Institutional investors and capital flows to emerging markets

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Abstract

This dissertation represents an investigation into the determinants of capital flows to emerging markets. It argues that the existing literature can be enriched by explicitly recognising the monetary nature of capital flows, which can be effectively drawn out on the basis of post-Keynesian monetary theory, and recognising the importance of institutional investors as key actors in today's financial markets. As such, the current cycle of capital flows to emerging markets can be understood as the demand for emerging markets assets by institutional investors.

The determinants of such a demand are therefore the key focus of this dissertation. Two factors, alongside many others already considered by the literature, stand out. Firstly, in line with post-Keyensian theories of exchange rates, currency liquidity plays an important role. Emerging markets currencies are structurally less liquid and thus subordinated to advanced countries currecncies, but the extent of their subordination is mitigated by context-specific "fundamentals". This dissertation argues that the accumulation of foreign exchange reserves is a primary factor in these respects.

Secondly, this dissertation points out that liabilities play a key role in the institutional investors' portfolio choice mechanism. Rather than mechanically optimising over the risk/return tradeoff, the asset allocation of institutional investors is primarily driven by the goal of achieving sufficient returns to face their obligations. In the post-crisis environment, institutional investors' balance sheet condititions have deteriorated, and - due to low interest rates and low financial market returns on safe assets - traditional asset classes cannot be relied upon to generate sufficient returns to cover liabilities. Institutional investors are therefore induced to look for alternative assets that can promise higher returns and allocate a growing part of their assets to emerging markets assets as part of this strategy.

This dissertation uses both qualitative and quantitative methods to support these arguments. It uses advanced macro-panel econometrics techniques to estimate assets demand equations for emerging markets equities and bonds. The econometric results confirm the macro-level significance of the hypothesised relationships, suggesting that higher level of foreign exchange reserves and weaker balance sheet conditions - proxied by lower pension funding

ratios - increase allocations to emerging markets.

Qualitative methods, in the form of semi-structured interviews, shed further light on the processes that lead to such results. In particular they highlight the complexity of the relationship between the "fundamentals" and their effect on asset allocation, and the interaction between regulation and the way through which liabilities affect investors' behaviour.

Finally the macroeconomics implications of these findings are analysed through a Stock-Flow Consistent model. It is shown that institutional investors may have a pro-cyclical or counter-cyclical impact on the system. Crucially, this is determined by how the dynamics of the model affect institutional investors' balance sheet conditions.

Overall, this dissertation warrants caution about the present situation of emerging markets. Institutional investors may be less panic-prone, but ultimately their interest in emerging markets seems to be caused more by their weaker balance sheets, as low returns make it impossible for assets to match their growing liabilities, rather than "fundamentals".

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List of Abbreviations

ADV	Advanced country
AMG	Augmented mean group
ARDL	Autoregressive distributed lags
CCE-MG	Correlated common effects - mean group
CCE-PMG	Correlated common effects - pooled mean group
CSD	Cross-sectional dependence
DB	Defined benefits
DC	Defined contribution
DSGE	Dynamic stochastic general equilibrium
EM	Emerging markets
EPFR	Emerging Portfolio Fund Research
FED	Federal Reserve of the United States
FXR	Foreign exchange reserves
GBP	British pound sterling
GDP	Gross domestic product
GMM	Generalised method of moments

IMF	International Monetary Fund
LSDVC	Bias-corrected least square dummy variable
MG	Mean group
QE	Quantitative easing
SFC	Stock-Flow Consistent
USD	US dollars

Chapter 1

Introduction

> "Japan's Government Pension Investment Fund, the world's biggest institutional investor, has confirmed a shift into emerging market equities, as it seeks higher returns amid rising payouts and persistently low bond yields." (Financial Times, 2 June 2012)

The integration of emerging markets into the global financial system has been a prime example of the financial instability of modern global capitalism. Despite a secular upward trend in cross-border financial claims and flows, emerging markets have experienced cyclical periods of capital inflows, interrupted by sudden capital outflows and financial crises. Arguably, the most renowned boom-bust cycle was the surge of private capital flows to emerging markets during the 1990's that ended with a succession of crises, starting with Mexico in 1995 and then touching East Asian countries in 1997-1998, Russia in 1998, Brazil in 1999, Argentina and Turkey in 2001. The following boom to emerging markets during the 2000's was again interrupted by a sudden reversal of capital flows during the global financial crisis following the Lehmann Brothers collapse in 2008. Since 2009 capital flows to emerging markets have been expanding again, although signs of an upcoming generalised retreat are evident, as testified in the summer of 2013 and 2015.

What is behind these waves of inflows and outflows? Although many culprits have been blamed over the sequence of these crises, a single answer is yet to be found. There is nevertheless agreement, as it will be shown, that this is not simply the fault of emerging markets' wrong policies, which was the consensus in the late 1990's. In particular, today much attention is given to the role of global monetary policy, and especially the Federal Reserve's decisions about the future path of interest rates.

This dissertation represents an investigation around the answers to this question. It situates the current cycle of cross-border financial investments to emerging markets within the operations of institutional investors from advanced countries. In particular, it will be argued that, in order to explain today's patterns of capital flows to emerging markets, it is crucial to understand which factors lead institutional investors - and in particular pension funds - to allocate a part of their portfolio to emerging markets assets.

The rest of this introductory chapter is divided into three parts. In the next section the key research objectives and main contributions will be discussed. In section 1.2 the research questions and hypothesis will be discussed. Section 1.3 makes some observation as to the methodological background of this dissertation. In the final section the structure of the dissertation will be outlined.

1.1 Dissertation objectives and contributions

This dissertation's objectives and contribution are of empirical, theoretical and methodological nature.

On the empirical side, the thesis' main contribution is to provide evidence on the portfolio allocation mechanism of institutional investors. In particular it will show which factors are relevant in determining allocation to emerging market assets. While much of macroeconomic analysis and financial theory tends to focus on risk/return tradeoffs, and more recently global risk-appetite cycles, this dissertation shows that a key determinant of institutional investors' behaviour is the condition of their liabilities. "Liability-driven investment" is in fact a paradigm of portfolio choice adopted by many pension funds and insurance companies, which has im-

portant implications for their asset allocation. This dissertation also provides evidence about which macro-level factors affect investors' views about emerging markets, highlighting the importance of macro-financial stability, and the role of foreign exchange reserves in particular.

The theoretical contribution of this dissertation is to provide a framework of analysis for the analysis of capital flows to emerging markets that is consistent with post-Keynesian monetary and financial theory. A key tenet of post-Keynesian theory - as well as other heterodox traditions in economics - is that modern capitalist economies are fundamentally 'monetary'. This dissertation argues that although conventional macroeconomic theory has put forward very important contributions for the understanding of capital flows to emerging markets, its theoretical background for the analysis of the open-economy remains rooted in a 'real' understanding of the economy. This dissertation argues that our understanding can be enriched by referring to post-Keynesian monetary theory, which sees capital flows as flow of funds rather than real resources. Particularly important in these respects are post-Keynesian contributions on the theory of the exchange rates, currency hierarchy and liquidity cycles (Harvey, 2010; Andrade and Prates, 2013; Kaltenbrunner, 2015). Capital flows are therefore understood as international asset demand by foreign investors.

This dissertation also contends that it is important to apply this framework in conjunction with the empirical reality of contemporary finance. Institutional and political economy analysis, such as Minsky's conceptualisation of money manager capitalism Minsky (1988b) and Toporowski's (2002) theory of capital market inflation, have pointed to the rise of institutional investors as a key process in the history of modern capitalism. This dissertation therefore argues that assessing institutional investors' portfolio choice mechanism is crucial to understand the patterns of capital flows to emerging markets. A framework proposing the various channels through which institutional investors make their asset allocation choice, with reference to the emerging market context, is developed. Crucial elements in these respects are first, the consideration of currency liquidity stemming from post-Keynesian theory and its implications for relevant macroeconomic variables, and second the centrality of institutional investors' liabilities in the overall decision framework.

Finally, the implications of this theoretical framework and its empirical relevance are also

analysed in an open-economy Stock-Flow Consistent model. This model's main innovative feature is the addition of an institutional investors sector and the analysis of its impacts on the system, particularly exchange rates. It will be shown that institutional investors' impact could be pro-cyclical or counter-cyclical depending on the nature of the shock that induces them to invest in emerging markets, and how this is determined by the liability-driven nature of their portfolio choice.

On the methodological level, this dissertation makes two contributions. Firstly, it uses a mixed-method approach combining qualitative with quantitative research methods, in the form of macro-panel econometrics and semi-structured interviews with pension funds investors and managers. Although mixed-methods have been used for research in macro-financial issues (e.g. Kaltenbrunner, 2011), this dissertation is original in explicitly tackling the issue of institutional investors and their asset allocation framework with respect to emerging markets assets. The addition of qualitative insights, in the form of semi-structured interviews, adds both as a second source of confirmatory evidence of the dissertation hypothesis and uncovers the processes and structures that macro-level econometric evidence inevitably conceals.

Secondly, this dissertation aims to provide innovative elements in its analysis of asset demand equations and Stock-Flow Consistent models. It applies advanced macro-panel econometrics to the asset demand equation approach of Brainard and Tobin (1968), showing how, the empirical estimation of these models can produce interesting insights for the analysis of contemporary questions. Moreover this econometric exercise, combined with the qualitative evidence, serves to provide empirical evidence for the relationships that constitute the novel elements of Stock-Flow Consistent model developed in this dissertation. Although the model itself is not fully empirical, the evidence upon which it is based is therefore more robust than simple stylised facts, which are often the basis of empirically-inspired Stock-Flow Consistent models (Caverzasi and Godin, 2015).

1.2 Research questions and hypotheses

In analysing the issue of capital flows to emerging markets, this dissertation is based upon the following research questions (RQ) and hypotheses (RH).

RQ1 How can we characterise the phenomenon of capital flows to emerging markets in today's economy?

RH1.1 In today's financially interconnected world capital flows mostly derive from the international portfolio decisions and transactions of economic units.

RH1.2 The rise of institutional investors as key institutions in today's economy makes capital flows highly dependent on the behaviour of these institutions.

RH1.2.1 As emerging markets are subordinate in the global financial system capital flows to and from these countries are mostly a product of the demand (or lack thereof) for their assets by institutional investors in advanced economies.

The second research question stems directly from the first one, and has a more empirical nature.

RQ2 What leads institutional investors from advanced countries to invest in emerging markets assets?

RH2.1 Institutional investors' portfolio choice depends crucially on the conditions of their liabilities.

RH2.2 The liquidity of emerging markets currencies is crucial in determining the attractiveness of the emerging markets asset class.

The final question assesses the implications of the first two.

RQ3 What are the implications on capital flows when institutional investors are the main actors?

RH3 Despite their long-term orientation, foreign institutional investors may not be a stabilising force for emerging markets.

1.3 Methodological considerations

Although this dissertation does not attempt to directly contribute to the debates about the methodology and epistemology of economics, some considerations are in order with respect to its adherence to the methodology generally adopted in post-Keynesian and heterodox economics, and its underlying ontological and epistemological issues.

At the broadest level, it has been claimed heterodox economics traditions differ from their orthodox counterpart at the ontological level. As famously stated by Lawson (2015, p. 43), "the set of principles currently collected together and systematised as heterodox economics is, in the first instance, an orientation in ontology". Heterodox and post-Keynesian economics is therefore considered to adhere to an "open-system" ontological stance, where the boundaries of reality are at least partially determined by human action (Dow, 1998; Kaltenbrunner, 2011). The boundaries of the system are influenced by social reality, which by definition is dynamic and does not always offer definite closures Lawson (2015, p. 40).

Open-system ontology is indeed often associated with social constructivist epistemological stance. These imply that "while reality may be independent of human thought, meaning or knowledge is always a human construction. Thus, the knower and unknown are inseparable. This also implies that general laws and time and context free generalisations are not possible and that it is impossible to distinguish causes from effects" Kaltenbrunner (2011, p. 185). However, proponents of open-system ontology tend to agree that while the lack of event regularities characterises observable reality, some partial and context-specific regularities can be found, but these are likely to be constantly changing due to the continuous interaction between human agency and the structure of the system itself (King, 2015; Kaltenbrunner, 2011; Lawson, 2015).

Closely associated with the concept of open-system ontology is that of realism. Proponents of the open-system ontology stance often propose the concept of "critical realism", which is

effectively a middle-ground position between determinism and social constructivism, but remains grounded in an open-system ontology (Kaltenbrunner, 2011, p. 185). Critical realists see reality as dynamic and interconnected, and its properties as emerging out of social interactions, but maintain that these properties are irreducible to social interactions, as they will in turn affect their causes (Lawson, 2015, pp. 40-41). Moreover, "the deep social structures and causal mechanisms are not directly observable ... but can only be inferred from observed reality" (King, 2015, p. 52). Because of reality's hidden and constantly changing nature, epistemologically this implies that it is impossible to give definitive answers in any absolute sense: researchers should strive to uncover the deep structures of reality, bearing in mind their knowledge will be by definition fallible and incomplete (Kaltenbrunner, 2010, p. 186). Knowledge is therefore acquired through a process of "retroduction", where the process is neither purely inductive or purely deductive: hypotheses can be made, and together with empirical observation, updated in a cumulative fashion, such that eventually an understanding of the deeper structures of reality is built (Kaltenbrunner, 2011, p. 191).

The centrality of the open-system ontology view has been criticised by other authors. Mearman (2006) argues that the dualistic treatment of "open" versus "closed" systems is of very little usefulness in practice: "practically, there is no prospect that either perfect openness or perfect closure exists. Between the two theoretical extremes lies everything of practical interest. Nevertheless, the language of [critical realism] has in general, particularly in its earlier work, focused on the extreme cases (p. 64)". This dualistic treatment leads to a rejection or acceptance of methodologies, ignoring the fact that "if systems are open to differing degrees, then it is likely that methods are too" (p. 68). Similarly, Lavoie (2011, p. 14) argues that acceptance of the open-system paradigm has often led scholars to misleading conclusions about economic concepts on the basis that they were based on closed-system arguments. Davidson (2003) argues that adherence to open-system ontology, with its implications about the lack of causality, is akin to permitting "anything goes" in economics, and should therefore be abandoned if post-Keynesian economics is to be taken seriously by the profession.

A much less controversial concept, though perhaps less philosophically deep, is that of "realisticness". Lavoie (2014, pp. 12-13) argues that the key contentious point distinguishing

heterodox and mainstream economics is not about "realism" but is in fact about "realisticness", i.e. the generation of economic theory on the basis observable reality:

> "Although it is recognized that assumptions are always abstractions and simplifications, and hence means to avoid cluttering a model with insignificant details. However, one should not start from assumptions that are descriptively false. The structure of a model cannot be built on foundations describing an imaginary or idealized economy." (Lavoie 2014, p. 13).

This is in stark contrast with "instrumentalism", the belief that the logical consistency and predictive power of the premises are more important than their realisticness, upon which much of mainstream economic theory is based.

The approach taken in this dissertation is very much in line with the principle of realisticness. This is particularly evident in the broad criticism that is made to the conventional theories of capital flows, which are said to fundamentally lack realisticness in that they often assume away, or do not include from the start, the idea of a monetary economy. As Minsky (1992a, p. 2) puts it, the starting point of economic analysis should be "a capitalist economy with expensive capital assets and a complex, sophisticated financial system", where the most important transaction is "the exchange of money today for money later" (Minsky, 1975, p. 12). This is fundamentally different from the neoclassical "village-fair" paradigm, according to which the economy is essentially a pure-exchange economy that is further "complicated" by introducing features, such as money as a means of exchange and production for the market, which makes the analysis more realistic (Bellofiore, 2012). A modern economy is essentially monetary, and therefore money along with any additional forms of finance, need to be integrated into the analysis since the onset as structural elements, as opposed to being "attachments" to an exchange-economy.

A second way in which realisticness - and possibly critical realism too - permeates the development of this dissertation is the importance given to rooting economic analysis in historical time. Capitalism, in the spirit of Marx and Schumpeter, is seen as a historically determined

social and economic structure, distinct to other types of society. Moreover it is a dynamic system, as it constantly changes itself through space and time. The view of the economy taken in this dissertation is one where historically-rooted institutions determine the economy and are in turn shaped by its dynamics. The integration of emerging markets into the global financial system and the rise of institutional investors represent the key historical developments that are necessary to realistically discuss the position of emerging markets in the international context.

The role of historical time and historically-rooted institutions is also related to the idea of reasonable rationality, considered by Lavoie (2011) as a key proposition of post-Keynesian economics. Since the importance of institutional investors in contemporary capitalism comes from their historical emergence, so their beheaviour is a product of historical and institutional arrangements, rather than the optmisation of some objective function. In this sense the rationality of institutional investors' portfolio choice is procedural, but clearly affected by fundamental uncertainty, just like the (real) investment process.

Beside realisticness, another key methodological contention is about the level of analysis. It is generally agreed that methodological individualism and atomism are a defining characteristic of mainstream economics (Lavoie, 2011; Lawson, 2015). Heterodox economists generally reject this approach as a valid way to conduct economic analysis. As Brancaccio (2010, p. 153) puts it: "not only does the economic system exists before and independently from the single individual, but also the individual himself is in turn affected by the system as a result of the role and the functions he plays within it." In such an 'holistic' view of the economy, clearly, the economic and social dynamics are far from being the necessary consequences of optimising behaviour, and rather, individual choices and behaviour can be sources of disequilibrium and paradoxes or even conflict.

Within this dissertation, the element of organicism comes into the analysis of the portfolio choice mechanism of institutional investors. Institutional investors, far from being the result of imperfections that occur in the otherwise perfect "state of nature", have come to have a functionally important role in the economy. And indeed the push to generate sufficient returns to fulfill their role in modern economies, i.e. providing income for their beneficiaries, is one of the primary determinants of their financial behaviour.

This view of a capitalist economy as an organic system also relates to the potentially contentious issue between the macro and micro-level analysis. By rejecting methodological individualism, and especially the paradigm of neoclassical concepts of rational maximising agents, heterodox economists reject the micro-foundations paradigm that dominates mainstream macroeconomic theory. By doing so however, the question of the relationship between the micro and the macro remains open. Some authors believe that, although macroeconomic phenomena cannot be reduced to the sum of microeconomic decisions, "rather than dispensing altogether with micro-foundations, it is necessary to identify the source of agency appropriate to the society being examined" (Toporowski, 2016, p. 97). Other authors, on the other hand, see Keynesian economic theory more consistent with "macro-foundations" of microeconomics (Kregel, 1985; Colander, 1993). Other authors reject both the ideas of micro-foundations and macro-foundations, suggesting that although micro and macro-level analysis influence each other, neither constitute the foundation for the other (King, 2015).

This dissertation does not take a fully explicit stance on this matter, but relates to it in two ways. Firstly, its motivation and the significance of its contributions are primarily at the macro-level. The issue of capital flows, their determinants and their theoretical and empirical underpinnings, are considered to be a relevant macroeconomic issue for emerging markets and the international financial system. Secondly, the focus of this dissertation, i.e. institutional investors, has been chosen by narrowing down the specificness from the fully aggregate system, i.e. the balance-of-payment phenomenon of capital flows, to a level in which the analysis becomes meaningful from an organic point of view, i.e. the sector of institutional investors. There is therefore no explicit micro nor macro-foundations, but a concern that the behaviour at the sectoral level must be coherent both in its macro-level empirical manifestation, and at the micro-level of individual institutions behavioural mechanism.

The research methods used in this dissertation are consistent with the considerations made thus far. The thesis first develops the theoretical framework and formulates hypotheses about the object of research: the phenomenon of capital flows to emerging markets and its determinants located in the operations of institutional investors. Empirical evidence is then gathered and assessed for the purpose of both "testing" the hypothesised relationship and to uncover

deeper mechanisms behind such relationships.

This dissertation can in this sense be understood as adopting a mixed-methods approach[1]. Econometric analysis is used to explore synthetically the evidence about the research hypotheses. In line with the proposition of realisticness and the crucial role of historical and institutional forces in shaping behaviour, these are not supposed to have absolute validity, but a meaningful way to organise empirical evidence. As Lavoie (2014, p. 37) puts it:

> "post-Keynesians are keenly aware that a limited number of econometric results is robust and can be replicated, [...] and fully aware of the difficulties involved in using past econometric results to provide good predictions. [...] Econometric analysis, as a subset of empirical analysis, gives further ammunition in the heterodox quest for explanation and causal mechanisms"

Qualitative methods have in this sense a crucial dual purpose of reinforcing the validity of econometric evidence, as well as uncovering some of its underlying processes[2]. Furthermore, qualitative methods also have the function of characterising relationships at the micro-level, therefore serving to establish coherence between different levels of analysis, which as discussed, is an important concern of this dissertation.

Finally, the theoretical and empirical propositions of this dissertation will be synthesised in a Stock-Flow Consistent model. The use of mathematics is also highly contentious in heterodox economics. For example, Lawson (2015) claims the use of mathematical methods in mainstream economics is an ideological feature, and indeed "the primary explanation of the numerous, long lived and continuing failings of modern academic economics" (p. 162). However, the use of modeling is different than what it is usually done in mainstream economics. Rather than using purely deductive logic in deriving consequences from logical premises, the model development is simply an exploration of the implications of the empirical evidence of the dissertation at the macroeconomic level. The principles of realisticness and organicism

[1] This is consistent with "retroduction" as Downward and Mearman (2007) consider

[2] This feature of mixed-methods research is denominated "triangulation", is seen as an appropriate guideline to heterodox economic research (Downward and Mearman, 2007; Kaltenbrunner, 2010).

are respected in drawing the behaviour and interactions of the model's components, in a way that is consistent with historical and institutional developments, e.g by adding institutional investors as a sector in the economy. As pioneers of the Stock-Flow Consistent approach Godley and Cripps (1983, p. 44) put it:

> "we do not ask the reader to believe that the way economies work can be discovered by deductive reasoning. We take the contrary view. The evolution of whole economies is a highly contingent historical process. We do not believe it is possible to establish precise behavioral relationships ... by techniques of statistical inference. Few laws of economics will hold good across decades and or between countries. On the other hand, we must exploit logic so far as we possibly can. ... The aim here is to show how logic can help to organize information in a way that enables us to learn as much from it as possible. That is what we mean by macroeconomic theory (...)"

1.4 Dissertation structure

The dissertation is divided into eight chapters, beside this introduction.

Chapter 2 explores the literature on the determinants of capital flows. This literature, has historically been focused on the empirical exploration of competing macro-level variables - crucially dividing between "push" and "pull" factors -, and on the microeconomic portfolio choice mechanisms, particularly their bias in the context of emerging markets. Recently, the literature has increasingly focused on global risk-aversion and liquidity provision, with an empirical focus on gross rather than net capital flows. The chapter concludes by summarising these determinants into two broad categories: fundamentals - combined with market imperfections - and investors' risk appetite, and by pointing out some limitations of this literature.

Chapter 3 develops a theoretical framework for the analysis of capital flows to emerging markets. Based on a review of post-Keynesian monetary theory, the chapter posits that cap-

ital flows need to be understood as inherently monetary rather than flows of real resources, and as such pertain to the analysis of monetary and financial decisions. Capital flows are thereby understood as demand for emerging market assets by foreign investors. The emergence of institutional investors is seen as a major historical development for the contemporary global financial system, and their portfolio choice is therefore a key variable of interest for the analysis of capital flows. In addition to the issues that the conventional literature discusses, insights from post-Keynesian theory suggest that two important determinants of institutional investors' portfolio decisions are their liabilities, and the liquidity of emerging market assets as determined by these countries' currency.

Chapter 4 presents descriptive empirical evidence on the research hypotheses and theoretical framework of this dissertation. The characteristics of the integration of emerging markets in the global financial system show how their position in the global financial system remains subordinate and that foreign institutional investors' presence in these countries has increased. At the same time, institutional investors in advanced countries, for structural, regulatory, and financial markets reasons, are under pressure to generate returns to cover their liabilities. As a result it is now common for these institutions to adopt a liability-driven investment strategy, whereby asset allocation is essentially driven by the imperative to cover and maintain coverage of investors' liabilities. Emerging markets, given their potential for high growth and their improved "fundamentals" - particularly from a macro-financial stability point of view with the accumulation of foreign exchange reserves - can provide a way for institutional investors to achieve these returns.

