asset position when the planner has access to both types of instrument. It is shown that pro-cyclical interest payments provide partial hedging against the shock and allow slightly higher borrowing in bad states, as they result in the need to accumulate lower precautionary savings. The largest gain in terms of ability to borrow in bad states is seen in periods where the agent is already highly indebted, due to the insurance benefit of contingent debt, which allows relaxing the binding collateral constraint. A smaller drop in consumption of tradable goods dampens the effect of real exchange rate depreciation on the valuation of collateral and therefore on the tightness of the collateral constraint.

2 Gondo Mori (2014) presents a detailed description of the methodology used to obtain the quantitative results.

Figure 5.7.2 compares policy functions for a constrained social planner (labelled "SP") with decentralized agents with access to contingent bonds only (labelled "SC only") and with access to both types of assets (labelled "NSC+SC"). State-contingent repayment allows for better insurance against shocks to the tradable endowment, reducing the volatility of net income. If all debt has state-contingent repayment, then borrowers need to repay less in bad states, making the constraint less tight than if total debt has a combination of state-contingent and non-state-contingent repayment. As shown by the policy functions, this effect is especially important in intermediate levels of debt, where the pecuniary externality is the largest.

Figure 5.7.2 – Policy Functions With and Without Access to Non-state-contingent Bonds

When comparing the policy functions for a constrained social planner (labelled "SP") and decentralized agents (labelled "CE"), we observe that the social planner internalizes the effect of the valuation of other agents' collateral, and thus borrows less. Moreover, the planner internalizes a differentiated effect, where state-contingent debt provides additional insurance against hitting the collateral constraint by dampening the effect of individual debt on the real exchange rate. Regarding total debt levels, a pecuniary externality exists because agents are not aware of the spillover effects of collateral valuation. Highly leveraged agents are limited by the borrowing constraint, so they must lower borrowing in bad states. A fall in consumption translates into real exchange rate depreciation due to capital outflows that occur during sudden stop episodes.

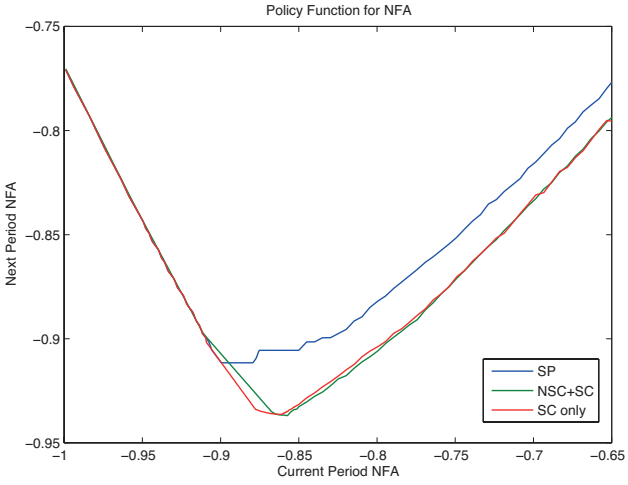
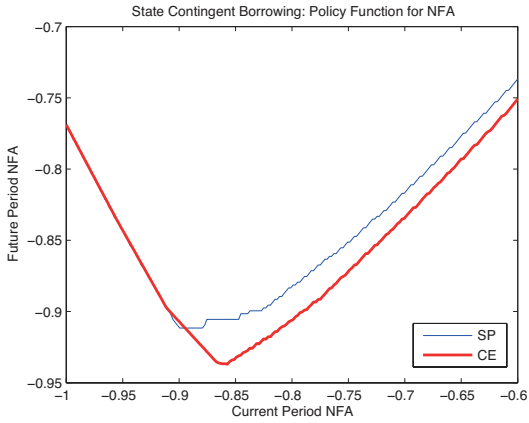


Figure 5.7.3 – Policy Functions for NFA in an Environment with Access to Both Types of Bond



With contingent assets, agents face the binding borrowing constraint less often, as the value of repayment is much lower in bad states. Given that agents do not need to reduce their tradable consumption as much, the effect of the current account reversal on the exchange rate is dampened. Decentralized agents face smaller exchange rate depreciation and a smaller drop in the nominal value of collateral. Therefore, the collateral constraint allows for higher amounts of debt by relaxing the borrowing constraint in low states, which are exactly the ones in which agents want to borrow more.

Results on the Distribution of NFA

The stationary distribution of net foreign assets shows that there is a higher probability of reaching higher debt levels under a private equilibrium with a single non-state-contingent bond than under the constrained efficient case. This result is consistent with the policy functions, where agents in the centralized economy borrow more than the constrained efficient level of debt. The result for the case with a regular bond only is similar to that obtained by Bianchi (2011), where the average debt in terms of tradable income is 87 percent (27.5 percent of GDP) for the constrained efficient case, while the average debt is 90 percent (28.6 percent of GDP) for the decentralized economy. Moreover, 49 percent of the highest debt levels for the decentralized equilibrium are not achieved under the constrained efficient equilibrium.

Figure 5.7.4 – Distribution of NFA for the Constrained Efficient Case (SP) and for Decentralized Equilibrium (CE) in an Environment with the Two Types of Bond

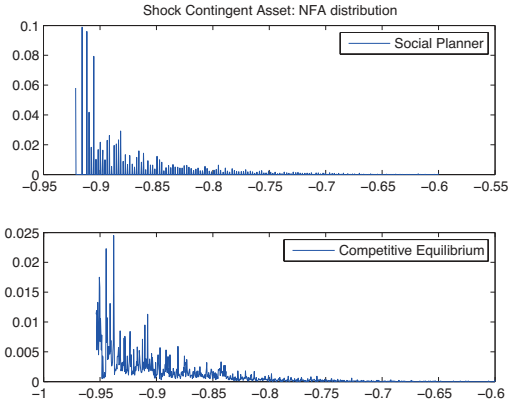


Figure 5.7.4 shows that the results are consistent with the qualitative analysis in that there is a smaller difference in the distribution of total debt, and hence a smaller pecuniary externality. The average debt level under decentralized equilibrium rises to 90.2 percent of tradable income (28.7 percent of GDP), whereas a constrained social planner who internalizes the effect of higher debt on the valuation of collateral has an average debt level of 88 percent of tradable income (27.7 percent of GDP). We observe that 44.9 percent of the highest debt levels for decentralized equilibrium are not achieved under the constrained efficient equilibrium, compared to 46.5 percent in the case with access to both types of asset.

Figure 5.7.5 – Results in an Environment with Access to State-Contingent Repayment only

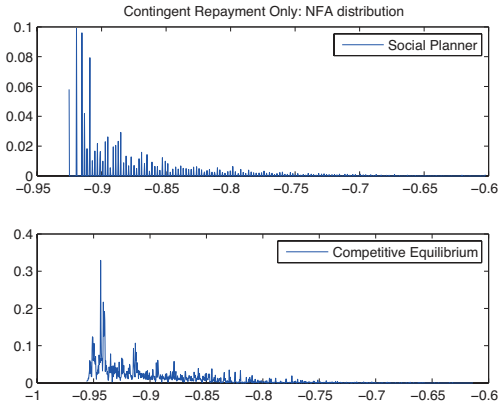


Figure 5.7.5 shows that there is a smaller pecuniary externality in an environment where agents have access only to bonds with state-contingent repayment. The intuition is that, with state-contingent repayment only, the pecuniary externality only affects the total level of debt, while benefiting from the insurance properties of the state-contingent repayment. In contrast, in an environment with both types of bond, the pecuniary externality affects the total amount and composition of debt, creating a larger distortion in the second best situation.

Results on Crisis Probability

A financial crisis is defined as a state in which the economy is constrained by the collateral requirement and in which the current account suffers a reversal with a magnitude larger than one standard deviation. Additionally, we consider that there are two channels that create a wedge between the frequency of financial crises under the constrained social planner's problem and decentralized equilibrium. The first channel is related to the higher proportion of state-contingent debt chosen by a constrained social planner. Higher state-contingent debt provides insurance by reducing the tightness of the collateral constraint in bad times so that binding collateral constraints are less frequent. The second channel is related to the fact that the social planner chooses a lower amount of total debt, as the planner internalizes the fact that higher debt tightens the collateral constraint through its effect on the valuation of collateral. Lower borrowing translates into lower probability of facing a binding collateral constraint as well.

Results show that, in the environment with bonds only, the probability of financial crisis is 4.6 percent, compared to 0.8 percent for the constrained social planner. However, if agents have access to the two types of bond, the probability of financial crisis in the decentralized equilibrium falls to 4.2 percent.

Conclusions

In this paper, we analyse the effect of using alternative hedging instruments with contingent interest payments on risk sharing, the probability of a financial crisis, and the size of the price externality in a two-good endowment economy subject to an endogenous collateral constraint.

Access to state-contingent bonds allows agents to obtain partial hedging against some fluctuations and therefore engage in better consumption smoothing. In addition, state contingent debt creates an asymmetric effect on the collateral constraint, where pro-cyclical interest payments relax the collateral constraint in bad states, when agents need to borrow more, at the cost of tightening in good states, when they do not need to borrow as much. Lower volatility of consumption dampens the fall in the price of non-tradable collateral in bad states, as agents would be facing a less tight collateral constraint and would not need to reduce their borrowing and consumption as much.

Having access to state-contingent financial instruments reduces the probability of experiencing a financial crisis and dampens the amplification effect created by the spillover effect of individual debt on the valuation of the collateral of other agents. However, it is not possible to fully correct the pecuniary externality. As shown in Bianchi (2011) and Korinek (2010), the use of a Pigouvian tax that depends on the level of individual debt enables the private equilibrium to be aligned with the one obtained by a constrained social planner. The optimal tax level is higher in states of higher debt levels, as there is a higher probability that the economy would face a binding collateral constraint in future periods.

6. Research Workshop

Research Workshop at the Second Annual BCC Conference in Geneva.





Research Workshop at the Second Annual BCC Conference in Geneva.

6.1 ASSESSMENT OF THE BANK LENDING DETERMINANT IN CENTRAL AND EASTERN AND SOUTH-EASTERN EUROPEAN COUNTRIES

ERJONA SULJOTI AND SOFIKA NOTE[1]

— Suljoti, E., and S. Note, "Assessment of the Bank Lending Determinant in Central and Eastern and South-Eastern European Countries", Research Workshop, in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 107–112.

A comprehensive research project analyses the determinants of credit activity, as bank lending is of special importance to the economic development and the financial stability of a country. Central and Eastern and South-Eastern European Countries (CESEEC) are extensively discussed in the literature as interesting case studies of transition processes significantly supported by the deepening of financial intermediation; the latter also aided by the participation of the Western European banks in the region. Especially in the pre-crisis period, higher financing from abroad has fuelled credit growth, thus supporting the deepening of the financial sector and the European integration process in this region.

The 2008 financial crisis severely impacted the credit activity of the foreign banks in the region. The financial problems with toxic assets that influenced most of the Western parent banks were transmitted to their subsidiaries in the region, thus substantially affecting their banking activity. Especially after the Greek crisis and after the strengthening of European supervisory standards, the CESEE region has experienced a second wave of strains, associated with an economic downturn and further deleveraging. In this regard, the determinants of credit growth are of special interest to those wishing to understand the influence of the financial crisis and also the current challenges facing the region.

Literature Review

Most of the research on credit before the 2008 financial crisis was focused on determining the equilibrium level of credit in an economy and on establishing whether credit was overshooting or undershooting this equilibrium. Since the crisis, there has been a growing

[1] Both authors are affiliated with the Monetary Policy Department of the Central Bank of Albania. The views expressed are those of the authors and do not necessarily represent those of the bank.

interest in credit developments, with a particular focus on credit growth determinants. These developments are even more important in the case of emerging economies because of the boom cycles some such economies were experiencing before the crisis and the bust that followed thereafter.

One of the most comprehensive studies after the crisis is the IMF paper of Guo and Sepanyan (2011), who look at credit growth determinants in 38 emerging countries for 2001–2010. The authors also decompose their analysis into pre-crisis and post-crisis periods, trying to find differences in drivers of credit growth in these two sub-periods. Their findings on CESEE countries suggest that the high foreign borrowing of banks was the main driver of credit growth before the crisis, followed by economic growth as the second most important factor. These two factors were also the most important after the crisis; first, the sharp withdrawal of foreign finance caused the rapid decline in credit growth rates and then the slowdown in economic growth explains the lack of credit in these countries.

Methodology

In our study we employ panel data econometric analysis to explain the real credit growth in ten CESEE countries: Albania, Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania, Serbia, the former Yugoslav Republic of Macedonia (FYROM), and Turkey. The data is of quarterly frequency and covers the period 2002Q4–2012Q4. The data is taken from the web sites of the respective central banks and national institutes of statistics. We originally began with the specification of Guo and Sepanyan (2011), including only GDP, foreign liabilities, deposits, and interest rates. However, based on other research work carried out on CESEE credit development and on our own observations drawn from an economic analysis of these countries, we extended the set of independent variables by including other variables accounting for risk, financial depth, and the dominance of foreign lending in the credit portfolio. We specify the regression equation in its broad form as follows:

$$CPS = f(GDP, NPL, DEP, FL, INT, IR, ER) \quad (1)$$

where CPS = the growth of real credit to the private sector, GDP = growth of real GDP, NPL = non-performing loans as a fraction of total loans, DEP = the growth of real deposits, FL = growth of real foreign liabilities of the banking system, INT = the deviation of CPS/GDP from its trend, IR = the lending interest rate,[2] and ER = the exchange rate.

We estimate the model for two periods: before the crisis, 2004Q4–2008Q3, and after the crisis, 2008Q4–2012Q4. The equations were estimated using fixed effects, thus accounting

[2] For the pre-crisis period we use two variables representing the cost of credit: one for credit in domestic currency and 12-month Euribor for credit in foreign currency (we could not find interest rates for foreign credit for all the countries). In the second period, we had data to calculate a composite interest rate, as a weighted average of the interest rate in domestic currency and interest rates in foreign currencies.

for unobserved heterogeneity across countries. The Wald test shows that the coefficients of the variables in second period are statistically different from those in the first period.[3]

Results

Table 6.1.1 presents the estimation results of the regression equations for the period before the crisis and the period after the crisis. All the coefficients have the expected sign and are significant.

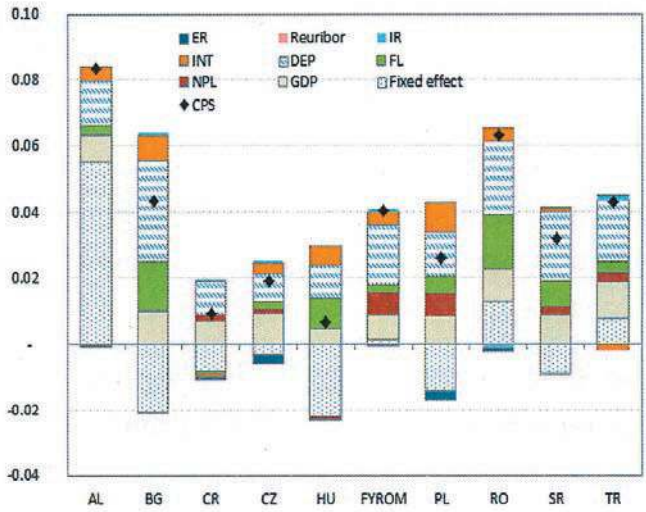
Table 6.1.1 – Estimation results

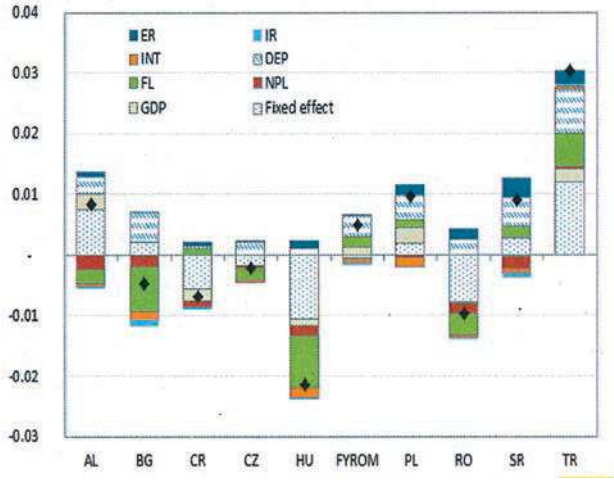
	2004Q4–2008Q3		2008Q4–2012Q4	
	Coefficient	St. error	Coefficient	St. error
Constant	0.0200***	0.0068	0.0571**	0.0022
GDP	0.6167**	0.3180	0.3117***	0.0942
NPL	–0.7906*	0.4743	–0.2299***	0.0928
FL	0.6893***	0.0844	1.0033***	0.0587
DEP	0.5822***	0.0804	0.3079***	0.0466
INT	–0.5549***	0.1268	–0.1238*	0.0687
IR, domestic currency	–0.1505**	0.0532		
Real 12-month Euribor	–0.5480**	0.2824		
IR, total			–0.1445*	0.0735
Exchange rate	0.1668***	0.0390	0.1440***	0.0270
Observations	160		170	
R^2 adjusted	0.82		0.81	

In the following we decompose real credit growth into contributions from the various factors identified in our regression. The benefit of this decomposition is twofold. First, it allows for the comparison of credit drivers among the different countries taken into consideration. Second, it helps the analysis of what changed after the crisis of 2008. The decomposition for the two periods is presented in Figure 6.1.1.

[3] The Wald test has been conducted for various break points, but its parameters show the best performance for the fourth quarter of 2008.

Figure 6.1.1 – Decomposition of Credit Growth for 2004Q4–2008Q3 and 2008Q4–2012Q4[4]





Source: Authors' calculation

[4] More precisely, this is the decomposition of credit in dlog transformation into contributions of independent variables in their transformed form. We have abstracted from the constant in the model so as to have a clearer view of the impact of the other factors.

Looking at the pre-crisis period, we see that domestic deposits and economic growth are important drivers of real credit growth in all the countries. Meanwhile, foreign liabilities have fuelled credit growth only in some of the countries, especially in Bulgaria, Hungary, Romania, and – to lesser extent – Serbia. In some of the countries, the significant presence of foreign banks has facilitated the increase of foreign borrowing by the banking system.

In the majority of the countries, the rapid credit growth has been an outcome of already low levels of credit in the economy. Countries with initially low financial depth, as measured by credit/GDP ratios, are more prone to experience high credit growth than countries with more mature credit markets. The effect of low initial credit/GDP is particularly significant for Albania, Bulgaria, Hungary, FYROM, Poland, and Romania.

Surprisingly, interest rates do not appear to be very important in determining credit growth in the pre-crisis period. This suggests that credit would have picked up in most of the countries regardless of the cost of credit, driven by high demand in an environment with low financial penetration.

The NPLs had been generally low in the years prior to the 2008 crisis in most of the countries. However, in some of the banking systems in the sample, especially in FYROM and Poland, NPLs were high in 2004. During the years that followed, up to 2008, the situation improved remarkably. The decrease in credit risk and the cleaning of the banking systems' balance sheet in these countries contributed positively to credit growth in this period. However, this conclusion should be interpreted with some caution. Reforms could have been taking place in the regulatory framework during these years, accounting for the change in the calculation of NPLs.

In the post-crisis period, the reversal of foreign finance to the banking systems has been a major force behind the worsening performance of credit in most of the countries. This is especially the case in Bulgaria, Hungary, and Romania, the same countries where foreign borrowing by the banking system was an important driver of credit growth. Turkey, on the other hand, has benefited from high foreign borrowing by the banking system in the last four years. This is due to the fact that the Turkish economy has not been in the same downturn cycle that the other countries have experienced after 2008.

The other source of funding, domestic deposits has continued to increase in all the countries, although to a lesser extent than in the years before the crisis. In some countries, its contribution to credit growth has more than offset the withdrawal of foreign finance, as in the case of Albania and the Czech Republic.

The deterioration of NPLs has been the next major contributor to weak credit growth in most of the countries. With the exception of Turkey, the banking systems in all the countries faced a considerable deterioration of their credit portfolio.

The effect of GDP growth on credit growth reflects differences in economic performance among CESEE countries following the 2008 crisis. Excluding Turkey, Poland, Albania, and FYROM were the only countries averaging positive GDP growth during the period 2009 –2012. For most of the other countries, the rapid contraction of GDP in 2009 and 2010 was the major factor in holding back credit in this period.

The deviation of credit/GDP from its trend has affected lending after 2008. However, in contrast to the period before the crisis, its effect is mostly negative and limited to only some of the countries, exerting a stronger effect in Bulgaria, Hungary, and Poland.

As in the period before the crisis, after 2008 interest rates do not seem to play a big role in determining credit developments. Despite easing monetary conditions and lower lending interest rates in most of the countries, the price of credit has had a negligible impact in stimulating demand for credit. This is in line with economic agents' increased uncertainty regarding the future, a factor which we could not approximate in our analysis.

Finally, the evaluation effect of the euro exchange rate, as expected, is positive after 2008. With the exception of Bulgaria, Croatia, and FYROM, which have some kind of a fixed exchange rate arrangement, almost all the other countries in the sample saw their currency depreciate against the euro during this period.

Conclusions

This paper aimed to evaluate empirically the factors that influenced the lending activity of banks in CESEE countries before and after the global crisis. The estimated results show that credit growth has been strongly held back by deterioration in credit quality, sluggish economic growth, and the withdrawal of foreign funds from the region. Furthermore, we find a low impact of the lending interest rates of new loans in both study periods. Interest rate elasticity is even lower after the crisis. This shows that even though policymakers in the region have eased the monetary conditions in the economies in question, lending activity remains constrained due to significant perceived uncertainty and risk aversion from both the demand and supply sides. The inclusion of a variable that may capture this phenomenon will be considered among further improvements of the model in the future.

Finally, it is worth mentioning that the degree of financial intermediation varies considerably between the countries in the region. Most have low levels of private sector indebtedness, so from the demand perspective there is still room for increased lending in the future. This will require higher bank participation in providing financial intermediation and in supporting economic growth. Therefore, the deepening of financial intermediation will be an important instrument for supporting long-run growth and the ongoing convergence towards Western European countries.