Chapter 5 evaluates econometrically the theoretical framework of the dissertation. Based on Tobin's asset demand approach (Brainard and Tobin, 1968), two asset demand equations for emerging markets bonds and emerging markets equities are estimated. The models use recent innovations in macro-panel techniques, with an autoregressive distributed lag-model that takes into account cross-sectional dependence. The results broadly confirm the predictions that institutional investors liabilities - proxied by pension funds' funding ratios - and the level of foreign exchange reserves, serving as the key indicator measuring the enhanced liquidity of emerging markets currencies, are important determinants of demand for emerging markets

assets.

Chapter 6 presents the results of semi-structured interviews. These interviews, conducted with European pension funds, confirm the central importance of the relationship between liabilities and the portfolio choice of institutional investors, but also allow for a deeper understanding of the actual processes behind this relationship, pointing out the importance of country-specific regulation in shaping it. Furthermore, in line with the theoretical framework developed in chapter 3, emerging markets "fundamentals" matter for the determination the risk/return profile of their financial assets, but they do so in a complex, rather than mechanic way. Crucial importance in the future prospects of emerging markets are the interrelationship between global monetary conditions and emerging markets' external financial fragility, as well as economic growth and political stability. The chapter therefore largely confirms the validity of the results of the previous chapters, and adds important insights as to how these macro-level results are generated in the actual decision mechanisms of European pension funds, highlighting the conditions upon which these are based and their potential changes in the future.

Chapter 7 develops a two-country Stock-Flow Consistent model, representing the relationship between advanced and emerging countries. The primary novelty of this model is the introduction of an institutional investor sector, located in the advanced country, investing domestically and internationally. By contrast, emerging markets only invest abroad through foreign exchange reserves, leading to an asymmetric situation between the two countries. Institutional investors follow a liability-driven investment strategy, which determines the way they respond to shocks affecting their asset allocation. The key message of the model is that, due to this mechanism, institutional investors have a counter-cyclical role, when portfolio flows are "pulled" to emerging markets, but pro-cyclical when these are "pushed" by low interest rates in advanced countries. This suggests that the current situation, which more closely resembles the latter case, is particularly risky for emerging countries.

Chapter 8 concludes by pointing out the implications of the findings of this dissertation, in terms of policies and potential for future research.

Chapter 2

Literature Review: The Determinants of Capital Flows

Introduction

The primary motivation of this dissertation is understanding the determinants of capital flows. This chapter explores the existing literature on the determinants of capital flows to emerging markets. It starts, in section 2.1, by exploring the "push-pull" factors framework, which empirically assesses the causes of capital flows by distinguishing between local and global variables. Although this framework was originally developed in the early 1990's, it has been enriched over-time as events unfolded and remains an influential starting point for any empirical assessment of capital flows.

In section 2.2, the chapter discusses the how the issue of capital flows has been addressed by finance literature on asset prices and portfolio choice, and the subsequent general equilibrium literature emphasising the role of informational asymmetries and other market imperfections. Section 2.3 deals with the recent, mainly post-crisis, literature on investors' risk appetite and global liquidity as a determinant of capital flows to emerging markets. The final section syntehesises all the reviewed literature, and points out some of its limitations.

2.1 The fundamentals: push and pull factors

The empirical assessment of the determinants of capital flows to emerging markets started in the early 1990's. During the 1980's emerging markets had limited access to the global capital markets, after the third-world debt crisis undermined their creditworthiness in the first half of the decade. In the early 1990's however there was a generalised resurgence of capital flows, especially in the form private portfolio flows, to both Latin American and Asian countries. This new trend was subject of a literature concerned with understanding the underlying determinants of the renewed capital mobility.

The seminal paper in this literature is Calvo *et al.* (1993). The authors argue that the resurgence of capital flows to Latin American countries was at least partially explained by conditions external to the region, especially US interest rates. They substantiate such a claim on the basis of a structural VAR model, which shows that international reserves - which they use as a proxy for capital flows - respond positively to external factors shocks. This view is reinforced in a later paper (Calvo *et al.*, 1996), where the authors review the various arguments related to the causes, consequences and policy implications of capital flows. Insofar as capital flows are mainly "pushed" by either low interest rates or generally unfavorable macroeconomic conditions in advanced countries, emerging markets' vulnerability to a sudden reversal is relatively unaffected by their policy choices. On the other hand, if capital is more attracted by domestic conditions, such as sound macroeconomic fundamentals and policies inducing more capital flows (e.g. liberalisation of the capital account), then there is a greater scope for direct emerging markets policy to manage the process.

The "push vs pull" factors debate has been carried forward by other authors throughout the 1990's. Chuhan *et al.* (1998) employ a panel-data approach to empirically assess the domestic and global causes of capital flows. They use a vast array of indicators, both domestic - credit rating, secondary market prices of debt and price/earnings and rates of return to equity - global - US interest rates and industrial production - to proxy expected risk and returns to investments in emerging markets. Their results confirm the idea that US interest rates play an important role in driving capital flows, but show that domestic factors, at least in Asian countries, seem to be equally important. This seems to provide more space for the "pull view".

Their work has been however criticised by Fernández-Arias (1996) on the basis that "seemingly obvious assumption that country creditworthiness indicators reflect domestic factors as opposed to external factors, needed for the interpretation given to the empirical observation, is unwarranted." (p. 391). He therefore works out an analytical model that accounts for both push and pull factors. The structure of the model is based, similarly to Chuhan *et al.* (1998), on investors' portfolio allocation, where the key equation is a non-arbitrage condition between an expected return in an advanced country R and a return in a developing country D adjusted by a factor C, which represents the country's creditworthiness[3]. The key non-arbitrage equation is Fernández-Arias and Montiel (1996):

$$D(d_t, F_t)C(c_t, S_{t-1} + F_t) = R_t$$

where d represents the domestic investment climate, F represents capital flows c is the country's ability to repay its liabilities and S is the stock of cumulated liabilities. It is assumed that D depends positively on d and negatively on F_t[4]. C depends positively on c and negatively on S. Rearranging the equation for F_t gives:

$$F_t = F(d_t, c_t, R_t, S_{t-1})$$

According to this equation capital flows depend positively on the domestic investment climate and the country ability to repay, and negatively on advanced countries returns and the country's stock of liabilities. Finally the model suggests that the parameter c is a function of the country's economic growth rate g and national income Y such that:

$$c = \frac{Y}{R - g}$$

The underlying idea is that a country's ability to repay its liabilities is the expected present value of future resources, which should therefore discounted by some rate R. In this way Fernández-Arias (1996, p. 398) formalises the contention that push factors affect directly a

[3]For advanced countries this value is equal to 1.
[4]On the basis of a diminishing marginal productivity argument

country's creditworthiness. This model is able to predict an average of 86% of the inflows in the 1989-1993 period. This clearly supports the "push" over the "pull" view. This viewpoint is also shared by Dooley *et al.* (1996). In their study they show how secondary market prices for developing countries debt, which they consider an important "barometer" of financial strength, is almost entirely dependent on external factors. An increase in US interest rates would bring down such prices, which would result in "a halt of recent capital inflows, rapid declines in international reserves, and exchange rate depreciation" (p. 47).

The "push" view was however challenged by Hernández and Rudolph (1995). They contend that scholars overlook the uneven distribution of capital flows across and within regions and excluded many countries that were not affected by the surge of capital flows from their analysis, producing a biased result. By using a larger sample that includes all countries for which data are available in the 1986-1993 period, they put forward an empirical case for the "pull" story. Firstly, they divide countries in two groups, high capital inflow recipients (HCIR) and low capital inflow recipients (LCIR), and show that the formers fared better in all the typical domestic factors[5]. Secondly, they employed a panel-data methodology and found a large role for domestic "pull" factors and an insignificant role for US interest rates. The authors however included long-term capital flows in their considerations, which may partially explain the increased role for domestic factors. This is tackled by Taylor and Sarno (1997), who distinguish between long and short term capital flows. They find that except from short-term bond flows, which are caused primarily by "push" factors, short-term equity and long-term bond and equity flows are equally dependent on push and pull factors.

The "push vs pull" factors literature of the 1990's seems to reach a point of consensus with the recognition that both types of factors play a role in driving capital inflows, with the formers determining the "timing and magnitude" and latter "necessary to explain the geographic distribution" of capital flows (Montiel and Reinhart, 1999, p. 623). Fernández-Arias and Montiel (1996, p 62) summarise this view:

[5]They saved and invested more, had sounder fiscal balances, lower and more stable inflation, lower net debt (debt minus foreign exchange reserves) stocks to GDP, less volatile real exchange rates and did better in terms of perceived political risks.

> "The combination of low interest rates and recession forced low rates of return on industrial-country assets (particularly in the United States), creating an incipient capital outflow as investors in these countries sought higher-yielding assets for their portfolios. The restoration of perceived creditworthiness was necessary for potential debtor countries to have access to these funds, and thus capital flowed initially to those countries whose creditworthiness was not severely impaired during the 1980s-largely the rapidly growing countries in East Asia that never suffered a debt crisis. The Brady Plan, announced in mid-1989, broadened the geographic scope for such inflows to include the heavily indebted countries in Latin America, in part by writing down the face value of debt, in part by supporting policy adjustments, and in part by providing information externalities, leading to bandwagon effects. Where none of these factors have come into play - that is, in most of Sub-Saharan Africa - capital inflows have not materialized"

Beside this theoretical agreement, that concedes that there is no compelling argument nor evidence to discard either view, external events imposed a turn on the literature on capital flows. The crises that savaged many emerging markets' economies in the late 90's and early 2000's (Mexico in 1995, East Asian countries in 1997-1998, Russia in 1998, Brazil in 1999, Turkey in 2001, Argentina in 2002 and Uruguay in 2002 among the major ones) pushed many scholars towards investigating the causes and dynamics of balance of payment financial crises[6]. A part of this literature is closely related to the "push" vs "pull" debate - not least for its participants -, by focusing more specifically on the mechanics of capital flows in the context of a crisis.

Typical of this literature are the two concepts of "current account reversals" and "sudden stops". The first concept, which has been elaborated by Milesi-Ferretti and Razin (2000), identifies sharp reductions in current account deficits, which needs to fulfill certain requirements in terms of their persistence and magnitude as to capture only the relevant large movements, as the key mechanism of a financial crisis. The authors then use a probit model to investigate

[6] See, for instance, Dornbusch (2001) for a wide ranging "primer" on emerging markets crises.

the impact of several factors on the probability of a financial crisis: they find that both "push" (among others US interest rates) and "pull" factors seem to predict a crisis.

The concept of "sudden stops" was originally formulated by Calvo (1998). He suggests that a common factor among emerging markets crises is the sharp and unexpected decrease of capital inflows, which brings about "bankruptcies, and destruction of human capital and local credit channels" (p. 47), irrespectively of the composition of the flows. Other later works (Calvo *et al.*, 2004, 2008) empirically define these "sudden stops" and explore their dynamics: the logic is that the lower is the domestic supply of tradable goods (net of factor transfers) relative to domestic absorption of tradable goods - in other words the higher is a country's current account deficit with respect to its total expenditures in tradable goods - the higher the necessary rise in the real exchange rate to compensate a fall in the current account deficit as a result of a "sudden stop". Given this framework, they find that both such a "leveraged" consumption of tradable goods and domestic liability dollarisation, as well as global financial integration, increase the probability of a sudden stop. Liability dollarisation, it is argued, is primarily a result "badly managed fiscal and monetary policies" (Calvo *et al.*, 2008, p. 30).

This conclusion seem thus to favor country-specific factors as determinants of a capital-account induced crisis, but nevertheless recognise that the initial "triggers" are exogenous. Other theories however seem to be in contrast to this view: according to the "original sin hypothesis", liability dollarisation in emerging markets is the result of their inability to borrow internationally and sometimes even domestically in their own currencies, due to incompleteness of the global capital markets, which favors assets denominated in a very restricted group of currencies (Eichengreen and Hausmann, 1999; Eichengreen *et al.*, 2003). "Sudden stops" episodes are therefore arguably both pulled and pushed.

The conceptualisation of "sudden stops" marked the beginning of the analysis of "extreme capital movements". With the resumption of capital flows to emerging markets after 2002, interest moved back from crisis to capital inflows. Reinhart and Reinhart (2008) provide a systematic study of historical episodes of "bonanzas" and study some their causes and consequences over a wide range countries. They find that global factors are important causes of these episodes. Moreover, they find the overall capital flows "bonanzas" have an important

pro-cyclical component, very often ending with a "sudden stop" and preceding some sort of economic/financial crisis. Once again, pro-cyclical fiscal policy is seen as one of the primary culprit of the negative effects of capital flows, a result that has been more directly tackled along with pro-cyclical monetary policy by Kaminsky *et al.* (2004b)[7].

Other papers have analysed the "bonanzas" phenomenon. One of the last pre-crisis paper (Cardarelli *et al.*, 2009), broadly confirms this pro-cyclical nature of capital flows. The conclusions point to policy advices for fiscal restraint, less intervention in the foreign exchange market to curb exchange rate appreciation and the ineffectiveness of capital controls. Caballero (2012) confirms the finding that surges increase the probability of a crisis, with the interesting additional result that portfolio equity flows, which traditionally have been considered safe, at least compared to debt flows, increase the probability of a crisis, even in the absence of a lending boom. Finally, Ghosh *et al.* (2014), analysing surges episodes, find the occurrence of surges being largely determined by global factors, but the magnitude of such episodes being determined mostly by country specific factors. This clearly echoes the debates the twenty years old conclusions of Fernández-Arias and Montiel (1996).

In sum, the vast literature on the empirical determinants of capital flows does not reach a unique conclusion. The "push-pull" factors framework has the merit of pointing out that global factors can play a role in determining both capital inflows and outflows, and has been very influential in shaping the evolution of the literature to these days.

Nevertheless the literature has some limitations. The issue is only addressed by means of econometric evidence, which are supposed to give validity to either one or the other view (or both), according to their statistical significance. Such findings are however contingent on the usage of data, econometric methodology and choice of variables, which gives rise to highly heterogenous results. The literature, in other words, raises awareness on the importance of an issue - the competing factors in determining capital flows -, but lacks a coherent theoretical framework to assess the causes and processes that lie behind it.

Moreover, the literature confines the causes of capital flows to factors that affect emerging markets assets. "Push" factors are external to emerging markets insofar as they cannot be

[7] They dub this positive relationship between macroeconomic policy and capital flows with the expression "when it rains, it pours", to indicate the negative role played by such policies in amplifying crises situations.

controlled by emerging markets' domestic policies, but both have an impact on the return and risk of emerging markets assets. What is missing from such a picture is the role the "investor" that is supposed to respond to these factors.

Finally the literature largely focuses on net capital flows rather than gross capital flows. However, arguably gross capital flows are what matters in terms of building up of financial positions and potential imbalances, as it will be argued throughout this dissertation.

All these issues have been tackled by subsequent developments in the literature. The more recent papers are informed by a burgeoning theoretical and empirical literature on international portfolio allocation, at the micro-economic and general equilibrium level. Forbes and Warnock (2012) for example mention a vast amount of theoretical and empirical literature on the portfolio choice determinants of capital flows, for which they provide empirical insights. Additionally, much of the now focus on the importance of global risk-aversion and its relationship with monetary policy as a factor driving capital flows. Finally many papers now tackle gross rather than net flows. The next two sections provide an overview of these developments.

2.2 Portfolio choice: the role of market imperfections

The process of financial globalisation since the 90's was characterised by a remarkable expansion of portfolio flows aside from cross-border lending. As a result, international finance scholars sought to assess the dynamics of such flows within a portfolio choice framework. Essentially, the idea is to understand the micro-determinants that drive international investors' behavior in order to predict the macro-phenomenon of capital flows and portfolio holdings. Most of this literature is moreover concerned in explaining some puzzling features of international portfolio choice. This section reviews these theoretical developments: section subsection 2.2.1 deals with portfolio home bias, section 2.2.2 tackles various 'puzzling' aspects of emerging markets, section 2.2.3 reviews the burgeoning literature that frames international portfolio choice into general equilibrium models.

2.2.1 Portfolio home bias

A key contention of the theory of international finance is that international portfolio diversification is beneficial. Securities from different countries show low levels of correlations between each other and therefore, according to "modern portfolio theory", investing in foreign assets improves the efficiency of a portfolio, by reducing its overall variance. This argument is almost as old as the "modern portfolio theory" approach itself (Grubel, 1968; Levy and Sarnat, 1970). Extending the results of the "capital asset pricing model" (CAPM)[8] to the international context implies that, all portfolios in the world should be expected to converge to a single global market portfolio. Such a portfolio would include assets from all countries in proportion to their value, since "if a country is not included, its share prices would fall (and rates of return rise) to levels where it would be included in the optimal portfolio" (Levy and Sarnat, 1970, p. 675).

Investors' portfolios however tend to be heavily biased towards domestic assets. Such a tendency, the so-called equity *home bias* phenomenon, was already acknowledged by the early literature in the late 60's, when international capital flows were restricted by regulations such as capital controls but gained prominence in the literature after the work by French and Poterba (1991): in their paper, they show that home bias was still a relevant phenomenon at the time of their writing, and that institutional constraints, such as direct limits on foreign asset holdings or taxes, were an insufficient explanation for the empirically observed biased allocations. The origins of home bias should therefore be found in the behavior of investors.

Economists have tried to explain the home-bias phenomenon in several ways[9]. A first set of explanations focused on the hedging properties of domestic assets vis-à-vis foreign assets. The argument is that since agents bear risks that are specific to their home country - e.g. inflation or the real exchange rate -, their portfolios will be biased towards domestic assets, since these provide better insurance against those risks. This is for example the argument of Obstfeld and Rogoff (2000), who explain portfolio home bias on the basis of trade costs in the goods

[8]The key implication of the CAPM is that market portfolio - the portfolio that holds every type of asset available in proportion to its presence in the market - is the most efficient portfolio, since it diversifies away any specific risk and it is thus only subject to systematic undiversifiable risk.

[9]The literature on the topic is vast and what follows will be just a synthetic overview. For more comprehensive literature reviews see Lewis (1999); Sercu and Vanpee (2007)

markets: international trade is costly[10] and therefore people's consumption is biased towards national goods. As a result, since domestic assets provide a better hedge against domestic consumption volatility, portfolios will be home-biased. However this interpretation seems to be questionable empirically, as shown by van Wincoop and Warnock (2006).

Other explanations focus on direct costs in the financial markets. For example, Faruqee *et al.* (2004) show that transaction costs such as phone costs do in fact play a role in determining portfolio home bias. This line of argument was however dismissed by one of the seminal papers of this literature: Tesar and Werner (1995) argue that transaction costs cannot be a sufficient explanation for the lack of international diversification, since, if they were a real constraint to international investment, then we would expect also to find lower turnover of foreign assets by international investors, while in fact they find the opposite is true.

A third line of explanations focuses on informational asymmetries. "Classic" papers (Kang and Stulz, 1995; Brennan and Cao, 1997) show that the home bias phenomenon can arise when local investors have an informational advantage over foreign investors. In this way, it is either too costly to gather information - making the informational asymmetry essentially an "implicit" transaction cost problem - or simply impossible for foreign investors to adequately price a security, thus increasing the risk of holding it, which generate home bias. This type of analysis has been tested empirically: Coval and Moskowitz (2001) show that investors portfolio are locally biased, suggesting that they exploit informational advantages on local securities to manage their portfolio; Edison and Warnock (2004) show that stocks of emerging markets firms that are cross-listed on US stock markets are included in US portfolios in a way that is consistent with standard portfolio theory, which they explain by suggesting that cross-listing helps overcoming the informational asymmetry arising from the lack of knowledge of foreign investor regulations; Faruqee *et al.* (2004) find significant roles for several different types of informational asymmetries such as language and cultural differences, size of GDP and asset markets, and geographical distance.

Informational asymmetries in the financial markets seem therefore to be the most plausible explanation for the home-bias phenomenon. A "gravity model" - that is a model that explains

[10] Indeed the authors consider trade costs in goods markets as a potential explanation to all of what they consider the "six major puzzles in international macroeconomics", which include the equity home bias phenomenon.

a variable as a direct function of size and inverse function of distance between two economies - was found a powerful tool approximate international portfolio holdings (Aviat and Coeurdacier, 2007; Faruqee *et al.*, 2004; Bhamra *et al.*, 2014). The "gravity model" is in fact a stylised way to represent informational asymmetries, with distance and size being proxies that measure the access to information.

However, some empirical facts, related financial globalisation question the relevance of home bias. Firstly, home-bias itself, at least in advanced countries, has reduced considerably as a result of the increase in cross-border flows and holdings, as documented among others by Lane and Milesi-Ferretti (2008). Secondly, the relevance of home-bias depends on the relevance of the diversification argument implied by standard financial models: the concept of a "bias" relies on the validity of the argument that the low correlations between different national financial markets returns provide a scope for diversification gains. However this is at least questionable at a time of increasing financial integration: the more financial markets are integrated, the smaller the diversification gains that can be obtained. This point has been made by Goetzmann *et al.* (2005) and, more recently by Quinn and Voth (2010) who conclude their paper by arguing:

> "During much of the postwar period, capital flows between advanced capitalist countries were anything but free. Correlations were low, but this did not indicate unexploited investment opportunities. Few investors were allowed to move funds from one jurisdiction to another. Our analysis suggests that capital controls did not just stand in the way of exploiting diversification opportunities. To a large extent, they created an illusion that they were large in the first place ... the world described in the seminal papers by Grubel (1968) and Levy and Sarnat (1970) looked promising for international investors precisely because it was de facto and de jure nearly impossible to invest across borders. Thus, many academic studies and practitioners' beliefs about the benefits of international investing may have been too sanguine - and the home bias inferred from investors' portfolios much too large".

Although as long as correlations are not perfect the case for diversification remains in theory valid, home bias seems in this light less of an important puzzle.

Finally, beside its fading empirical significance, home-bias does not explicitly consider the monetary nature of financial assets. As it will be discussed in the next chapter, liquidity at the international level depends crucially on the currency of denomination, and thus results by definition in imperfect asset substitutability, beside considerations of "fundamentals" and imperfections.

2.2.2 Positive-feedback trading, contagion and herding

Foreign holdings, beside being too small if compared to standard financial theories, are also very volatile. The literature has individuated a number of mechanisms that explain the characteristics of such volatility, namely positive-feedback trading, contagion and herding behaviour. As for home bias, these phenomena are puzzling in light of theoretical predictions, and imperfections were introduced in the canonical models to account for them.

International portfolio investment is often seen as being plagued by positive-feedback trading, i.e. investors tendency to behave in a pro-cyclical way with respects to foreign assets by chasing returns. Bohn and Tesar (1996) represents a "classic" contribution in this literature. The authors develop a very simple model of security purchase in a standard international capital asset pricing model (CAPM) framework. Let net NP_{kt} be purchase of security k at time t, by definition it is equal to:

$$NP_{kt} = x_{kt}W_t - (1 + g_{kt})x_{kt-1}W_{t-1}$$

where x_{kt} is the portfolio weight of security k at time t, W_t the size of the overall portfolio at time t and g_{kt} the capital gain on security k at time t. Now by definition W_t is the sum of past wealth plus the returns between $t-1$ and t, that is the sum of d_t^P dividends and g_t^p capital gains on the total portfolio. Then approximately:

$$NP_{kt} = (x_{kt} - x_{kt-1})W_{t-1} + (d_t^P + g_t^P)x_{kt-1}W_{t-1}$$

This equation shows that net purchases of a security depends on a change in its weight within the portfolio, and on a portfolio rebalancing part, i.e. the net purchase of a security due to changes in the value of the total portfolio. According to standard financial models, a change in portfolio weight depends on a standard mean-variance choice: keeping return variance fixed, an increase in expected return of a security determines an increase of its weight within a portfolio. Investors that increase allocation to a particular security due to its performance are therefore 'chasing returns'. The combination of 'portfolio rebalancing' and 'return-chasing' effects determine the ultimate net purchase of a security. The authors proceed to test empirically which of the two effects is dominant when considering US investors purchases of foreign assets. They find that return-chasing is a much more important motive that rebalancing. Foreign investors, therefore, seem to engage in so-called 'positive-feedback' trading, that is, they keep investing in high-return assets and sell low-return assets. Importantly, as a result of their trading strategy, investors underperformed the market, by achieving lower returns and a higher volatility than a market weighed portfolio.

In another "classic" paper, Brennan and Cao (1997) rationalise this phenomenon from a theoretical point of view. They show that in a situation of asymmetric information, foreign investors have an informational disadvantage *vis-à-vis* domestic investors and tend to react to public information more than local investors. As a result, foreign investors will invest more when returns in the host market are high and vice-versa, i.e. they will tend to chase returns.

Many other authors have broadly confirmed this correlation between flows and returns. Froot *et al.* (2001) show that not only investors seem to engage in positive-feedback trading, but their flows are persistent - that an increase in flows today predicts an increase in flows in the future - and in turn predict higher future stock returns and increased asset prices. The increase in prices could be interpreted as price pressure given by high demand beyond what would be warranted by "fundamentals", in line with the theoretical argument by Brennan and Cao (1997) and the empirical evidence in Bohn and Tesar (1996). However, Froot and Ramadorai (2001) argue and present evidence that portfolio flows actually forecast improvements in fundamentals. Analogous results can be found in Bekaert *et al.* (2002): investors do in fact reduce the cost of capital, and seem thus to have informational advantages rather than

disadvantage. Under this light, positive-feedback trading is the optimal outcome of superior information by foreign investors.

Despite this, most of the evidence seem to point to the opposite relationship. Several authors (Kim and Wei, 2002; Borensztein and Gelos, 2003; Griffin *et al.*, 2004; Aggarwal *et al.*, 2005; Dvořák, 2005; Bae *et al.*, 2008; Jinjarak and Zheng, 2010; Hsieh *et al.*, 2011) present evidence that, especially in emerging markets, local investors have superior information as compared to foreign investors, and that is indeed the cause of "positive-feedback" trading. The already mentioned "gravity model" (Portes *et al.*, 2001; Martin and Rey, 2004; Portes and Rey, 2005) tries to explain flows on the basis of size and distance, and find that such a model seem to explain a big part of international transactions in assets, thus giving credit to the view of informational frictions as a key determinant of international financial flows.

Closely related to the positive-feedback phenomenon are herding behaviour and contagion, respectively the correlation of investments decisions across investors and across markets. Both these phenomena appear to be present in international portfolio investment, especially during crises. There is evidence that these phenomena are also present in emerging markets: herding behaviour is pervasive across emerging markets mutual funds (Hsieh *et al.*, 2011; Borensztein and Gelos, 2003; Chang, 2010; Jeon and Moffett, 2010), and contagion is often mentioned as a key mechanism in spreading financial crises across emerging markets (Kaminsky and Reinhart, 2000; Forbes, 2004).

Both contagion and herding behaviour can be explained to by referring to informational asymmetries. Herding behaviour can be explained by referring to "informational cascades" (Borensztein and Gelos, 2003, p. 45): when foreign investors can observe the actions of other investors, but remain at an informational disadvantage, they may interpret the actions of other investors as a source of information and seek to imitate them. The model by Calvo and Mendoza (2000) shows that in fact, herding behavior can be the rational response for some investors. The information gathering costs in the presence of short-selling constraints and increasing portfolio size can be too high to gather, and therefore investors prefer to conform to a market portfolio selling off assets performing badly.

Similarly, the co-movement of asset prices around the world seems to vary over-time but,

as Karolyi and Stulz (2002) show by surveying the literature, there is scant evidence of their relation with fundamentals. There is evidence that sometimes, and especially in times of crises, seemingly unrelated markets move - or rather crash - together. Contemporaneous sales of assets from different countries, even in the absence of fundamental changes in some of these countries, has frequently affected emerging markets (Froot and Tjornhom Donohue, 2002; Broner *et al.*, 2006; Kaminsky *et al.*, 2004a). Contagion can once again be the result of herding-like informational asymmetries. For example in the model of Calvo (1999), as liquidity constrained investors sell off assets of a country, other uninformed investors may be induced to imitate them, thereby spreading selloffs across countries. Alternatively, as shown by Kodres and Pritsker (2002), new information generates contagion, as informational asymmetries exacerbate price movements that follow portfolio rebalancing.

Another way through which informational asymmetries can affect emerging markets portfolio investment is by considering the specific behaviour of foreign institutional as opposed to individual investors. As it will be shown in chapter 4, foreign institutional investors have grown in importance within emerging financial markets, representing a substantial part of of the stock market capitalization, particularly when considering the free-floating part (Frenkel and Menkhoff, 2004, p. 1277). Emerging markets mutual fund investments and holdings have also dramatically increased over the past decade, only briefly but sharply interrupted by the global financial crisis (Gelos, 2011). Moreover there is widespread evidence that they behave pro-cyclically, fueling the boom in capital flows - even three months before a crisis happens - and the subsequent contraction (Kaminsky *et al.*, 2000, 2001; Didier *et al.*, 2008), and follow quite tightly market benchmarks (Disyatat and Gelos, 2001). Many of the results shown about positive-feedback trading, herding and contagion do in fact use data from emerging mutual funds[11].

Beside the already reviewed reasons - e.g. informational disadvantages of foreign investors - the literature on institutional investors focuses on an additional layer of imperfections. These arise out of a principal-agent problem: the principal - the investor - entrusts his savings management to the agent - the fund manager-, but faces problems in monitoring performance, and therefore sets up an incentive structure to ensure the manager follows his mandate. In

[11] See Gelos (2011) for an overview on this evidence specific to institutional investors.

practice the performance of fund managers is assessed against a market benchmark or the performance of other managers. Benchmark following has been documented among the most important determinants of international asset allocation (Raddatz *et al.*, 2013). As Frenkel and Menkhoff (2004) argue, this creates the incentive for herding among institutional investors, as fund managers are incentivised to follow the decisions of other managers, in order to avoid worse results compared to the average performance. The incentive structure also creates a basis for positive-feedback trading and contagion, as "when returns in a country are low, funds which are overexposed to that country tend to have below average gains ... therefore, they reduce their exposure to all countries in which they are overexposed, including the affected country" (Gelos, 2011, p. 7). Calvo and Mendoza (2000) model financial contagion as a result of delegated-investment problems: if the costs of performing above average exceed the benefits of performing above average, it is rational for managers to just conform to the benchmark portfolio, and therefore fuel contagion in times of a crisis. Miyajima and Shim (2014) confirms empirically that the increased presence of asset managers in emerging countries' financial markets, herding behaviour and pro-cyclicality are reinforced.

In conclusion, there is considerable evidence that foreign investors in emerging markets engage in positive-feedback trading, herd and spread financial shocks across countries. The most common explanation has been to refer to informational frictions, which induce investors to base their portfolio choice on something else other than direct information about the assets, such as the actions of other investors or the conditions of other assets, and originates agency problems in the the case of delegated investment. As a result of asymmetric information, trading behaviour of investors can therefore depart from fundamentals, and generate substantial volatility.

2.2.3 General equilibrium models of capital flows and portfolio choice

All the themes discussed in the previous subsection were conducted at the micro or partial equilibrium level. The realisation that portfolio choice had to be taken into account into a broader general equilibrium macroeconomic framework emerged in the mid 2000's. This essentially filled a gap in the general equilibrium literature, and in particular in its more advanced methodological tool, the Dynamic Stochastic General Equilibrium (DSGE) models.

The New Keynesian general equilibrium approach to open-economy macroeconomics started with Obstfeld and Rogoff (1995)[12]. Their model applies the typical New Keynesian features of sticky prices and monopolistic competition to a two-countries general equilibrium model. Essentially the authors build a bridge between two literatures: the "inter-temporal approach to the current account", which derives from the new classical literature where macroeconomic phenomena are the result of optimal micro-economic responses to shocks in a frictionless world, and the "Keynesian" classical open-economy models with nominal rigidities, such as the Mundell-Fleming and the Dornbusch models, which provide many realistic insights at the macro-level, but lack micro-foundations.

Financial markets in this literature initially were modeled in two "extreme" ways. The first is analysing a model of financial markets with only one asset, generally an international bond, as Obstfeld and Rogoff (1995) do in their seminal model. This assumption, while unrealistic, is preferred to the alternative of "complete markets" due to its consistency with the model structure: "it is hard to imagine how price or wage rigidities could survive in a world sufficiently sophisticated that complete international risk sharing is accomplished" (Lane, 2001, p. 249). However in these models, there clearly is not much scope for analysing gross asset positions nor flows. The alternative "extreme" assumption usually made in these models is that financial markets are complete. As Obstfeld (2004, p. 6) describes it is "a world of fully enforceable state-contingent contracts covering all possible future random event". The existence of several different assets under this alternative assumption, allows for the analysis of gross positions, but it is a rather implausible assumption, which has also been empirically disproved (Obstfeld and Rogoff, 2000).

In the mid 2000's, general equilibrium models were in fact inadequate to address a number of new and old empirical "puzzles" that came (back) to the fore. Among the "old puzzles", research focused on explaining the two already considered issues: the determinant of international portfolio holdings, with special focus on equity home bias that, while declining, continued to be a relevant phenomenon even in the phase of financial globalisation; and the relationship between capital flows, trading and asset prices, with a special focus on volatility and contagion.

The "new puzzle" emerges from the consideration of financial globalisation, which gained

[12]Lane (2001) provides a comprehensive survey of the initial stage of this literature.

prominence in those years (Lane and Milesi-Ferretti, 2001, 2003), in relation to another well known tendency that characterised the decade before the global financial crisis: the rise of global current account imbalances. It was emphasised that current account deficits, which are traditionally deemed to be sustainable on the basis of some future income from goods trade - that is with future trade surpluses -, can be financed with higher expected returns on the foreign assets. External adjustments do not necessarily work through the trade channel, but may also through a financial adjustment channel, which, with the rise of gross foreign asset positions, is likely to become an increasingly important mechanism.

Some authors have in fact documented that asset prices and/or exchange rate movements, have a sizable impact on the dynamic of net foreign assets, particularly for the US where these "valuation effects" in some years have almost completely offset the current account deficit (Lane and Milesi-Ferretti, 2003; Gourinchas and Rey, 2005b). Gourinchas and Rey (2005a) argue that the US does in fact enjoy an "exorbitant privilege", by paying considerably less on its external liabilities than it earns on its external assets. This is due to the particular composition of US portfolio holdings, long on foreign currency equity and FDI and short on short-term dollar denominated debt. Gourinchas and Rey (2005b) and Cavallo and Tille (2006) argue that this privilege can in fact smooth the US current account adjustment, which would otherwise be extremely sharp. This view is not shared by Obstfeld (2004, 2012a), who argues that valuation effects are an unreliable source of financing for current account deficits, especially in the long-run. Nevertheless both Obstfeld and Gourinchas share the view that the issue ought to be analysed better, and that general equilibrium models with perfect markets were unlikely to properly perform the task (Obstfeld, 2004; Gourinchas, 2006). Both "home-bias" and the "valuation effects" have been analysed with standard DSGE models, which however maintain some of the heroic assumptions of perfect risk-sharing and rely on very specific assumptions or model-design to explain the observed phenomena (Engel and Matsumoto, 2006; Kollmann, 2006; Heathcote and Perri, 2007; Ghironi *et al.*, 2007). Hence, the call for a development in the literature: "at the moment, we have no integrative general-equilibrium monetary model of international portfolio choice, although we need one" (Obstfeld, 2004, p. 19).

The call was answered by several authors, who managed to get the technical improvements

necessary to model imperfect multiple-assets financial markets (Devereux and Sutherland, 2007, 2011; Devereux *et al.*, 2010; Evans and Hnatkovska, 2012; Tille and van Wincoop, 2010; Bhamra *et al.*, 2014)[13]. Standard DSGE models are solved by studying the dynamics of linear approximations around a steady state. However, when financial markets are imperfect, the portfolio coefficients are not uniquely defined in a non-stochastic steady state, and similarly, the first-order approximations of the portfolio equations yield conditions that are consistent with any portfolio coefficient[14]. The solution to this problem is employing higher order approximations to tie down both the steady state and the first-order time-changing portfolio coefficients (Devereux and Sutherland, 2007, 2011; Evans and Hnatkovska, 2012; Tille and van

[13]See also Pavlova and Rigobon (2010b) for a literature review and Devereux *et al.* (2010) for a introduction to a special issue of the Journal of International Economics, both related to the recent developments in international macro-finance.

[14] Devereux and Sutherland (2011) in section 2.2 explain this problem at length. Since the "true" non-approximated equilibrium portfolio must be a function of "state variables", the portfolio coefficient at time t α must be a function of the only state variable in their model, the net claims by home agents on foreign assets W_t, so that $\alpha_t = \alpha(W_t)$. The first-order Taylor expansion of $\alpha(W_t)$ around the point $\overline{W}$ is:

$$\alpha(W_t) = \alpha(\overline{W}) + \alpha'(\overline{W})(W_t - \overline{W})$$

where $\alpha(\overline{W})$ is the zero-order, non time-varying component, and $\alpha'(\overline{W})(W_t - \overline{W})$ the first-order component, capturing the dynamics. The usual approach adopted in DSGE models, is to find the deterministic steady state and then use first order approximations of the model's equations around it to tie down both the zero and first order conditions around the deterministic steady state. In their model however, this is not possible, because both the steady state and the first-order approximations of the portfolio equations do not yield a unique solution for α. Only by using second-order approximations it is possible to find a value for the zero-order component, and third-oder approximation to find the first-order component. In economics' terms, in order to find unique portfolio allocations, risk factors need to be part of the decisions, since assets only differ in terms of risk characteristics. However the approximated equilibrium conditions equations do not take into account risk: in the non-stochastic steady state, risk is by definition excluded, and equilibrium conditions require assets to have the same rate of returns; first-order approximation around the steady state yield equilibrium conditions that require expected (rather than actual) returns to be the same. Risk only appears in second-order approximations of the equations, by linking portfolio choices to the marginal utility of consumption, in line with the standard prediction of the "consumption-CAPM"model (e.g. Cochrane, 2009). A second-order approximation "therefore captures differences between assets in their ability to hedge consumption risk and thus ties down an optimal portfolio allocation" (p. 15).

Wincoop, 2010), or simplify the models and find exact solutions, although this is only valid for special assumptions - i.e. log-linear utility functions (Pavlova and Rigobon, 2010b, 2011).

With these solution techniques, it is possible to incorporate market imperfections in DSGE models. Tille and van Wincoop (2010, p. 159), for instance, simply add an "iceberg" costs to foreign asset returns - i.e. agents receive the return on foreign equity multiplied by a factor $e^{-\tau}$, which captures the information costs of investing abroad. In another model Tille and van Wincoop (2008) introduce dispersed information, where investors have private information about future fundamentals, alongside the noise in portfolio shifts generated by transaction costs. These imperfections, along with the explicit recognition of risk, allow the modeling of more realistic features of open-economy, such as capital flows in multiple-assets financial markets and many of the associated theoretical "puzzles". For instance some models allow for valuation effects offsetting current account deficits (Devereux and Sutherland, 2010; Pavlova and Rigobon, 2010a; Tille and van Wincoop, 2008, 2010), home-bias as a structural feature of households portfolio choice (Devereux and Sutherland, 2009; Hnatkovska, 2010; Tille and van Wincoop, 2008, 2010) and highly volatile (Hnatkovska, 2010) and partially disconnected from fundamentals (Tille and van Wincoop, 2010) trading in foreign assets. Furthermore, these models are able to show the co-movements of gross capital inflows and outflows, either as a response of productivity shocks in the non tradable sector through the change of risk premia (Hnatkovska, 2010) or productivity shocks through changes in assets hedging functions (Tille and van Wincoop, 2008) [15].

However, there is a lack of consistency in some of the implications of the comparative dynamic exercises. For example, while both Tille and van Wincoop (2008) and Devereux and Sutherland (2009) find that a positive productivity shock in the home country leads to negative gross capital outflows and an increase in home-bias, Hnatkovska (2010) finds that the opposite is true. Pavlova and Rigobon (2010a) find that a positive supply shock generates a capital gain and a current account deficit, whereas Devereux and Sutherland (2010) and Tille and van Wincoop (2008) find just the opposite. Moreover, as Broner *et al.* (2013) argue, some of the findings are inconsistent with the data, which likely reflects the focus on productivity shocks -

[15] More precisely change in the covariance between excess returns (the difference between home and foreign assets) and exchange rates and the covariance between excess returns and excess future returns (p. 162).

these models typically have Real Business Cycle core - as the main economic driver of capital flows.

The recent literature in DSGE models therefore is able to address some of the empirical "puzzles". However they still maintain the key ingredients of general equilibrium modeling, populated by representative agents, with monetary considerations being effectively absent. This, as it will be argued, constitute an important weakness of this literature, which is indeed shown by the lack of analytical consistency of some of its results.

2.3 The legacy of the crisis: gross flows and risk-aversion shifts

The 2008 financial crisis shook up the conventional understanding of how financial markets have an impact on the economy. A major emerging theme, in light of the relationship between the crisis and financial globalisation, is the increasing concern with two-ways gross capital flows.

Traditionally, since the capital account is by definition equal to the current account, the focus was placed on net capital flows. In the words of several prominent macroeconomists:

> "Capital flows are traditionally viewed as the financial counterpart to savings and investment decisions, in line with the narrative of capital flowing "downhill" from capital-rich countries with lower rates of return to capital-poor countries with higher returns. From this perspective, the focus is typically on net capital flows, since that is what counts for funding a country's borrowing requirements." (Brunnermeier *et al.*, 2012)

The years preceding the crisis were undoubtedly related to global current account imbalances - indeed some authors argued that they caused or were a key determinant of the global financial crisis (e.g. Obstfeld and Rogoff, 2009; Portes, 2009) -, but an even more remarkable phenomenon was the expansion of gross capital flows and positions. Gross capital flows are several orders of magnitude bigger than net flows, highly volatile, and strongly pro-cyclical - falling dramatically during a financial crisis (Broner *et al.*, 2013). In the case of emerging

markets, typically private inflows have been mirrored by foreign exchange reserves accumulation (Lane and Milesi-Ferretti, 2007). Under such circumstances, it has been argued, focusing on current accounts to understand global financial imbalances is unwarranted (Johnson, 2009; Borio and Disyatat, 2011; Borio, 2015). Understanding the patterns of gross flows is crucial to analyse the actual financial relationships existing across countries, and the potential instabilities that may arise as a result of them. While there exist disagreements with respect to the centrality of current accounts for open economy macroeconomics, the idea that gross flows matter at least just as much has become increasingly shared among economists: "net international asset positions certainly remain relevant for several purposes ... but it is the gross positions that better reflect the impact on national balance sheets of various economic shocks" (Obstfeld, 2012b, p. 470).

As a result, many of the themes discussed in the previous sections have been re-examined by taking this view into account. Cavallo *et al.* (2015) have developed a new taxonomy of "sudden stops" distinguishing between gross and net sudden stops. Cerutti *et al.* (2015) analyse gross inflows to emerging countries disaggregating by type of flows (banks or funds), and find that the sensitivity to push factors largely reflect the type of lenders rather than domestic fundamentals. Forbes and Warnock (2012) provide a wide-ranging empirical assessment of the determinants of extreme gross capital movements, and crucially they disaggregate flows according to whether they are driven by foreigners or domestic investors: beside "surges" and "stops" they add the categories of "flight" and "retrenchment", respectively a sharp increase and decrease of gross capital outflows. The DSGE literature explored in the previous section, as discussed, is also fundamentally preoccupied to include simultaneous expansion of gross inflows and outflows combined with their "puzzling" features, such as positive-feedback trading and equity home bias.

More fundamentally however, the recent evaluation of capital flows determinants, has put strong emphasis on one factor: global risk-aversion. This factor had already appeared as a determinant of capital flows to emerging markets as "pure contagion", rather than fundamental-driven contagion, in a renowned paper by Masson (1999). In case of pure contagion investors "become more risk averse following bad news and less risk averse following good news irre-

spective of fundamentals in their own markets" Karolyi and Stulz (2002, p. 52). Broner *et al.* (2006, p. 212) develop a model that explains the transmission mechanism of contagion in these terms:

> "(i) weak relative performance due to an overexposure to the crisis country increases investors' risk aversion; (ii) the increase in risk aversion, in turn, produces a retrenchment towards the average portfolio; and (iii) the retrenchment of overexposed investors, in turn, leading to a drop in stock prices in countries that share overexposed investors with the crisis country"

Fundamentals, in this framework, do not necessarily play a role: investors simply rebalance their portfolio on the basis of weak returns of their total portfolio, and therefore sell out securities from countries where their portfolio is overexposed but may have little in common in terms of fundamentals with the initial crisis country.

Gradually, risk-aversion gained prominence as an explanation of the capital flows cycles to emerging markets. First, on the finance front, several studies have focused on emerging markets sovereign spreads and found that global risk-aversion, often proxied by the VIX index[16], has a crucial role in determining the size of the risk-premium that emerging markets have to pay (Baek *et al.*, 2005; Gonzalez-Hermosillo, 2008; Ciarlone *et al.*, 2009; Özatay *et al.*, 2009; Petrova *et al.*, 2010). More recently, risk-aversion has become a central concern of international macroeconomics. Rey (2013) argued that global risk-aversion is the crucial factor determining the global financial cycle, from leverage to asset prices and capital flows. Bruno and Shin (2015) put forward a similar argument, whereby capital flows depend positively on bank's leverage, which in turn mirrors the VIX index and therefore global risk aversion. The empirical literature has largely confirmed these ideas: the role of global risk-aversion (Ahmed and Zlate, 2014; Ananchotikul and Zhang, 2014; Forbes and Warnock, 2012; Fratzscher, 2012; Ebeke and Kyobe, 2015) in driving capital flows to emerging markets is well established.

Furthermore the literature shows that changes in risk-appetite are heavily influenced by

[16]This is an index that measures the implied volatility of the S&P 500.

monetary policy of advanced countries, with monetary expansion increasing the appetite for risk and vice-versa (Fratzscher *et al.*, 2012b,a; Chen *et al.*, 2012; Zhu, 2012). This is also recognised in the 2010 IMF Global Financial stability Report, which states that "(1) recent capital movements have been partly generated by the low interest rate policy in the G-4 and abundant liquidity in the global financial system; and (2) capital inflows can come to a sudden stop once monetary policy in the G-4 is tightened"(IMF, 2010a). Additionally, the risk-appetite channel reduces the policy space of emerging markets, as their central banks are induced to follow the FED lower interest rates in line with advanced countries to contain capital flows (Rey, 2013).

Very recent papers have suggested how the risk-appetite mechanism may apply to financial markets dominated by institutional investors and asset managers. Shin (2013) discusses how in what he calls "the second phase of global liquidity", institutional investors and their asset managers have become the crucial providers of finance to emerging markets, particularly through the corporate bond markets. Shifts in risk-aversion may quickly translate into capital outflows from emerging markets, increasing yields on emerging markets bonds, with negative consequences on corporations in those countries (Turner, 2014). That global risk-aversion also affects institutional investors rather than banks only is also documented by the (IMF, 2011, 2014). Ebeke and Kyobe (2015) show that, as foreign investors become dominant market players in emerging bond markets, the impact of foreign monetary policy on financial markets stability becomes substantial, through the risk-appetite, liquidity and portfolio rebalancing channels.

Risk-appetite changes may therefore generate capital flows cycles. These cycles take the form of an asymmetric asset swap between emerging and advanced countries, marked by shifts in global investors' risk appetite (McCauley, 2012): when risk is "on" capital flows to emerging markets, and central banks in those countries accumulate safe assets as reserves, when risk is "off", such reserves are drawn down and bought back by the investors' "flight to safety".

In sum the post-crisis literature has evolved in considering more explicitly financial mechanisms to understand capital flows. Gross cross-border flows and positions matter to understand capital flows and their volatility, and risk-appetite cycles are a primary factor behind their

dynamics. As it will be discussed in the next section, this represents a substantial progress for the analysis of capital flows, but more could be gained in rooting these factors into the historical and empirical context, and in more explicitly adopting a monetary analysis of the economy.