6.2 BANKING FRAGILITY IN COLOMBIA: AN EMPIRICAL ANALYSIS BASED ON BALANCE SHEETS

IGNACIO LOZANO AND ALEXANDER GUARIN[1]

— Lozano, I., and A. Guarin, "Banking Fragility in Colombia: An Empirical Analysis Based on Balance Sheets", Research Workshop, in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 113–121.

Introduction

Since the beginning of the global economic crisis in mid-2007, topics relating to financial stability have gained importance in both the theory and the practice of macroprudential policy. An understanding of issues such as the funding structure of bank lending, the role of leverage, the determinants of credit cycles and the identification of credit booms has become crucial for authorities, given their aim of anticipating and avoiding financial crises. These themes are particularly relevant in emerging economies where periods of rapid expansion in credit could give rise to diverse fragilities in the financial system.

The literature on financial stability has extensively studied the dynamics of credit, the measurement of the financial cycle, and its relationship to banking crises (e.g. Gourinchas et al., 2001; Cerra and Saxena, 2008; Jorda et al., 2012; Schularick and Taylor, 2012; and Borio, 2012). Furthermore, the recent literature on this topic has concentrated on the construction of early warning indicators of lending booms, financial fragility, and banking crises (e.g. Reinhart et al., 2000; Frankel and Saravelos, 2010; Drehmann et al., 2012; Guarín et al., 2014; and Greenwood et al., 2012).

Lately, there has been a burgeoning literature that associates both the credit cycle and financial stability to the dynamics of the funding sources the banking system uses for lending (e.g. Damar et al., 2010; Huang and Ratnovski, 2010; Shin and Shin, 2011; Hahm et al., 2012a and 2012b; and Hamann et al., 2014). According to this literature, in periods of rapid credit growth, traditional funding sources (i.e. retail deposits from savers or core liabilities) are not enough to cover the demand for bank lending. As a result, banks make use of funding sources other than traditional retail deposits (i.e. wholesale funds or non-core liabilities).

---

1 Both authors are affiliated with the Central Bank of Colombia. The views expressed are those of the authors and do not necessarily represent those of the bank.

Shin and Shin (2011) and Hahm et al. (2012a, 2012b) highlight that, in emerging economies with open capital markets (e.g. Korea), short-term foreign obligations and interbank loans are relevant sources of non-core liabilities. Moreover, their increasing use increases the vulnerability of financial institutions. Hahm et al. (2012a, 2012b) note that the composition of bank liabilities provides valuable signals regarding lending booms, financial fragility, and banking crises. In fact, large holdings of wholesale funds increase the willingness of the banking system to face greater risk exposure. Hence, the extent of wholesale liabilities could reflect the phase of the financial cycle and the degree of vulnerability to setbacks.

Bearing in mind the previous discussion, the main objective of this paper is to study the empirical relationship between credit funding sources and the vulnerability of the Colombian banking system. We propose a monitoring tool based on predictions of the probability of financial fragility. In particular, the empirical exercise estimates the probability of being in a state of banking fragility as a function of credit funding sources. The econometric exercises carry out a Bayesian averaging of logistic regression models that express a financial risk index in terms of retail deposits and wholesale funds. The estimations are performed using monthly Colombian data from the balance sheet for the entire banking sector.

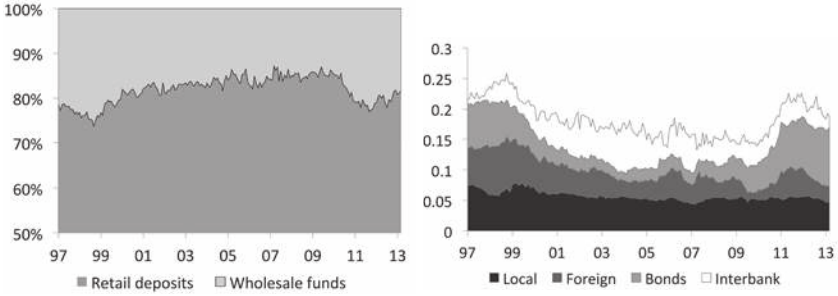
The results show the increasing use of wholesale funds, particularly to support credit expansion, entails potential elements of risk and, hence, episodes of banking fragility. Among them, foreign credit, interbank operations, and securities liquidation are relevant factors to identify most such episodes. Therefore, monitoring credit funding sources becomes an essential tool, in a macroprudential scenario, for preventing occurrences of financial crisis.

Funding Sources of Banking Loans

We break down the total liabilities on the balance sheet into two groups of resources – namely, retail deposits and wholesale funds. In principle, retail deposits are the liabilities of a bank with non-bank domestic creditors. These funds are both the predominant source of banks' funding and the ones that grow in line with the aggregate wealth of households (Hahm et al., 2012b; Shin and Shin, 2011). Retail funds include demand deposits, savings deposits, and term deposits with different maturities.

For Colombia, wholesale funds will consist largely of bond issues, institutional deposits from other intermediaries (e.g. deposits from second-tier banks), foreign credit, and interbank short-term liabilities (e.g. repos and other operations). Bond issuance is normally used to finance projects for the banks themselves, but also could eventually fund loans to third parties. Foreign credit corresponds to resources for commercial credit, while interbank operations correspond to short-term operations (i.e. intraday transactions to cover liquidity shortfalls).

Figure 6.2.1 – Retail Deposits and Wholesale Funds (% of Total Liabilities)

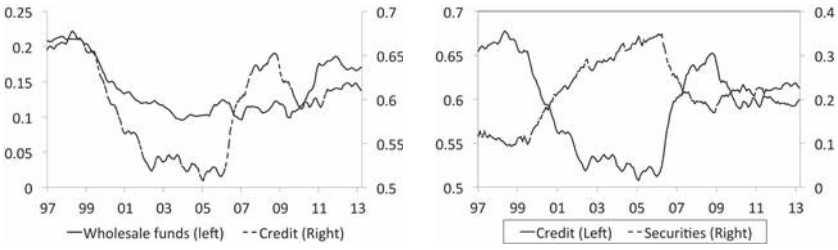


Note: The left panel presents the dynamics of the funding sources while the right panel shows the composition of wholesale funds.

We consider the monthly balance sheets of the Colombian banking system from December 1996 to March 2013. Figure 6.2.1 (left panel) shows the size and dynamics of retail deposits and wholesale funds (as a share of total liabilities). Retail deposits are the main source of credit funding (around 80 percent). Within retail deposits, saving deposits represent half of the total. In turn, wholesale funds are in the minority, are more volatile, and their share fluctuated between 10 percent and 20 percent.

Figure 6.2.1 (right panel) shows the dynamics of wholesale funds and their components. Contrary to retail deposits, these funds exhibit a high volatility and none of the components was dominant throughout the period. At the end of 1990s, wholesale funds recorded their highest peak (over 25 percent of total liabilities) and foreign loans were most prominent. A new high peak in this funding is observed between 2010 and 2012 (above 20 percent of total liabilities), but – in this period – bonds and deposits from other intermediaries constituted the majority.

Figure 6.2.2 – Wholesale Funds, Total Credit and Securities Investment of the Banking System



Note: The left panel compares the dynamics of wholesale funds (% of total liabilities) to total credit (% of total assets), while the right panel shows the dynamics of both credit and investment in securities (% of total assets).

Figure 6.2.2 (left panel) compares the dynamics of total credits granted by banks with the dynamics of wholesale funds. Both series seem to have a high positive correlation, at least up to 2006. Thereafter, the series seem to diverge. We suggest that this divergence is due to the banking system using resources from the sale of fixed-income investments to provide loans. Figure 6.2.2 (right panel) shows that loans decreased progressively in the first part of the period 2000–2010, while the investments of banks in securities increased. This trend changed abruptly in the middle of this period, when credit began to increase and, simultaneously, investment fell.

Financial Fragility

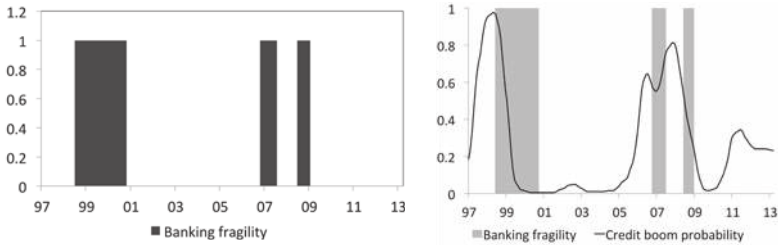
To characterize financial vulnerability empirically, we constructed a single indicator that collects most of the risks to which a bank is exposed. This indicator takes the form of a dummy variable and tries to identify periods in which a particular key risk or some key risks generate a warning for banks.

Four types of risk are taken into account: credit risk, liquidity risk, profitability risk, and solvency risk. In turn, each risk is measured by two criteria: credit risk by means of ratios of overdue/gross loans and unproductive/gross loans, and liquidity risk through the ratio of deposits to gross loans and the non-covered liabilities ratio (NCLR). The third subset, profitability risk variables, includes the return-on-assets (ROA) and return-on-equity (ROE) measures. The final set includes solvency and leverage risks, which capture the ability of an entity to meet its long-term commitments and to fund its projects, respectively.

To construct the financial fragility indicator, our technique starts by decomposing each risk into its trend and cycle using the Christiano and Fitzgerald filter (Christiano and Fitzgerald, 2001). Periods with a high cyclical component correspond to situations where exposure to a specific risk increased beyond its natural trend. We consider the highest peaks to be associated with periods of high risk exposure (i.e. phases of increased fragility).

Decomposition of each risk leads to time series that reveal several periods of fragility, because each risk evaluates a different aspect of the health of banks. We use Principal Component Analysis (PCA) on the cyclical components of eight risks to find common patterns. The three principal components (PCs) jointly explain 85 percent of the total variance of data. The first PC summarizes both credit and leverage risks, the second PC illustrates liquidity and solvency risks, while the third PC involves profitability risk. We define a dummy of banking fragility as those situations where each PC is above a threshold (i.e. our variable takes the value 1 in those cases and 0 otherwise). The threshold is established by using a quartile at 90 percent confidence for each PC.

Figure 6.2.3 – Episodes of Financial Fragility and Credit Boom



Note: This figure shows the financial fragility dummy for the total banking sector (left panel) and compares it to the probability of credit boom (right panel) found by Guarín et al. (2014).

The left panel in Figure 6.2.3 shows the periods of financial fragility (grey areas) while the right panel compares these areas with the probability of credit booms. From 1996, we can distinguish three periods of banking vulnerability. The first (1999–2001) is associated mainly with the downturn in the Colombian economy. The second period is related to the credit expansion of 2006–2007. The third period (2009) is related to the fall in profitability in the sector, credit expansion in 2008, and – in some cases – liquidity problems. Following Shin and Shin (2011), it is not surprising that periods of high financial fragility are associated with periods of credit expansion.

Model

We employ a Bayesian averaging of logistic regression models to estimate the probability that the banking system is in a position of financial fragility.[2] This position is affected, in particular, by loan funding sources. We consider the following model:

$$v_t = \alpha + X_t\beta + \varepsilon_t \quad t = 1, \dots, T \tag{1}$$

where $v_t = 1$ if there is financial fragility at month t and $v_t = 0$ otherwise, α is the intercept, β is an Rx1 parameter vector, $\boldsymbol{\varepsilon}_t$ is the error term, and $X_{T\text{x}R}$ is the set of covariates that capture the sources of credit funding. We also include an indicator of economic activity as the control variable z_t. We can rewrite Equation (1) as

$$v_t = \alpha + [rd_t, wf_t, -s_t, z_t]\beta + \varepsilon_t \quad t = 1, \dots, T \tag{2}$$

[2] This technique is used by Guarín et al. (2014) to estimate the probability of a credit boom occurring in Latin American emerging economies.

where rd_t, wf_t, and s_t are the retail deposits,the wholesale funds (both as shares of total liabilities), and the investment in securities (as a share of total credit), respectively.

Let $p(v_t = 1|\theta; rd_t, wf_t, s_t, z_t)$ be the probability of being in a situation of financial fragility at time t; it can be defined as 0

$$p(v_t = 1|\theta; rd_t, wf_t, s_t, z_t) = F(\alpha + [rd_t, wf_t, -s_t, z_t]\beta) \quad (3)$$

where $\theta = [\alpha'\beta']$ and F is the cumulative logistic distribution function.

To deal with both the model and the parameter uncertainty in our estimation, we run a BMA, (Bayesian Model Averaging) estimation following Guarín et al. (2014) based on Raftery (1995) and Raftery et al. (1997). The data set is denoted by D, and $M = [M_1, \ldots, M_K]$ is the set of all models. So, M_k is the k-th model considering a subset of the covariates whose size is less than or equal to R, and θ^K its associated parameter vector.

Rewriting (3) in a BMA context, we get

$$p^{BMA}(v_t = 1|D) = \sum_{k=1}^{K} \int p\left(v_t = 1|\theta^k, M_k; D\right) p(\theta^k, M_k|D) d\theta^k \quad (4)$$

where $p(\theta^K, M_k|D)$ is the joint posterior probability and the equation as a whole is a weighted average of the probabilities in Equation (3). Those weights are given by $p(\theta^K, M_k|D)$.

The Reversible Jump Markov Chain Monte Carlo (RJMCMC) algorithm introduced by Green (1995) is used to estimate the BMA probability in Equation (4) (see also Hoeting et al. (1999), Brooks et al. (2003), and Green and Hastie (2009) for additional details).

In order to compute a value of the BMA probability at which there is a clear signal of financial fragility, we take a threshold value $\tau \in [0,1]$as the solution to the following minimization problem

$$Min\ \phi(\tau) \quad \text{subject to} \quad \gamma(\tau) \leq \bar{\gamma}$$
$$\tau \in [0,1] \quad (5)$$

where $\phi(\tau)$ is the proportion of financial fragility false alarms, $\gamma(\tau)$ is the proportion of undetected fragility situations, and $\bar{\gamma}$s the maximum value of γ admitted by the policymaker.

The values of $\phi(\tau)$ and $\gamma(\tau)$ are calculated as proportions of the total number of observations in the sample. That is to say,

$$\phi(\tau) = \frac{\sum_{t=1}^{T} 1_{\{(\hat{v}_t(\tau)=1)\wedge(v_t=0)\}}}{T} \quad (6)$$

$$\gamma(\tau) = \frac{\sum_{t=1}^{T} 1_{\{(\hat{v}_t(\tau)=0)\wedge(v_t=1)\}}}{T} \quad (7)$$

where $1_{\{\cdot\}}$ is a dummy variable equal to 1 if condition $\{\cdot\}$ is satisfied, and 0 otherwise. The variable $\hat{v}_t(\tau)$ is defined as

$$\hat{v}_t(\tau) = \begin{cases} 1 & if \;\; p\left(v_t = 1 | \theta^k, M_k; D\right) \geq \tau \\ 0 & \text{otherwise} \end{cases} \tag{7}$$

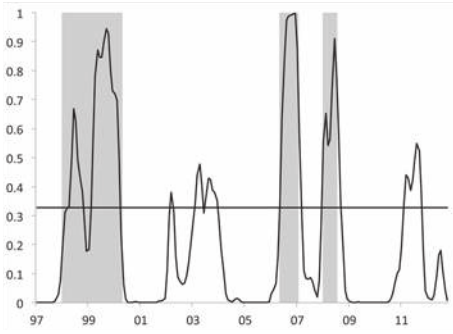
Results

The probabilities of being in a situation of financial fragility at time t are estimated on the set $[v_t, x_t]$. The dependent variable v_t corresponds to the indicator estimated in Section 3. The set of regressors x_{it} includes both contemporary covariates and up to six (6) lags of each one. The threshold probability τ is computed by solving the minimization problem (5) with a maximum value of $\bar{\gamma}$ equal to 5 percent of observations in our sample.

The BMA estimation is run using a Markov chain with 220,000 draws. We use a Reversible Jump Markov Chain Monte Carlo method to simulate the draws. The draw chains were constructed using the Metropolis-Hastings algorithm. We assume the prior model probability to be $p(M_k) = \frac{1}{K}$ for all k = 1, …, K, and the prior distribution of θ^k to be N (0^k, $10 \cdot I^k$) where the zero vector 0^k and the identity matrix I^k change their size with the model M_K.

The BMA parameters are used to estimate the probabilities of being in a situation of financial fragility for the total banking sector. Figure 4 illustrates the results. The solid line shows the estimated values of the probability, the grey areas correspond to the periods of financial fragility identified via the risks indicators, and the dashed line defines the threshold, which is estimated at 33 percent. Given this percentage figure, the probability of detecting a period of financial fragility is 88 percent, while the probability of having no false alarms is 82 percent.

Figure 6.2.4 – Estimated Financial Fragility – Banking System



Note: The estimated financial fragility probability for the banking sector until 2013. The grey areas represent the dummy built by using the sector risks.

The BMA probability identifies seven episodes of financial fragility. Three of them are not captured by the risk-based dummy variable: in the middle of 2003, in 2004, and at the

end of 2011. During these three periods, the banking system exhibited a significant degree of vulnerability through its funding sources, but these situations were not captured by the standard risks. Based on these outcomes, monitoring the sources of bank funding could be a complementary tool for assessing their state of fragility.

The estimated probability highlights two episodes of financial fragility at the end of the 1990s. The first takes place in the second half of 1998 and at the beginning of 1999. Not surprisingly, these events coincide with the credit boom identified by Guarín et al. (2014). Subsequently, there is a rise in probability to very high values, showing new episodes of vulnerability between the second half of 1999 and the last quarter of 2000. These episodes are associated with one of the worst downturns in the Colombian economy.

In the first half of the period 2000–2010, the BMA probability finds a new set of episodes of financial fragility. The first features a peak in the third quarter of 2002, which might be associated with the increase in market risk due to liquidity problems in the public debt market. The second peak reflects an increase in financial fragility between the second half of 2003 and the first half of 2004, which seems to be linked to a large expansion in credit.

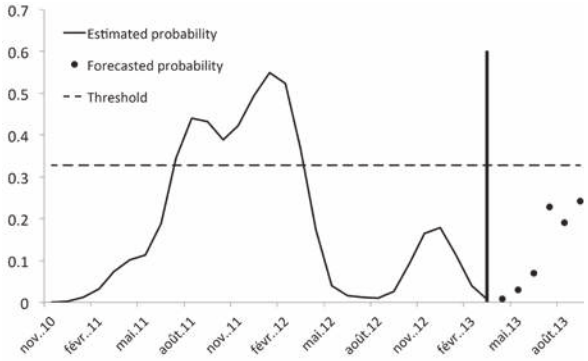
Between mid-2006 and mid-2007, financial fragility is characterized by a strong expansion in credit and capital inflows. The central bank increased the levels of the marginal legal banking reserve to deal with the perverse effects of these capital flows. The next episode occurs in the second half of 2008. It is closely related to the collateral effects of the international financial crisis. We also found a period of fragility between the second half of 2011 and the first quarter of 2012, which is associated with the expansion of credit, capital inflows, and high asset prices.

The increase in credit funding sources such as foreign credit, interbank operations, and credit from other domestic intermediaries, has a positive effect on the probability of financial fragility. On the contrary, an increase in investments in securities, bond issuance, or economic activity, has a negative impact. Hence, the liquidation of securities has the expected sign. The banking system uses resources from the sale of investments to fund loans. Regarding the other two variables, in the middle of downturns, the income of households is negatively affected and borrowers have difficulties paying their debts, thereby increasing vulnerability. We also presume that banks could issue bonds when they are funding new projects instead of issuing bonds to fund new loans.

Predicting Financial Fragility Episodes

The models computed in previous sections can be useful for predicting the short term probability of being in an episode of financial fragility at time t+h, based only on credit funding information up to time *t*. Note that *h* stands for the time horizon of our direct forecast. We carry out the BMA estimation of $p^{BMA}(v_{t+h} = 1|D)$ for $t = 1,\ldots,T$ and $h = 1\ldots,6$.

Figure 6.2.5 – Prediction of the Financial Fragility Probability



Note: Six direct forecasts of the probability of financial fragility from April to September 2013.

Figure 6.2.5 plots both the in-sample estimate of the probability of financial fragility for $h = 0$ (i.e. the solid line in Figure 4) and the results of our prediction for $h = 1, \ldots, 6$, (black points). Each point represent the direct forecast of the probability at time T + h, given data on credit funding sources up to time T = March of 2013, which is the last available date in the sample. For instance, with h = 6, we predict the probability of being in a fragility episode for September of 2013. Figure 5 shows the predicted probabilities are below the estimated threshold for all time horizons.

Conclusions

This paper provides empirical support for the relationship between the funding sources of credit and the financial fragility of the Colombian banking system. In particular, we explore how the increasing use of wholesale funding to support bank loans, especially in credit expansion phases, is a potential source of financial instability.

Our model identifies seven episodes of financial fragility in the period up to 1996. Three of these episodes are not captured by traditional risk indicators. As wholesale funds with greater impact we identify foreign credits, interbank short-term operations, and bond issuance.

Changes in the funds used for lending could be a potential source of financial instability, and monitoring them could be a complementary tool for assessing their state of fragility. Even though the exercise is performed specifically for the Colombian banking system, it could serve as a reference to be applied to other emerging economies.

6.3 DISCUSSION BY PROF. URS BIRCHLER[1]

Affiliated with the University of Zurich

— Birchler, U., "Discussion", Research Workshop, in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 123–125.

- *Assessment of the Bank Lending Determinant in Central and Eastern and South-Eastern European Countries*
  Erjona Suljoti and Sofika Note, Central Bank of Albania

The paper analyses the impact of the 2007–2008 global financial crisis on bank lending in the Central and Eastern and South-Eastern European (CESEE) countries. To begin, the authors report a number of interesting stylized facts: (i) the convergence of credit growth rates after 2008; (ii) the closer link between economic activity and credit in the course of the downturn (which may, though, be a statistical artefact); (iii) a high dependence on foreign funds; and (iv) a high share of foreign currency lending.

The authors then use a panel regression (with fixed effects) to analyse the effects of the crisis on bank lending. They find that the credit slowdown is the product of a general economic slowdown, a deterioration of loan quality, and a simultaneous drop in foreign funding only partially offset by increased domestic funding.

The authors achieve a valuable and interesting decomposition of credit growth components. The paper is carefully set up and is very readable. It could serve as a role model for research in CESEE countries or in any fast changing/developing country in the period around a significant shock such as a financial crisis.