2.4 Conclusion

Research touching upon the issue of financial flows to emerging markets and their determinants has been vast and diverse. Since the early 1990's, with the establishment of the "push-pull" factors framework, researchers have been considering an increasing amount of potential explanations as to which determinants are crucial to drive cross-border financial relationships, with a special concern for their stability.

Conscious of the risk of oversimplification, a synthesis of the literature hitherto reviewed can be made to classify two main categories of factors:

1. **Characteristics of the Emerging Markets assets: fundamentals and market imperfections**
2. **Investors' risk appetite**

The first category has been subject to a much longer and deeper analysis. Any factor affecting the risk/return tradeoff of emerging markets assets fits into this category. The category could then be further divided, for example by distinguishing domestic and external fundamentals, but when looking at capital flows, it is logical to keep the category as one formally distinct from investors factors. After all, as Ahmed and Zlate (2014, p. 234) argue, "whether growth differentials widen because foreign growth is low or emerging markets growth is high, in both cases it is economic fundamentals at work driving the flows". Market imperfections also do not fundamentally change the focus of analysis, since they also focus on the assets characteristics, and in particular on the financial markets in which they are exchanged and the financial institutions which exchange them. To be sure, this does not mean that adding informational

asymmetries is just a minor cosmetic change to the analysis, but simply that it keeps the analysis on the assets and their markets rather than on the agents.

Investors' factors have become central as explanatory factors in more recent years. The idea that risk-appetite is volatile, and crucially depends on factors such as the macroeconomic environment or agents' balance sheets has become a central research topic [17]. This represents a whole different area of analysis compared to the first category: changes in capital flows to emerging markets and their consequences on asset prices are explained by changes in investors' global appetite for risk, regardless of emerging markets asset characteristics. The importance of this factor, documented by a rapidly expanding literature reviewed in the previous section, opens up major issues regarding financial stability in emerging markets: even if fundamentals matter, and policy-makers try to counterbalance changes in "external" factors, emerging markets can still be hit by global risk-appetite swings. It is indeed also on these grounds that the IMF has reconsidered its position on capital controls, which can be adopted temporary, last resort policy (IMF, 2010b, 2012), a view shared by other prominent economists (Obstfeld and Rogoff, 2009; Lane, 2012; Rey, 2013).

While the surveyed literature represents a very useful starting point to explore the issue of capital flows and asset prices in emerging markets, a number of limitations can be identified.

Firstly, the literature tends to over-aggregate different kinds of investors. In a world with multiple private agents making international investment decisions it is important to understand which sector in the economy is driving capital flows. Moreover, it is key to understand the precise nature of the investor driving such flows (e.g. banks, pension funds, sovereign-wealth funds). While some micro-level literature assessing the role of mutual funds exists, the macroeconomic literature focus on foreign claims and flows between countries. In short, there is a need to take into account the evolution of "investors" through historical time and space.

Secondly and directly stemming from the previous point, the process of portfolio choice is confined to the analysis of the asset characteristics and its economic and financial environment. In most of the literature, the implicit - or sometimes explicit - presumptions is that, if it were not for market imperfections, standard portfolio theory would hold. While undoubtedly the

[17] This also applies to the theoretical asset pricing literature. Cochrane (2011) in his presidential address explains how changes in investors' stochastic discount factors, rather than expected cash-flow payoffs, are the major driving forces behind changes in asset prices.

risk/return profile of an asset plays a major role, investors may have additional goals and constraints driving their portfolio choice. The post-crisis literature's focus on risk-appetite expands the portfolio choice mechanism. But once again, it is important to locate risk-appetite in the actual operations of the historically determined nature of "investors".

Finally, much of the reviewed literature remains ultimately grounded on a 'real' analysis of the economy. This is true of models essentially based on international loanable funds market (Caballero *et al.*, 2008), where interest rates are determined by the equilibrium between saving and investment. Even in the more recent models with multiple assets and imperfect capital markets, the portfolio choice is between foreign and domestic assets, which represent a claim on real output, whereas money either does not even exist and prices are expressed in terms of a numeraire good (Tille and van Wincoop, 2010), or determines the price through a quantity theory of money approach (Devereux and Sutherland, 2009). The dynamics of capital flows are thus determined by what are ultimately real economic decisions, chiefly the inter-temporal consumption choice of economic agents, who determine aggregate saving, and consequently the dynamics of current accounts and capital flows.

This limitation applies quite clearly to the "push-pull" factors framework and much of the partial and general equilibrium analysis emphasising the role of market imperfections. On the other hand, as mentioned, the post-crisis developments do partially overcome this limitation. The increasing consideration of monetary and financial factors, such as the FED monetary policy, the balance sheets of financial intermediaries and the focus on specific financial actors - banks or institutional investors -, and more in general the attention to the gross two-way flows and relationships clearly go beyond a purely 'real' analysis of the economy.

However the analysis is not wholly brought to its ultimate logical consequences. This is best exemplified by Obstfeld (2012b), who argues that the expansion of cross-border transactions can be conceptually understood as trading future consumption for future consumption, rather than current consumption for future consumption, as in the case of current account imbalances. These two-ways claims on future consumption, unlike current accounts, are not inherently constrained: "at any point in time, the size of the current account imbalance is limited by output sizes and the sizes of predetermined international assets and liabilities – but there is

no limit to the number of times funds can be recycled in different forms between Home and Foreign" (p. 470). The analysis of Obstfeld however seems to remain rooted in the inter-temporal consumption choice framework: the "asset-to-asset" transactions originate in the consumption choice of representative households, to which the internationally traded "funds" can ultimately be traced back. Even in this analysis, asset and liabilities are ultimately seen as claims on real resources, rather than monetary claims[18].

In sum, in line with the methodological considerations made in the introduction, the literature reviewed in this chapter can be considered as being on the one hand characterised by a lack of realisticness and on the other hand by a strict adherence to atomicism. The absence of money from the start, and of a deeper analysis of the portfolio choice process, in light of the historical evolution of the financial sector rather than derived from "rational" behaviour, indicates privileging instrumentalism over the realisticness of the assumptions.

Insights from the post-Keynesian and other economic traditions that have been grounded in a 'monetary' analysis of the economy, can substantially enrich this framework. These economic schools have long emphasised the importance of liquidity and balance sheets as a crucial determinant of economic and financial behaviour. Additionally, they have clearly underlined the importance of grounding economic analysis in historical developments, rather than purely abstract ideal types. Reviewing them to develop a theoretical framework for the analysis of capital flows to emerging markets is the task of the following chapter.

[18]This view echoes quite clearly what Schumpeter (1954, p. 686) terms the "monetary theory credit", a theory that sees "money as the only genuine and ultimate means of payment and the credit instrument that embodied a claim to money".

Chapter 3

A theoretical framework for the analysis of capital flows

Introduction

This chapter continues the development of a theoretical framework for the analysis capital flows to emerging markets. It assesses the contributions of alternative schools of economic thought in the subjects of money and finance and their potential contribution to a deeper understanding this thesis' topic. Bearing in mind the strengths and limitations found in the literature reviewed in chapter 2, the analysis will start with a survey of post-Keynesian monetary theory.

Post-Keynesian economists have long emphasised the importance of a monetary analysis of the economy, and sought to understand the importance of money for the dynamics of a capitalist economy. Key insights in these respects include the theory of liquidity preference, as a theory of money stocks demand - and portfolio choice in general - and the theory of endogenous money, as the demand for credit money as purchasing power. Particularly important for this thesis is the work of Minsky (1975), who conceptualised of a monetary economy as the interaction of the balance sheets and the resulting cash flows between economic units, and the behaviour of such units as being dependent on their balance sheet and cash flows

On the basis of this survey, the chapter will then proceed to develop these characteristics in section 3.2. Firstly it will consider how the monetary nature of the economy applies to the context of the open economy and the analysis of capital flows to emerging markets in particular. Secondly, it will highlight the relationship that capital flows bear with liquidity preference, in relation to contemporary post-Keynesian theories of the exchange rate. These two points suggest an understanding of capital flows as international asset demand.

In recognising the importance of the historical context for a realistic economic theory, section 3.3 highlights the rise of institutional investors as a major development that bears considerable relevance in the process of global financial integration.

These themes are finally syntehsised into a theoretical framework in section 3.4. This is based upon the understanding of the determinants of international asset demand by global institutional investors, in a world where liquidity and monetary factors matter, and the liabilities of economic units substantially influence their behaviour.

3.1 Post-Keynesian monetary analysis

This section looks at the broad arguments about the monetary nature of the economy and then moves to assess the post-Keynesian contributions, by referring to the theory of endogenous money and liquidity preference. It then closes with the recent evolution of these debates that seek to unify these two strands, and in particular highlights the role of Minsky's theory and the monetary theory as embedded in the Stock-Flow Consistent models literature.

3.1.1 Liquidity preference and endogenous money

As chapter 2 pointed out, a limitation of the conventional literature is its reliance on a real analysis of the economy, or an insufficient departure from it. A different perspective should start from the point of view that modern economies are fundamentally monetary. A monetary analysis, in Schumpeter (1954)'s words:

> "introduces the element of money on the very ground floor of our analytic structure and abandons the idea that all essential features of economic life can be represented by a barter-economy model ... it has to be recognized that essential features of the capitalist process may depend upon the 'veil' and that the 'face

behind it' is incomplete without it".

A monetary analysis recognises the importance of money as an essential component of a capitalist economy. It rejects the idea that money is neutral, that is the idea that what matters for economic decisions are not nominal - i.e. monetary - values but "real" values. In the words of Keynes, quoted in Bertocco (2005, p. 493):

> "The distinction which is normally made between a barter economy and a monetary economy depends upon the employment of money as a convenient means of effecting exchange. It is regarded as a mere link between cloth and wheat, ... It is not supposed to affect the essential nature of the transaction from being, in the minds of those making it, one between real things, or to modify the motives and decisions of the parties to it. ... That, however, is not the distinction which I have in mind when I say that we lack a monetary theory of production. An economy, which uses money but uses it merely as a neutral link between transactions in real things and real assets and does not allow it to enter into motives or decisions, might be called ... a real exchange economy"

On the contrary, monetary analysis considers all the fundamentals characteristics of a capitalist economy - production, employment, consumption - are essentially monetary, in line with the famous statement by Robert Clower that "money buys goods and goods buy money; but goods do not buy goods". Money, in the spirit of Marx, is also the end the capitalist production process, and thus the underlying cause of capitalist dynamics: "the purpose of production is to accumulate money - not to barter the produced commodities for other commodities ... money is the object of production - it is not merely the way we measure the value of output" Wray (2010, p. 4). Moreover, since goods do not buy goods, it follows that money is also needed as a starting point for any economic activity. In short, as Keynes - quoted in Fontana (2000, p. 40) - stated: "The theory which I desiderate would deal ... with an economy in which money plays a part of its own and affects motives and decisions and is, in short, one of the operative

factors in the situations of that the course of events cannot be predicted either in the long period or in the short, without a knowledge of the behavior of money between the first state and the last".

Arguably, the school of thought that more than others stressed the importance of money in a modern capitalist economy is the one associated with Keynes and the post-Keynesians[19]. A useful way to summarise the post-Keynesian views on monetary theory is analysing how they have addressed two fundamental functions of money: *store of wealth* and *purchasing pow*er. This is indeed what Keynes himself does in chapter 13 of *The General Theory of Employment, Interest and Money* (GT, from now on). After defining interest as "the reward for parting with cash", he considers that while the purchasing power of money justifies the loss of interest "for the convenience of liquidity", the absence of a yield on holding money makes the demand for money as a store of wealth harder to explain (p. 109). To account for that, it is argued, we must take into consideration the existence of *uncertainty*[20]. In conditions of uncertainty, there can be three motives behind people's demand for money - i.e. their *liquidity preference* -: the transaction motive, the precautionary motive and the speculative motive. While the first two essentially depend on the level of economic activity, and do not depend on the rate of interest, the relation of the last one with the rate of interest is given considerable importance in the GT. The underlying idea is that, with uncertainty about future rates of interest and with well developed organised security markets, investors will try to bet and anticipate market changes: if they expect the interest rate to increase, and consequently the price of their bonds to decrease, the will increase their demand for cash holdings, as to avoid preemptively the depreciation of their portfolio.

Keynes' monetary theory in the GT is further developed in chapter 17. Firstly, Keynes formulates the theory of "own rates of interest", according to which, "for each capital-asset

[19]It is beyond the scope of this dissertation to provide a comprehensive debate about the several different strands of "monetary" economic theories. For instance, the marxian Money-Commodity-Money' circuit and the schemes of reproduction could be well considered one of the first consistent monetary theories of production. Schumpeter also gave great importance to credit money as a necessary starting condition for innovation. What follows is a critical overview over the various concepts that broadly defined post-Keynesians have put forward to show the features of a monetary economy.

[20]Uncertainty is not very specifically defined in the GT. However, in his later writings, Keynes defines it as the condition for which, with respect some events "there is no scientific basis on which to form any calculable probability whatever". This really echoes Frank Knight's definition of uncertainty as unforeseeable and therefore not calculable, as opposed to risk, which can be accounted for by probabilistic forecasts.

there must be an analogue of the rate of interest on money" (p. 142). The rate of interest of an asset is its yield q, minus its carrying cost c, plus its liquidity premium l, the latter being "the power of disposal" over that asset (p. 144). With respect to this characterisation, money is peculiarly defined as an asset with a liquidity premium that greatly exceeds its carrying costs, making its rate of interest essentially stable over-time - or at least comparatively more stable than any other asset. Moreover money, according to Keynes, has two other essential features: inelasticity of production and inelasticity of substitution. The first condition means that money cannot be simply produced by employing labour; the second means that, as the demand for it increase, "there is no tendency to substitute some other factor for it" (p. 147). These conditions, coupled with the stability of its rate of interest, make the money rate of interest the standard against all the other rates are measured and in turn form the basis upon which money becomes the standard unit of account:

> "Thus, we see that the various characteristics, which combine to make the money-rate of interest significant, interact with one another in a cumulative fashion. The fact that money has low elasticities of production and substitution and low carrying-costs tends to raise the expectation that will be relatively stable; and this expectations enhances money's liquidity premium and prevents the exceptional correlation between the money rate of interest and the marginal efficiencies of other assets". (p.152).

Keynes' monetary theory in the GT therefore provides the means to justify under-employment equilibrium: as people seek to increase their savings, thereby reducing effective demand and causing unemployment. As interest rates are determined by liquidity preference, rather than saving, higher saving is not necessary accompanied by a fall in interest rates which would be necessary to generate full employment.. "The trouble arises, therefore, because the act of saving implies, not a substitution for present consumption of some specific additional consumption which requires for its preparation just as much immediate economic activity as would have been required by present consumption equal in value to the sum saved, but a desire for "wealth"

as such, that is for a potentiality of consuming an unspecified article at an unspecified time." (p.135).

The monetary analysis contained in the GT seems to focus more on the store of wealth function of money (Bertocco, 2005, 2007), which can lead to interpret the theory of liquidity preference solely as a theory of money as a store of value (Tily, 2012). Some post-Keynesians authors have sought to develop Keynes' monetary theory on these lines, focusing on liquidity preference in conditions of fundamental uncertainty (Davidson, 1972a,b; Dequech, 2000). Fundamental uncertainty is especially pervasive in financial markets and results in the impossibility of determining precise probability functions about future asset prices. In these conditions, expectations will be driven by conventions, about what is collectively deemed to be "fundamental" in driving asset prices, and confidence swings as a result of psychological factor. This interpretation of liquidity preference is also what some authors, whose theories constituted the core of the neoclassical synthesis, like Hicks and Tobin, have tried to model (Bibow, 2009, chap. 4). Differently from the original formulation of the GT, as Carvalho (2010) argues, is the major emphasis on the precautionary motive, which Keynes had conflated into the transaction motive. Moreover, in the GT, Keynes simplifies his theory as the choice between only two simple assets, money and bonds, thus considerably simplifying the issue of portfolio choice. In sum "Keynes' liquidity preference is a theory of money allocation that helps us understand how economic agents perceive their demand for money" (Sawyer, 2003).

However, the theory of liquidity preference as expressed in the GT has one very important limitation: it assumes, more or less explicitly, that the money supply is exogenous and fixed. Another key issue in post-Keynesian theory was therefore the development of a theory of "endogenous money", that is a theory in which money is endogenously created by private banks through credit creation which finances production. Keynes (1937), in fact, acknowledged the limitation of his approach to money in the GT and added the "finance motive", firm's need for a source of finance in order to undertake investments, as a determinant of money demand. While the analytical consistency of this addition is disputable (Chick, 1999; Bertocco, 2005; Bibow, 2009), it provided, along with Keynes' earlier works in the *Treatise on Money,* a foundation

upon which theories of money endogeneity could be built.

The precise nature and mechanisms of money endogeneity have been subject of intense debate[21]. A strand, which can be connected to the work of Kaldor, is the so-called "horizontalist" or "accommodationist" school (Kaldor, 1985; Moore, 1979; Lavoie, 1984), according to which banks accommodate the demand for money by firms, the central bank in turn accommodates the demand for reserves by banks: the money supply is infinitely elastic with respect to the interest rate. This view seems to undermine the role of liquidity preference, as the demand for credit-money is what determines the money stock while the interest rate is exogenously chosen. As Kaldor (1985, p. xvii) puts it, "once we realise that the supply of money is endogenous (it varies automatically with the demand, at a given rate of interest), liquidity preference and the behavior of the velocity of circulation ceases to be important".

The "structuralist" view (Dow and Dow, 1989; Dow, 1996; Palley, 1996; Chick and Dow, 2002) criticised the "horizontalists" precisely on the grounds that it overlooked the importance of liquidity preference in the process of credit supply. Especially important is the liquidity preference of banks, which, it is argued, are not passively accommodating the demand for credit, but actively manage their balance sheets. The demand for money too needs to take into account liquidity preference, if one broadens "money" to include interest-bearing deposits (Dow and Dow, 1989). Some authors have in fact argued that "horizontalism" is in fundamental contradiction with the theory of liquidity preference and Keynes' monetary theory more in general (Cottrell, 1994; Monvoisin and Pastoret, 2003; Carvalho, 2010). For the structuralists, the money supply therefore, while being endogenous, is not horizontal but slightly upward sloping as a result of liquidity preference considerations: as demand for credit increases, lending rates will increase, therefore resulting in a positive relationship between economic activities and interest rates. Structuralist theory therefore offers "middle ground position" between the "extremism" of both horizontalism and the exogeneity of the money supply (Chick and Dow, 2002).

Finally, a third approach to monetary endogeneity is the so-called "monetary circuit" approach (Parguez and Seccareccia, 1999; Halevi and Taouil, 2002; Realfonzo, 2006; Gnos, 2006),

[21] Overviews of the debate can be found in (Cottrell, 1994; Fontana, 2003)

which also draws from Keynes' writings, although not exclusively[22] and was developed independently from the "traditional" literature in post-Keynesian economics. In the ciruitist theory "the working of the economy is described as a sequential process, characterised by successive phases whose links form a circuit of money" (Realfonzo, 2006, p. 106). The circuit starts with bank credit granted to firms; then firms pay their inputs - in the aggregate this corresponds to the total wage-bill - and undertake production; once production is complete, firms put their goods on the markets, which are bought by workers; money therefore flows back to firms, which pay back their loans, effectively destroying money and thus closing the circuit.

To summarise, there are two main lines of thought in the post-Keynesian literature, about the nature of a monetary economy. The first, which originates in the liquidity preference theory contained in the GT, focuses on the role of uncertainty in creating a demand for money stocks, and liquid assets more broadly defined. In this sense therefore, liquidity preference can be interpreted as theory of asset choice, and considers the money as a store of wealth (Tily, 2012). The second line of thought focuses on the endogenous money creation through bank credit. Endogenous money theory and "circuitism" focus more on the circular flow of money, therefore highlighting the importance of money as "purchasing power" (Fontana, 2000; Sawyer, 2003). However it is hardly contestable that in a modern capitalist economy money plays both roles. The debates in post-Keynesian monetary theory seems to originate in a difficulty to provide a consistent theory of money that reconcile its two fundamental roles (Fontana, 2002). As Chick (1999, p. 126) puts it, "while Keynes broke the classical dichotomy between the monetary and real aspects of the economy, this device simultaneously created a new dichotomy between flows (the analysis of income) and stocks (portfolio analysis)".

3.1.2 A possible synthesis

Analysing some recent developments in the post-Keynesian literature, it seems that a synthesis between the various approaches can be found. While post-Keynesian scholars acknowledge that decisions behind a "finance" demand for credit money are quite independent from

[22] Both Gnos (2006) and Realfonzo (2006) mention Marx, Schumpeter and Wicksell as main points of reference for the the French and Italian schools of monetary circuit. Arestis and Glickman (2002); Halevi and Taouil (2002) point out the close relation between circuit theory and Kalecki.

the "portfolio" demand for money as an asset, in practice the two are usually merged together into a single "demand for money" function. This not only represents a theoretical shortcoming but also creates, as Sawyer (2001, 2003) has convincingly argued, an empirical problem: credit-money as purchasing power corresponds to what is today defined as M1, whereas money as a store of wealth corresponds to M3 or M4 (other than M1), a distinction that Kalecki had already pointed out. As Bertocco (2005, 2006, 2007) has explicitly argued, what is needed is a framework that specifies the distinction between a credit and a money market. He refers to Tobin's contributions that distinguished between an income account and a capital account: the former tracks income flows, where income decisions such as investments are made, the latter tracks supply and demand of different assets, tracking the change of stocks over-time. Credit-creation, being the outcome of firms' investment decisions, is related to the income account, while the money-market, being associated with portfolio allocations by wealth holders, is part of the capital account.

Viewpoints similar to Bertocco's have been expressed by several others scholars over the past decade. Brown (2003) argues that the main interpretation of liquidity preference is flawed, conflating a transaction/finance demand for credit money with the portfolio decisions of wealth holders, and therefore should be re-interpreted in the spirit of the *Treatise on Money*'s concept of "bearishness", i,e, the desire to hold assets with stable values, even if low yield. If there is a rise in liquidity preference, the "bears" prevail, and there is a shift towards broadly defined money, increasing the yield and decreasing the prices of long-term securities:

> "It is the ever-present potential for convulsive shifts in the structure of relative prices among securities, brought about by the interplay of psychological and institutional factors, that is, or more accurately, ought to be, the quintessence of LP." (p. 331)

This view of liquidity preference actually has several important precedents (Townshend, 1937; Boulding, 1944; Robinson, 1979; Mott, 1985). In today's world, where secondary markets for securities are deep and well developed, liquidity preference is relevant for all assets that pertain

to what Keynes called "financial circulation" (Erturk, 2006, 2005).

There is no incompatibility between this view of liquidity preference and the endogenous money theory: "under the assumptions of extreme horizontalism, this analysis [liquidity preference] does not apply to the overnight rate, to loan and deposit rates, and to government bond rates ... still, this leaves a great range of assets whose prices are in part determined by liquidity preference" (Wray, 2006, p. 9). Lavoie (1996, 1999, 2006) - one of the most prominent horizontalists - has also repeatedly claimed that horizontalists have never questioned the importance of liquidity preference - and other reasons - in influencing interest rates, but simply argued that there is no compelling case for an upward sloping money supply curve. While still claiming that horizontalism is the best approximation, he acknowledges the fact that liquidity preference has a role to play even in banks' credit creation including credit rationing, households portfolio allocation and firm's financing decisions.

Although less directly related to the theory of liquidity preference, the theory of the monetary circuit is also fully compatible with the idea that money can be held as a stock. This is well explained by Realfonzo (2006):

> "monetary circuit theory distinguishes between the demand for money to finance production (which Keynes called 'finance motive') and the demand for cash reserves (dependent on the famous transactions, precautionary and speculative motives). The finance motive explains the creation of money and its injection into the economy ... The demand for cash reserves leads to the formation of money stocks which are present at the closure of the circuit." (p. 110-11).

Thus, in the monetary circuit there is a clear distinction between the credit market[23], where banks and firms bargain over loans, and the financial market, where households can decide to use part of their savings in security purchases. The interest rates forming in the two markets are different, the second being more directly related to the general public's liquidity preference.

[23] Unfortunately Realfonzo (2006) calls the credit market "money market", thus potentially sparking confusion in terminology.

There seems therefore to be a line thought pointing to the importance of analysing together the flows of income and the wealth allocation of the various sectors, in a wider macroeconomic framework. A very useful theoretical framework in these respects, can be found in theory of Minsky, and especially his "Wall street paradigm", which he exposed in his book *John Maynard Keynes* (Minsky, 1975; Dymski and Pollin, 1992; Dymski, 1997; Bellofiore *et al.*, 2010). In chapter 4, Minksy depicts a modern monetary economy, essentially in terms of balance sheets and cash flows:

> "In a capitalist economy, one way every economic unit can be characterized is by its portfolio: the set of tangible and financial assets it owns, and the financial liabilities on which it owes ... Each economic units makes portfolio decisions ... what assets are to be held, controlled, or acquired ... [and how] the position in these assets ... is to be financed. Both assets and liabilities ... set up cash receipts or expenditures over some fixed or variable future time period" (p. 70).

To analyse the dynamics of a Wall Street economy, it is therefore central to assess the balance sheet structure and the cash flows dynamics of the various units that compose it. This leads to a re-interpretation of Keynes' theory of the "own rate of interest" as a theory of asset prices: an asset is valued on the basis of its quasi-rents, its carrying costs and the liquidity premium. In the context of the Wall Street paradigm this acquires a particular interpretation, related to the balance sheet structures where the quasi-rents from are cash inflows from assets, the costs of holding such assets are the cash commitments from the liabilities, and the liquidity premium is the the implicit yield that liquid assets owe to their ease of disposal - that is it can quickly generate an actual cash flow if sold. In deciding the composition of their balance sheets, economic units speculate that their liability cash commitments can be met by cash receipts originating from its assets. Liquidity preference essentially affects the shift of balance sheets, not only as an asset shuffling between money and bonds, as in the original Keynesian formulation, but between capital/non liquid financial assets and liquid assets on the asset side, and in the leverage choice on the liability side.

Minsky also acknowledged the importance of an elastic supply of money (p. 123), and the difference between credit creation and the portfolio choice of units: "the finance for both additional capital-asset production and the increased debt-financing of positions has to come from some place. Two sources of such financing may be identified: the creation of money and portfolio diversification of wealth owners." (p. 121). Finally, Minsky believed that the evolution of the economy as a macro-monetary system could be based on the distinction between three different types of cash flows, income flows, balance sheet flows and portfolio flows, "which he proposed to integrate into what we would now call the "flow of funds" accounts, showing the evolution of money in circulation and portfolio balances" (Toporowski, 2012a, p. 6).

It would thus seem that Minsky's Wall Street paradigm provides a useful theoretical framework upon which to develop the view of a monetary economy that is characterised by balance sheets that evolve through time through the dynamic interaction of cash flows. It also enriches the traditional Keynesian view of decisions under uncertainty, by highlighting the importance of the liability structure in determining portfolio choice. The burgeoning literature on Stock-Flow Consistent models[24] seems to provide a formalisation of this view:

> "SFC macroeconomic models are, by definition, ones in which the balance sheet dynamics of all assumed institutional sectors (given by sectoral saving flows, portfolio shifts, and capital gains) are explicitly and rigorously modeled .. this definition implies (as exemplified in the next section) that SFC models are necessarily based on social accounting frameworks that consistently 'integrate' conventional product and income accounts with 'flow of funds' accounts and a full set of balance sheets" (Dos Santos, 2006, pp. 542-543).

Unsurprisingly, Minsky is mentioned by Godley and Lavoie (2012) as a main linkage between the Stock-Flow Consistent approach and post-Keynesian economics.

In sum, a monetary analysis of the economy is characterised by both an endogenous money

[24] See (Dos Santos, 2006; Caverzasi and Godin, 2015) for an overview.

supply, and agent's liquidity preference under conditions uncertainty. Furthermore, these processes give rise to a complex set of balance sheets and financial transactions, which represent the interactions between economic units in a sophisticated financial system, such as the one that exists today, and determine the evolution of asset prices.

How can this picture be applied to the context of international capital flows, and what are its implications in relationship to their determinants, surveyed in the chapter 2?

3.2 Post-Keynesian monetary theory in the open-economy

This section applies the considerations about the nature of a monetary economy emerging from section 3.1 to the context of the open economy. The theoretical concerns discussed in the previous section can also be observed at a different level of abstraction, in the analysis of capital flows as analysed from a monetary perspective. Firstly, it discusses the importance of understanding capital flows as flows of funds, rather than real resources, and the implication that this has on the importance of the current account. Secondly, it explores the application of liquidity preference theory in the open-economy, by referring to post-Keynesian theories of the exchange rate. These are then summarised in the understanding of capital flows as investors' international asset demand.

3.2.1 International monetary flows

The monetary view of the economy based on Minsky's theory, whereby agents interact by engaging in financial transactions and holding claims on one another, can be extended to the context of an open economy. In a monetary open economy, capital flows are nothing but financial transactions between economic units located in different countries. A monetary analysis needs to consider capital flows as "flows of funds", rather than transfers of "real" resources, as a result of which some units will hold claims on foreign units which in turn incur liabilities for foreign units. As Carvalho (2009, p. 19) puts it, "foreign investment should not be confused with "real" resources, just as domestic savings should not be confused with surplus corn. Cross-border financial transactions ... by themselves they represent the circulation of

foreign currency, not of real goods or real capital" .

Although this view is a natural implication of a monetary analysis of the economy, its direct consequence is to break down the conventional analytical link between capital flows and current accounts. Current accounts are the outcome of decisions pertaining to the "real economy" or, in "accounting terms", economic units' income accounts: saving and investment or imports and exports. In a monetary economy these have a financial transaction counterpart in the capital account, which can be divided, mirroring Minsky's definitions, into income flows (the trade in goods and services) and balance sheet flows (net factor income). However, financial transactions may also have nothing to do with these decisions. These "portfolio transactions" - that is, transactions resulting from the purchase and sale of existing and newly-created assets - are logically distinguished from the current account, and can be - and are in practice - several orders of magnitude higher than income and balance sheet flows.

To capture the dynamics of such transactions the focus needs to shift from net to gross capital flows, as a recent paper by Borio and Disyatat (2011)[25] vividly argued. The authors claim that the focus on net flows arises out of a confusion between "saving" and "financing": in a monetary economy, saving is nothing but income not consumed which has no necessary relationship, let alone a causal one, with financing, a cash flow concept representing a monetary transaction. In the open-economy the same distinction can be made between current accounts - or net capital flows - and gross capital flows, where the former only represent the difference between saving and investment of an economy as a whole, whereas the latter represent all cross-border financial transactions.

A number of implications follow. Firstly, gross capital flows bear little relationship to current accounts because most financial transactions result in zero-net flows. An example can clarify this point: suppose a US private resident purchases a UK security, denominated in British pounds sterling. This represents an increase in US claims to the UK and thus a gross outflow. However, to purchase the security, the US resident must pay for it in Pounds Sterling, which leads him to either run down any reserves he might have in that currency, or exchange his dollars for British pounds in either a US or a UK bank (at least indirectly). This results in either a reduction of gross outflows or an increase in gross inflows, thereby offsetting

[25] It is interesting to note that the authors are not explicitly referring to post-Keynesian monetary theory.

the initial transaction. As a result, although financial transactions have occurred, and new two-ways claims have been established, no net change in capital flows will result.

Secondly, by implication, this means that the current account does not reveal much about how investment in a country is financed. "Even if, say, a country's current account is in balance, or no imports and exports take place at all, the whole of its investment expenditures may be financed from abroad" (p. 9).

Thirdly, it is wrong to link any specific type of gross flow to the current account. Specifically, this point relates to the widely-held view that current accounts are needed to accumulate reserves. Reserve accumulation is, however, a financial transaction that generates offsetting flows and, for it to occur, there only needs to be a gross inflow of foreign currency, which may not necessarily be related to the current account. Finally, this is clearly even more valid in the presence of multilateral capital flows: "in terms of national income accounting, deficit countries are compensating for the non-consumption of surplus countries. In this sense, current account deficits are matched by saving in other regions. But the underlying consumption and investment expenditures that generate such imbalances may be financed in a myriad of ways, both domestically and externally" (p. 10).

This view is alternative to "real" and loanable funds theories of capital flows. It goes beyond Obstfeld's (2012) view presented in chapter 2, which sees gross positions as repeatedly exchangeable but ultimately as claims on real resources. It also goes beyond applications of Minsky's Financial Instability Hypothesis to the boom-bust cycles and financial crises in emerging markets (Kregel, 1998; Arestis and Glickman, 2002; Schroeder, 2002; Onaran, 2007; Frenkel and Rapetti, 2009)[26]. In this line of inquiry, capital flows add to the domestic build-up of financial fragility in emerging markets. In particular, financial liberalisation - both domestic and capital account - kicks off the boom phase of the cycle: high interest rates and good growth prospects attract foreign capital, which in turn eases the financing conditions in the economy, increasing the liquidity of financial markets and institutions. The economy will then experience a credit boom, with rising asset prices. At the same time, the real exchange rate appreciates, following nominal exchange rate appreciation and/or increasing prices of non-tradable as a result of the boom in aggregate demand, generating a current account deficit. As the boom

[26] A full exposition of the financial instability hypothesis is beyond the scope of this chapter.

proceeds, more economic units will present an increasingly fragile financial structure, by short-term borrowing, often in foreign currency - as the cost of borrowing abroad is lower, given the interest rate spread and the real exchange rate appreciation of the domestic currency. At some point, however, the fragility of the economy would be such that either some endogenously generated problems occur in the domestic economy (e.g. a bank failure), or international investors start to doubt the soundness of the economy and begin to decrease their exposure to it or even speculate against its currency. Either way, financial fragility will quickly turn into a financial crash, with the dramatic fall of the exchange rate and higher interest rates, which will create extremely serious situations for economic units.

While these theories accurately depict the dynamics of the emerging markets' crises in the late '90s, recent events cast doubts about their validity as a general theory of open economy boom-bust cycles. The pre-2008 cycle of capital flows to emerging markets presents some substantial differences from the story outlined above. First of all, most emerging markets had solid "fundamentals", such as government fiscal soundness, or they contained firms' and banks' leverage; secondly, they received massive capital inflows despite their current account surpluses, which in some Asian countries were remarkable; thirdly, the highly destructive phenomena of currency and maturity mismatches were largely not present; fourthly, they accumulated unprecedented levels of foreign exchange reserves, as a shield against both the likelihood and the consequences of a financial crisis. Despite all of the above, in late 2008, massive capital outflows from emerging markets, with asset deflations and exchange rate falls, and a generalised, albeit less severe than in the past, economic crisis. Theories that ultimately link financial crashes to unstable domestic financial systems, and those in which capital flows simply amplify or trigger phases of the cycle, are therefore not well equipped to analyse the recent trends of financial globalisation. Therefore, the existing literature's application of Minsky's financial instability hypothesis to balance-of-payments crises cannot be considered a generally applicable characterisation of capital flows cycles, to the extent it tends to place an unnecessary high focus on current accounts and domestic credit booms[27].

Theoretically, the limitations of these theories can be traced back to their insufficiently

[27]This does not mean that such characterisations are not useful anymore. For example, emerging eastern european economies in the 2002-2007 period have experienced a boom-bust cycle of capital flows that could arguably be consistent with those theories.

clear distinction between gross and net capital flows. Once it is recognised that current account imbalances do not necessarily play a role in open economy financial crises, since a great deal of capital flows consist in portfolio transactions, it becomes clear that boom-bust cycles may therefore be largely detached from domestic financial conditions, as much of the current empirical literature also confirms. In a monetary economy, the determinants of capital flows need to be understood as the determinants of such "portfolio transactions", which may or may not be related to the build-up of internal financial fragility, and the dynamics of the current account.

A final word of caution is in order. De-emphasising current accounts does not imply that these are irrelevant for exchange rates. As Lavoie (2014, p. 494) claims, current accounts in the long-run tend to determine the appreciation or depreciation trends of a currency, with capital flows having a short-term impact but often resulting in an opposite effect in the long-run. The contention of this dissertation is that, although current accounts, as implied by the logic of Stock-Flow Consistency, guide the long-run trends of exchange rates, movements in capital flows are often sizable and quick enough to counterbalance these long-run trends in the short-run, so that the long-run equilibrium exchange rate may not always be reached before the direction of capital flows change again.

3.2.2 Fundamental uncertainty, currency hierarchy and liquidity cycles

As discussed in section 3.1, post-Keynesian economists have long emphasised the role liquidity preference in an uncertain world. In financial markets, portfolio transactions by economic units are considered to depend largely on conventions, and the belief about how the market as a whole will align to such evolving conventions. In the context of the open-economy, post-Keynesian theory has especially focused on the determination of the exchange rate as a result of such mechanisms.

The work of Harvey (2010) is probably the most renowned application of post-Keynesian concepts of uncertainty and expectations to the theory of exchange rates and capital flows. The theory is chiefly based on the concept of fundamental uncertainty, whereby expectations about asset prices are mostly based on conventions and psychological factors, in the absence of

stable probability functions. Market sentiment is therefore the crucial determinant of financial market expectations, which drive short-term capital flows and in turn exchange rates.

Under this view, capital flows and foreign exchange markets are a prime example of a "beauty contest". Fundamentals may play a role only insofar as they represents relevant indicators to drive exchange rates in the future, as participants are "guided by mental models of the currency market that are in turn based on experience and scholarly and professional research" (Harvey, 2006, p. 164). However technical factors, as well as behavioural factors are likely to be just as pervasive.

Other post-Keynesian authors also start from liquidity preference, but take a less "fundamentalist" [28] approach. The theoretical framework of reference is the theory of the own rate of interest in Keynes' GT chapter 17, which has also been discussed in section 3.1. Accordingly, different assets have different liquidity premia, depending on their ability to function as a means of payment or store of value, and have a corresponding rate of return. In the open economy the crucial aspect determining an asset's liquidity is its currency of denomination. Capital flows must therefore be understood in relation to the conditions of the international monetary structure, which determine the liquidity of currencies. Some post-Keynesian authors have characterised this with the notion of "currency hierarchy", according to which different currencies have different liquidity premia, based on their ability to store value and exchange medium (Terzi, 2005; Andrade and Prates, 2013). In this hierarchy emerging markets remain in a lower position, with their currency being exchangeable internationally but only working as a limited store of value, and therefore carrying a low liquidity premium. This contributes to justify the high interest rates that assets in emerging markets generally offer compared to assets denominated in core currencies.

Kaltenbrunner (2011, 2015) expands this view, developing a comprehensive framework for the analysis of the exchange rate and capital flows, mostly based on the work of Minsky (1975). The central contention of her work is that a currency's liquidity premium does not only depend on its role as a store of value, but is crucially determined by its ability to be used to meet outstanding obligations; that is, to use assets denominated in that currency to cover liabilities funded in the reserve - core - currencies.

[28] In the sense of Coddington (1976).

Several factors will in turn affect this ability. First is the stock of a country's foreign liabilities, which comprises the foreign currency debt boom-bust "Minskyan" cycles described above. Kaltenbrunner however also goes beyond that, in arguing that any accumulation of foreign liabilities exposes the country to heavier impacts on its financial and currency stability. Second is the ability to generate foreign currency flows to meet outstanding obligations through income generation, i.e. through trade and net factor income surpluses - a condition which emerging markets unsurprisingly often seek to achieve. Finally is the ability to face foreign liability commitments by selling assets, including the "institutional liquidity" of a country's financial markets.

In synthesis, a country's currency will have a higher liquidity premium, the lower its (net) exposure to foreign investors, and the higher its capacity to face those obligations through either income/balance sheet flows or portfolio transactions. In determining a currency's liquidity premium, any indicator of the evolution of these factors could therefore be regarded as a "Keynesian fundamental", around which market conventions will be catalysed. Foreign exchange reserves in particular can be interpreted as a crucial determinant of emerging markets currency liquidity, since they effectively represent a country-level hedge of foreign liabilities. Indeed, the primary role of foreign exchange reserves is precisely to dampen exchange rate volatility, providing direct support to the "institutional liquidity" of foreign exchange markets.

Emerging markets have historically presented vulnerabilities in all these "Keynesian fundamentals". They have a long history as "bad borrowers", highly unstable exchange rates, and in general their currency cannot readily be used to face international liabilities. Emerging markets assets therefore have lower liquidity premia, and as such occupy a subordinate and peripheral position among financial assets.

This goes a long way in explaining the equity home-bias "puzzle". Since emerging markets' currencies cannot be used to face international obligations directly, emerging markets assets carry a structurally lower liquidity premium, and it is logical to see them in small proportions within foreign investors' portfolio. Imperfect asset substitutability is a natural consequence of a monetary analysis of capital flows, where different currencies have different capabilities to serve as money.

Furthermore, the lower liquidity of emerging markets' currencies makes them subject to unstable patterns of capital flows and exchange rates. These patterns, as Biancareli (2009, 2011) argues, can be characterised as "liquidity cycles". Capital flows to emerging markets are always "a consequence of a reduction in liquidity preference in the international level" (p. 9). This is because, in addition to the inherent instability of contemporary capital flows, emerging markets face the additional problems of being in a subordinate position in the currency hierarchy: emerging markets assets, being a risky non-core part of an investors' portfolios - due to the lower liquidity of their currency of denomination - are subject to sudden losses of confidence and thus likely to be liquidated quickly in times of turmoil. "Hence, the power of domestic "fundamentals" — which can, of course, reinforce a trend already in progress or compensate its effects — are clearly subordinated to more important forces" (Biancareli, 2009, p. 11). Momentum strategies and "herding" behaviour appear in this light less "puzzling".

The theory of currency hierarchy is therefore a powerful component for the analysis of capital flows to emerging markets. In line with the discussions made in the previous section, capital flows are seen as monetary transactions, resulting from international investors' changing liquidity preference, and the interaction that such a preference depends on the liquidity premium of currencies – i.e. their ability to be used as 'money'[29] The specificity of emerging markets lies in the lower liquidity of their currencies, which makes their assets a peripheral and more volatile component of investors' portfolio.

3.2.3 International asset demand

In sum, the extension of the key features of post-Keynesian monetary theory to the context of capital flows and emerging markets can be syntehsised in seven main points:

[29] Indeed, as Biancareli (2009, p. 5) suggests, "liquidity cycles" could even replace the term capital flows due to the latter's association with the idea of a foreign savings/current account analysis, whereas the focus should be on private financial capital, which "seems to move without any close relation with the current account result".

1. Firstly, it allows for the recognition that capital flows are flows of funds, coming from and going to money stocks, and therefore pertaining to the analysis of capital account changes;

2. Secondly, as a result, the focus should be on gross rather than net flows, as the latter simply reflect the financial transaction related to income flows, whereas international flows can be several times higher than their net result;

3. Thirdly, in today's world, most of these flows of funds are portfolio transactions - i.e. purchases and sales of assets;

4. Fourthly, an economic unit's portfolio choice at the international level remains subject to fundamental uncertainty, in particular, with respect to the currency of denomination;

5. Fifthly, a crucial determinant of portfolio choice will be therefore the liquidity of the currency, which in turn depends on the systemic "Keynesian fundamentals" that determine the ability of such currency to be used to face liabilities. This provides a clear rationale for the notion of imperfect asset substitutability;

6. Sixthly, capital flows result from the changing liquidity preferences of international investors;

7. Seventhly, due to lower liquidity of their currency, emerging markets are a peripheral components of portfolios, which results in cyclical and volatile capital flows;

Capital flows can be understood here as international asset demand, the demand that foreign investors have for a country's assets. They are the result of a financial decision rather than a real one, and will therefore be subject, in line with the post-Keynesian literature, to liquidity preference considerations. Emerging markets are at a disadvantage, due to the lower liquidity of their currency, which makes their financial assets by definition a marginal and risky investment, subject to greater volatility of demand.

These elements are key to a proper understanding of the patterns of capital flows and address most of the criticisms raised at the end of chapter 2, chiefly the full appreciation of

the monetary nature of the phenomenon of capital flows. However, they do not fully address the issue of the nature of investors. To paraphrase Kalecki, countries do not invest as a whole[30], and therefore it is important to understand which economic units within countries are investing in foreign assets and why, and as such locate these theories within the historical developments of the financial system. Kaltenbrunner (2011) does in fact acknowledge the importance of distinguishing between different types of investors, as the behaviour and motives of different institutions may differ.

There is therefore a need to understand the role of the different sectors in shaping the dynamics of gross financial flows. To do so it is important to assess the institutional characteristics of the financial system in contemporary capitalism. This will be the task of the next section.

3.3 The rise of institutional investors

Understanding gross capital flows, according to the ideas put forward in the previous section, necessitates going beyond abstract theoretical concepts. Innovation, following Schumpeter, is a key characteristic of a capitalist economic system. Understanding capitalism as a monetary economy thus requires an historical analysis of the evolution of the financial system.

In this section it is argued that a key development in the financial markets has been the emergence of institutional investors. The analysis financial globalisation and capital flows to emerging markets, needs therefore to take into account the pivotal role of institutional investors in contemporary financial markets.

3.3.1 Money-Managers and the Theory of Capital Market Inflation

Innovations in the financial sector have been at the forefront of the evolution of late 20th century capitalism. As the literature on "financialisation" shows[31], the role of financial institutions and practices has experienced considerable changes over the past three decades,

[30] With the notable exception of foreign exchange reserves accumulation.

[31] The literature is extremely vast. See Stockhammer (2012) for theoretical review of the recent themes. See also Toporowski (2012b) for a critical overview.

considerably affecting households, non-financial firms, banks and economic policies. Specific stylised facts include: the push for "shareholder value" creation by non-financial firms, the rise of household debt, innovations in the financial markets (e.g. the creation of new asset classes such as derivatives), the change in banking practices towards fee-generating business and the creation of "shadow banking" system, the dominance of market-based over bank-based financial systems, the liberalisation of international capital accounts.

The diversity of the views and facts raised by different authors suggest the richness and the importance of the "financialisation" debate. On the other hand they highlight the difficulty in finding a common framework of analysis, as the extremely broad definition which is generally used for financialisation suggests: "financialization means the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the domestic and international economies" Epstein (2005, p. 3). It is hard to disagree that this definition is clearly relevant for the analysis of modern capitalism. However it is similarly hard, as Toporowski (2012b) argues, to formulate a coherent theory that goes beyond such a definition and the observation of some sketchy, albeit important, empirical facts[32].

One of the most important financial system developments of the past thirty years is the rise of institutional investors as key actors in the financial markets and in the economy in general. This was the result of the increasing institutionalisation of household savings, especially through the inauguration of funded pension schemes, which has characterised (primarily) Anglo-Saxon countries since the late '70s. Institutional investors and asset managers, as claimed by Grahl and Lysandrou (2006), have become a mass industry serving large parts of the population, so that they effectively determine the very large trading volume that exists in capital markets nowadays. The importance of institutional investors for contemporary capitalism is also highlighted by the fact that some scholars, quite independently from each other, have addressed it as the most important development in modern economies, going so far as to dub contemporary capitalism as "pension fund capitalism" or "money-manager capitalism".

Hyman Minsky was one of the first scholars to recognise the relevance of the rise of "money-managers" for the structure of American - and global - capitalism. While Minsky is mostly

[32]The concept of financialisation has also been applied to the context of developing countries and their external relationship by Powell (2013). See alsoBonizzi (2013) for a more general review of the literature on financialisation and developing countries.

known for his "Keynes-inspired" theories of the business cycle, which gave rise to the Wall-Street paradigm and the Financial Instability Hypothesis, in the late stages of his career he focused on long-term trends of capitalism development. His work starts from a reappraisal of Schumpeter[33] who, along Marx and Keynes, "define the problem that economic theory must explain as the path of development of an accumulating capitalist economy through historical time", which "do not lead to smooth progress but rather to 'explosions' and breakdowns ... crises are the normal result of the capitalist process" (Minsky, 1983a, p. 2). This gives rise to a view of "economies as evolving systems, systems that exist in history and change in response to endogenous factors ... history doesn't lead to an end of history" (Minsky, 1992b, p. 104). Hence, there is a need to formulate historically grounded theories: "He [Minsky] firmly believed that general theories are either plainly wrong, or are simply too general to be of any use ... institutions must be brought into the analysis at the beginning; useful theory is institution-specific" (Papadimitriou and Wray, 1998, p. 201).