We suggest that the authors look into the following issues:

They use country fixed effects; yet, within sample period, there were more structural changes with potential informational value: (1) some countries joined the EU in 2004 (Poland, the Czech Republic, and Hungary) or in 2007 (Romania and Bulgaria); (2) some countries applied for EU membership (Turkey in 2005, Albania in 2009); (3) some countries introduced the euro during the sample period.

1 Important assistance from René Hegglin and Inke Nyborg is acknowledged.
The views expressed are those of the author and do not necessarily reflect those of the university.

Data are available for 2002Q4–2012Q4, but regressions cut off 2002–2003 observations.

Could one control for the participation of Western banks in the region (e.g. the economic slowdown was less severe in Poland, which is mainly exposed to German banks)?

Capital is not an important factor pre-crisis but becomes one after the crisis. Is there an alternative to the use of regulatory CAR; banks claim to be capital constrained?

Finally, the authors might emphasize the relationship of their findings to existing insights, such as, for example, Guo and Sepanyan (2011) or to research into banks' foreign currency lending (i.e. Brown and Beck, 2011). There may also be a relationship to the twin crisis literature (see Asia in the 1990s). For further information we would recommend OeNB and the Bank of Finland Institute for Economies in Transition[2] as well as the most recent IMF report of 2014[3].

- *Banking Fragility in Colombia: An Empirical Analysis Based on Balance Sheets*
  Ignacio Lozano and Alexander Guarin, Central Bank of Colombia

The paper develops a method of forecasting fragility episodes hitting banks or banking systems. The main explanatory variables are banks' compositions of credit funding sources. The authors analyse monthly balance sheet data of Colombian banks for the period 1996–2013 by use of a logit model. They find that fragility episodes are predictable to some degree, the main predictor being the fraction of wholesale funds in credit financing.

This result is plausible but not extremely surprising in the light of the failure of Northern Rock. Northern Rock, traditionally funded to two thirds by retail deposits, expanded its balance sheet from 1998 to 2007 more than fourfold by borrowing heavily in the wholesale market. When the interbank market froze in the financial crisis of 2007, Northern Rock faced a crisis of confidence, even though its assets were beyond suspicion.

A strong point of the paper is its theoretical basis in the accounting framework of Shin and Shin (2010). The empirical strategy is sophisticated and impressive. In particular, the authors found a nice way of optimizing the threshold value τ accounting for alpha and beta errors. With τ too small there are many false alarms, while a τ too large would leave many valid alarms undetected.

The paper raises a few questions and invites a few suggestions though. First, one might try control variables for business models of banks, the sample encompassing both S&Ls as well as universal banks with access to international financing sources. Second, it would be interesting to see how the fra-

2 http://www.oenb.at/en/Monetary-Policy/Central--Eastern-and-Southeastern-Europe--CESEE-.html

3 http://www.imf.org/external/pubs/ft/reo/2014/eur/eng/pdf/ereo0414.pdf

gility indicator performs out-of-sample (how sensitive are fragility periods for different observation periods?)

Third, the paper distinguishes four risk types: credit, liquidity, profitability, and solvency risk. But is profitability risk relevant? What about important risks not covered by the analysis, such as market risk (measure, for example, by Colombian stock exchange volatility) or interest rate risk? Fourth, we wonder whether there are any effects from the implementation of pro-market reforms since the 1990s (opening of the economy) and associated volatility. One would also expect to find some impact of the 1999 crisis and recession in Colombia.

Fifth, it is not fully obvious why the paper uses a dummy generated on threshold exceedance instead of the individual principal components themselves for a much simpler panel data regression. And, by the way, it could be freed of some technical jargon (better placed in footnotes) like "Reversible Jump Markov Chain Monte Carlo" (RJMCMC) and "Metropolis-Hastings algorithm" (as far as such techniques are indeed required and reliable in the present context).

We would, finally, suggest continuing work on this promising study by extending the analysis to other countries with larger banking sectors and by relating the findings to Buch and Prieto (2014) who estimates the impact of capital on lending activity using long-run panel estimation.

6.4 THE DYNAMIC EFFECTS OF INTEREST RATES AND RESERVE REQUIREMENTS: A ZERO-SIGN RESTRICTION APPROACH

FERNANDO J. PÉREZ FORERO AND MARCO VEGA[1]

— Pérez Forero, F. J. and M. Vega, "The Dynamic Effects of Interest Rates and Reserve Requirements: A Zero-Sign Restriction Approach", Research Workshop, in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 127–132.

Since the outbreak of the 2007–2008 global financial crisis, monetary policies in developed and emerging economies have relied more on unconventional policies to achieve macroeconomic and financial stability. Reserve requirement ratios are an example of such policies used by a number of emerging-market countries (see Montoro and Moreno, 2011; Tovar et al., 2012; and Cordella et al., 2014; among others). Even though reserve requirements have been abandoned in most developed economies, they have been actively used in the world of emerging economies, especially after the global financial crisis. This has been the case, for example, in Colombia, Brazil, Peru, and Turkey.

This paper studies the special case of Peru, where the central bank makes active use of reserve requirement policies applied to both domestic and foreign currency banking liabilities (Rossini et al., 2014; Choy and Chang, 2014). The paper explores the transmission mechanisms of conventional interest rate policy together with that of reserve requirement policies in both currencies. Reserve requirement ratios are part of the pool of instruments that the central bank uses to implement its policy. Since the adoption of an inflation targeting regime in 2002, the central bank implements its policy by setting a reference interbank interest rate and uses open market operations to keep the interbank rate at the reference level (Rossini and Vega, 2007), given reserve requirement rates.[2] Nevertheless, due to 2008's global financial turmoil, the central bank started using reserve requirement policies actively in both domestic and foreign currencies for monetary control purposes, especially to fight the undue credit growth dynamics related to capital inflows associated with the

1 Both authors are affiliated with the Central Reserve Bank of Peru. The views expressed are those of the authors and do not necessarily reflect those of the bank.

2 The central bank adopted an inflation targeting regime in 2002. Later, in September 2003, the central bank set the interbank rate in domestic currency (Nuevo Sol or PEN) as the target instrument. Previously, since early 2001, the central bank had started setting a corridor for interest rates.

unprecedented expansionary monetary policies of the USA. It is important to recall, however, that reserve requirements were used for implementing monetary policy even in the period prior to the crisis (see Montoro and Moreno, 2011;and Armas et al., 2014), but that the instrument was used only sporadically.

The rationale behind the use of reserve requirements rests on the existence of an externality whereby banks issue too much short-term debt (deposits) that fund excessive money creation (loans). Banks do not completely internalize the fire-sale costs generated when a system-wide liquidity shock hits (Stein, 2012). Armas et al. (2014) examine the case for reserve requirements when the dollarization of the financial system is high.

On the other hand, there are two competing theories of how reserve requirement shocks affect credit levels and deposit and lending interest rates. The first theory posits that reserve requirement shocks first affect "loanable" funds (deposits) and prompt banks to change their lending levels. DSGE models like that of Glocker and Towbin (2012b) and Carrera and Vega (2012) have this money-multiplier property built into their structure. The second theory asserts that banks decide first on their lending levels and this urges them to create deposits (Disyatat, 2011; Bianchi and Bigio, 2014). In this case, changes in reserve requirements affect the riskiness of banks' balance sheets, which, in turn, affects lending levels. Another theory posits that changes in the asset portfolio in reserve requirement changes affect the liquidity risk of banks, which prompts banks to adjust their lending and interest-rate levels. This channel is emphasized in Alper et al. (2014).

This paper presents a unified framework that identifies both interest rate and reserve requirement shocks. The framework relies on imposing a mix of zero and sign restrictions in a structural vector autoregressive (SVAR) model for the Peruvian economy.

The SVAR model is as follows:

$$y_t' A_0 = \sum_{i=1}^{p} y_{t-i}' A_i + c + w_t' D + \varepsilon_t' \qquad , for\ t = 1, \dots, T \qquad (1)$$

where y is a vector of endogenous variables, $\boldsymbol{\varepsilon}$ is a vector of normally distributed structural shocks, and w is a vector of exogenous variables. Moreover, all matrices are governed by structural parameters. In particular, matrix A_0 denotes the contemporaneous relationships across variables. In short, the task of achieving structural identification is basically how to find A_0. Indeed, there is a significant literature that discusses different ways of achieving this (see, for instance, Canova, 2007; Rubio-Ramırez et al., 2010; or Kilian, 2011). Once the model is identified, we can construct impulse-response functions (IRFs). Basically, the IRF is a *nxn* matrix that contains the dynamic responses of the full vector y after a structural innovation $\boldsymbol{\varepsilon}$ that happened h periods ago.

Robust zero and sign restrictions in SVARs have been used in a number of applications (see Arias et al., 2014 and references therein), in particular to identify the effects of mone-

tary policy shocks.[3] This paper aims to identify two types of policy shocks by following the algorithms presented in Rubio-Ramirez et al. (2010) and Arias et al. (2014).

The sign-restriction approach does not identify one structural model. The identification is partial as we are only interested in the effects of two types of shock. In fact, a set of plausible structural models support the sign restrictions. Therefore we cannot know which of the aforementioned theoretical models performs best in fitting the data. Our results are meant to be a guide for structural model building and for policymaking.

In this paper, the restrictions are based on the conventional wisdom regarding the main characteristics of the aforementioned shocks. For instance, policy interest rate shocks are identified according to restrictions implied in Rossini and Vega (2007), while reserve requirement shocks are identified following León and Quispe (2011) and Armas et al. (2014). In all cases, we remain agnostic about the effects of policy on credit levels.

Table 6.4.1 – Zero and sign restrictions on the effects of monetary policy shocks on macroeconomic variables

	INT shock		RR shock	
	t = 0	t = 1,2	t = 0	t = 1,2
Amount of reserves	?	?	≥ 0	≥ 0
Exchange rate	≤ 0	≤ 0	?	?
Interbank rate	≥ 0	≥ 0	?	?
Reserve ratio	?	?	≥ 0	≥ 0
Credit level	0	?	0	?
Credit level (US$)	0	?	0	?
Interest rate spread	0	?	≥ 0	≥ 0
Price level	0	≤ 0	0	?
Real product	0	≤ 0	0	?

Note: INT shocks are policy interest rate shocks while RR shocks are reserve requirement shocks. Time t is measure in month and the question mark "?" means that we remain agnostic.

As far as we know, the only other paper that identifies interest-rate as well as reserve-requirement shocks is Glocker and Towbin (2012a), which also uses a mix of zero and sign restrictions in a SVAR set-up. Our paper differs from Glocker and Towbin's (2012a) in two ways. First, the sign and zero restrictions diverge. In our set-up, a surprise hike in reserve requirements increases the loan-deposit interest rate spread while Glocker and Towbin (2012a) only impose a zero effect within a month. The second difference is that the latter

3 See for example Faust (1998), Canova and De Nicoló (2002), and Uhlig (2005).

authors apply their method to Brazil while we apply ours to Peru, which features a highly dollarized financial system. Therefore, we also include an additional model where we measure the effect of shocks to reserve requirements on dollar-denominated bank deposits. The analysis sample is 1995:10–2013:12.

The first finding of the paper is that standard interest rate policy shocks can be found in Peruvian data as described by Rossini and Vega (2007) – that is to say, a tight monetary policy generates an appreciation of the domestic currency and a fall in both output and prices. These shocks are also useful for controlling credit growth dynamics in both domestic and foreign currency, and we also find evidence of a rise in interest rate spreads between loan and deposit rates. These results regarding the conventional effects of monetary policy are compatible with the general literature and the specific literature for Peru.

The second key finding of the paper is that a rise in the reserve requirement rates in both currencies can reduce lending levels. A rise in domestic currency reserve requirements reduces both domestic currency and US dollar credit levels. The fact that US dollar lending falls more persistently is explained i) by a strong liquidity channel that operates due to the willingness of banks to hold less dollar liquidity for more domestic currency liquidity after the domestic currency reserve requirement rises, and ii) because output falls, though mildly, and thus pushes lending levels a little downwards.

Figure 6.4.1 – Effects of a 0.25% Interest Rate Shock; Median Value and 66% Confidence

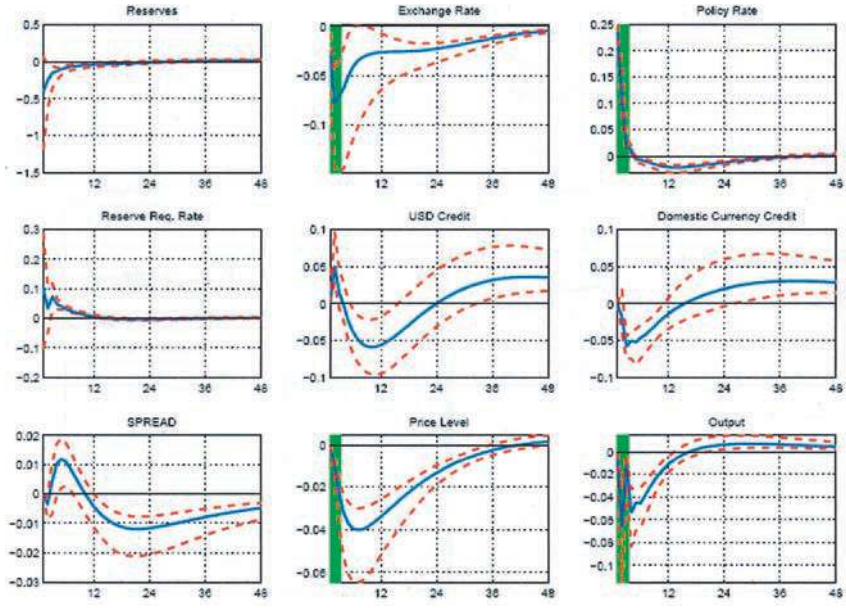
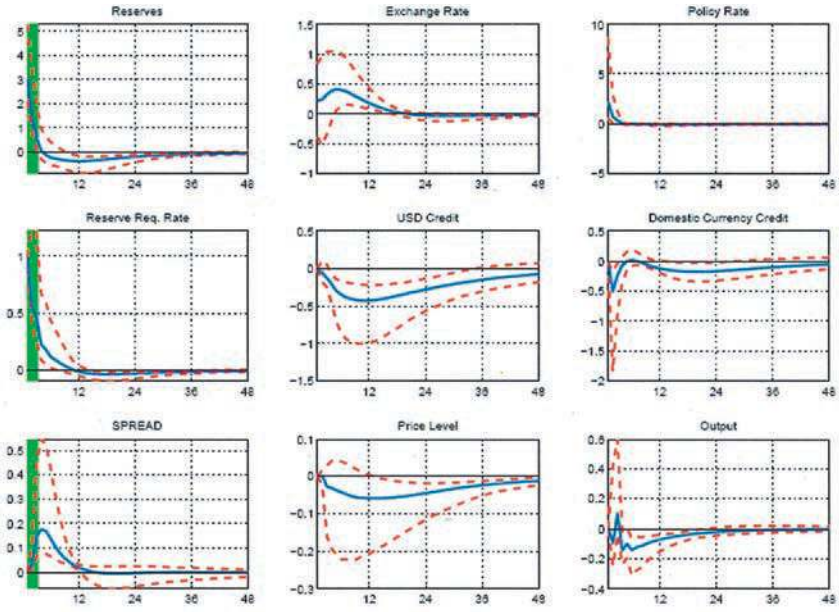
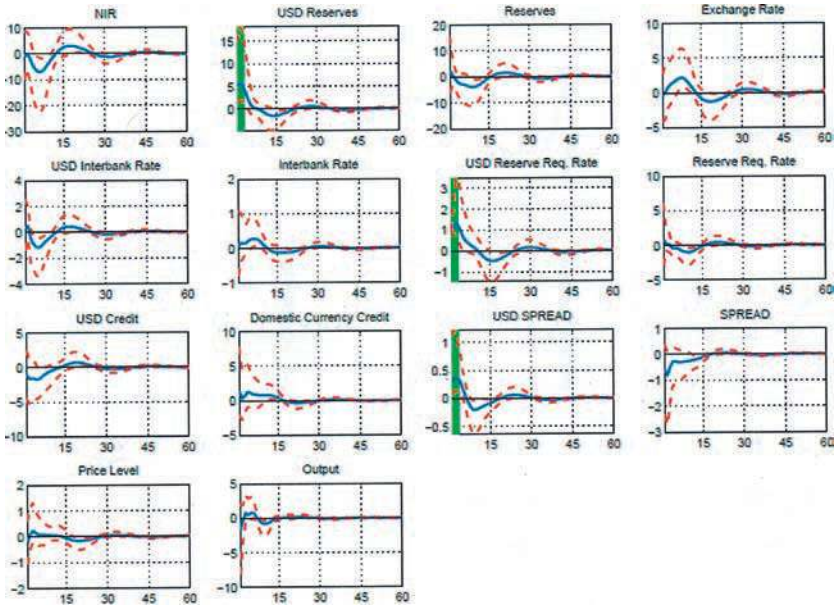


Figure 6.4.2 – Effects of a 1% Reserve Requirement Shock; Median Value and 66% Confidence



Instead, a rise in US dollar reserve requirements essentially only reduces US dollar credit. The liquidity channel, based on the liquidity swapping observed in the previous paragraph, does not operate here to reduce domestic currency lending. This may be due to the low willingness of banks to sacrifice domestic-currency assets in an era of exchange rate appreciations linked to the capital inflow period governing all the sample period.

Figure 6.4.3 – Effects of a 1% Foreign Currency Reserve Requirement Shock; Median Value and 66% Confidence



These results are interesting because they can act as guides for structural model building that integrates the presence of conventional monetary policy and the two types of reserve requirements in a dynamic setting with banks. With this type of model we could also identify the relative merits of the various channels that interact in this three-policy setting.

The findings are also important as policy guides. We can see that conventional monetary policy is better suited to controlling prices and output whereas its effect on lending activity is weaker compared to reserve requirement policies. Therefore, reserve requirement policies are a convenient way of complementing monetary policy with financial stability considerations.

6.5 A MEDIUM-TERM FORECASTING MODEL FOR TUNISIA

LAJMI MOEZ AND SIHEM EL KHADHRAOUI[1]

— Moez, L., and S. El Khadhraoui, "A Medium-Term Forecasting Model for Tunisia", Research Workshop, in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 133–139.

The main objective of this paper is to build a medium-term forecasting model for economic growth and inflation in Tunisia as a part of the analysing and forecasting device of the Central Bank of Tunisia. The model is New Keynesian and is based on the assumption that the expectations of the economic agents are rational in the presence of nominal rigidities. Its structure is inspired by the Global Projection Model (GPM) developed at the IMF; in particular the version presented by Carabenciov et al. (2008). The model, nevertheless, attempts to sufficiently replicate the specific developments of the Tunisian economy. Its equations formalize the behaviour of aggregate demand, aggregate supply, the exchange rate, and the nominal interest rate. Some parameters are estimated while others are calibrated to replicate important Tunisian economic developments.

Some Stylized Facts

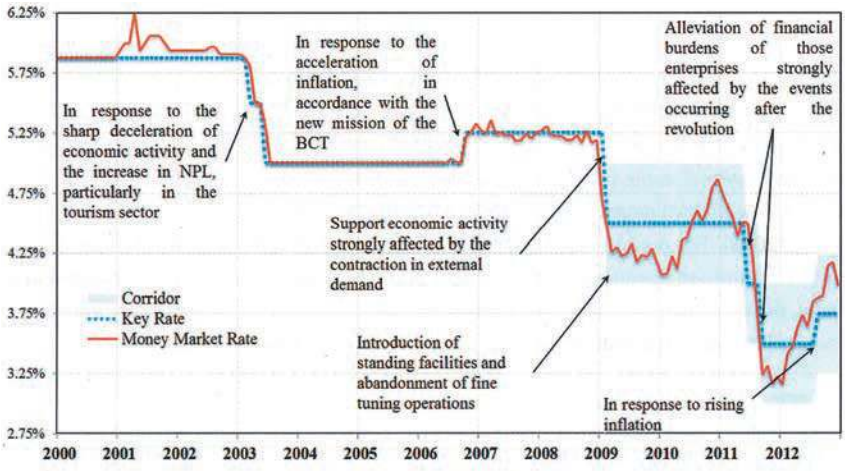
The Central Bank of Tunisia (CBT) has pursued, since the 1990s, a discretionary monetary policy, making use of multiple instruments. This orientation is explained by the bank's attachment to several objectives simultaneously. In fact, the CBT aims to support economic activity and preserve the stability of the financial system and the viability of the external position, while keeping the growth of domestic prices under control. This approach is justified not only by the ambiguity surrounding the main mission of the CBT, which consisted – according to the previous legal instrument governing the creation and the organization of the CBT – of the preservation of the internal and external value of the national currency, but also by the absence of a reliable analytical framework that would allow it to carry out its monetary policy.

[1] Both authors are affiliated with the Central Bank of Tunisia. The views expressed are those of the authors and do not necessarily reflect those of the bank.

Trends in interest rates during the period 2000–2008 show a strong reluctance on the part of the CBT to use interest rates as a main instrument in the conduct of monetary policy, mainly due to financial stability considerations.

This monetary policy, which can be qualified overall as neutral, along with the rigidity of the interest rates, has stripped the money market rate of its informative content regarding the liquidity situation and led to a substantial reduction in its role in the conduct of monetary policy. It was only with the introduction of the standing facilities and a corridor of 100 basis points around the key rate, in February 2009, that the average money market rate (*TMM*) became more flexible.

Figure 6.5.1 – Trends in the main money market interest rates



Unlike the interest rate policy, the exchange rate policy has been very active. Indeed, and in order to preserve or even improve the competitiveness of Tunisian exports, the CBT opted for a depreciation of the real effective exchange rate (REER). This strategy was abandoned in 2008 in favour of greater stability of the REER as the inflation differential between Tunisia and the Eurozone was widening.

During the period 2000–2008, economic activity performed well despite the year 2002 being strongly affected by a sharp decline in the activity of the tourism sector in the wake of the attacks of September 11, 2001, and those carried out in Djerba in April 2002. The growth rate evolved during this period, at around 5 percent on average led by strong private consumption.

The Tunisian economy depends significantly on the economic situation in Europe, the country's main trade partner. While Tunisia succeeded in 2009 in effectively managing the financial crisis thanks to its low degree of integration into the global economy and the existence of restrictions imposed on capital flows, the country was unable to avoid a slowdown in its economy, which occurred due to the economic crisis in the Eurozone.