Charles Whalen (2001), who worked with Minsky in the development of his theory of capitalist development (Minsky and Whalen, 1996), has summarised the four key features of such a view. Firstly, there is the focus, as in Schumpeter, on the role of credit and the financial structure in driving capitalist dynamics: a credit system, i.e. "a set of institutions that were not dependent on prior savings in order to finance investment" (Minsky, 1983a, p. 15), is a necessary component of a capitalist economy. Borrowing Schumpeter's expressions, Minsky argued that the banker is the *ephor* of market economies, thus effectively being the "overseer" of the economy and deciding, by (not) providing credit, what "enter the realm of the possible" (Minsky, 1992b, p. 106). Secondly, Minsky highlighted the importance of profits as key determinants of capitalist dynamics:

> "among the players in financial markets are entrepreneurial profit-seekers who innovate. As a result these markets evolve in response to profit opportunities which emerge as the productive apparatus changes. The evolutionary properties

[33] While praising Schumpeter's views on credit and capitalist development, Minsky was also highly critical of the inconsistency in Schumpeter's works. He especially blamed his ambiguous relations with Walrasian general equilibrium theories, which he found inconsistent with his early views as expressed in "The theory of economic development" (Minsky, 1983b, 1992b).

of market economies are evident in the changing structure of financial institutions as well as in the productive structure"(Minsky, 1992b, p. 106).

Thirdly, in a sense combining the previous two points, innovations in the financial sector are also dynamic forces. The financial sector, being driven by profits like any other sector, is constantly evolving through time so that "the *ephor* is itself endogenously determined" *(Minsky, 1992b, p. 106).* Finally, Minsky recognised the role of policy as driver of change. The banker is the only *ephor* if there is no central authority supervision over the economy, but, once it recognised that economic changes endogenously generate instability, the importance of the government and the central bank "as the ephor of the ephor of the financial structure" (Minsky, 1988a, p. 10) becomes central.

With this theoretical framework Minsky analysed the evolution of US capitalism. He divided it into four stages: commercial, finance, managerial and money manager capitalism[34]. Money manager capitalism emerges out of the relative stable phase of managerial capitalism, with the institutionalisation of funded pension schemes which integrated and/or replaced social security system based pensions. This led to vast accumulation of savings stocks that were entrusted to external fund managers, who became the new key actors in the economy. The behavior of these managers led to remarkable changes in the economy. Firstly, with the the rise of managed-money funds most companies shares were actively traded by money-managers, whose sole interest is to maximise the financial return of their managed portfolios, resulting in major emphasis by corporate managers on short-term profits and companies' valuation. Secondly, since fund managers do not generally value control and long-term holding of securities, they tend of accept "offers" that improve their portfolio, hence facilitating securities exchange for the purpose of highly speculative merger and acquisitions activities such as leveraged buyouts. Thirdly, money-manager capitalism increases the scope for international diversification, as money managers are always striving to find ways to improve their returns. Finally, money managers will also tend to exhibit herding and momentum behaviour, given by the incentives to follow benchmarks of their performance evaluation structure (Menkhoff, 2002; Wray, 2009;

[34]We focus here only on the last stage. See (Minsky, 1988a, 1992b; Whalen, 2001) for a complete overview of the first three.

Liang, 2011).

Another useful theoretical framework to analyse the increasing importance of institutional investors is "the theory of capital market inflation", which was formulated by Toporowski (2002) and subsequently developed in later works (Toporowski, 2010). The theory provides a disequilibrium - alternative to standard finance theory inspired by various versions of the efficient market hypothesis and the capital asset pricing model - theory of financial markets mechanism. It argues that the inflows of funds into the capital markets is what effectively determines the general level of security prices: whenever the supply of equity capital is higher than demand by firms, a net excess inflow of funds enters capital markets. This net excess inflow is traded within the market by financial intermediaries and inflates the price of securities. This process lasts "until effective prices reach a level that elicits the issue of sufficient new stock to take up the positive net inflow, or until the positive inflow ceases" (p. 34). Once the supply of equity capital becomes smaller than its demand and the cumulated excess inflows dry up, the rising illiquidity leads to deflation.

The historical process, according to Toporowski (2002), that originated the process of capital market inflation was the creation of funded pension schemes in the late 70's[35]. The introduction of pension funds created a huge and sudden inflow of funds into the equity markets that pushed up securities price. At the same time the decline of funded pension schemes poses an ultimate constraint on the process of capital market inflation: as pension funds reach "maturity", i.e. the situation by which the pensions expenses exceed the contributions, the decline of their investment will lead to more "bearish" markets and eventually to deflation. Thus in the the long-run capital market inflation is unsustainable, creating potential issues for both pensioners security and financial stability more in general.

There are clearly points in common with the theory of capital market inflation and the economics of Minsky. Indeed Toporowski (2002, p. 6) considers Minsky as "the writer whose work is most immediately developed in this book", and in a later paper (Toporowski, 2000, p. 4-6) he specifies the links between his theory and those of Minsky, suggesting two main points of connection. The first is Minsky's concept of "layering", the "pile" of claims that

[35]Indeed the subtitle of the book refers to "capital market inflation, financial derivatives and pension fund capitalism".

units have on each other in the financial system which, in the case of a large-scale inability to meet such claims in a sub-sector of the economy, could bring about the generalised collapse of the system. Toporowski argues that this is in fact the situation with pension funds: in a situation of sufficiently large-scale maturity, the need to sell assets in order to meet pension liabilities would make the security prices collapse, thus generating widespread insolvency in the pension fund sector. Secondly, Toporowski refers to Minsky's famous taxonomy of the financing structure and argues that the current structure of the capital market is essentially a big Ponzi scheme, in which units seek capital gains that depend on a continued inflow of funds into the market.

A more general, albeit implicit, link between Toporowski's and Minsky's theories, is the focus on the liability side of balance sheets as a determinant of investment choices. Just as Minsky's economic units choose their asset composition on the basis of their liability structure, in the theory of capital market inflation institutional investors will purchase securities depending on the maturity and size of their liabilities. This is most clearly expressed in a subsequent paper (Toporowski, 2010), where it is argued that institutional investors' net purchase of equity depends on their net cash flows: whenever the contributions to the funds exceed the net payments of liabilities, institutional investors will have spare cash to invest in equities. As it will be argued throughout the dissertation, beyond cash flows, the structure of liabilities is likely to have a more general impact on the asset allocation of institutional investors, and on their "risk-appetite" in particular.

The theory of "capital market inflation" and Minsky's concept of "money manager capitalism" suggest that the historical development of western capitalism has given institutional investors a central position in the economy. These investors are among the most important originators of portfolio transactions in today's economy, and therefore their behaviour is crucial to understanding the patterns of financial claims, balance sheets and transactions. The view taken here therefore claims the need to link the insights put forward by the theories of economic development about the changing role of finance through the rise of institutional investors, with a theoretical framework grounded in post-Keynesian monetary theory, as developed in the previous section. In this sense, Toporowski's theory of capital market inflation,

which adopts a similar approach, represents the most important and direct inspiration for the theoretical framework of this dissertation.

3.3.2 Institutional investors and global financial flows

The view that institutional investors are increasingly important in today's financial markets has become widespread in recent years. Recent work by the Bank of England (Haldane, 2011, 2014), the IMF (2011; 2014) and the Bank for International Settlements (Miyajima and Shim, 2014; BIS, 2011), amongst others, confirm that understanding institutional investors' portfolio choice is key to addressing important global financial stability issues, including the movements of capital flows to emerging markets. This view is generally shared by authors working in the post-Keynesian and institutionalist tradition, who argue that institutional investors have become prominent actors in financial markets – including in emerging markets –, not always with positive consequences (Harmes, 2001; Frenkel and Menkhoff, 2004; Liang, 2011). The empirical relevance of these phenomena will be discussed in the next chapter.

The removal of restrictions to capital flows across several countries has made it possible for institutional investors to invest in foreign assets rather easily. Indeed, it could be argued that the growth of international portfolio transactions by institutional investors is an essential characteristic of modern capitalism. Minsky (1988b, p. 35) suggested that as managed funds grow, international portfolio diversification is likely to be an increasingly common phenomenon. He also pointed out that "the international dimension of the movements from institutions to markets for financing is that the exports and import of capital increasingly takes the form of the purchase of managed and international portfolio diversification by managers of money" (Minsky, 1988a, p. 10). The view that financial globalisation and the institutionalisation of savings are closely linked is expressed by Braasch (2010, p. 2):

> "The institutionalisation of savings is one of the main drivers of financial globalisation. Given the rapid increase in inflows to such large, cross-border institutional investors, the search for yield and for ways of diversifying risk has forced portfolio

managers, working in a highly competitive environment, to channel more funds into hitherto relatively peripheral markets, which are less correlated with one another"

Moreover this is linked to the understanding of international financial fragility at the macroeconomic level (p. 3):

> "If the behavior of key global market players is not understood, it will be impossible to understand the process of financial globalisation or to achieve significant progress in analysing the causes and implications of financial crises ... This is not about gaining an insight into individual investors' strategies, but about obtaining better data at the aggregate level, in other words for the main investor groups, in order to assess market dynamics, to achieve better and more timely monitoring."

This is the key link between the analysis of portfolio choice, and the international macroeconomic analysis of financial globalisation. Portfolio shifts by institutional investors are a crucial determinant of capital flows in today's world. It is certainly not the only one: international bank credit, short-term highly speculative carry-trade operations by hedge funds or other financial institutions and long-term productive foreign direct investments clearly represent important components of gross capital flows. Nevertheless, given the importance and the size of institutional investors in the modern economy, they are likely to be one of the most important sources of international transactions.

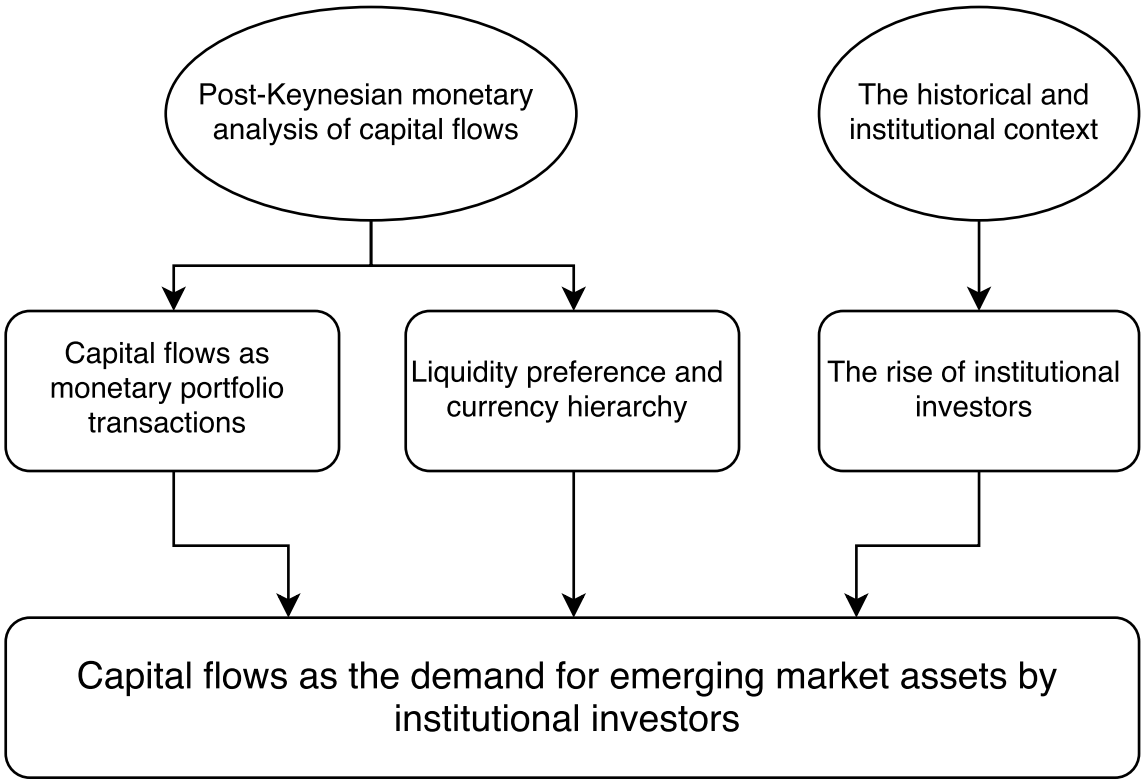
Importantly, the pivotal role of institutional investors reinforces the asymmetry between advanced and emerging markets. As the discussion in the previous subsection makes clear, and the next chapter will show the rise of institutional investors is predominantly a phenomenon that occurred in advanced economies[36]. This only serves to reinforce the dominance of core countries currencies, given that institutional investors would prefer their assets to be denominated in the currency of the country they are located, and in which their liabilities are

[36] An exception to this is the very recent rise of sovereign wealth funds.

denominated. Furthermore, due to the lack of a domestic investor base in emerging markets, the liquidity of their financial markets – beside that of the foreign exchange market – will be lower and dependent on foreign investors. This further strengthens the view that capital flows to emerging markets are effectively the outcome of foreign private portfolio decisions.

Capital flows to emerging markets are thus here analysed as the demand for emerging markets' assets by institutional investors, the flow of funds that institutional investors move from/to emerging countries' financial markets Figure 3.1. However, equipped with the theories discussed so far in this chapter, it is clear that motives beyond "diversification" are likely to be relevant. This is what the following section will describe.

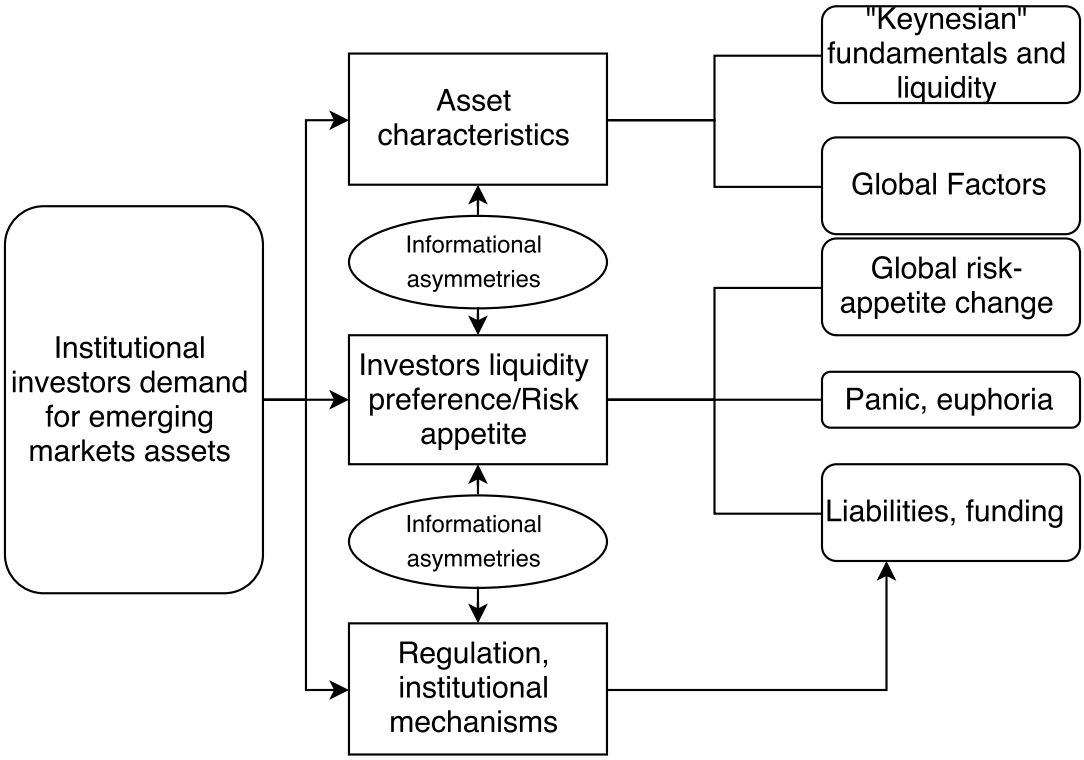
Figure 3.1: Theoretical framework



3.4 Institutional investors decisions and capital flows to emerging markets

The determinants of capital flows to emerging markets must be based on the understanding of what leads institutional investors to change their demand of their assets. In line with all of the theoretical arguments presented so far, figure Figure 3.2 presents an overview of the various channels through which their demands for emerging market assets are determined.

Figure 3.2: Institutional investors channels



Similarly to chapter 2, the first broad category of determinants can be defined as the characteristics of the assets. Any factor that affects the risk/return profile of an asset falls into this category. Financial market factors, such as historical volatility and returns, or domestic economic "fundamentals" such as economic growth, or global factors such as commodity prices or the Federal Reserve monetary policy represent renowned examples of this. Countries' political stability may also affect the view of the overall riskiness of an asset. These factors all

affect the desirability of an asset according to the traditional theory of portfolio diversification.

However, in line with the views presented in the preceding sections, a much more prominent role needs to be given to liquidity considerations. "Keynesian fundamentals", in particular, determine currency liquidity and therefore the liquidity and stability of a country as a whole. These vary according to the historical and country-specific context, but affect what is ultimately a country's ability to face its external obligations. The accumulation of foreign exchange reserves, a major development over the past fifteen years in emerging markets, may well be liquidity-enhancing from this point of view, as it acts as a systemic buffer against currency swings and insolvency on foreign liabilities.

The second broad category is investors' liquidity preference, which again resembles the conventional views about the "risk appetite" channel. Global risk appetite in much of the "mainstream" literature is measured by the general level of market volatility, which induces investors to reallocate their portfolio to more/less risky assets. A post-Keynesian interpretation would relate this to fundamental uncertainty about expectations and the general state of general confidence in financial markets. In a dynamic "Minskyan" sense, good news slowly increase risk appetite, and reduce liquidity preference, and conversely, financial fragility often turns into a crash due to panic spreading, as in Biancareli (2009, 2011) theory of "liquidity cycles". Peer-pressures and benchmark following can also exacerbate such processes to magnify the co-movement of liquidity preference and asset prices.

However, risk appetite and liquidity preference are not purely "behavioural" phenomena, but are also affected by institutional investors' balance sheets. In line with Minsky's and Toporowski's theories, the asset structure of an economic unit needs to be assessed in relation to the associated liabilities, which are therefore an essential component of investment decisions. Institutional investors' liabilities, however, are of a peculiar nature since they are contractual long-term obligations, such as future pension incomes to be paid and technical provisions for insurance policies, rather than debt commitments. Institutional investors thus have small margins of choice in the determination of their liability structure and the cash flow commitments resulting from them. They can change the offer of their products - which is indeed going with the shift from defined benefits to defined contribution pension schemes -

but they clearly lack the flexibility of banks or other investors that manage their short-term funding sources on a daily basis. Since the liability structure is relatively rigid, the asset allocation is the institutional investors' main level of decision.

A key contention of this dissertation is that the financial conditions of institutional investors' liabilities are crucial in determining their liquidity preference. Such investors have often promised - or at least target - rates of returns; this determines the size of their liabilities, and their main goal is to ensure that their assets are large - and liquid - enough to cover such obligations. In conditions of low returns, assets will grow at a slower rate than liabilities, thus generating potential financial troubles in the long run. As a result, they will engage in a search for assets that can produce sufficient returns to match their long-term liabilities. These assets may include emerging market bonds and equities which, although less liquid and riskier, do in general promise higher rates of return.

This mechanism effectively implies a reduction in liquidity preference – or an increase in risk appetite – although, rather than a genuine preference or appetite, it is more a "forced" search, induced by the liability structure. This process from a purely theoretical possibility. "Liability-driven investment", as it will be discussed in the next chapter, is an increasingly popular investment paradigm amongst pension funds, whose primary purpose is precisely to put liabilities at the core of the operations of institutional investors (BIS, 2011).

The third broad category affecting institutional investors asset demand is regulation and other institutional mechanisms. These may for instance be changes in macroeconomic regulations at the international level, such as capital controls or financial transaction taxes, which may promote or contain cross-border investments. On the other hand, there may be domestic regulations and accounting rules that could have a significant effect on institutional investors' portfolio choice. For example, it is likely that regulations that impose capital requirements on institutional investors, such as Solvency II for insurance companies in Europe, may pose a restraint on investments in risky assets, which could affect negatively the size and stability of emerging markets investments.

Finally, although not crucial in the post-Keynesian literature, informational asymmetries and other market frictions may indeed affect the way many of these channels work. For

example, agency problems may affect the institutional decisions of a pension fund, or high information acquisition costs may reduce and/or make more volatile the demand for emerging markets assets.

To provide a realistic picture of the current trend of capital flows, it is important to analyse what cyclical and structural factors are - or will be - pushing, through these channels, institutional investors to increase their portfolio allocations towards emerging markets assets.

3.5 Conclusion

This chapter has developed an alternative approach for the analysis of capital flows to emerging markets. It has been argued that to adequately understand their determinants, the analysis should seek to move beyond the limitations that can be found in the current mainstream literature. These consists in the over-aggregation of investors into a single category at the macroeconomic level, the consideration of an often too narrow range of portfolio choice determinants, and the *real* rather than *monetary* nature of much of the analysis of capital flows.

By assessing the debates on monetary theory in the post-Keynesian literature this chapter has argued that capital flows need to be analysed within a "monetary economy" framework, where money is part of the analysis from the beginning, as opposed to entering as a "friction" in more sophisticated levels of analysis. The supply of credit money as purchasing power - and primarily to finance investment - and the demand for liquid assets as store value - for either speculative or precautionary reasons - are a central component of a capitalist economy. Liquidity preference is thus understood as a theory of asset choice, that is relevant for all the macro-sectors in the economy. Particularly useful in this sense is Minsky's Wall Street paradigm, that conceptualise economic units as balance sheets, whose assets generate cash flows and liabilities generate cash commitments.

In the context of the open economy, capital flows need therefore to be understood as international "flows of funds" between units as opposed to real resources flows. In this sense, the traditional analysis of capital flows on the basis of current accounts is particularly limited, as it only analyses a portion of total capital flows, namely the part that settles trade and

net factor income transactions (income and balance sheet flows in Minsky's terminology). However, flows unrelated to trade or net factor income (portfolio transactions in Minsky's terminology) have surged in the past decade. Hence the need to focus on gross as opposed to net capital flows.

Applying liquidity preference theory to cross-border investment points to the key role of exchange rates. In particular, Keynes' own rate of interest theory gives rise to the notion of a "currency hierarchy", in which countries' currencies have different liquidity premia, according to their ability to work as store of value, and especially their usage as a mean to face liabilities. Emerging markets' middle-ground position in the currency makes them subject to swings in global liquidity preference, profoundly affecting their financial market stability.

The chapter has then assessed which important developments in the institutional structure of western capitalism, particularly in the financial sector, are relevant for the understanding of gross capital flows. It was pointed out that a major structural development is the rise of institutional investors and their managers, as key actors in modern economies, so that some authors have called the present stage "money-manager" or "pension-fund" capitalism.

Finally, the chapter has analysed the rising role of institutional investors in light of the framework on gross capital flows to emerging markets. Capital flows can be the demand for their assets by foreign institutional investors. It was argued that the decisions by managers to invest in emerging markets are affected by economic factors through three main categories: the asset risk/return characteristics which include the considerations made about liquidity and currency hierarchy, investors' risk-appetite, particularly in relation to their liabilities, and institutional decision mechanisms and regulation.

Combined, these theoretical arguments help overcoming the limitations of conventional literature highlighted in chapter 2, and set out a useful theoretical framework for the analysis of capital flows to emerging markets. The view expressed here argues that the analysis of the impact of recent events - such as the global financial crisis - through these channels may provide a useful framework to assess the current trends in capital flows to emerging markets.

As these countries become increasingly integrated and attract capital flows, such a framework would point to improvements in their "Keynesian fundamentals", such as the accumu-

lation of foreign exchange reserves and the reduction of foreign currency debt, which would enhance the "institutional liquidity" of their currency. On the other hand, the low interest rate environment could pressure institutional investors to search for riskier assets that may ensure them enough returns to cover their growing liabilities. This second channel is likely to be very important, as the prospect of rising interest rates in advanced countries may not only reduce differentials in returns, but may also signal an improvement in institutional investors' liabilities, which could decrease their demand for risky assets. The recent fall in the demand for emerging markets' assets was, in fact, also triggered by the prospect of a rise in the federal funds rates.

Evaluating the validity of these intuitions, and assessing their implications will be the task of the following chapters.

Chapter 4

Empirical evidence on capital flows and institutional investors holdings of emerging markets assets

Introduction

This chapter will provide some descriptive empirical findings based on the theoretical framework presented in the previous chapter, as well as background evidence with respect to this thesis' research hypotheses. It focuses on three key ingredients discussed in the previous chapter: emerging markets financial integration, institutional investors, and the Keynesian "fundamentals" of emerging markets' assets.

As argued in the previous chapter, a monetary analysis of capital flows requires the assessment of gross flows and their composition. This is covered in section 4.1, which shows how the integration of emerging markets [37] into the global financial system has been largely driven by the expansion of foreign private inflows, which do not seem to follow the dynamics of current accounts. The mirror image of capital inflows has been the accumulation of foreign exchange

[37] Emerging markets are: Argentina, Brazil, Chile, China, Colombia, Czech Republic, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, Philippines, Poland, Russia, South Africa, Taiwan, Thailand, Turkey.

reserves, pointing out once again the subordinate nature of these countries in the process of financial globalisation. The section also documents how institutional investors have played an increasingly important role in this process, especially since the crisis.

Section 4.2 locates the increasing demand for emerging markets assets in the historical evolution of institutional investors' operations. It discusses the changes in institutional investors' asset allocation, highlighting their relation to liabilities, and regulatory and institutional changes. It will be shown that the demand for emerging market assets fits into the broader changes in institutional investors' portfolio choice, driven by their increasing concern - partially induced by regulation - about liabilities. In this framework emerging market assets are part of a larger movements towards "alternative" asset classes to enhance portfolio returns, while simultaneously reducing allocation to conventional return-seeking assets, i.e. domestic equity.

Section 4.3 explores the attractiveness of the the risk/return profile of emerging markets assets, with particular reference to the "Keynesian fundamentals" that make these countries less risky from a systemic point of view. It will be shown that the decade prior to the crisis saw considerable improvements on several grounds, thus validating investors' behaviour. However, in the most recent period, this relationship seems to have weakened, with fundamentals being constant or mildly deteriorating, despite a continuous inflow of foreign funds.

The final section concludes.

4.1 Emerging Markets and the global financial system

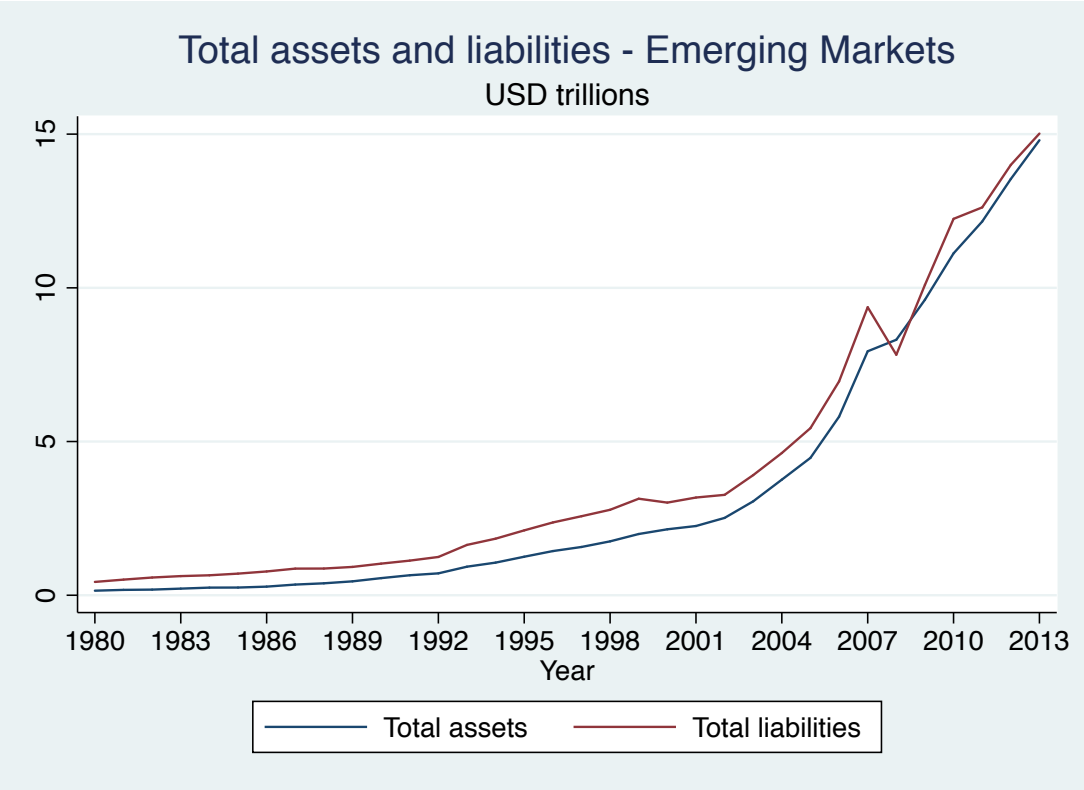
4.1.1 Financial globalisation

Financial integration, through the growth of cross-border capital flows and holdings expanded substantially over the past two decades. The process started in the 1980's but really took off in the 2000's, and despite a slowdown in 2008, has kept increasing after the crisis. While the phenomenon is most prominent in advanced economies, emerging markets have become increasingly integrated too, and now account for about 10% of the total international positions[38].

[38] Source: own calculation based on IMF balance of payment statistics. See Lane and Milesi-Ferretti (2007); Lund *et al.* (2013) for a discussion.

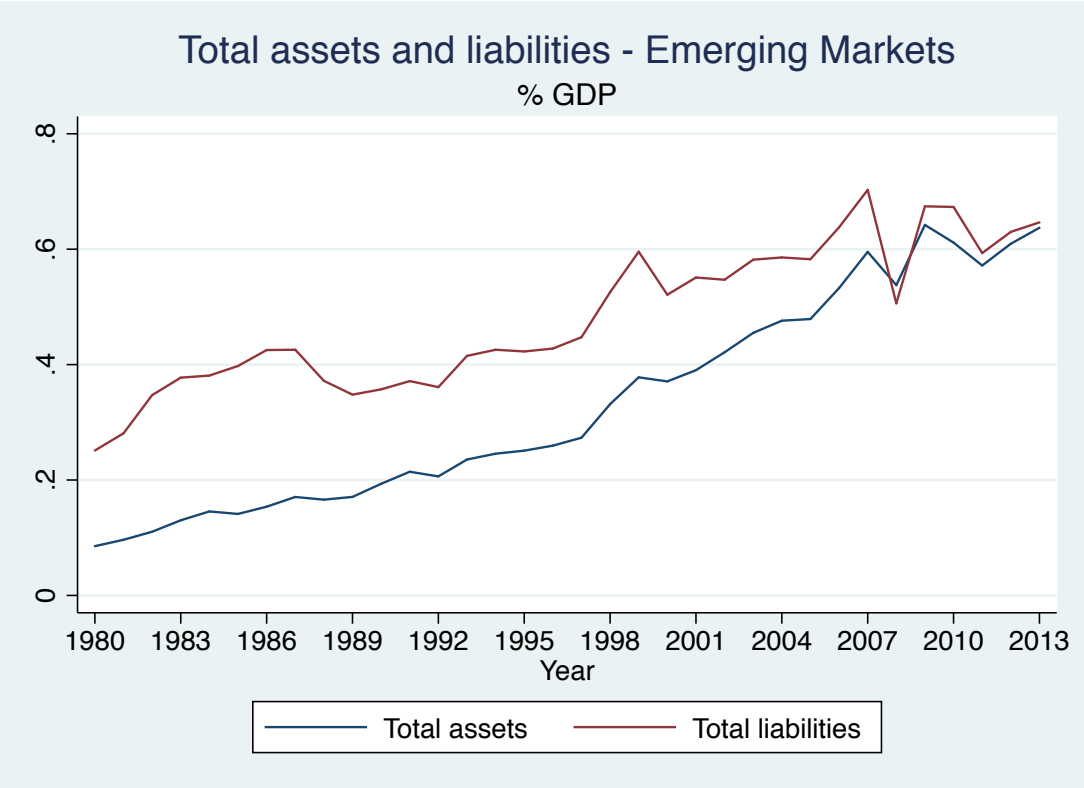
Figure 4.1 shows the steady expansion of international balance sheet positions in emerging markets. Emerging markets foreign assets and liabilities have steadily increased in absolute terms since the early 1990's, picking up especially after 2003. As of 2013, assets and liabilities have increased to about 15 USD trillions, about six times as big as their level at the turn of the century. Looking at the same figures as a share of GDP (Figure 4.2), emerging markets foreign liabilities have grown from about 40% in the early 1990's to about 65% in 2013, which is remarkable considering the growth performance of these countries over the past fifteen years. The global financial crisis from this perspective looks like a dip, though a significant one, in a secular upward trend. The speed of the trend however has slowed down since the crisis.

Figure 4.1: International investment position



Source: Author's calculations based on updated and extended version of dataset constructed by Lane and Milesi-Ferretti (2007) and IMF Balance of Payments Statistics (BOPS)

Figure 4.2: International investment position - % GDP

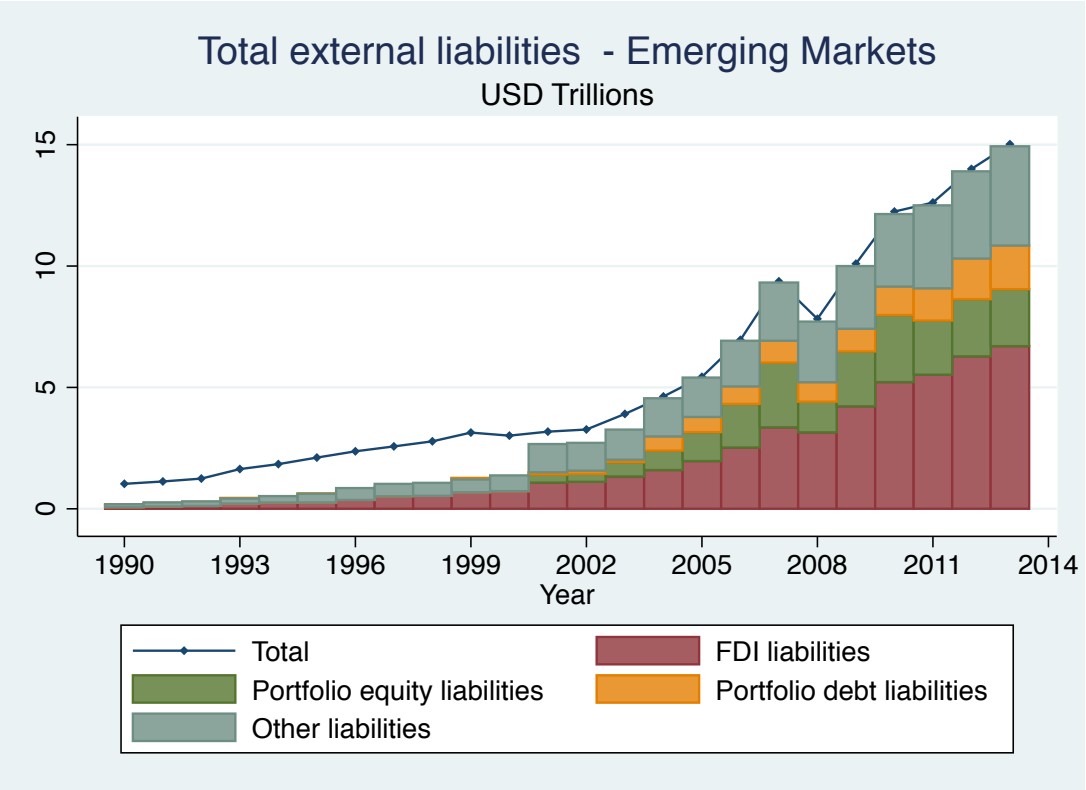


Source: Author's calculations based on updated and extended version of dataset constructed by Lane and Milesi-Ferretti (2007) and IMF Balance of Payments Statistics (BOPS)

Interestingly, the growth of foreign assets and foreign liabilities follow different patterns: while assets have grown every year as a proportion to GDP, even if at variable paces, liabilities seem to follow more closely the trends in capital flows cycles. The flat level of foreign liabilities to GDP in the late 1990's and early 2000's marks the impact of the emerging markets' financial crises, and similarly their decline in 2008 represents the impact of the global financial crisis. In those years foreign assets kept growing, although more slowly than in other years. Moreover, throughout the period foreign liabilities are bigger than foreign assets, indicating a negative net international investment position for the country group as a whole. These facts indicate that emerging markets have entered financial globalisation from the liability side, i.e. the process is first driven by foreign lending and investment, with foreign assets lagging behind and only recently catching up.

This can be further inferred by the composition of their international investment position. As Figure 4.3 shows, the expansion of foreign liabilities in emerging markets consisted in increases in all types of flows and holdings, but was driven primarily by foreign direct investment (FDI) and portfolio equity liabilities in the 2003-2008 period, with debt-like liabilities only substantially rising since 2006.

Figure 4.3: Emerging markets international investment position - liabilities



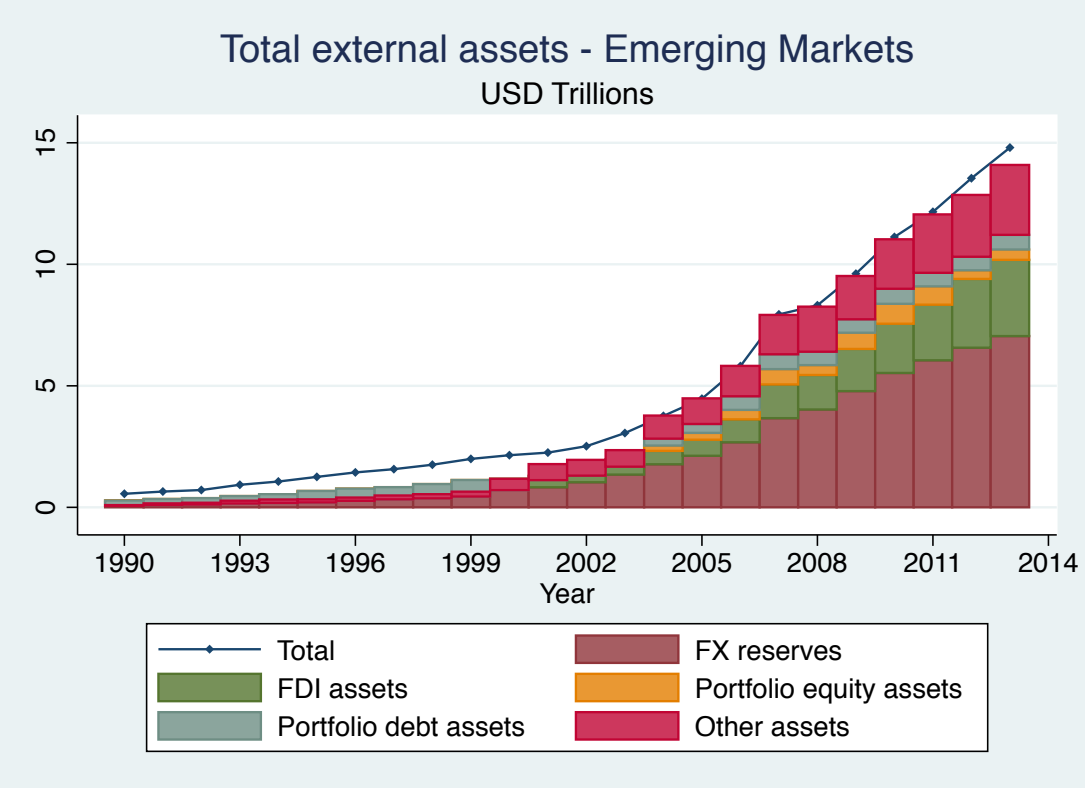
Source: Author's calculations based on updated and extended version of dataset constructed by Lane and Milesi-Ferretti (2007) and IMF Balance of Payments Statistics (BOPS)

On the other hand, the expansion of emerging markets assets, as shown in Figure 4.4, is driven by the accumulation of foreign exchange reserves. This indicates that emerging markets foreign assets are mostly the result of central banks hedging against the growing foreign liabilities of their country as a whole, by investing in foreign exchange reserves[39]. This

[39] Foreign exchange reserves could be accumulated for mercanitlist purposes, i.e. the aggressive intervention to maintain low exchange rates in order to favour exports. On balance, it looks like the evidence points to the "precautionary" motive as the crucial dimension behind the accumulation of foreign exchang reserves (Aizenman and Lee, 2007).

further confirms that for emerging markets financial integration is mostly induced by foreigners than locals investing abroad. Only in very recent years a sizable growth of FDI from EMs can be observed.

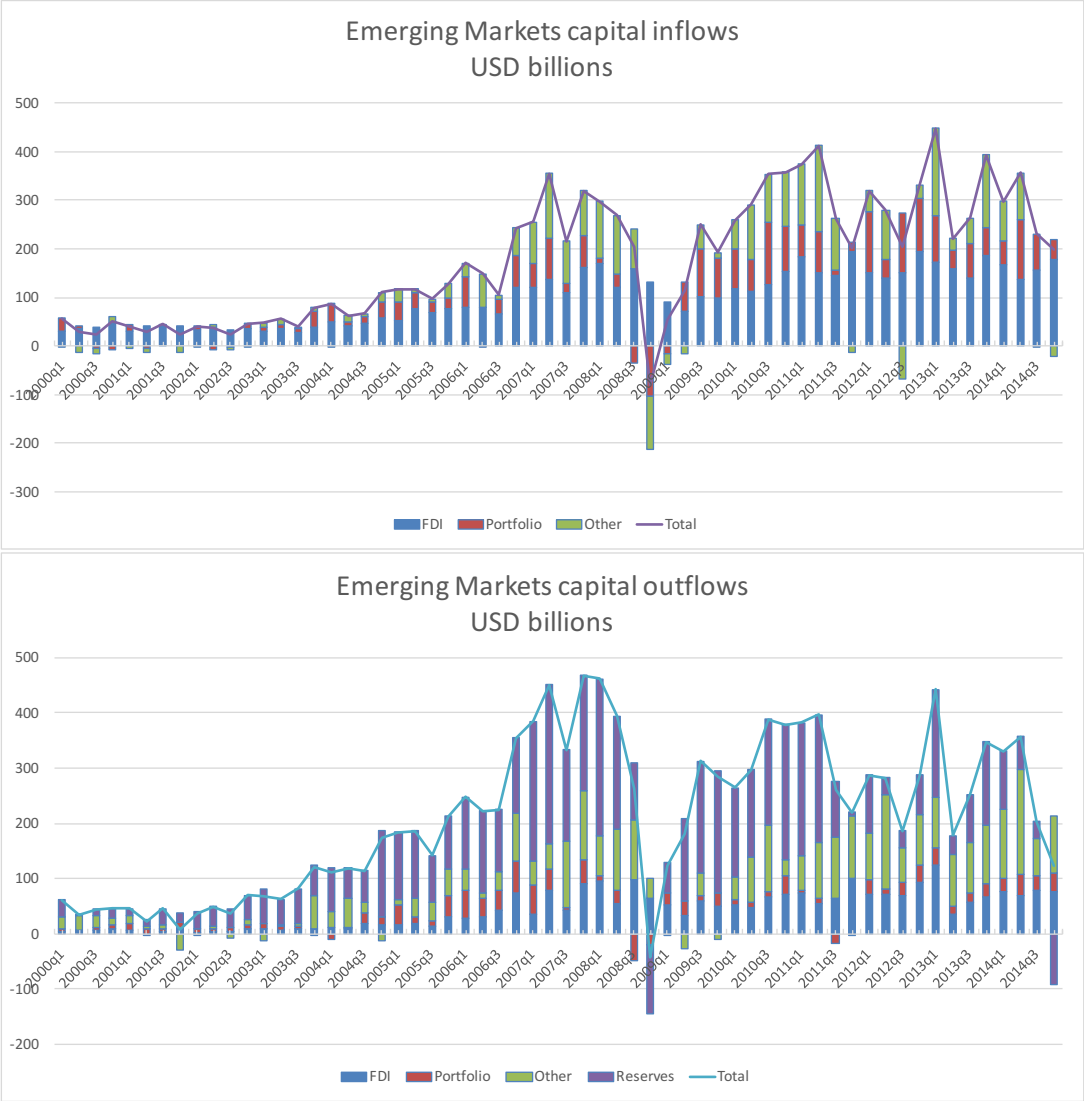
Figure 4.4: Emerging markets international investment position - assets



Source: Author's calculations based on updated and extended version of dataset constructed by Lane and Milesi-Ferretti (2007) and IMF Balance of Payments Statistics (BOPS)

Quarterly figures for capital flows to and from emerging markets (Figure 4.5) broadly confirm this picture. Inflows and outflows have increased substantially since the mid-2000's and have recovered to levels comparable to the pre-crisis peaks. The crisis does not seem to have lasting effects on the process of financial globalisation in emerging markets. A difference between the pre-crisis and the post-crisis situation can be found in the higher levels of gross inflows compared to outflows, which is mirrored by a smaller current account surplus, as it will be shown below.

Figure 4.5: Capital flows: Emerging Markets



Source: Author's calculations based on, IMF BOPS, Banco de Mexico

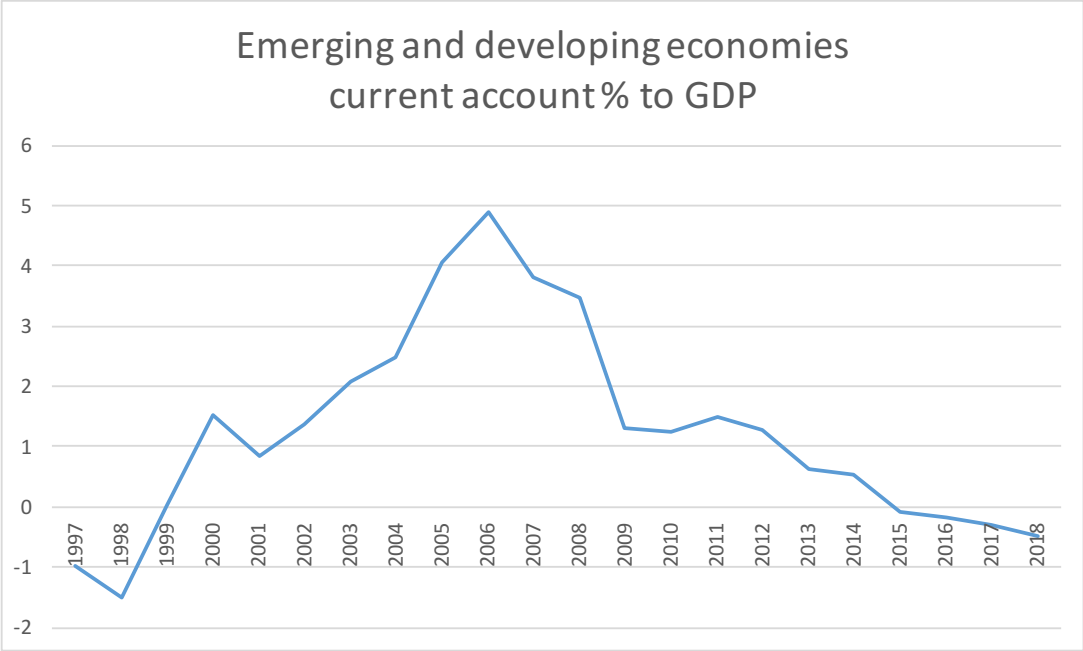
With respect to their composition, FDI inflows seem to be more stable and remained positive throughout the entire period. Both portfolio and other inflows are much more volatile, driving the cyclical movements, and becoming negative in some quarters, most notably in the fourth quarter of 2008, which resulted in an aggregate negative figure for capital inflows as a whole. Furthermore, portfolio inflows have grown from 16% in the 2000-2008 period to 27% in the post-crisis period as a share of total inflows.