Regarding inflation, Tunisia has managed, during the period 2000–2010, to keep its rate under control using a policy of price administration, which during this period succeeded in countering the impact of hikes in international prices for commodities and energy and contained inflation to acceptable levels. Three features have marked the evolution of prices during this period:

i. A relatively high volatility and cyclical profile, less noticeable in core inflation, with alternating phases marked, especially, by the evolution of fresh food prices.
ii. The upward trend caused by the ongoing rise in import prices mainly due to the depreciation of the exchange rate for the dinar.
iii. The high share of regulated prices in the consumption basket, despite the liberalization process initiated by the government. Thus, any unexpected adjustment in administered commodity prices is likely to cause a budgetary bias in the control of inflation and to reduce the impact of the interest rate in the transmission of monetary policy impulses.

Model

In the paper, we have considered a semi-structural model for a small, open economy. The main equations describe the dynamics of aggregated demand and supply, of the nominal interest rate, and of the real exchange rate. The approach is characterized by a reduced number of observable variables. Four variables for the Tunisian economy were used: the quarterly growth rates of real GDP and of the nominal exchange rate, the inflation rate, and the short-term nominal interest rate. For the Eurozone economy, the choice was limited to three variables: the output gap, the inflation rate, and the real interest rate.

- Price dynamics are described by a Phillips curve augmented by the real exchange rate. In this version we have assumed that inflation expectations are partly backward-looking, partly forward-looking, with the weights on the forward- and backward-looking components adding up to one. This assumption implies that current inflation is partly influenced by expected future inflation. When a firm sets its prices, it must be concerned with future inflation developments because it may be unable to adjust those prices for several periods (Walsh, 2003).
- Aggregated demand is described by the output gap equation. It is determined by past and future output as well as by the real interest rate gap, the real exchange rate gap, and the foreign output gap. In this respect, particular attention was paid to the measurement of potential output and the positioning of actual production in relation to this measure in the presence of several shocks.

- To assess the dynamics of the real exchange rate, the model uses the concept of uncovered interest rate parity (UIP) with a risk premium, where the expected exchange rate has both backward and forward components. This condition links the difference between the real exchange rate of the dinar and its expected value to the difference between domestic and foreign real interest rate gaps.
- Through a monetary policy rule, in particular a Taylor rule, we try to describe the monetary policy developments in different periods and to understand the central bank's behaviour regarding its short-term interest rate adjustments. Thus, the nominal interest rate is determined by the past rate, the deviation of the inflation rate from its desired level, the output gap, and changes in the real exchange rate. From a normative point of view, the comparison of the interest rate estimated through the rule to the rate observed allows the adequacy of monetary policy reactions to developments in the main macroeconomic variables to be judged.

Results

The model consists of 17 equations and 41 parameters. The estimation is carried out over the period 2000Q1–2012Q4. Estimation by traditional econometric methods seems inappropriate given the size of the sample, which is relatively small. To cope with such a problem, we have applied the Bayesian method, which consists in combining the information delivered by the data with prior information on the parameters of the model, which is generally gleaned from expert knowledge and/or simply deduced from economic theory.

- Results from the Bayesian estimation show that parameters are, overall, consistent with our prior beliefs. First of all, the output inertia of the IS curve is confirmed by the model (β_1=0.67). This persistence is mainly due to the sustainable growth in private consumption over the period of estimation. Monetary policy impulses, transmitted through the interest rate gap, remain limited in effect; this is because of the limited reaction and strong inertia of the nominal interest rate over a long period (β_3=0.07). Moreover, the contribution of foreign demand to aggregate demand is relatively high, reflected by the effects of the deviation of the real exchange rate (β_4=0.16) and the demand from the Eurozone (β_5=0.20).

Second, the estimated parameters of the Phillips curve give particular importance to forward-looking expectations ($\lambda_{1=}$0.67), reflecting partly the inflationary trend observed during the past decade. The effect of the output gap on inflation in Tunisia is relatively low compared to that in other countries. In fact, the output gap-inflation relationship was strongly affected by the developments of the post-revolution period. This is because the

increase in wages was not accompanied by a proportional improvement in productivity. Broadly, the results indicate that prices mostly adjust to supply shocks.

Third, the estimates of Taylor rule coefficients are globally consistent with our prior expectations. The smoothing coefficient is relatively high (γ_1=0.93), reflecting the strong rigidity of the interest rate, which is due to monetary authorities' reluctance to use this instrument over past periods. However, the interest rate seems to be sensitive to activity movements (γ_2=0.44). Moreover, the response of the interest rate to deviations in the real exchange rate is quite important (γ_4=0.16). This means that monetary policy contributed to limiting bilateral exchange rate appreciation through the decrease in the interest rate, to support the competitiveness of Tunisian exports.

Finally, the potential growth rate is estimated at 3.65 percent, which is lower than the previous figure (4.0 percent). The uncertainties surrounding this parameter are important, given the difficulty of determining, in an accurate way, if the revolution had a permanent or temporary effect on potential growth.

- The decomposition of the output gap shows a high contribution of both domestic and foreign demand shocks. Furthermore, monetary policy seems to have been quite accommodative since 2009 and, in particular, during the post-revolution period. The decomposition of inflation deviations from the average rate (4.0 percent) reflects the important contribution of the supply shocks,[2] in particular during the post-revolution period.
- Analysis of the impulse-response functions of key variables in the model shows that an increase in the nominal interest rate of one percentage point of standard deviation generates short-term appreciation of the real exchange rate. This tightening of monetary conditions led to a slowdown in economic activity after one year. The appreciation of the exchange rate combined with a negative output gap led to an easing of inflationary pressures for up to ten quarters.

In response to a positive supply shock, the real exchange rate appreciates immediately. Monetary policy reacts to these inflationary pressures, within two quarters, by increasing the nominal interest rate. As a consequence, output falls gradually and hits its trough about six quarters after the shock. An increase in the nominal interest rate implies an increase in credit costs, which may reduce consumption and investment.

In addition, an increase in demand following a positive output gap shock of one standard deviation implies pressures on production capacities and consequently tensions regarding the real costs of production. These push inflation higher in the short term. The nominal interest rate increases gradually and hits its peak about one year after the shock. These developments would imply a slowdown in economic activity and a decrease of inflationary pressures over the medium term.

---

2 These shocks are largely the result of disorder in domestic distribution channels, speculation, and illegal exports to Libya.

Finally, rising foreign demand for Tunisian products leads to an increase in output in the short term. The resulting pressures on production costs contribute to a rise in inflation. The exchange rate of the dinar vis-à-vis the euro appreciates immediately (1 quarter). Then, it starts to depreciate in order to support the economic recovery through foreign demand. Monetary policy does not impede this process and reacts gradually to inflationary pressures. It hits its peak about six quarters after the shock.

Forecasting

The model is used to perform quarterly inflation and activity growth forecasts over the medium term horizon (2 to 3 years). The projection process may be based merely on unconditional forecasts, as it can integrate specialists' judgments and appreciations, which take into account other important factors omitted from the model. This last approach is often favoured by central banks and international institutions.

The experts' judgments help to determine the most likely future developments of exogenous and endogenous variables. Regarding exogenous variables, the judgments consist in opinion regarding the economic, price, and financial developments in the world, and in particular in the main trade partner countries. They allow sources of uncertainty to be identified, and incorporated into the baseline forecast and into the construction of the fan charts. The judgments on the endogenous variables are often based on near-term forecasts (one or two quarters), which are generally derived from models that do not necessarily have the same structure as the medium-term forecasting model.

The dynamic, unconditional forecasts for eight quarters ahead, over the second half of the sample period, show that the model is quite able to track the behaviour of inflation, especially when the number of observations (quarters) increases. Over the near term, the experts' judgments can outperform the model and may provide a good starting point for the model to carry out medium-term forecasting.

Conclusions

The model presented in the paper will support the existing set of analysis and forecasting tools used at CBT. It will be used quarterly to prepare medium-term inflation and growth forecasts for Tunisia. The model's specifications seem relatively consistent with the explicit assumptions on the long-term movement of variables, with expectations, and with the Tunisian data. Using Bayesian estimation, we obtained broadly consistent results. In particular, economic fluctuations compared to a long-term trend incorporate an inertial component that is relatively important. The impact of the interest rate on activity fluctuations is relatively low. Nevertheless, the effects of the real exchange rate and of activity in the Eurozone are clearly significant. Moreover, the estimated parameters of the Phillips curve indicate an important effect of forward-looking expectations, driven by an inflationary trend

that accelerated during the post-revolution period. The output gap influences weakly the dynamics of inflation. The exchange rate pass-through is relatively comparable to similar countries. The effects of supply shocks are high, in particular since 2012, and are likely to exert inflationary pressures in the future. The Taylor rule parameters seem reasonable, with a relatively high degree of smoothing, reflecting the inertial behaviour of the interest rate over the estimation period. Finally, the further development of the model seems possible and necessary. In particular, it could integrate missing components of inflation and separate private and public agents' behaviours. Once completed, the model will be able to be used to carry out policy analysis (fiscal and monetary policies) and to build forecasts.

6.6 DISCUSSION BY PROF. CÉDRIC TILLE

The Graduate Institute and Head of the BCC programme

— Tille, C., "Discussion", Research Workshop, in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 141–143.

- *The Dynamic Effects of Interest Rates and Reserve Requirements: A Zero-Sign Restriction Approach*
  Fernando J. Pérez Forero and Marco Vega, Central Reserve Bank of Peru

- *A Medium-Term Forecasting Model for Tunisia*
  Lajmi Moez and Sihem El Khadhraoui, Central Bank of Tunisia

The recent crisis has highlighted the need for central banks to rely on additional instruments beyond the interest rate. While such instruments, such as reserve requirements, have long been part of the toolkit of policymakers in emerging economies, their use in advanced economies is more novel. As they are likely to remain relevant beyond the crisis, understanding their workings and their impact is of paramount importance.

The two papers bring complementary insights to the use of instruments other that the interest rate. The study by Pérez Forero and Vega presents an empirical assessment using a SVAR for the case of Peru, with identification achieved through restriction of parameters. The contribution by Moez and El Khadhraoui approaches the question from a theoretical perspective by developing a general equilibrium model of Tunisia for assessing the impact of various instruments and contrasts them depending on the policy regime, a focus motivated by the transition of Tunisia towards an inflation-targeting framework.

Pérez Forero and Vega are motivated by the fact that Peru uses both interest rates and reserve requirements on bank lending, the latter differing depending on whether loans are in domestic or foreign currency. The standard challenge in an empirical VAR analysis is to carefully impose assumptions in order to be able to identify the various shocks. The authors adopt a sign-restriction approach. Specifically, they assume that a higher interest rate appreciates the currency and reduces inflation and output, while higher reserve requirements raise the amount of reserves and their ratio to lending and widen the interest spread. Using monthly data since end 1995, they find that a positive interest rate shock reduces credit (in all currencies), output, and inflation, and appreciates the currency. A higher reserves shock on the other hand reduces credit, output, and prices (limited significance), and

depreciates the currency. Interestingly, the impact on credit is heterogeneous with a more persistent contraction in foreign credit. The authors also consider a shock to the reserve requirement for foreign currency loans and find that its impact is hard to measure with precision.

The paper makes an interesting contribution and raises several questions. The first pertains to the relative impact between credit volumes and GDP and inflation. An interest rate shock leads to movements of similar magnitude in credit volumes on the one hand and GDP and inflation on the other hand. By contrast, a shock to reserve requirements leads to much smaller movements in output and inflation relative to the movements in credit. In other words, a given contraction in credit is achieved at a lower cost of growth and inflation when it is driven by a shock to reserve requirements than when it results from an interest rate shock. It would be interesting to assess the underlying reasons for this difference, which could possibly be traced to the different responses of the exchange rate. The results also suggest that reserve requirements are best suited to control credit volumes, whereas the interest rate should be used to steer output and inflation.

The analysis shows a highly differentiated impact on credit volumes in different currencies. The baseline estimates indicate that a tightening of reserve requirements has a larger and more persistent impact on credit in foreign currency than on credit in domestic currency. In addition, focusing on the impact of reserve requirements on foreign currency loans leads to very imprecise estimates, an aspect that warrants further investigation.

The analysis by Moez and El Khadhraoui is undertaken in the context of a changing policy framework at the central bank. A key question is to gauge the effectiveness of the new framework. An empirical study is unfortunately problematic, as the available data relate to another policy framework. This problem can be handled by developing a general equilibrium model which can be used as a "laboratory" in which to assess alternative policy rules. Specifically, Moez and El Khadhraoui stress that economic policy in Tunisia is moving towards a clearer focus on price stability and a more active use of the interest rate.

The authors develop a standard model with the key relations in the form of a Phillips curve, an aggregate demand, a policy Taylor rule, and the impact of foreign shocks. The model is estimated using Bayesian techniques to handle the limited amount of data. The authors show that recent growth and inflation have been fuelled by the accommodative stance of monetary policy.

The paper undertakes a rigorous exercise, and leads to several observations. First, the various equations of the model are analysed in terms of gaps around reference levels. While this is a standard approach, the reference levels usually represent the steady state of the economy in the absence of shocks. The authors, however, consider that the reference levels follow exogenous processes, which raises the question of

whether these processes are consistent with the workings of the model.

A second comment pertains to the coefficient in the policy Taylor rule that the model considers. The estimated rule displays substantial inertia in the interest rate, which is to be expected as policymakers have historically smoothed the interest rate. An interesting extension would be to assess the behaviour of the economy under alternative parameterizations of the policy rule. Such an exercise would fit well with the authors' motivation to assess new policy regimes. Specifically, the authors could take their estimates of the actual time series for the various shocks and input them into a variant of the model with a different policy rule to compute a counterfactual path for variables such as growth and inflation. Such an exercise would give policymakers a sense of how well an alternative policy rule would have fared historically.

6.7 FINANCIAL MARKET INFRASTRUCTURE AND THE EFFECTIVENESS OF MONETARY POLICY IN FOSTERING FINANCIAL STABILITY AND ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM VIETNAM

TRONG VI NGO

— Trong, Vi Ngo, "Financial Market Infrastructure and the Effectiveness of Monetary Policy in Fostering Financial Stability and Economic Growth: Empirical Evidence from Vietnam", Research Workshop, in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p.145–151.

Profile of Vietnam

The slowdown in the global economy has led to falls in growth in developing economies from 2009 until the present. The Vietnamese economy was strongly affected by the financial crisis of 2007/2008. Consequently, customer sentiment was adversely affected and the VN-Index fell constantly. The global recession hurt Vietnam's export-oriented economy, with GDP growth in the period from 2009 to 2014 at less than the 7 percent per annum average achieved during the previous decade (it fell from 6.8 percent in 2000 to 5 percent in 2013, the slowest rate growth since 1999) (CIA, 2014). In 2013, the budget deficit was 4.2 percent and public debt was 48.2 percent of GDP. In order to mitigate the scale and depth of the recession, large-scale counter-cyclical policy packages were put in place, accompanied by liquidity injections into the financial system, restructuring, and changes to management oversight. There has been significant movement in the direction of less bureaucracy, more transparency, and increased efficiency. Exports were USD 114.6 billion in 2013 and increased by more than 12 percent per year; several administrative actions brought the trade deficit back into balance. This is also considered to be a result of the prospects of economic recovery in the key economies around the world.

Between 2008 and 2014, Vietnam's managed currency, the dong (VND), was devalued in excess of 20 percent (VND per USD increased from 16,548 in 2008 to 18,612 in 2010 and to 21,200 in 2014), but its value has remained stable in the past three years (CIA, 2014).

Foreign direct investment (FDI) fell by 5 percent of GDP to USD 84.6 billion in 2013 and was last measured at 7.52 percent of GDP in 2010. Foreign donors pledged USD 6.5 billion in new development assistance for 2013. In February 2011, the government shifted policy away from those measures aimed at achieving a high rate of economic growth, which had stoked inflation, to ones aimed at stabilizing the economy (and achieving price stability by an inflationary target) through tighter monetary and fiscal control. In early 2012, Vietnam unveiled a broad, three-pillar economic reform programme, proposing the restructuring of public investment, state-owned enterprises, and the banking sector. The country's economy continues to face the challenges of an undercapitalized banking sector and a high rate of inflation. First, non-performing loans (NPLs) weigh heavily on banks and businesses. The official bad debt ratio climbed to 8.8 percent in September 2012, though some financial analysts believe that it could have been as high as 15 percent. Second, inflation in Vietnam has been a serious issue in the past, but has recently declined and was recorded as being 4.32 percent in August of 2014 (from 6 percent in 2013). From 1996 to 2014, it averaged 7.24 percent, but at its highest was 28.24 percent in August 2008 (it was running substantially higher elsewhere in frontier and emerging markets) and at its lowest was 2.6 percent in July 2000. Inflation climbed to around 23 percent in 2011, due to the impact of external shocks on the domestic economy, but this was exacerbated by loose macroeconomic policies – such as a pro-growth policy stance – resulting in easy money and excessive fiscal stimulus. Therefore, the modest growth rate of 5.5 percent in 2013 (lower than the 5.9 percent of 2001 and the 6–6.5 percent targeted by the government) reflects the bad debts, the poor infrastructure, and the weak corporate governance of Vietnamese enterprises.

Over the past three years, the State Bank of Vietnam (SBV) has made considerable progress in achieving financial stability and restructuring the banking sector. As with many countries, there remain significant challenges in ensuring that the banking sector continues to support economic development. Fiscal year 2013 saw the continued success of the SBV in the field of monetary policy, foreign exchange reserves, and gold management. Progress was made in other areas of the banking industry, with mergers and consolidations amongst commercial banks and the rollout of circulars (such as circular 2), which allow commercial banks to define provisions that are more closely in line with international practice. Together with the establishment of the Asset Management Company (AMC) for NPLs, the expanded payment system is performing well, with no major system stoppages or service interruptions. All the implementing agencies have adopted the next five-year plan for information technology infrastructure development, and continue to upgrade systems with enhanced technical confidence and considerable funding of their own. Changes to organizational structure and business processes have made commercial banks more customer-centric, which in turn promotes a non-cash economy and further develops financial sector infrastructure and improves access to finance. Clearly, these improvements in Financial Management Information Systems (FMIS) and in the efficiency and effectiveness of the central bank in operating monetary policy helped Vietnam to limit the damage from the unexpected effects of internal and external economic shocks, and to accelerate economic growth.

The Link between the Financial Authorities' Effectiveness, Financial Market Infrastructure, and Economic Growth

The term "FMI" refers to the multilateral system shared by participating financial institutions, including the operator of the system, used for the purposes of recording, clearing, and settling financial transactions (BIS, 2012; Monetary Authority of Singapore, 2013; Bank of England, 2012). It has established common rules and procedures, technical infrastructure, and risk management frameworks for all participants in order to prevent or minimize risk. According to the BIS (2012), there are 24 principles grouped into five types of FMI that can be broken down into two broad categories: (i) the payment system (PS), for the first type, and (ii) the capital market system, for the remaining four types; this is the functional definition of an FMI. Participants can manage their risks more efficiently and effectively, and in some instances they can even eliminate certain risks. FMIs can also promote increased transparency in financial markets and help central banks conduct monetary policy and maintain financial stability. Therefore, FMIs should not only be safe, but also be efficient in order to contribute to well-functioning financial markets. If this is not the case, it may distort financial activity and market structure, affect participants and customers, lead to lower aggregate levels of efficiency and safety, and increase risks within the broader financial system. Not surprisingly, there exists a consensus of the role of FMIs in the smooth functioning of the economy and in the promotion of wider financial stability (Bank of England, 2014a).

Economic growth is a broad term that refers to the quantitative and qualitative changes in an existing economy or an increase in the productive capacity of an economy. It refers to the general increase in output that is measured by taking into account GDP (Gross Domestic Product). It can be measured in nominal terms, which include output, or in real terms, which exclude inflation. In economics, inflation refers to a rise in the general level of the prices of goods and services in an economy over a period of time. One of the most fundamental objectives of macroeconomic policies (especially monetary policy) is therefore to sustain high economic growth, together with low inflation. Output is expected to increase by at least the rate of inflation each year to be worth the same amount or to avoid losing value in real terms. When price levels rise, each unit of currency buys fewer goods and services. It is common sense that most people favour a low and steady rate of inflation, since it reduces the severity of economic recession and enables monetary policy to stabilize the economy (European Central Bank, 2014). Financial authorities have emphasized the costs associated with high inflation, since it leads to more conservative investment strategies or to lower levels of investment and economic growth, as well as reducing a country's international competitiveness. It is clear that high-inflation economies suffer poor growth that is positively related to poor macroeconomic policy, leading to high interest rates and a decrease in the value of the local currency (known as depreciation).

In most countries, interest rates are used as the main monetary policy instrument. Central banks set the policy interest rates at which they lend to financial institutions and influence interest rates for their own savers and borrowers (Bank of England, 2014b). They attempt to affect the price of financial assets and exchange rates, and to influence the overall level

of expenditure in the economy. A reduction in interest rates makes saving less attractive (as it reduces the income from savings) and borrowing more attractive (as it reduces the interest payments due on loans). Changes in interest rates, therefore, affect the future cash flows of consumers and firms, and the exchange rate. Lower interest rates can raise the value of the foreign currencies and increase demand for local goods and services abroad. Unfortunately, the impact of changes in interest rates on the exchange rate can seldom be predicted. However, the transmission mechanism of monetary policy shows that exchange rate movements have a direct effect on the domestic prices of imported goods and services. It also has an indirect effect on the prices of local goods and services, and on the components of overall inflation (Bank of England, 1999; Asso et al., 2007).

Central banks conduct monetary policy by directly and indirectly influencing asset prices. These include financial assets issued and traded on financial markets. Therefore, monetary policy has an intrinsic link to financial markets (Bank of England, 1999). Financial market prices reflect the expectations of the participants regarding future economic and monetary developments. These expectations, in turn, provide valuable information for central banks to adjust monetary policy in order to achieve expected outcomes (the necessary premises for sustained economic growth). Clearly, there exist links between the financial authorities' effectiveness and the evolution of the economy. Although it is difficult to prove the direction of causation, these results confirm that macroeconomic instability has generally been associated with a low rate of economic growth. Without macroeconomic stability, domestic and foreign investors will stay away and resources will be diverted elsewhere.

Central banks have the objective to protect and enhance the stability of the country's financial system. Since financial markets may rely on the continuity of the services that FMIs provide, their supervision becomes important in achieving this objective (Bank of England, 2014a). Monitoring, managing, and mitigating risk, including systemic risk, is a primary responsibility for the operators of FMIs. The central bank's role as supervisor is to ensure that the country's financial infrastructure is managed consistently with the public interest, maintaining and enhancing financial stability and reducing systemic risk (Bank of England, 2012; Monetary Authority of Singapore, 2013). Supervision of FMIs is therefore closely linked to preserving financial stability.

Literature Review

The inflation model developed by Goujon (2006) and modified by Nguyen et al. (2012) and Bhattacharya (2013) refers to a function of foreign price inflation and of movements in key economic variables (including money supply, aggregate demand, real output, the nominal effective exchange rate, and the nominal interest rate) as follows:

$$\Delta p_t = \alpha + \beta_1 \Delta \varepsilon_t + \beta_2 \Delta p_t^w + \beta_3 \Delta M_t + \beta_4 \Delta Y_t + \beta_5 \Delta r_t + \xi_t \quad (1)$$

where p denotes the log of the consumer price index (CPI), ε is the log of the nominal exchange rate against the US dollar, p^{W}_{t} stands for the international price of tradable goods (in US dollars), M represents the money supply, Y represents the level of real output (GDP), r represents the nominal interest rate (the refinancing rate), Δ is the first difference operator, and ξ_t denotes the error term.

There are several reasons why the existing literature on the links between FMIs, economic growth, and monetary policy is fairly limited. First, there is no empirical evidence showing the impact of FMIs on economic growth. Second, the existing literature on inflation determinants and dynamics in Vietnam is limited and tends to give conflicting results. Bhattacharya (2013) provides an overview of inflation developments in Vietnam from 1999 to 2012 in comparison with other emerging markets in Asia and also provides empirical evidence to define the key drivers of inflation. Her working paper focuses on understanding the monetary policy transmission mechanism and shows that interest rates in Vietnam do not have a significant impact on inflation either in the short term or in the medium term. It is concluded that the monetary policy transmission mechanism is weak in Vietnam and interest rates need to be more effective in order to combat inflation. An obvious extension of this study is to carry out an empirical investigation into the link between FMIs (as opposed to payment systems) (Monetary Authority of Singapore, 2013), economic growth, and the financial authorities' effectiveness (the monetary policy of the central bank).

Empirical Results

The purpose of this paper is to answer the key question of whether there is any connection between FMIs, economic growth, and the financial authorities' effectiveness in Vietnam? Rather than investigating the inflation determinants and dynamics of Vietnam, this paper examines the indirect contribution of FMIs to financial stability and economic growth by adding indicators in the more conventional approach adopted by Bhattacharya (2013). To accomplish the above objectives, we perform the regression model derived from the prior study as follows:

$$\Delta \mathrm{CPI}_t = \alpha + \beta_1 \Delta \mathrm{CPI}_{t-1} + \beta_2 \Delta \mathrm{GDP}_{t-1} + \beta_3 \Delta \mathrm{M}_{t-1} + \beta_4 \Delta \mathrm{NIR}_t + \beta_5 \Delta \mathrm{NEER}_{t-1} + \beta_6 \Delta \mathrm{PS}_{t-1} + \beta_7 \mathrm{MktCap}_{t-1} + \beta_8 \mathrm{D}_{gfc} + \varepsilon_{it} \quad (2)$$

The inflation model is a function of inflation (changes in the consumer price index, ΔCPI) and of movements in the key economic variables, including changes in GDP (changes in GDP growth, ΔGDP), in the money supply (changes in M2 growth, ΔM), in the nominal interest rate (changes in the refinancing rate, ΔNIR), in the nominal effective exchange rate against the US dollar (ΔNEER), the payment system of GDP (PS), and stock market capitalization (MktCap). In order to determine the impact of the global financial crisis on the economy, we add a dummy variable (Dgfc), which refers to the period after the global financial crisis of 2007–2008.

Table 6.1.1 – The effects of FMIs and monetary policy on domestic inflation

Variables	lnΔCPI
$\ln\Delta CPI_{t-1}$	0.5487*** (0.0214)
$\ln\Delta GDP_{t-1}$	0.0566 (0.0151)
$\ln\Delta M_{t-1}$	0.0863* (0.0337)
$\ln\Delta NIR_{t}$	−0.0957** (0.0591)
$\ln\Delta NEER_{t-1}$	0.0832** (0.0618)
$\ln PS_{t-1}$	−0.0602 (0.0961)
$\ln MktCap_{t-1}$	−0.0835* (0.0133)
Dgfc	0.0896** (0.0756)
AR (1)[a]	−1.86***
AR (2)[b]	−0.84
Wald test	142.65***
Sargan test[c]	48.52 P-value = 0.657

Note: ***, **, and * are statistically significant at levels of 1%, 5%, and 10%, respectively.

The value of the standard error is in parentheses.

[a] Arellano-Bond test for AR (1) in first differences.

[b] Arellano-Bond test for AR (2) in first differences.

[c] Sargan test for over-identifying restrictions in the GMM dynamic estimation.

Table 6.8.1 shows that there is a negative relationship between inflation and both banking and financial market activities. As inflation rises, its marginal impact on banking and stock market development diminishes rapidly. Further, we find evidence of thresholds, and if the inflation rate continues to rise beyond a threshold, the relationship between inflation and financial sector performance reverses (i.e. both the banking system and the stock market drop significantly). Moreover, high inflation, caused by excessive growth of the money supply, will make the population lose confidence in the local currency and will have a harmful effect on economic growth (including the further intensification of debt crises). The central bank therefore makes efforts to control and maintain low inflation for its economic benefit through contractionary monetary and fiscal policies. Given the critical role of FMIs, it is not surprising that they have become key elements in the central bank's efforts to strengthen financial stability in order to accelerate economic development.

Conclusion

FMIs play a key role in the smooth functioning of the economy and can enhance the stability of markets, and promote wider financial stability. Market functioning can be dependent on the continuity and orderly operation of the services that these infrastructures provide. Oversight and supervision of FMIs are supposed to monitor, manage, and mitigate risks (including systemic risk), which becomes a primary responsibility for the operators. These operators are closely linked to preserving financial stability. Therefore, the central bank tends to undertake its supervision of FMIs with a view to protecting and enhancing the stability of the financial system based on the design of, rules and procedures for, and the operation of FMIs. In order to connect the securities clearing and settlement system with the payment system, the SBV will assume the prime responsibility for this and coordinate with the Ministry of Finance (MoF) to ensure the delivery versus payment mechanism. This will help to avoid solvency risks when the increasing volume of transactions exceeds the processing capacity of the settlement bank. This tends to cause systemic risk and inequality between members participating in the financial markets.

6.8 FOREIGN DIRECT INVESTMENT IN GHANA: A SECTORAL ANALYSIS

IBRAHIM ADBULAI AND EMMANUEL KINFUL[1]

— Abdulai, I., and E. Kinful, "Foreign Direct Investment in Ghana: A Sectoral Analysis", Research Workshop, in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 153–160.

Introduction

Foreign Direct Investment (FDI) has been viewed as a major stimulus to economic growth in developing countries. Its ability to deal with major obstacles such as shortages of financial resources, technology, and skills, has made it the centre of attention for policymakers in low-income countries. Principally, FDI helps by adding to the resources available for investment and capital formation. The transfer of technology, skills, innovative capacity, and organisational and managerial practices between countries is also enhanced through the activities of foreign direct investors. Also, FDI helps the host country to access international marketing networks.

FDI policy in Ghana aims to achieve several objectives, including attracting investment into key sectors of the economy, creating employment, and increasing national income. Over the years, several policy initiatives have been implemented, by successive governments, including the creation of a much more liberalised regime for investment, the privatization of public enterprises, and the active promotion of investment, all of which aimed to create a positive environment that boosts investor confidence. The scope for FDI has also been expanded to allow foreign investors into sectors that were hitherto limited to only domestic investors.

A topical issue that has engaged the attention of researchers and economic commentators is whether FDI does indeed bring to the host country the numerous benefits outlined in the literature, including – for instance – impacting positively on economic growth and poverty reduction. While several studies come up with different results, the general consensus in the

[1] Both authors are affiliated with the Bank of Ghana. The views expressed are those of the authors and do not necessarily reflect those of the bank.

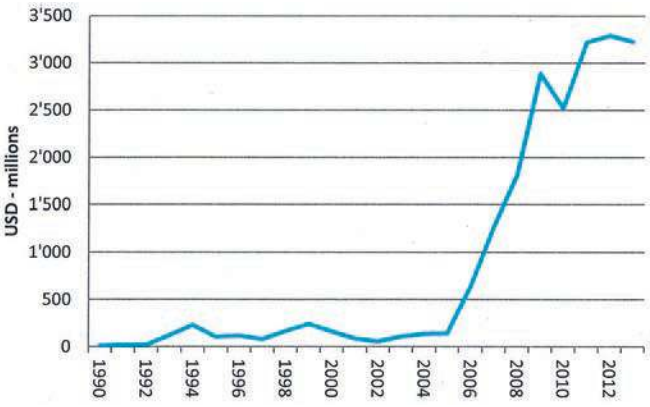
literature seems to be that the efficacy of FDI depends principally on the absorptive capacity of the host country. An emerging train of thought holds that another way of ascertaining the benefits of FDI is to analysis flows from a sectoral perspective.

The objective of the paper is to shed light on current trends in FDI flows to Ghana with specific focus on sectoral distribution.

FDI Trends

Ghana has witnessed a substantial flow of foreign investment into the country over the past two decades. This has happened in a context of generally tight global economic conditions especially during the past decade. Beginning in 2005, interest in Ghana from foreign investors picked up remarkably. This phenomenon was clearly due to the favourable macroeconomic environment and the fact that the country has been able to sustain the democratic arrangement adopted in 1992.

Figure 6.8.1 – Total FDI Flows into Ghana



Source: Bank of Ghana

The historical trend in FDI flows is largely reflected in three main phases since 1983. The period 1983–1988 witnessed sluggish inflows, averaging about USD 4 million per annum, and the highest and lowest inflows during the period being USD 6 million in 1985 and USD 2 million in 1984, respectively.

The period 1989–1992 recorded moderate inflows, averaging about USD 18 million per annum; the highest and lowest being USD 22 million in 1992 and USD 14.8 million in 1990, respectively. The period following the return to multi-party democracy shows significant inflows, particularly since 2005.

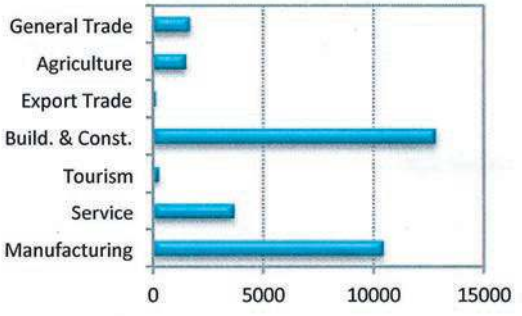
Sectoral Analysis of Foreign Direct Investment

FDI flows to all sectors of the economy have grown steadily over the years, though with some degree of volatility. The services sector (financial and non-financial), has become the hotspot for foreign investors as reflected in the growing number of registered projects. Investments in manufacturing and general trade have also witnessed significant increases in project numbers over recent years.

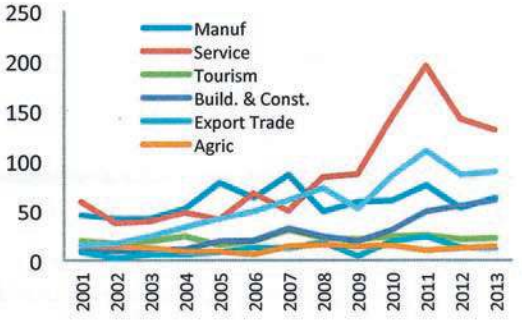
Between 1994 and 2013, the Ghana Investment Promotion Centre (GIPC) registered about 4,644 projects mainly in the services (1,438), manufacturing (1068), general trade (816), tourism (407), building and construction (441), agriculture (247), and export trade (227) sectors. The cumulative flows stood at USD 44.96 billion in the same period.

Figure 6.8.2 – Sectoral Distribution of Projects

Cummulative FDI Projects (USD millions) 2001–2013



Sectoral Distribution (Number of Projects)



Source: GIPC

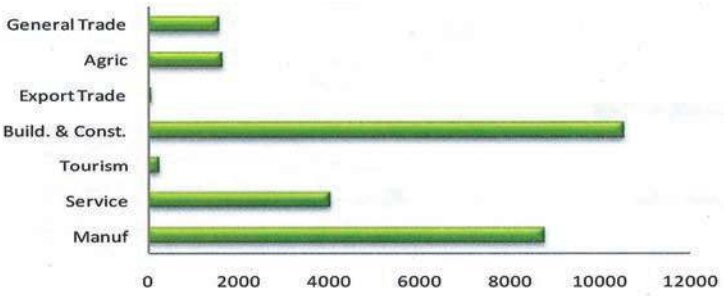
Although the services sector, in value terms, attracts a relatively smaller amount of FDI in comparison to the other sectors, it accounts for the largest share of FDI in registered projects. Within the services sector, telecommunications accounts for the largest share of FDI and continues to trigger new opportunities for services-related activities such as remote data entry operations. Another area with a significant foreign presence is banking. The entry of foreign banks including GT Bank, UBA Bank, Access Bank, and Zenith Bank has added to the presence of Barclays and Standard Chartered, which have histories in the country dating back a few hundred years.

The expert trade sector saw significant increases in FDI between 1994 and 2013 compared to other sectors, recording an average growth rate of 44.4 percent. The next to follow is building and construction with 20.6 percent, general trade with 18.8 percent, services – 12.7 percent, manufacturing – 7 percent, and tourism – 40.2 percent.

The building and construction sector accounted for the largest share of FDI stock, at USD 10,531.3 million. This is followed by manufacturing with USD 8,774 million and services with USD 4,046 million. The remainder, in descending order, are agriculture (USD 1,665 million), general trade (USD 1,594 million), tourism (USD 247 million), and export trade (USD 80 million). The building and construction and manufacturing sectors together account for 74 percent of total FDI projects in the period

The construction and manufacturing industries have seen significant growth primarily due to the strength of increased domestic and international manufacturing activities and industrial growth. Major construction projects have been launched in in recent years, bolstered by the continued growth of the domestic economy, together with increased foreign direct investment and an influx of international businesses and corporations. The increasing presence of international firms in the financial services sector is also driving forward the real estate market.

Figure 6.8.3 – Cumulative Investment Costs (USD – millions) 1994–2013



Source: GIPC

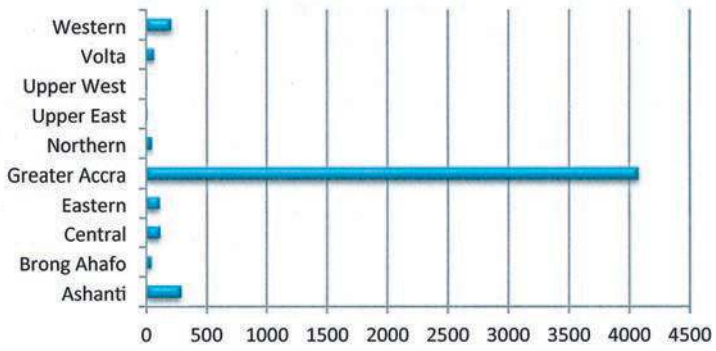
Regional Distribution of FDI Projects

Historically, FDI flows to Ghana have been concentrated in the Greater Accra region (the capital city). This is apparently due to the greater availability of social and other investment infrastructure compared to other regions. Greater Accra accounts for about 82.4 percent of total investment projects between 1994 and 2013. The Ashanti region (the second largest city) follows with 5.8 percent. The Western region accounts for 4.2 percent, followed by the Central region (2.3 percent), the Eastern region (2.2 percent), Volta (1.2 percent), the Northern region (0.9 percent), Brong Ahafo (0.8 percent), and the Upper East (0.16 percent) and Upper West (0.08 percent) regions.

Apart from issues relating to infrastructure, poverty and educational standards also affect the likelihood of FDI flowing to each region. The northern sector (Northern region, and Upper East and Upper West regions), where poverty is so high, tends to attract a smaller percentage of FDI flows compared to the southern sector. What a typical investor will obviously be looking for is the availability of a population that has the requisite purchasing power to buy whatever that investor produces. But this is a somewhat conventional argument, given that the expansion of trade that followed the significant withdrawal of trade barriers between countries in recent times means that whatever is produced can also be exported to other areas where a market exists for it. The infrastructural consideration can be seen as playing a leading role as far as foreign investors' decisions to invest in a particular locality are concerned.

A key factor that seems to have exacerbated the problem is that past government policies, seeking to address investment issues in Ghana did not appropriately highlight the opportunities that exist in regions other than Accra. This made the Greater Accra region the most attractive location for setting up businesses.

Figure 6.8.4 – Regional Distribution of FDI projects (1994 – 2013)

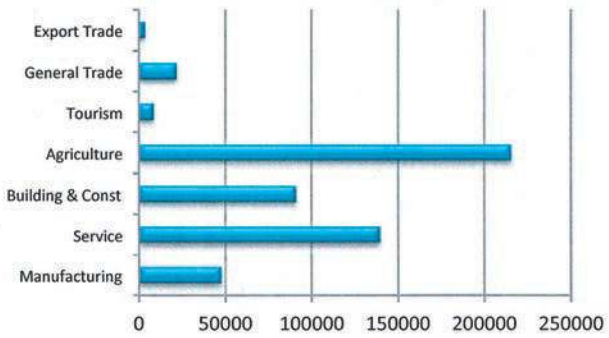


Source: GIPC

Expected Employment

As with most developing countries, tackling high and rising unemployment is a key policy objective in Ghana. Policies for attracting foreign investment go beyond merely attracting capital into the economy but invest in areas that have significant employment generation potential. Based on data provided by the Ghana Investment Promotion Centre, various FDI companies are expected, in total, to have created about 570,000 new jobs across the various sectors of the economy between 1994 and 2013. The agriculture sector has been a major driver in terms of employment as it contributed over 215,000 new jobs. The services sector has also been quite robust, thanks to the entry of new telecommunications companies and the licensing of new foreign banks.

Figure 6.8.5 – Number Jobs created through FDI Investment by Sector 2001–2013

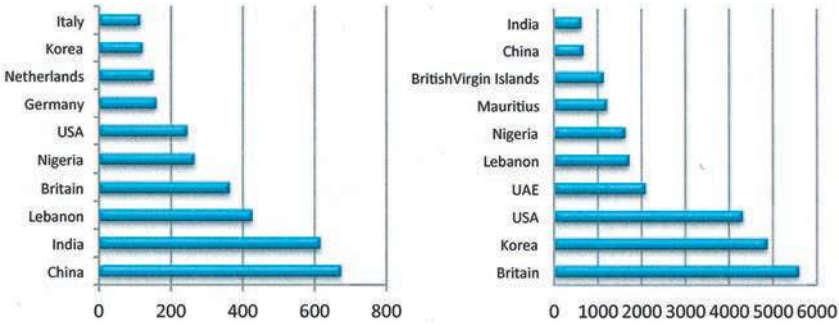


Source: GIPC

Sources of FDI Flows

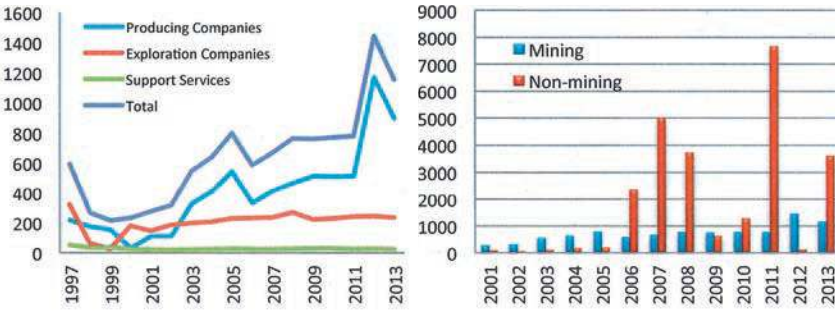
The sources of FDI have varied over recent years. Traditionally, Europe and especially the United Kingdom have been the largest sources of FDI flows to Ghana, mainly into mining and other resource-based activities. The leading sources of FDI projects between 1994 and 2013 are the United Kingdom, South Korea, and the USA. Even though China and India have a significantly larger number of projects, the value of those projects is much lower as most of the investment is in small-scale sectors of the economy. Countries like the UK, Korea, and the USA invest in areas such as telecommunications, oil and gas, and the financial sector.

Figure 6.8.6 – Sources of FDI Flows by Country 1994–2013



Source: GIPC

Figure 6.8.7 – Mining and Non-mining FDI Flows (USD millions)



Source: GIPC and Minerals Commission

Conclusion

The analysis shows that there has been a significant flow of foreign investment into various sectors of the economy, although the services sector seems to attract a significantly larger number of projects. In terms of regional distribution, foreign investment has been skewed towards the Greater Accra region.

Issues that are packaged in investment laws must adequately capture the advantages of investing in regions other than the capital city. For instance, it could be cheaper to invest in the Northern region due to lower labour costs, a fact that could be exploited to the advantage of the investor. This is, however, contingent on the government providing basic amenities such as water and electricity. This could be achieved by setting up export processing zones in various regions, with added incentives. This, along with a good policy environment, would probably help reduce the imbalance with regards to the flow of foreign capital into the various regions.

While efforts are made to encourage foreign investment, domestic investors must also be paid the necessary attention as are their foreign counterparts. More often than not, this is not the case with domestic investors because they are perceived as lacking the necessary capital and expertise required to undertake the kind of investment that is undertaken by their foreign counterparts.

6.9 DISCUSSION BY PROF. YI HUANG

The Graduate Institute Geneva

— Huang, Y., "Discussion", Research Workshop, in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 161–162.

- *Financial Market Infrastructure and the Effectiveness of Monetary Policy in Fostering Financial Stability and Economic Growth: Empirical Evidence from Vietnam*
  Trong Vi Ngo, State Bank of Vietnam

- *Foreign Direct Investment in Ghana: A Sectoral Analysis*
  Ibrahim Adbulai and Emmanuel Kinful, Bank of Ghana

The two papers have discussed popular issues within the topic of financial market development and investment.

The paper by Ibrahim Adbulai and Emmanuel Kinful investigates the features of FDI inflows to Ghana over the last few decades, with a particular focus on sectoral distribution. It shows that the building and construction sector and the manufacturing sector have absorbed more than 70 percent of these FDI inflows. When it comes to the regional distribution of FDI-funded projects, there is a significant concentration in the capital city. In addition, FDI inflows have also demonstrated a significant welfare effect by boosting employment across the country. Overall, this is a very informative paper.

I would like to raise some questions and offer some comments and suggestions. First, we observe a surge in FDI inflows since 2005. What are the driving factors accounting for this trend? Second, why does the service sector absorb a large proportion of FDI inflows in terms of its number of registered projects? Third, how should we interpret the effect of FDI on employment, especially for the agriculture sector? Since all these issues need to be extensively studied, I would suggest the authors focus on one issue in their next paper.

The paper by Throng Vi Ngo uses GMM-IV (general method of moments with instrumental variables) to evaluate the connection between FMIs, economic growth and the of financial authorities' effectiveness in Vietnam, especially during the global financial crisis. Talyor's Rule and the inflation model developed by Goujon (2006) make up the theoretical foundations of this study. The empirical results indicate a significant role for both the central bank and FMIs in enhancing financial stability.

One major concern of the paper is the justification of the instrumental variable. For

this empirical study, an issue to be addressed is the endogeneity of the explanatory variable. Throng Vi Ngo proposes to use IV to obtain consistent estimates. However, the author fails to provide details regarding either the selection or the justification of the IV of interest.

I would offer some suggestions for this paper. Firstly, the author should explicitly state the endogeneity problem and provide intuitions behind the selection of the instrumental variable. Secondly, since most numerical analyses are sensitive to the variables and samples used, the author needs to conduct a sensitivity check to evaluate the robustness of the model.

7. Concluding Remarks

PROF. JOSÉ DE GREGORIO
University of Chile, and Peterson Institute for International Economics

— De Gregorio, J., "Concluding Remarks", in *Financial Sector Development: Policies to Promote and Strengthen Local Capital Markets, Proceedings of the Second Annual Conference of the Bilateral Assistance and Capacity Building for Central Banks Programme (BCC)*, Bern: Swiss State Secretariat for Economic Affairs; Geneva: Graduate Institute of International and Development Studies, 2015, p. 163–174.

Some Challenges for Financial Policies in Emerging Markets

Thanks for the invitation to make some comments on financial markets and implications for research and policymaking. There have been many discussions, at the academic as well as at the policy level, on financial markets policies. Regulation, macroeconomic implications, and how to foster safer and deeper financial systems have been high on the agenda. In these brief remarks I would like to discuss three issues. To set the stage, I will begin by discussing the benefits and risks of financial development. Then, I will express some concerns regarding financial and monetary policies in emerging-market economies, beginning with capital account management and the accumulation of reserves. In the third section, I will comment on monetary policy in a financially integrated world, and whether and how countries can run an independent monetary policy subordinated to domestic objectives rather than to the global financial cycle. I will end with the issue of "the original sin" – the ability of emerging markets to borrow in their own currency. While this may bring benefits in terms of risk sharing, it brings with it the handicap of greater exposure to global financial market volatility.

Challenges for Financial Development

Financial systems are essential to development, but they can also be a source of serious problems. These contradictions can, in turn, be a source of policy confusion and ambivalence.

Financial intermediation is good, and with the backlash from the crisis it should be remembered that a well-functioning financial system is key to prosperity. It promotes economic growth by channelling investment funds from savers to borrowers (Levine, 2006). It is central to promoting entrepreneurship and to facilitating investment, including human capital accumulation. It provides financing to households in order to smooth consumption, and it provides insurance. It provides safe and cheap means of payment. The difficulties faced by households and firms in many emerging-market economies due to underdeveloped financial institutions and markets should be a clear reminder of this positive role that financial intermediation plays.

But financial depth may also be a source of great problems. As in many situations, more is not always better, especially in cases where "more" is at the cost of excessive risk. It is known that recessions that accompany financial crisis are much more costly in terms of output losses (Reinhart and Rogoff, 2009). In the past, in Latin America and Asia, currency crises had output costs of 7 percent of GDP in a five-year period, and when crises accompany a banking crisis the costs double (De Gregorio and Lee, 2004). Therefore, a strong financial system, and sound macroeconomic policies, can be very effective in mitigating the costs of crisis. Unfettered financial markets are prone to deep crisis, and crises are very costly. But also, regulation has its limitations, and may be a source of problems, due to negligence, political capture, or other agency problems. In addition, financial problems, or even crises, are not always avoidable. Therefore, a strong institutional framework for preventing crisis and allowing financial depth is required, but a good system for crisis resolution is also essential.

There is plenty of research that concludes that economies with deep financial systems grow more. However, studying this issue in Latin America many years ago I came to the conclusion that, in the region, growth during the 1980s was lower in countries with more developed financial systems, since the collapse of their economies during the debt crisis was more significant (De Gregorio and Guidotti, 1995). Indeed, it was Carlos Diaz-Alejandro, in the mid-eighties, who eloquently said "Good-bye financial repression, hello financial crash" (Diaz-Alejandro, 1985). Some recent research also points in the same direction, indicating that beyond a certain level, financial depth makes a marginal contribution to growth.

We know that periods of tranquillity and financial innovation can lead to financial imbalances, which become evident only when a crisis arrives. Financial innovation often comes about for sensible reasons. Financial inclusion is – of course – good, but if not carried out properly and with the necessary safeguards, could be a cause of distress. It is useful to remember that in the origins of the global financial crisis lay a noble cause: providing housing to low-income families. This was perhaps the response to rising income inequality and the lack of other policies for correcting this problem in a fast and efficient way. Ironically, the crisis affected more intensely precisely those that were supposed to benefit from financial inclusion.

There are many other cases in which well-intentioned developments are implemented through weak policies. Take the case of interest rate ceilings. In order to promote fairness, many countries introduce limits on interest rates on loans. This policy principally attempts to protect people with disadvantages and allow them to participate in the financial system. If this ceiling is set low enough, it may end up generating exclusion rather than lower financial costs for households, who may end up paying much higher interest rates in informal credit markets.

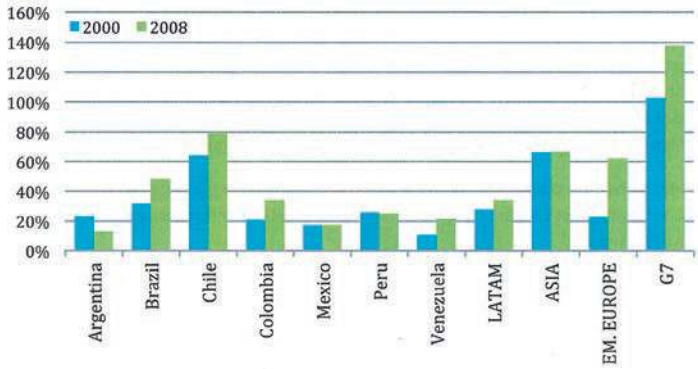
On the other hand, imposing heavy regulation may lead a relevant fraction of borrowers to move to the shadow financial system. Risks may shift to unregulated areas of the market, and – of course – there is a complex trade off. Unregulated areas may contaminate the whole financial system. But, the temptation to extend the regulatory perimeter may increase moral hazard and risk-taking.

All financial developments should be properly evaluated for potential vulnerabilities. Of course, performing acid stress tests, in particular on the solvency of borrowers, is central. Let me just illustrate this point by looking at the increase in credit prior to the crisis in Latin America and other regions (Figure 7.1). The rise in financial depth is quite remarkable in advanced economies (G7) and in emerging Europe. In emerging Europe it is possible to think about financial deepening through the access of new households and firms to credit, but there was certainly a significant credit boom. This also was the case for G7 countries.

The expansion of credit in Latin America and Asia was moderate, and banks were in a relatively solid position to face the global crisis. They were also highly capitalized and not involved in complicated financial off-balance-sheet operations. Perhaps the debt crisis of the 80s, the Tequila crisis in the 90s, and the Asian crisis resulted in a regulatory framework that was able to avoid excesses. Having lived through deep crises and having paid the costs has made bankers more conservative than in other parts of the world. These countries were able to navigate successfully during the global crisis.

The fact that emerging markets had resilient financial systems during the global crisis does not imply that there are no challenges. Financial systems tend to be too interconnected and procyclical and this may threaten financial stability. As financial innovation proceeds, necessary steps have to be taken to preserve soundness. Macroprudential policies could be developed; however we still need to learn more about their effectiveness and proper design. We need to avoid the temptation of thinking that by applying some new tools we can downplay fundamentals, such as strong macroeconomic policies and well-capitalized and regulated financial systems. In many emerging markets macroprudential regulation is not new, and perhaps we have to look more closely at what rules and constraints on financial activities have worked well.

Figure 7.1 – Private Credit as Share of GDP (%)



On Capital Account Management and the Accumulation of Reserves

An issue that has been dominant in international finance in small, open economies is the role and potential destabilizing effects of capital flows. Periods of rapid capital inflows may end in very costly, sudden stops. The accumulation of reserves, and capital controls, are the main tools policymakers have used to manage the capital account. However, I want to raise some issues on the interpretation and policy implications of capital flows.

The first refers to the distinction between gross versus net flows and their respective implications regarding macroeconomic and financial stability.

Net capital inflows are the counterpart of current account deficits, when there is no accumulation of reserves. Excessive net inflows may be an indication that the economy is running an unsustainable current account deficit. What is driving this, the current account imbalance or capital inflows? This is an open issue, and of course causality should go both ways, but this requires further analysis. If the cause of large net inflows is the current account, one has to think about macroeconomic policies to contain aggregate expenditure. In contrast, capital account management seems more appropriate when the driver is financial flows. As a first approximation, the current account – or net inflows – is what matters for exchange rates, in particular for the real exchange rate, which is the relative price that gives the signal for resource allocation and demand patterns consistent with savings and investment decisions.

Gross inflows, in turn, are the response to portfolio allocation and are central to financial stability. The form and volume that gross flows take have a direct impact on the vulnerability of the financial system. It has long been argued, rightly, that foreign investment and equity flows are more stable, while banking flows are more likely to be subject to sharp reversals.

Therefore, it is important to be clear about the objectives of different policy actions. Whether they are geared to affect the volume of net flows or the composition of gross flows is relevant to the choice of instruments. In particular, we would expect that concerns

regarding the exchange rate have to do with net flows; those regarding financial stability with gross flows. For net flows, any policy must be broad based. By contrast, a differentiated policy aimed at affecting various types of gross flows in a different way is more reasonable to deal with financial vulnerabilities.

A second issue relevant to capital flows is how we interpret them in the presence of an accumulation of reserves. In this case net capital inflows equal the current account deficit plus accumulated reserves. In other words

$$CA + FA = \Delta R \tag{1}$$

where CA and FA are the current and financial account balances, respectively, and ΔR is the change in international reserves. Therefore, net capital inflows may be the result of both a current account deficit (-CA) and international reserve accumulation (ΔR). Or, with causality running the other way around, accumulation of reserves may be the result of large capital inflows.

In the case that reserve accumulation has no effect on the exchange rate, and therefore no effect on the current account, as in a frictionless world, FA will change one-to-one with ΔR. Therefore, for the accumulation of reserves to be effective in reducing capital flows it is necessary for it to have effects on the exchange rate and the current account.

The evidence is inconclusive, but it is interesting to contrast the evidence of surges in capital flows during the 1990s and the "2000s" to illustrate that they may be caused by different phenomena (De Gregorio, 2014).

Table 1 shows episodes of surges of net capital inflows since 1990 in a large sample of countries. The surges are those identified in Ghosh et al. (2012) and I add the current account balance and the increase in reserves in both decades for three groups of countries. In the 1990s, capital inflows to Asia and Latin America were much more significant than in the 2000s. Particularly in Asia where the average surge was 7.6 percent of GDP, while the current account deficit was 4.8 percent of GDP. This is consistent with the fact that some Asian countries had increased current account imbalances before the crisis. In contrast, during the 2000s only Korea had a couple of surge episodes, but these were associated with a large accumulation of reserves with current account surpluses. Current accounts were in surplus, while net inflows were the result of reserves accumulation. In Latin America, net capital inflows during the 2000s were slightly less than during the 1990s, although their composition in terms of current account deficit and accumulation of reserves was quite different. During the 2000s there was much more reserve accumulation. During the 1990s net capital inflows were indeed the counterpart of significant current account deficits, which was not the case in the 2000s.

Table 7.1 – Surges of Capital Inflows (in % of GDP)

		Net Capital Flows	Current Account	Change in Reserves
LATAM	1990s	7.5	–4.6	2.5
	2000s	6.7	–1.7	4.2
Asia	1990s	7.6	–4.8	2.8
	2000s	3.7	3.2	5.6
Europe	1990s	11.0	–6.4	4.4
	2000s	17.3	–10.5	3.1

Sources: Ghosh et al. (2012) for Net Capital Inflows and IMF-IFS for current account and reserves accumulation.

"Emerging Europe" exhibits the opposite characteristics. Surges of capital inflows were much more frequent and larger than those in Latin America and Asia. In addition, during the 2000s they responded much more to very large current account deficits; more than double those experienced in the other regions. In hindsight, the region really suffered a "capital-inflows-unsustainable current account problem."

This evidence illustrates that interpretations of surges in capital inflows are diverse, and therefore that the related policy implications are not straightforward. Beyond the traditional push and pull factors explaining capital inflows we should add a third factor: that of reserves.

But there are also other policy factors that we should look at when discussing capital inflows. Some acute examples of the phenomenon have coincided with high domestic interest rates and pressure on the exchange rate. This was the case for Chile in the 1990s and Brazil in the 2000s. In both cases, capital controls were applied to contain the appreciation of the exchange rate and to limit capital inflows. However, success – at least from the exchange rate perspective – was at most limited. Interest rate differentials with Fed funds were about 10 percentage points at the peak of the inflow period in both episodes.

This leads me to my final points regarding capital account management and the role of capital controls. We have seen recently some interesting analytical research on the usefulness of capital controls (e.g. Brunnermeier and Sannikov, 2014; and Korinek, 2011). If an economy is subject to pecuniary externalities, which increase vulnerability, then the use of capital controls – or Pigouvian taxes – serves the purpose of macroprudential policies. It is good that new models are introducing financial frictions in order to understand the business cycle and its policy implications. In this regard, the issue is: What are the appropriate financial policies for reducing fragilities? Indeed, as most distortions have to do with excessive credit, with regards to credit booms prudential policies could be more appropriate than capital controls.

There is somewhat of disconnect between analytical developments, the evidence, and practice with regards to capital controls. The evidence has broadly shown that capital controls have a very limited effect on flows and almost none on exchange rates. There are problems, though, in translating theory into practice. When investors have incentives to take a long position in a given country and some forms of inflows are restricted, they just use other, less regulated forms of investment. Controls may generate some short-term frictions, but unless they apply to all types of flows their effectiveness is impaired. Indeed, recent research has highlighted the perils of capital controls in a highly liquid, global economy.

Firms in emerging markets have had high incentives to borrow in global markets, as interest rates are very low or because restrictions on capital flows may create an arbitrage opportunity for firms subject to less strict controls. This borrowing could be to finance investment or restructure liabilities, or to behave as financial intermediaries. When banks are limited in their ability to raise funds abroad, corporations may borrow and deposit the proceeds domestically.

Shin and Zhao (2013) analysed this issue for four Asian countries: China, India, Indonesia, and Korea. Non-financial firms use cash or borrow in order to invest, their financial assets and liabilities moving, therefore, in opposite directions. In contrast, financial intermediaries borrow to lend and hence the correlation between financial assets and liabilities is positive. Using this insight, Shin and Zhao (2013) compare the case of Asian economies with that of the US economy. The evidence shows that while in the US the correlation zero, in the four Asian countries it is positive, and – hence – large corporations are surrogate intermediaries. Caballero et al. (2014) address this issue for Brazil and Chile for non-financial corporations during the period 2002–2012, and conclude that in Brazil the correlation is positive, while in Chile it is zero. The policy implication is that when carry trade is attractive, non-financial corporations with access to global markets could take advantage by behaving as intermediaries.

If the problem is the volume, and not composition, restrictions must be broad based, something that in general is not possible to implement. Moreover, most theories refer to problems with excess credit and financial vulnerability, and regarding this concern a more efficient route would be to regulate and limit the activities of the banking industry. This has indeed been the case in emerging markets. It was, for example, done in Korea with non-core liabilities in the banking system. But in such a case we could expect non-financial firms to borrow, and while this measure could be good for financial stability it would not, perhaps, reduce the volume of inflows. Finally, I do not know of countries where one could argue that a cornerstone of successful macroeconomic management during the global financial crisis has been capital controls; as could be stated, for example, of exchange rate flexibility.

One risk with the use of capital controls is that policymakers may not possess a proper evaluation of the causes of flows and exchange rate tensions. The use of capital controls may give central bankers the perception that they can significantly raise interest rates without experiencing repercussions on exchange rates. But, if the controls have small effects on the exchange rate, severe monetary tightening will cause an appreciation of the currency and large incentives for carry trade. The cause of this appreciation would be the misperception

that the currency is immune to monetary policy, and policymakers could end up blaming foreign investors for being eager to bring capital.

Monetary Policy in Emerging Markets: "Trilemma" or Dilemma?

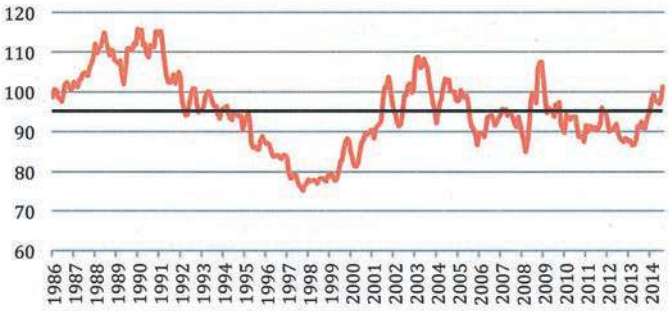
The impossible trinity states that a country cannot be open to capital flows, manage the exchange rate, and have independent monetary policy. So, the implementation of inflation targets has come with a flexible exchange rate in order to maintain an independent monetary policy. This view has been challenged recently by Rey (2013), reducing the trilemma to a dilemma: countries with open capital accounts cannot have an independent monetary policy. This view highlights the high degree of financial interconnectedness in the world, and the key role played by the US as a financial centre. International transmission takes place through credit growth, asset prices, and gross capital flows. Therefore, emerging markets are unable to isolate themselves from the financial cycle unless they restrict financial flows.

Coming from a small, open economy, I do not recall periods in which we felt constrained by international financial conditions in our conduct of monetary policy. Of course, conditions in the global economy had an impact on the domestic economy, which has to be taken into account when setting monetary policy rates. However, this is not a very rigorous demonstration that we can effectively run independent monetary policy.

A first constraint policymaker's face is exchange rate fluctuations, which could hamper development goals such as competitiveness. This was what exactly happened with the commodity price boom before the crisis. Exchange rate tensions were significant, and sterilized exchange rate intervention was used to avoid an excessive appreciation. There was no evidence of massive inflows, the economy was running a current account surplus, and so it was exporting capital. Despite the fact that intervention may have limited effects, it also serves the purpose of reserve accumulation, which provided a significant buffer of foreign exchange in case a sudden stop or a massive speculation against the peso took place. This dual purpose of reserve accumulation also helps us to understand why contingent credit lines have not been successful, since they do not provide an exchange rate management tool.

Despite exchange rate fluctuations being significant under a flexible exchange rate, they are not more pronounced than those in periods with more exchange rate management and capital controls. Figure 7.2 shows the evolution of the real exchange rate in Chile since the mid-1980s. Since the exchange rate was allowed to float and capital controls were removed in 1999, the short-term volatility of the exchange rate has been larger than before, but at a lower frequency the movements have been less extreme. Despite tensions in foreign exchange markets, the exchange rate has acted as a shock absorber. And this is good; otherwise, all price adjustment will have to fall on the interest rate.

Figure 7.2 – Chile, Real Exchange Rate (1986=100)



Source: Central Bank of Chile.

A relevant issue is whether domestic interest rates are highly correlated with foreign interest rates, which would be an indication of little independence of monetary policy. This issue has been recently analysed in Obstfeld (2014), who shows that emerging-market economies have significant degrees of monetary independence. It is normal that short term interest rates can deviate significantly, but the issue is to what extent long-term rates can deviate from the external rate. Figures 7.3 and 7.4 review the case of independent monetary policy in Chile. As can be seen in Figure 7.3, the correlation of long-term rates is relatively weak. It is interesting to note that when tapering of QE was announced in May 2013 long rates did not increase, as was the case in most emerging markets. More recently they have been declining in response to monetary policy loosening.

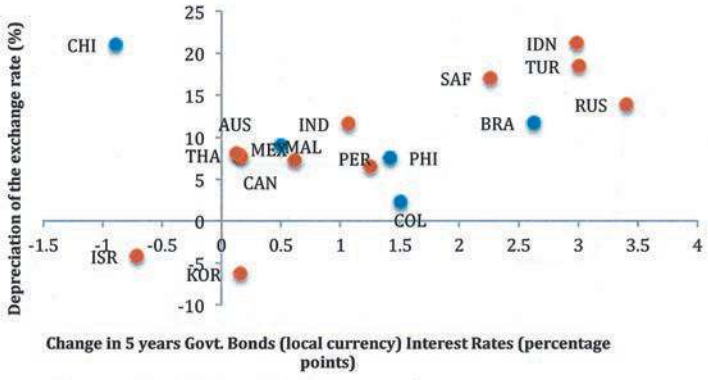
Figure 7.3 – Chile Monetary Policy Rate – 10yr Peso and US Bonds (%)

Source: Bloomberg. Monetary policy rate (MPR), US 10-year bond yield (GT-10), Chile 10-year Peso denominated bond (Peso-10).

Figure 7.4 shows the evolution of exchange rates and long-term rates (5-year rates) for a number of countries since tapering was announced. Chile is somewhat of an exception. While we observe a clear, positive relationship between depreciation and the increase in

long-term rates, in Chile the depreciation has been sharp, but long-term rates have declined. This is not the result of capital controls. Although this is a special case, it would be interesting to learn more regarding what the determinants are for the degree of monetary policy independence. In the case of Chile there are two particular features. First, fiscal policy is quite strong, and the country has close to zero public debt. And second, although Chile has been able to mitigate the "original sin" problem, by which emerging markets are not able to borrow in their own currency, foreign participation in the bonds market is relatively low.

Figure 7.4 – Exchange Rate Depreciation and 5 years Interest Rates; May 2013–August 2014 (%)



Source: Bloomberg

Of course, having the ability to change interest rates independently does not mean that emerging markets can avoid the financial cycle, in particular the waves of credit booms. But as I have already mentioned, while the G7 and "emerging" European countries went through severe credit booms, which sowed the seeds of the financial crisis, Asian and Latin American countries did not follow such an extreme credit cycle. Despite the expansion of global liquidity, they had very resilient financial systems.

Overall, many emerging markets were successful in weathering the global financial crisis without relying on capital controls or special policies. Many used some form of macroprudential tools to control overexpansion of the financial system and excessive risk-taking. They already had sufficiently sound financial markets, enough exchange rate flexibility and ample policy space to face the worst financial crisis since the Great Depression with much more success than they had previous, milder, crises.

How to run effective monetary policy is an issue high on the policy and academic agenda. However, most emerging-market economies have been able to successfully navigate periods of extreme financial turmoil, mostly through the use of sound monetary and fiscal policy and flexible exchange rates, with an adequately regulated financial system. Before proposing a new and massive set of tools, it is useful to be clear regarding what worked and where we need to persevere.

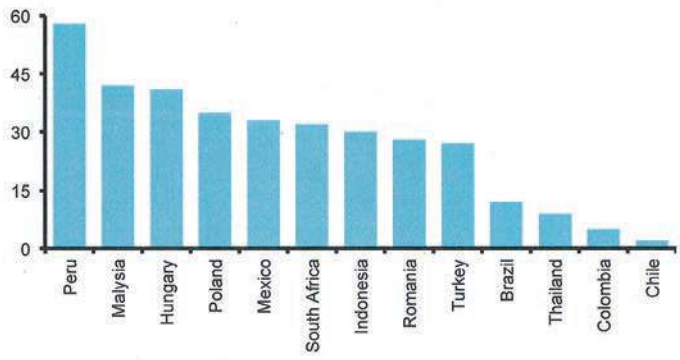
The "Original Sin" and Foreign Investors

After the Asian crisis it was argued that one of the key problems of emerging-market economies was that they were unable to borrow in international markets in their own currencies. Thus, there was no risk sharing since the wealth effects of a real depreciation would fall entirely on domestic residents. This was called the "original sin" (Eichengreen et al., 2005). In contrast, in advanced economies that can borrow in their own currency, some costs of a real depreciation are born by foreign investors. This idea behind this argument is that a real depreciation in the US generates a positive wealth effect for the US since the world is long on US assets.

There is strong evidence that there has been some redemption of this "original sin". In recent years, foreign participation in local bonds markets has increased. Borrowers have more opportunities in domestic markets denominated in domestic currency. As Alfaron and Kanczuk (2014) report: "While debt in emerging markets increased from close to [USD] 1 trillion in 2000 to more than [USD] 4 trillion in 2010, the composition suggests a shift away from foreign-currency-denominated debt, which fell from 11 percent in 2000 to 4 percent in 2010. More importantly, the participation of foreign residents in the emerging markets' domestic-bond markets has increased. According to BIS, in 2000 [...] foreign investors accounted for less than 1 percent of the total stock of local currency – sovereign bonds in most emerging markets. By 2010, this share had increased to 30 percent in Indonesia, 18–22 percent in Mexico and Malaysia, 14 percent in Brazil, and 10 percent in Korea."

Figure 7.5 shows foreign participation in local bonds markets for a number of emerging markets, which is an indication of the redemption of "original sin" across countries. At one extreme, foreigners account for 60 percent of local bond holdings in Peru, while they represent less than 5 percent in Chile. These differences could be due to two main factors. First, the relevance of local investors: In Chile, institutional investors are quite important; mostly pension funds and insurance companies. Second, more relevant than the existence of capital controls for fixed-income foreign investors, which in Chile are absent, is tax treatment for foreign investors. Tax rates, as well as how taxation is treated – for example, capital gains taxes – are relevant to the participation of foreign investors in local markets.

Figure 7.5 – Foreign Participation in Local Bond Markets (% of GDP)



Source: Central Bank of Chile based on IMF and World Bank data; First quarter of 2012.

How relevant is "original sin"? Is redemption beneficial? A return to Figure 7.4 may shed some light on these questions. Chile, which is a country with very few foreign investors in local bond markets, is also a country where the exchange rate and interest rates moved in an expansionary direction after tapering was announced. This fact illustrates that the participation of foreign investors brings with it the handicap that markets are more volatile and dependent on global, rather than domestic, financial factors. At times of turmoil, investors look for safe havens in their markets of origin. Thus, during these episodes they will look for safe havens at home, dumping their foreign exposure. This could explain the fact that most countries have experienced tightening of financial conditions since mid-2013, as foreign investors abandoned, partially, emerging markets.

In contrast, when local investors dominate bond markets, the impact of global portfolio adjustment will be more muted. Therefore, despite the fact that the participation of global investors allows for risk sharing, it may also increase volatility and reduce monetary policy independence.

However, the evidence on the redemption of "original sin" is still incomplete. First, we do not have a complete picture of the actual extent to which the "original sin" has been redeemed, as we need to complement these data with the net position in derivatives markets. Foreign investors may buy local bonds, but at the same time they could be hedging their currency exposure. The same occurs with local investors in foreign markets where they also could be hedging their currency exposure. Overall, we have been able to observe significant cross-border activity, but with most of the currencies' exposure being hedged using derivatives. We need more information in order to carry out a more accurate assessment.

The normative challenge is how to benefit from risk sharing, with limited volatility of financial conditions and increased monetary policy independence. The most stable hedge is foreign direct investment, which is also less sensitive to short-run financial turbulence. Therefore, we will need to combine further figures on derivatives markets and foreign direct investment to have a more complete view of the true state of redemption from the "original sin", and of how to limit its pitfalls.

8. References

Admati, Anat R. and Paul Pfleiderer (2000): Forcing Firms to Talk: Financial Disclosure Regulation and Externalities, in: *Review of Financial Studies* 13(3), 479–519.

Agenor, Pierre-Richard, John C. McDermott, Eswar Prasad (2000): Macroeconomic Fluctuations in Developing Countries: Some Stylized Facts, in: *World Bank Economic Review* 14(2), 251–285.

Alfaro, Laura and Fabio Kanczuk (2014): Debt Redemption, Reserve Accumulation, and Exchange-Rate Regimes, in*: Harvard Business School Working Paper* 13(074).

Alper, Koray, Mahir Binici, Selva Demiralp, Hakan Kara, and Pinar O. Ozlu (2014): Reserve Requirements, Liquidity Risk, and Credit Growth, in: *Ko University-TUSIAD Economic Research Forum Working Papers* 1416.

Arcand, Jean-Louis, Enrico Berkes and Ugo Panizza (2012): Too Much Finance?, in: *IMF Working Paper* 12 (161).

Arias, Jonas F., Juan Rubio-Ramirez and Daniel F. Waggoner (2014): Inference Based on SVARs Identified with Sign and Zero Restrictions: Theory and Applications, in: *Federal Reserve Bank of Atlanta Working Paper* 2014(1).

Armas, Adrian A., Paul Castillo and Marco Vega (2014): Inflation Targeting and Quantitative Tightening: Effects of Reserve Requirements in Peru, in: *Economia* 15.

Aryeetey, Ernest, Amoah Baah-Nuakoh, Tamara Duggleby, Hemamala Hettige and William F. Steel (1994): Supply and Demand for Finance of Small Scale Enterprises in Ghana, in: *World Bank Discussion Paper* 251.

Asso, Pierre F., George A. Kahn and Robert Leeson (2007): The Taylor Rule and the Transformation of Monetary Policy, in: *Federal Reserve Bank of Kansas City Research Working Paper* 07(11).

Bank of England (1999): The Transmission Mechanism of Monetary Policy. The Monetary Policy Committee, Bank of England.

Bank of England (2012): The Bank of England's Approach to the Supervision of Financial Market Infrastructures. Bank of England, December 2012.

Bank of England (2014a): The Bank of England's Supervision of Financial Market Infrastructures – Annual Report 2014. Bank of England, March 2014.

Bank of England (2014b): How Monetary Policy Works, Bank of England. Available at http://www.bankofengland.co.uk/monetarypolicy/Pages/how.aspx (Accessed 15 August 2014).

Bank of Ghana (2001): Monetary and Exchange Rate Management in Ghana. Bank of Ghana, January 2001.

Beck, Thorsten and Ross Levine (2004): Stock Markets, Banks, and Growth: Panel Evidence, in: *Journal of Banking & Finance* 28, 423–442.

Benston, George (1973): Required Disclosure and the Stock Market: An Evaluation of the Securities Market Act of 1934, in: *American Economic Review* 63, 132–155.

Bernanke, B., Gertler, M. and Gilchrist (1999): The Financial Accelerator in a Quantitative Business Cycle Framework, in: J. Taylor and M. Woodford (eds), Handbook of Macroeconomics 1C, Elsevier Science, North Holland.

Bhattacharya, Rina (2013): Inflation Dynamics and Monetary Policy Transmission in Vietnam

and Emerging Asia, in: *IMF Working Paper* 13(155).

Bianchi, Javier (2011): Overborrowing and Systemic Externalities in the Business Cycle, in: *American Economic Review* 101(7): 3400–3426.

Bianchi, Javier and Saki Bigio (2014): Banks, Liquidity Management and Monetary Policy, in: *Federal Reserve Bank of Minneapolis Research Department Staff Report* 503.

BIS (2012): Principles for Financial Markets Infrastructure, in: BIS Committee on Payment and Settlement Systems, Technical Committee of the International Organization of Securities Commissions, April 2012.

Black, Bernard (2001): The Legal and Institutional Preconditions for Strong Securities Markets, in: UCLA Law Review 48, 781–858.

Borio, Claudio (2012): The Financial Cycle and Macroeconomics: What Have We Learnt?, in: *BIS Working Paper* 395.

Borensztein, Eduardo, Paolo Mauro, Marco Ottaviani and Stijn Claessens (2004): The Case for GDP-Indexed Bonds, in: *Economic Policy* 19(38), 165–216.

Borensztein, Eduardo, Marcos Chamon, Olivier Jeanne, Paolo Mauro, and Jeromin Zettelmeyer (2004): Sovereign Debt Structure for Crisis Prevention, in: *IMF Occasional Paper* 237.

Borensztein, Eduardo, Barry Eichengreen and Ugo Panizza (2006): A Tale of Two Markets: Bond Market Development in East Asia and Latin America, in: *HKIMR Occasional Paper* 3, October 2006.

Borensztein, Eduardo, Kevin Cowan, Barry Eichengreen and Ugo Panizza (eds.) (2008): Building Bond Markets in Latin America, MIT Press, Cambridge, MA.

Buch, Claudia M. and Esteban Prieto (2014): Do Better Capitalized Banks Lend Less? Long-Run Panel Evidence from Germany, in: *International Finance* 17(1), 1–23.

Burger, John, Francis E. Warnock and Veronica Warnock (2012): Emerging Local Currency Bond Markets, in: *Financial Analysts Journal* 68(4), 73–93.

Burger, John D. and Francis E. Warnock (2006): Local Currency Bond Markets, in: *IMF Staff Paper* 53, 115–132.

Burger, John D. and Francis E. Warnock (2006): Foreign Participation in Local Currency Bond Markets, in: *NBER Working Paper* 12548.

Burns, Arthur F. and Wesley C. Mitchell (1946): Measuring Business Cycles, in: National Bureau of Economic Research Book Series Studies in Business Cycles, New York.

Brooks, Steve, Nial Friel and Ruth King (2003): Classical Model Selection Via Simulated Annealing, in: *Journal of The Royal Statistical Society* 65(2), 503–520.

Brown, Martin and Thorsten Beck (2011): Foreign Bank Ownership and Household Credit, in: *European Banking Center Discussion Paper* 2011(024).

Brunnermeier, Markus K. and Yuliy Sannikov (2014): International Credit flows and Pecuniary externalities, in: *NBER Working Paper* 20803.

Bry, Gerhard and Charlotte Boschan (1971): Cyclical Analysis of Time Series: Selected Procedures and Computer Programs, in: *NBER Technical Paper* 20.

Caballero, Ricardo and Stavros Panageas (2008): Hedging Sudden Stops and Precautionary Contractions, in: *Journal of Development Economics* 85(1–2), 28–57.

Caballero, Julian, Ugo Panizza and Andrew Powell (2014): Corporate Borrowing and Credit Growth. Under preparation, Inter-American Development Bank.

Campbell, John Y. and Robert J. Shiller (1988): Stock prices, Earnings, and Expected Dividends, in: *Journal of Finance* 43(3).

Canova, Fabio and Gianni De Nicoló (2002): Monetary Disturbances Matter for Business Fluctuations in the G-7, in: *Journal of Monetary Economics* 49, 1131–1159.

Canova, Fabio (2007): Bayesian Time Series and DSGE Models, in: Methods for Applied Macroeconomic Research, Princeton University Press.

Carabenciov, Ioan, Igor Ermolaev, Charles Freedman, Michel Juillard, Ondra Kamenik, Dmitry Korshunov, Douglas Laxton and Jared Laxton (2008): A Small Quarterly Multi-Country Projection Model, in: *IMF Working Paper* 08(279).

Carrera, Cesar and Hugo Vega (2012): Interbank Market and Macroprudential Tools in a DSGE model, in: *Banco Central de Reserva del Peru, Documento de Trabajo* 2012(014).

Cecchetti, Stephen G., Hans Genberg, John Lipsky and Sushil Wadhawani (2000): Asset Prices and Central Bank Policy, in: Geneva Reports on the World Economy 2, ICMB and CEPR.

Cerra, Valerie and Sweta C. Saxena (2008): Growth Dynamics: The Myth of Economic Recovery, in: *American Economic Review* 98(1), 439–457.

Chamon, Marcos and Marcio Garcia (2013): Capital Controls in Brazil: Effective? Efficient?, mimeo.

Chemmanur, Thomas, and Paolo Fulghieri (1994): Investment Bank Reputation, Information Production, and Financial Intermediation, in: *Journal of Finance* 49, 57–79.

Choy, Marylin and Giancarlo Chang (2014): Medidas macroprudenciales aplicadas en el peru, in: *Banco Central de Reserva del Peru Documento de Trabajo* 2014(007).

Christiano, Lawrence J. and Terry J. Fitzgerald (2001): The Band Pass Filter, in: *NBER Working Paper* 7257.

Cifuentes, Rodrigo, Jorge Desormeaux and Claudio González (2002): Capital Markets in Chile: From Financial Repression to Financial Deepening, in: The Development of Bond Markets in Emerging Economies, *BIS Papers* 11, Chapter 6, 86–102.

CIA – Central Intelligence Agency (2014). The World Factbook – South and Vietnam Economy. Central Intelligence Agency. Available at https://www.cia.gov/library/publications/the-world-factbook/geos/vm.html (Accessed: 15 August 2014).

Coffee, John (1984): Market Failure and the Economic Case for a Mandatory Disclosure System, in: *Virginia Law Review* 70, 717–753.

Cordella, Tito, Pablo Federico, Carlos Vegh, and Guillermo Vuletin (2014): Reserve Requirements in the Brave New Macroprudential World, in: *World Bank Policy Research Working Paper* 6793.

Cowan, Kevin and José De Gregorio (2007): International Borrowing, Capital Controls and the Exchange Rate: Lessons from Chile, in: S. Edwards (ed.), Capital Controls and Capital Flows in Emerging Economies: Policies, Practices and Consequences, NBER and University of Chicago Press.

Damar, H. Evren, Césaire A. Meh, and Yaz Terajima (2010): Leverage, Balance Sheet Size and Wholesale Funding, in: *Bank of Canada Working Paper* 39.

De Fiore, Fiorella and Harald Uhlig (2005): Bank Finance versus Bond Finance: What Explains the Differences between the US and Europe, in: *CEPR Discussion Paper* 5213.

De Gregorio, José (2014): How Latin America Weathered the Global Financial Crisis, Peterson Institute of International Economics, Washington.

De Gregorio, José and Pablo Guidotti (1995): Financial Development and Economic Growth, in: *World Development* 23(3), 433–448.

De Gregorio, José and Jong-Wha Lee (2004): Growth and Adjustment in East Asia and Latin America, in: *Economia* 5(1), 69–134.

De la Torre, Augusto, Juan Carlos Gozzi and Sergio L. Schmukler (2007): Stock Market Development under Globalization: Whither the Gains from Reforms?, in*: Journal of Banking & Finance* 31(6), 1731–1754.

De la Torre, Augusto, Juan Carlos Gozzi and Sergio L. Schmukler (2008): Capital Market Development: Whither Latin America?, in: Sebastian Edwards & Marcio G. P. Garcia (eds.), Financial Markets Volatility and Performance in Emerging Markets, NBER Books, National Bureau of Economic Research, Chapter 4, 121–153.

De Long, Bradford (1991): Did J.P. Morgan's Men Add Value? An Economist's Perspective on Financial Capitalism, in: Peter Temin (ed.) Inside the Business Enterprise: Historical Perspectives on the Use of Information, University of Chicago Press, Chicago, IL.

Demirguc-Kunt, Ash and Ross Levine (1996): Stock Market Development and Financial Intermediaries: Stylized Facts, in*: World Bank Economic Review* 10(2), 291–321.

Demirguc-Kunt, Asli and Ross Levine (2008): Finance, Financial Sector Policies, and Long-Run Growth, in: *World Bank Policy Research Working Paper* 4469.

Diaz-Alejandro, Carlos (1985): Good-bye Financial Repression, Hello Financial Crash, in: *Journal of Development Economics*, 19(1–2): 1–24.

Disyatat, Piti (2011): The Bank Lending Channel Revisited, in: *Journal of Money, Credit and Banking* 43(4), 711–734.

Dittmar, Robert F. and Kathy Yuan (2008): Do Sovereign Bonds Benefit Corporate Bonds in Emerging Markets?, in: *Review of Financial Studies* 21(5), 1983–2014.

Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes and Andrei Shleifer (2003): Courts, in: *Quarterly Journal of Economics* 118, 453–517.

Djankov, Simeon, Rafael LaPorta, Florencio Lopez-de-Silanes and Andrei Shleifer (2008): The Law and Economics of Self-dealing, in: *Journal of Financial Economics* 88(3), 430–465.

Djankov, Simeon, Caralee McLiesh and Andrei Shleifer (2007): Private Credit in 129 Countries, in: *Journal of Financial Economics* 12(2), 77–99.

Drehmann, Mathias, Claudio Borio and Kostas Tsatsaronis (2012): Characterising the Financial Cycle: Don't Lose Sight of the Medium Term, in: *BIS Working Paper* 380.

Dunning, John H. (1988): Explaining International Production. London, Unwin Hyman.

Dutt, Amivata K. (1997): The Pattern of Direct Foreign Investment and Economic Growth, in: *World Development* 25, 1925–1936.

Easterbrook, Frank and Daniel Fischel (1984): Mandatory Disclosure and the Protection of Investors, in: *Virginia Law Review* 70, 669–715.

*Égert, Balázs and Dubravko Mihaljek (2007): Determinants of House Prices in Central and Easter*n Europe, in: *BIS Working Paper* 236.

Eichengreen, Barry, Ricardo Hausmann and Ugo Panizza (2005): The Pain of Original Sin, in: B. Eichengreen and R. Hausmann (eds.) Other People's money: Debt Denomination and Financial Instability in Emerging Market Economies, University of Chicago Press.

Eichengreen, Barry and Pipat Luengnaruemitchai (2004): Why doesn't Asia Have Bigger Bond Markets?, in: *NBER Working Paper* 10576.

Eichengreen, Barry and Pipat Luengnaruemitchai (2006): Bond Markets as Conduits for Capital Flows: How Does Asia Compare?, in: *NBER Working Paper* 12408.

European Central Bank (2014): The Definition of Price Stability. *European Central Bank.*

Available at https://www.ecb.europa.eu/mopo/strategy/pricestab/html/index.en.html (Accessed 15 August 2014).

Faust, Jon (1998): The Robustness of Identified VAR Conclusions about Money, in: *Board of Governors of the Federal Reserve System International Finance Discussion Papers* 610.

Findlay, Ronald (1978): Relative Backwardness, Direct Investment and the Transfer of Technology: A Simple Dynamic Model, in: *Quarterly Journal of Economics* 92, 1–16.

Fischel, Daniel, and Sanford Grossman (1984): Customer Protection in Futures and Securities Markets, in: *Journal of Futures Markets* 4, 273–295.

Fry, Maxwell (1988): Money, Interest, and Banking in Economic Development, in: The Johns Hopkins University Press, Baltimore.

Fry, Maxwell J. (1993): Foreign Direct Investment in South East Asia Differential Impacts, in: Asean Economic Research Unit, Institute of Southeast Asian Studies.

Frankel, Jeffrey A. and George Saravelos (2010): Are Leading Indicators of Financial Crises Useful for Assessing Country Vulnerability? Evidence From the 2008–09 Global Crisis, in: *NBER Working Paper* 16047.

Friend, Irwin and Edward Herman (1964): The S.E.C. through a glass darkly, in: *Journal of Business* 37, 382–405.

Fox, Merritt (1999): Retaining Mandatory Disclosure: Why Issuer Choice is not Investor Empowerment, in: *Virginia Law Review* 85, 1335–1419.

Gelb, Alan (1989): A Cross-Section Analysis of Financial Policies, Efficiency and Growth, in: *World Bank Policy Research Working Paper* 202.

Gennaioli, Nicola, Alberto Martin and Stefano Rossi (2014): Sovereign Default, Domestic Banks and Financial Institutions, in: *Journal of Finance* 69(2), 819–866.

Gera, Surendra, Wulong Gu, and Frank C. Lee (1999): Foreign Direct Investment and Productivity Growth: The Canadian Host Country Experience, in: Industry Canada Research Publications Program Working Paper 30.

Ghosh, Atish R., Jun Kim, Mahvash S. Qureshi and Juan Zalduendo (2012): Surges, in: *IMF Working Paper* 12(22).

Giannetti, Mariassunta and Luc Laeven (2009): Pension Reform, Ownership Structure, and Corporate Governance: Evidence from a Natural Experiment, in: *Review of Financial Studies* 22(10), 4091–4127.

Ghana Investment Promotion Centre (GIPC) Annual Report 2013.

Glocker, Christian and Pascal Towbin (2012a): The Macroeconomic Effects of Reserve Requirements, in: *Banque de France Document de Travail* 374.

Glocker, Christian and Pascal Towbin (2012b): Reserve Requirements for Price and Financial Stability: When are they Effective?, in: *International Journal of Central Banking* 8(1), 65–113.

Gondo Mori, Rocío (2014): State Contingent Assets, Financial Crises and Pecuniary Externalities in Models with Collateral Constraints, in: *Banco Central de Reserva del Perú Working Paper* 2014(001).

Goujon, Michaël (2006): Fighting Inflation in a Dollarized Economy: The Case of Vietnam, in: *Journal of Comparative Economics* 34, 564–581.

Gourinchas, Pierre-Olivier, Rodrigo Valdes, and Oscar Landerretche (2001): Lending Booms: Latin America and the World, in: *NBER Working Paper* 8249.

Gormley, Todd, Simon Johnson, and Changyong Rhee (2008): Corporate Bonds: A spare Tire in Emerging Markets?. Unpublished manuscript, International Monetary Fund.

Green, Peter J. (1995): Reversible Jump Markov Chain Monte Carlo Computation and Bayesian Model Determination, in: *Biometrika* 82(4), 711–732.

Green, Peter J. and David Hastie (2009): Reversible Jump MCMC, in: University of Helsinki Working Paper 155, 1391–1403.

Greenwood, Robin, Augustin Landier and David Thesmar (2012): Vulnerable Banks, in*: NBER Working Paper* 18537.

Greenstone, Michael, Paul Oyer, Annette Vissing-Jorgensen (2006): Mandated Disclosure, Stock Returns, and the 1964 Securities Act Amendments, in: *Quarterly Journal of Economics* 121(2), 399–460.

Grieco, Joseph (1986): Foreign Investment and Development. Theories and Evidence, in: *Theodore Moran (ed), Investing in Development: New Roles for Private Capital*?, New Brunswick and Oxford: Transactions Books, 35–60.

Grossman, Sanford (1981): The Informational Role of Warranties and Private Disclosure about Product Quality, in: *Journal of Law and Economics* 24, 461–483.

Grossman, Sanford and Oliver Hart (1980): Disclosure Laws and Takeover Bids, in: *Journal of Finance* 35, 323–334.

Guo , Kai and Vahram Stepanyan (2011): Determinants of Bank Credit in Emerging Market Economies, in: *IMF Working Paper* 11(51).

Guarín, Alexander, Andrés González, Daphné Skandalis and Daniela Sánchez (2014): An Early Warning Model for Predicting Credit Booms using Macroeconomic Aggregates, in: Ensayos Sobre Política Económica 32(73), 77–86.

Gyapong, O. Anthony and John A. Karikari (1999): Direct Foreign Investment Strategies and Economic Performance in Ghana and Ivory Coast, in: *Journal of Economic Development* 24 (1), 133–147.

Hamilton, James D. (2003): What is an Oil Shock?, in: *Journal of Econometrics* 113(2), 363–398.

Hahm, Joon-Ho, Frederic H. Mishkin, Hyun Song Shin and Kwanho Shin (2012a): Macroprudential Policies in Open Emerging Economies, in: *NBER Working Paper* 17780.

Hahm, Joon-Ho, Hyun Song Shin and Kwanho Shin (2012b): Non-Core Bank Liabilities and Financial Vulnerability, in: *NBER Working Paper* 18428.

Hamann, Franz, Rafael Hernández, Luisa F. Silva, Fernando Tenjo G. (2014): Leverage Pro-cyclicality and Bank Balance Sheet in Colombia, in: *Ensayos Sobre Política Económica* 32(73), 50–76.

Harwood, Alison (2000): Building Local Bond Markets: Some Issues and Actions, in: Alison Harwood (ed.), Building Local Bond Markets: An Asian Perspective, Chapter 1.

Hawkins, John (2002): Bond Markets and Banks in Emerging Economies, in: The development of Bond Markets in Emerging Economies, in: *BIS Papers* 11, Chapter 3, 42–48.

Herring, Richard J. and Nathporn Chatusripitak (2001): The Case of the Missing Market: The Bond Market and Why it Matters for Financial Development, in: *Wharton Financial Institutions Center Working Paper* 01(08).

Hoeting, Jennifer A., David Madigan, Adrian E. Raftery and Chris T. Volinsky (1999): Bayesian Model Averaging: A Tutorial, in: *Statistical Science* 14(4), 382–417.

Hott, Christian and Alexander Monnin (2008): Fundamental real estate prices: an empirical estimation with international data, in: *Journal of Real Estate Finance and Economics* 36, 427–450.

Hott, Christian (2009): Banks and Real Estate Prices, in: *Swiss National Bank Working Paper* 2009(08).

Huang, Rocco and Lev Ratnovski (2010): The Dark Side of Bank Wholesale Funding, in: *Journal of Financial Intermediation* 20(2), 248–263.

IMF (2002): Emerging Equity Markets, in: Global Financial Stability Report, Chapter 4.

IMF (2004): Monetary Policy Implementation at Different Stages of Market Development, IMF Board Paper available at: https://www.imf.org/external/np/mfd/2004/eng/102604.htm (Accessed 14.01.2015)

Jordà, Òscar, Moritz Schularick, and Alan M. Taylor (2012): When Credit Bites Back: Leverage, Business Cycles, and Crises, in: *NBER Working Paper* 17621.

Kenny and Moss (1998): Stock Markets in Africa: Emerging Lions or White Elephants?, in: *World Development* 26, 829–843.

Kilian, Lutz (2011): Structural Vector Autoregressions, in: *CEPR Discussion Paper* 8515.

Korinek, Anton (2010): Regulating Capital Flows to Emerging Markets: An Externality View, manuscript, University of Maryland.

Korinek, Anton (2011a): Foreign Currency Debt, Risk Premia and Macroeconomic Volatility, in: *European Economic Review* 55(3), 371–385.

Korinek, Anton (2011): Capital Flows, Crises and Externalities, mimeo, University of Maryland.

Lane, Philip R. and Gian Maria Milesi-Ferretti (2012): External Adjustment and the Global Crisis, in: *Journal of International Economics* 88(2), 252–265.

LaPorta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny (1997): Legal Determinants of External Finance, in: *Journal of Finance* 52, 1131–1150.

LaPorta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny (1998): *Law and Finance*, in: Journal of Political Economy 106, 1113–1155.

LaPorta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny (2002): Investor Protection and Corporate Valuation, in: *Journal of Finance* 57, 1147–1170.

LaPorta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer (2002): Government Ownership of Banks, in: *Journal of Finance* 57, 265–301.

LaPorta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer (2006): What Works in Securities Laws?, in: *Journal of Finance* 61(1), 1–32.

Laeven, Luc and Enrico C. Perotti (2001): Confidence Building in Emerging Stock Markets, in: *CEPR Discussion Paper* 3055.

León and Quispe (2011): El encaje como instrumento no convencional de polıtica monetaria, in: *Revista Moneda* 2011(143), 8–16.

Levine, Ross and Sara Zervos (1998): Stock Markets, Banks, and Economic Growth, in: *American Economic Review* 88, 537–558.

Levine, Ross and Sara Zervos (1996): Stock Market Development and Long-run Economic Growth, in: World Bank Review 10(2).

Lundberg, Filip (1903): Approximerad framställning afsannollikhetsfunktionen: II. återförsäkring af kollektivrisker (Almquist und Wicksell, Uppsala).

Macey, Jonathan (1994): Administrative Agency Obsolescence and Interest Group Formation: A Case Study of the SEC at Sixty, in: *Cardozo Law Review* 15, 909–949.

Magud, Nicolas E., Carmen Reinhart and Kenneth S. Rogoff (2011): Capital Controls: Myth and Reality – A Portfolio Balance Approach, in: *NBER Working Paper* 16805.

Mahoney, Paul (1995): Mandatory Disclosure as a Solution to Agency Problems, in: *University of Chicago Law Review* 62, 1047–1112.

McKinnon, Ronald I. (1973): Money and Capital in Economic Development, in: The Brookings Institution, Washington, D.C.

McKinnon, Ronald I. (1991): The Order of Economic Liberalization: Financial Control in the

Transition to a Market Economy, in: The Johns Hopkins University Press, Baltimore.

Mendoza, Enrique G. and Marco E. Terrones (2008): An Anatomy of Credit Booms: Evidence from Macro Aggregates and Micro Data, in: *NBER Working Paper* 14049.

Mihaljek, Dubravko, Michela Scatigna and Agustin Villar (2002): Recent Trends in Bond Markets, in: The Development of Bond Markets in Emerging Economies, in: *BIS Papers* 11, Chapter 2, 13–41.

MilesiÐFerretti, GianÐMaria and Cedric Tille (2011): The Great Retrenchment: International Capital Flows during the Global Financial Crisis, in: *Economic Policy* 26, 285–342.

Mohanty, Madhusudan (2002): Improving Liquidity in Government Bond Markets: What Can Be Done?, in: The Development of Bond Markets in Emerging Economies, in: *BIS Papers* 11, Chapter 4, 49–80.

Monetary Authority of Singapore (2013): Supervision of Financial Market Infrastructures in Singapore, Monetary Authority of Singapore. Available at www.mas.gov.sg/~/media/MAS/About%20MAS/Monographs%20and%20information%20papers/MASMonograph_Supervision_of_Financial_Market_Infrastructures_in_Singapore%20Final.pdf (Accessed: 15 April 2013).

Mongardini, Joannes and Tahsin Saadi-Sedik (2003): Estimating Indexes of Coincident and Leading Indicators: An Application to Jordan, in: *IMF Working Paper* 03(170).

Montoro, Carlos and Ramon Moreno (2011): The Use of Reserve Requirements as a Policy Instrument in Latin America, in: *BIS Quarterly Review*, March 2011.

Moss, Todd (2003): Adventure Capitalism: Globalization and the Political Economy of Stock Markets in Africa, in: Palgrave Macmillan, London.

Musacchio, Aldo (2008): Can Civil Law Countries Get Good Institutions? Lessons from the History of Creditor Rights and Bond Markets in Brazil, in: *Journal of Economic History* 68(1), 80–108.

Nguyen, Huu Minh, Tony Cavoli, John K. Wilson (2012): The Determinants of Inflation in Vietnam, 2001–2009, in: *ASEAN Economic Bulletin* 29(1), 1–14.

Obstfeld, Maurice (2014): Trilemmas and Tradeoffs: Living with Financial Globalization, mimeo, University of California, Berkeley.

Osei, Victor (2005): Does the Stock Market matter in Ghana? A Granger-Causality Analysis, in: *Bank of Ghana Working Paper* 05(13).

Pallage, Stephane and Michel Robe (1998): Foreign Aid and the Business Cycle, in: *CREFE Working Paper* 63.

Pistor, Katharina and Chenggang Xu (2002): Law Enforcement under Incomplete Law: Theory and Evidence from Financial Market Regulation, Columbia Law School, mimeo.

Poterba, James M. (1992): Taxation and Housing: Old Questions, New Answers, in: *American Economic Review* 82 (2), 237–242.

Poterba, James M. (1984): Tax Subsidies to Owner-occupied Housing: An Asset-Market Approach, in: *Quarterly Journal of Economics*, 99(4), 729–52.

Raftery, Adrian E. (1995): Bayesian Model Selection in Social Research, in: *Sociological Methodology* 25, 111–164.

Raftery, Adrian E., David Madigan and Jennifer Hoeting (1997): Bayesian Model Averaging for Linear Regression Models, in: *Journal of the American Statistical Association* 92(437), 179–191.

Rand, John and Finn Tarp (2002): Business Cycles in Developing Countries: Are They Different?, in: *World Development* 30(12), 2071–2088.

Rajan, Raghuram G. and Luigi Zingales (2003): The Great Reversals: The Politics of Financial

Development in the Twentieth Century, in: *Journal of Financial Economics* 69, 5–50.

Reinhart, Carmen and Kenneth S. Rogoff (2009): This Time is Different: Eight Centuries of Financial Folly, in: Princeton NJ, Princeton University Press.

Rey, Hélène (2014): Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence, in Global Dimensions of Unconventional Monetary Policy, 2013 Jackson Hole Symposium Proceedings.

Reinhart, Carmen, Morris Goldstein and Graciela Kaminsky (2000): Assessing Financial Vulnerability, an Early Warning System for Emerging Markets: Introduction, in: Assessing Financial Vulnerability: An Early Warning System for Emerging Markets, Washington, DC, Institute for International Economics, 1–56.

Reinhart, Carmen and Belen Sbrancia (2011): The Liquidation of Government Debt, in: *NBER Working Paper* 16893.

Romano, Roberta (2001): The need for Competition in International Securities Regulation, in: *Theoretical Inquiries in Law* 2, 1–179.

Ross, Stephen (1979): Disclosure Regulation in Financial Markets: Implication of Modern Finance Theory and Signalling Theory, in: Franklin Edwards (ed.), Issues in Financial Regulation, McGraw-Hill, New York.

Rossini, Renzo, Adrian Armas and Zenon Quispe (2014): Global Policy Spillovers and Perus Monetary Policy: Inflation Targeting, Foreign Exchange Intervention and Reserve Requirements, in: *BIS Papers*, Chapter 78, 241–264.

Rossini, Renzo and Marco Vega (2007): El mecanismo de transmision de la polıtica monetaria en un entorno de dolarizacion financiera: El caso del peru entre 1996 y 2006, in: *Banco Central de Reserva del Peru, Documento de Trabajo* 2007(017).

Rubio-Ramırez, Juan, Daniel F. Waggoner and Tao Zha (2010): Structural Vector Autoregressions: Theory of Identification and Algorithms for Inference, in: *Review of Economic Studies* 77, 665–696.

Schularick, Moritz and Alan Taylor (2012): Credit Booms Gone Bust: Monetary Policy, Leverage Cycles and Financial Crises, 1870 – 2008, in: *NBER Working Paper* 15512.

Schinasi, Garry and R. Todd Smith (1998): Fixed-income Markets in the United States, Europe, and Japan: Some Lessons for Emerging Markets, in: *IMF Working Paper* 98(173).

Singh, Ajit (1999): Should Africa Promote Stock Market Capitalism?, in: *Journal of International Development* 11(3), 343–365.

Shiller, Robert J. (1981): Do Stock Prices Move Too Much to Be Justifies by Subsequent Changes in Dividends?, in: *American Economic Review* 71(3).

Shin, Hyun Song and Kwanho Shin (2010): Procyclicality and Monetary Aggregates, in: *NBER Working Paper* 16836.

Shin, Hyun Song and Laura Yi Zhao (2013): Firms as Surrogate Intermediaries: Evidence from Emerging Markets, mimeo, Princeton University.

Shleifer, Andrei, and Daniel Wolfenzon (2002): Investor Protection and Equity Markets, in*: Journal of Financial Economics* 66, 3–27.

Simon, Carol (1989): The Effect of the 1933 Securities Act on Investor Information and the Performance of New Issues, in: *American Economic Review* 79, 295–318.

Stein, Jeremie C. (2012): Monetary Policy as Financial Stability Regulation, in: *Quarterly Journal of Economics* 127(1), 57–95.

Stigler, George (1964): Public Regulation of the Securities Market, in: *Journal of Business* 37, 117–142.

Stiglitz, Joseph E. (2002): Globalization and Its Discontents, in: New York, W.W. Norton.

Tovar, Camilo E., Mercedes Garcia-Escribano, and Mercedes Vera Martin (2012): Credit

Growth and the Effectiveness of Reserve Requirements and Other Macroprudential Instruments in Latin America, in: *IMF Working Paper* 12(142).

Turner, Philip (2002): Bond Markets in Emerging Economies: An overview of Policy Issues. In: The Development of Bond Markets in Emerging Economies, *BIS Papers* 11, Chapter 1, 1–12.

Uhlig, Harald (2005): What are the Effects of Monetary Policy on Output? Results from an Agnostic Identification Procedure, in: *Journal of Monetary Economics* 52, 381–419.

Van der Walt (1983): Indicators of business cycle changes in South Africa, in: South African Reserve *Bank Quarterly Bulletin* 147.

Vittas, Dimitri (1992): Contractual Savings and Emerging Securities Markets, in: *Policy Research Working Paper* 858.

Walsh, Carl E. (2003): Speed Limit Policies: The Output Gap and Optimal Monetary Policy, in: *American Economic Review* 93(1), 265–278.

Yartey, Charles A. (2006): The Stock Market and the Financing of Corporate Growth in Africa: The case of Ghana, in: *IMF Working Paper* 06(201).

Yartey, Charles A. and Charles K. Adjasi (2007): Stock Market Development in Sub-Saharan Africa: Critical Issues and Challenges, in: *IMF Working Paper* 07(209).

Yartey, Charles A. (2007): Macroeconomic and Institutional Determinants of Stock Market Development in Africa, in: Okpara, John (ed.), Management and Economic Development in Sub-Saharan Africa: Theoretical and Applied Perspectives, Adonis and Abbey Publishers, London.

Yartey, Charles A. (2008): Financial Development, the Structure of Capital Markets, and the Global Digital Divide, in: *Information Economics and Policy* 20, 208–227.

9. List of Participants

ABDULAI	IBRAHIM	Bank of Ghana
ADIGOZALOV	SHAIG	Central Bank of the Republic of Azerbaijan
ARCAND	JEAN-LOUIS	Professor, Graduate Institute
BASKOT	BOJAN	Central Bank of Bosnia & Herzegovina
BIRCHLER	URS	Professor, University of Zurich
CASTILLO	PAUL	Central Reserve Bank of Peru
CICHERO	DAVIDE	Graduate Institute
ČOLAKOVIČ	BELMA	Central Bank of Bosnia & Herzegovina
FORERO	FERNANDO	Central Reserve Bank of Peru
FERREIRA	ELSA	BCC
CAMEN	ULRICH	BCC (retired)
DO	VIET HUNG	State Bank of Vietnam
FREI	IRENE	State Secretariat for Economic Affairs (SECO)
GENBERG	HANS	SEACEN Centre
GHOSH	ATISH	International Monetary Fund
GONDO	ROCIO	Central Reserve Bank of Peru
GOOSSENS	ROMAN	Graduate Institute
DE GREGORIO	JOSÉ	University of Chile
GORPE	MEHMET	Graduate Institute
GUARÍN	ALEXANDER	Central Bank of Colombia
HAMANN	FRANZ	Central Bank of Colombia
HASMAN	AUGUSTO	BCC
HENGGE	MARTINA	Graduate Institute
HOANG	THI QUYNG MAI	State Bank of Vietnam
HOFFMANN	MATHIAS	Professor, University of Zurich
HOMIAH	RICHARD	Bank of Ghana
HUANG	YI	Professor, Graduate Institute
JOB	ANN	Graduate Institute
KOVAČEVIČ	DEJAN	Central Bank of Bosnia & Herzegovina
LAEVEN	LUC	International Monetary Fund
LAJMI	MOEZ	Central Bank of Tunisia
LALIVE	RAFAEL	University of Lausanne
LUTERBACHER	URS	Graduate Institute
MAMMADOV	FUAD	Central Bank of the Republic of Azerbaijan
MANJANI	OLTA	Bank of Albania
MATHIEU	PAUL	International Monetary Fund
MATHUR	AAKRITI	Graduate Institute
MORGANDI	NESTOR	Graduate Institute

MOSER	THOMAS	Swiss National Bank
NOTE	SOFIKA	Bank of Albania
QUARTEY	GLORIA	Bank of Ghana
QUAST	BASTIAAN	Graduate Institute
QUAYE	MADOC	Bank of Ghana
SALADIN	MARTIN	State Secretariat for Economic Affairs (SECO)
SCHLUP	ROSMARIE	State Secretariat for Economic Affairs (SECO)
SCHMUKLER	SERGIO	World Bank
SCHUSTER	CARLOTTA	BCC
SHEN	ZHOUXIANG	Graduate Institute
SOKOLOVA	MARIA	Graduate Institute
SULJOTI	ERJONA	Bank of Albania
SWOBODA	ALEXANDRE	Graduate Institute
TILLE	CÉDRIC	BCC; Professor, Graduate Institute
TORO CÓRDOBA	JORGE	Central Bank of Colombia
TRONG	NGO VI	State Bank of Vietnam
VARGHESE	RICHARD	Graduate Institute
WIDMER	LORENZ	State Secretariat for Economic Affairs (SECO)
XIA	JINGJING	Graduate Institute
YZEIRAJ	ENDRIT	Bank of Albania

Achevé d'imprimer
en mai 2015
sur papier Splendorlux Premium White
250 gr et couché mat 115 gr
sur les Presses de Musumeci S.p.A.
Quart (Vallée d'Aoste) – Italie

The Bilateral Assistance and Capacity Building for Central Banks (BCC) programme focuses on the design and implementation of technical assistance and training programs for central banks around the world.

It is administered by the Graduate Institute of International and Development Studies (GIIDS) in Geneva on mandate of the Swiss State Secretariat for Economic Affairs (SECO).

The programme articulates around four poles of activities: technical assistance missions in the countries; coaching by GIIDS faculty of research projects; in residence research by economists from central banks at GIIDS; and conferences in Geneva and in the countries. It covers numerous key areas such as monetary policy analysis and implementation, operational and systemic risk management, financial supervision, statistics and personnel management.

The Second Annual Conference held in Geneva took place on October 2–3, 2014. These proceedings provide a concise review of the research presented and the policy discussions between BCC countries staff members, prominent academics and policy makers during this event.

↗ **graduateinstitute.ch/bcc**