Once again, the mirror image of such cycles is the change in reserves, which accounts for almost half of total outflows in most quarters throughout the entire period. This is again particularly clear in 2008, when the figure becomes substantially negative, reflecting the drawdown in foreign exchange reserves by central banks facing negative capital inflows. Again, it can be observed that another growing component is in the forms of FDI, reflecting the recent outward investment expansion of emerging markets' corporations.

As a whole, these charts show emerging markets increasingly have been increasingly embedded in the process of financial integration, which the crisis in 2008 does not seem to have substantially affected. However their integration has not occurred in equal terms on their assets and liability side. These countries have become substantial recipients of foreign investments, both direct and financial (credit and portfolio). The latter have become more important after the crisis, and while substantial and growing, have presented a high degree of volatility. Emerging markets' response to these trends has been the accumulation of foreign exchange reserves

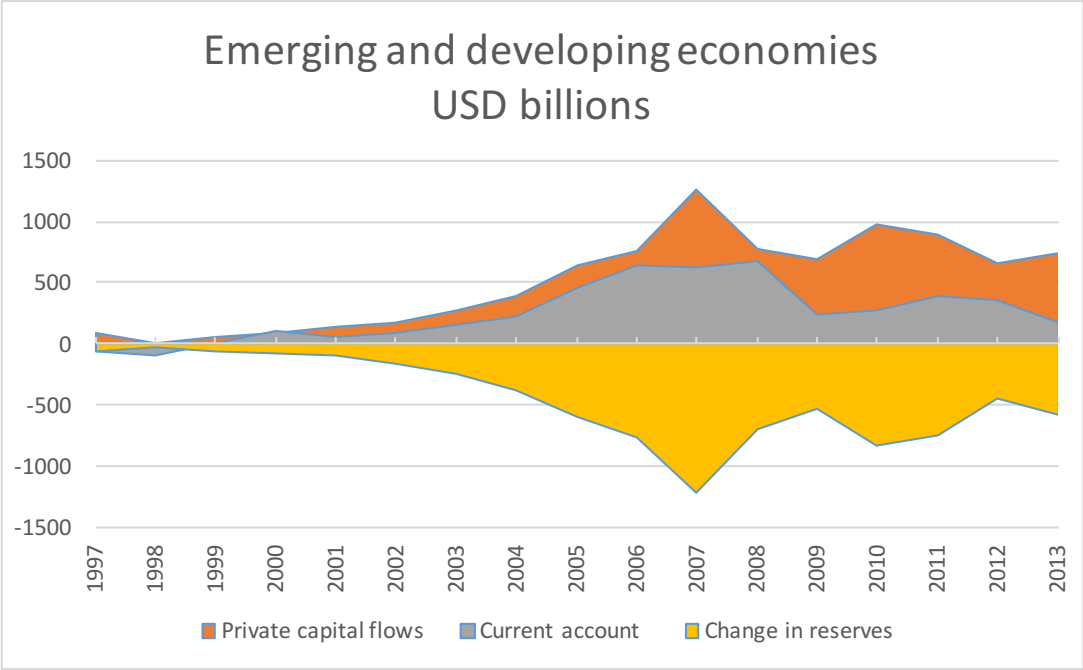
Some additional characteristics of capital flows may be inferred from Figure 4.6 and Figure 4.7. The current account of emerging markets, whose deficits in the late 1990's, as discussed in chapter 2, was usually associated with currency and financial crises, has registered surpluses throughout the 2000's, reaching a peak of 5% of GDP in 2006. This surplus has declined markedly during the global financial crisis, and then kept decreasing in recent years, so that the IMF projections show an effectively balanced position in the next few years.

Figure 4.6: Emerging markets current account



Source: IMF World Economic Outlook (WEO)

Figure 4.7: Emerging markets net flows



Source: IMF WEO

While current account surpluses clearly contributed to the accumulation of reserves throughout the period, since 2002, these came often with substantial positive net capital inflows. Especially since 2009, as current accounts surpluses slowly declined, private capital inflows became especially prominent, representing a larger surplus for emerging markets than current accounts. Foreign exchange reserves accumulation has been therefore the result of a combination of both current and capital account surpluses in emerging economies, with the latter becoming less important since the crisis. This is important, in light of the discussions made in the previous chapter: the current account can be a source of financial flows, but taken in isolation is not informative to understand the dynamics of financial globalisation.

In sum, these figures show that the process of financial globalisation for emerging markets is a relatively new phenomenon but its expansion has been really dramatic, especially in the last decade. Emerging markets seem to be more subjects than actors in it, receiving capital inflows, which increasingly take the form of portfolio flows, and accumulating foreign exchange reserves. With the decline of current account surpluses across the emerging markets world, the dynamics of the balance of payment and in particular the accumulation of foreign exchange reserves have become more closely exposed to the private capital inflows, which have substantially increased but remain volatile. This gives credit to the interpretation of capital flows as the demand for emerging market assets proposed in the previous chapter.

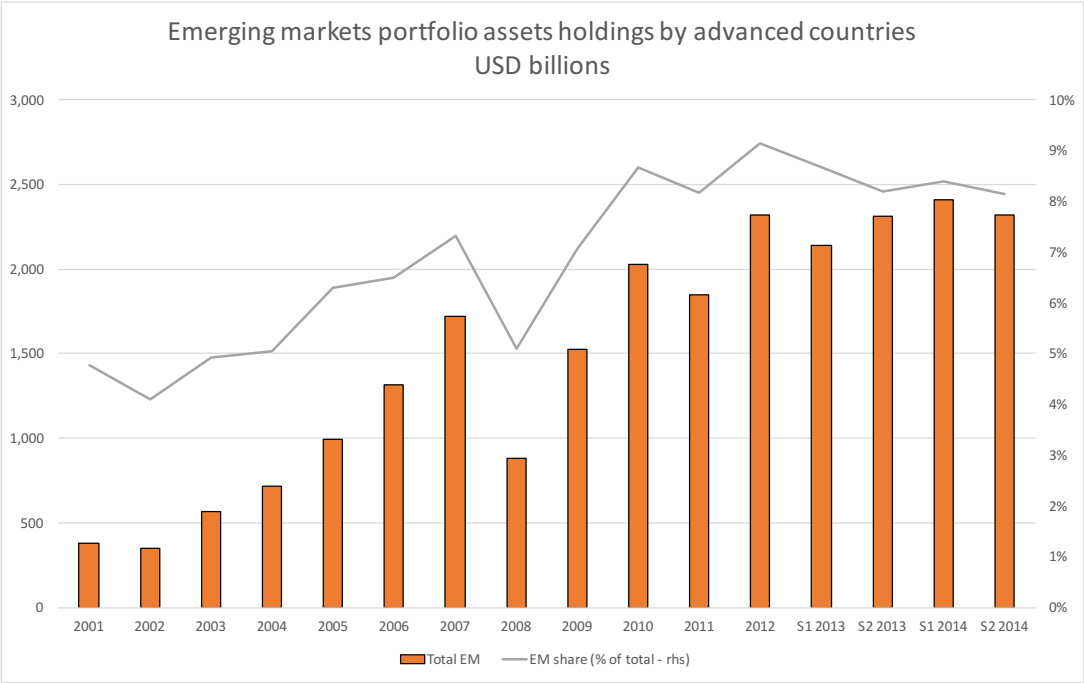
4.1.2 Emerging markets portfolio holdings by advanced countries

The mirror image of the balance of payment data presented in the previous sub-section, are cross-border financial holdings. The following figures are from the Coordinate Portfolio Investment Survey (CPIS) database from the IMF. Through survey-based methods, these figures seek to establish a complete overview of bilateral cross-country portfolio holdings. These figures show how, as the process of financial globalisation deepens, emerging markets' cross-border connections have grown in importance.

Figure 4.8 shows the foreign portfolio holdings of advanced countries. Total foreign holdings in 2014 have increased by almost four times since their level in 2001, with a particularly steady increase in the 2002-2007 period. The figure for holdings of emerging markets assets shows a very similar picture growing overall, but their growth has been more pronounced: emerging

markets assets holdings by advanced countries grew by more than six times, from around $250 billions to about $2.3 trillions in 2014. As a result, the share of emerging market assets within advanced countries' foreign assets holdings has doubled, from about 4% to more than 8%.

Figure 4.8: Advanced countries foreign assets



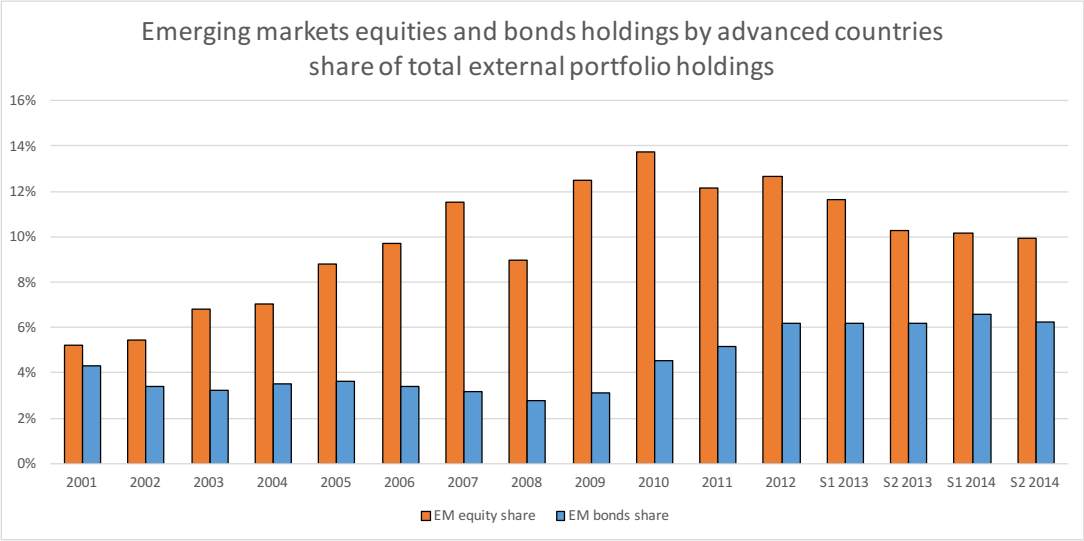
Source: Author's calculations based on IMF Coordinated Portfolio Investment Survey (CPIS)

This secular growth is however not immune to cyclical patterns, since advanced countries' total and emerging markets holdings both follow clearly the financial cycles, dropping in 2008, 2011 and 2013 and increasing in all other years. Furthermore, emerging markets holdings are more pro-cyclical, changing more than proportionally within the total foreign assets portfolio. The volatility of emerging markets assets holdings therefore remains high.

In terms of their composition between equities and bonds, two phases can be distinguished in Figure 4.9 and Figure 4.10. In the 2002-2007, most of the expansion has been in the form of equities, which increase from 4.5% to almost 12% within advanced countries foreign equity portfolio, and growing to represent almost 80% of total emerging markets holdings. This is not surprising considering the performance of the stock markets in these countries, which likely attracted foreign investors. Since 2009 the trend has reverted, as emerging markets equities

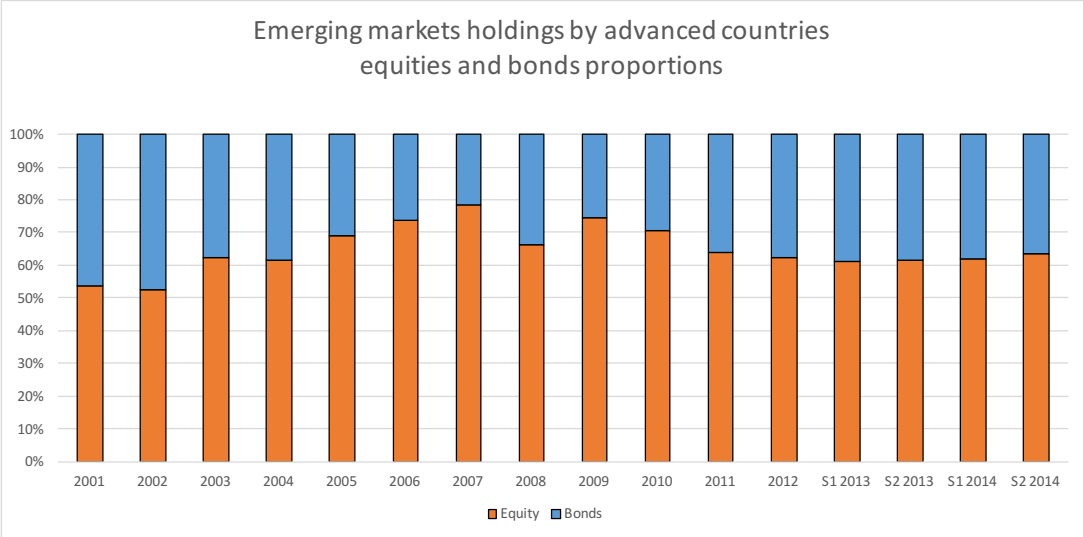
actually declined within foreign equity portfolios, stabilising at around 10%. Bonds did on other other hand gain momentum, growing from 2% in 2007 to about 6% in 2014 within the foreign asset holdings, and increasing to 40% of total emerging markets holdings. This trend is driven in particular by growing popularity of local currency EM bonds amongst global investors, as documented by World Bank and the BIS (Miyajima *et al.*, 2012; Sienaert, 2012).

Figure 4.9: Equity and bonds composition



Source: Author's calculations based on IMF CPIS

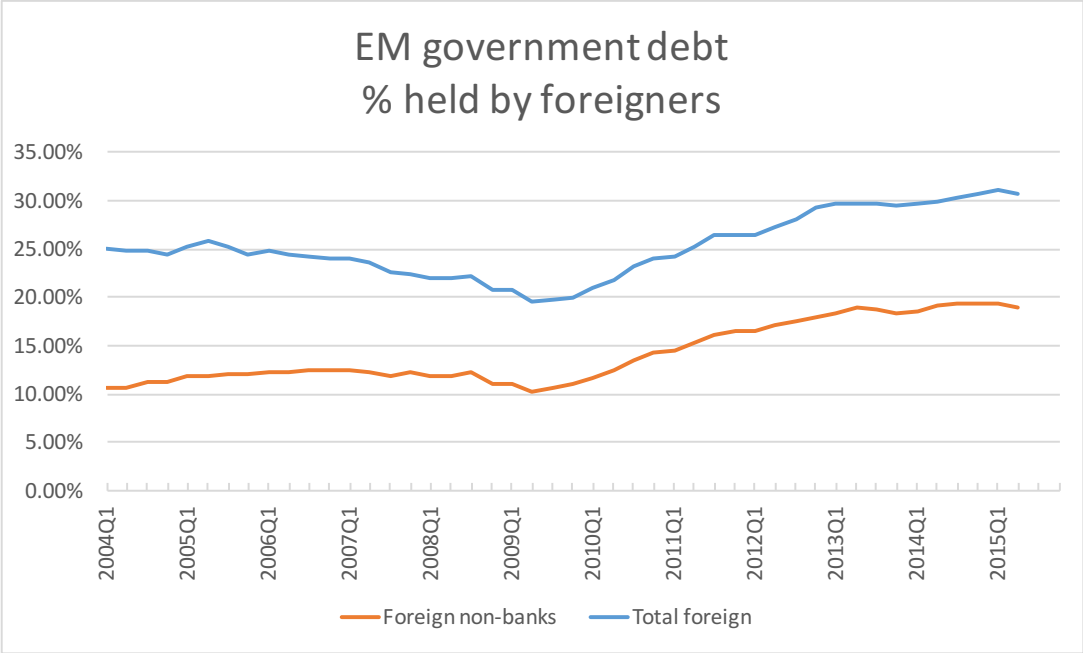
Figure 4.10: Equity and bonds composition



Source: Author's calculations based on IMF CPIS

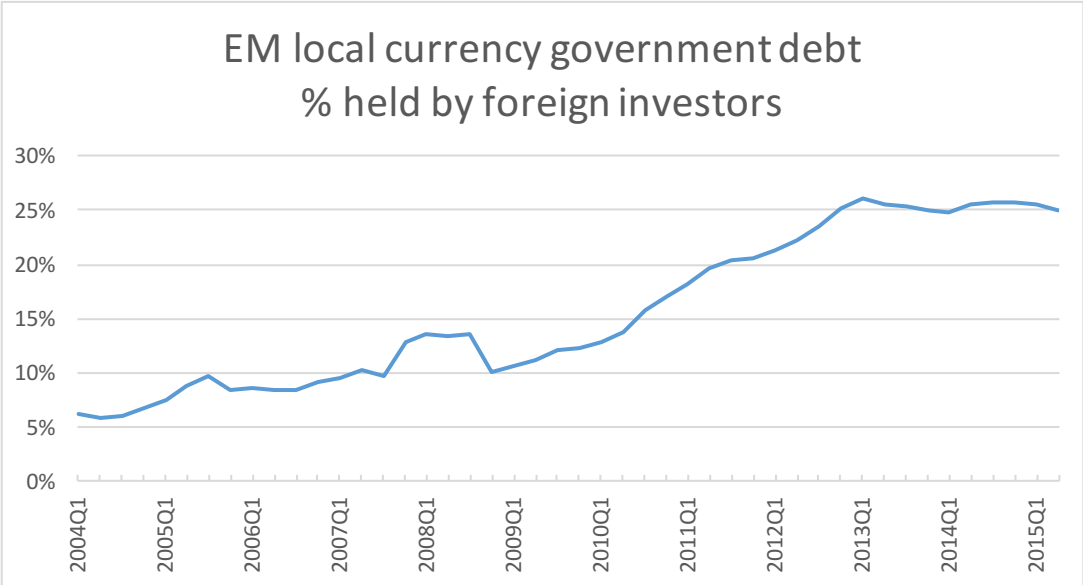
Some further information can be gathered from the database by Arslanalp and Tsuda (2012). This database tracks sovereign debt outstanding, distinguishing by holder type. As shown in Figure 4.11 and Figure 4.12, interest in government bonds has risen steeply since the financial crisis. This has been driven entirely by institutional investors, which increased their presence from 10% to 20% in the 2009-2013 period, driving up the total foreign presence from 20% to 30%. Most of this additional holdings have been in the form of local currency instruments, which saw the presence of foreign investors increasing from 10% to 25% over the same period.

Figure 4.11: Sovereign bonds



Source: Author's calculation based on Sovereign Investor Base Estimates by Arslanalp and Tsuda (2012)

Figure 4.12: Local currency sovereign bonds



Source: Author's calculation based on Sovereign Investor Base Estimates by Arslanalp and Tsuda (2012)

Overall the CPIS figures show the steadily expanding importance of portfolio investment by advanced countries in emerging markets assets. This pattern is more evident for equities in the pre-crisis time, and for bonds since 2009. Emerging markets assets holdings remain more volatile than total foreign assets, with a higher degree of pro-cyclicality.

This is in line with the theoretical discussion made in the previous chapter. Emerging markets appear to be a growing but still "peripheral" part of advanced countries' portfolio: a good investment during normal and boom periods, but a quickly disposable one during bad times. The lower liquidity of these markets is likely to enhance these cycles. The causes of these patterns need to be related to investors decision mechanisms and emerging markets asset characteristics. Before exploring these in detail, the following subsection is linking more clearly these patterns to institutional investors.

4.1.2.1 Funds figures

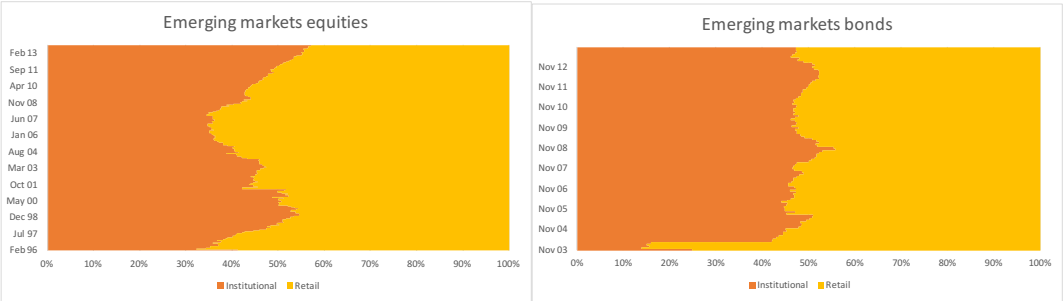
This section will explore some figures by the Emerging Portfolio Funds Research database. In particular it uses figures from the "Country Flows" dataset. This dataset combines the data from the "Fund Flows" dataset, which has figures for net flows into and out of a very large sample of mutual funds[40], with the "Country Allocations" dataset, which calculates the funds' allocation to each country. The "Country Flows" dataset shows the resulting combination by presenting estimates of flows and asset holdings to each country. While these represent only a sample of total portfolio flows to emerging markets, it has been shown to represent about half of equity and one eight of bonds flows, and to be representative and consistent indicator of fund-level and macro-level data (Pant and Miao, 2012; Jotikasthira *et al.*, 2012; Kroencke *et al.*, 2015, p. 22).

Very importantly for the purpose of this dissertation, the EPFR database allows for the distinction of underlying investors between retail and institutional investors. As shown in Figure 4.13, the proportions are roughly equally split into retail and institutional investors. While for bonds these have remained relatively constant over-time, the importance of institutional investors declined during the 2002-2007 period, suggesting the boom was then led by retail investors, but then quickly regained prominence in the post-crisis period, representing about

[40] About $17 trillion of funds assets are considered http://www.epfr.com/overview.aspx

60% of total investments at the end of the sample period. Given their crucial importance, and the focus of this dissertation, the following charts are focus on institutional investors only.

Figure 4.13: Proportion of retail and institutional investors

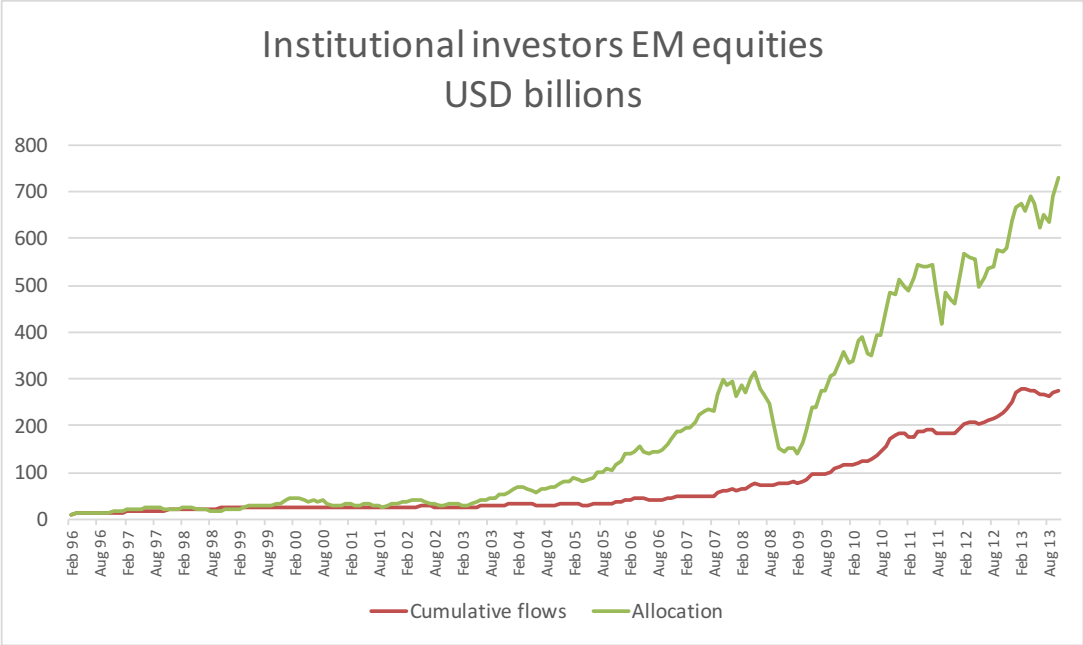


Source: EPFR

Figure 4.14 and Figure 4.15 show institutional investors cumulative flows and allocations to emerging markets equities and bonds[41]. The figures confirm the evidence considered so far: the growth in emerging market assets has been remarkable, in both the 2004 - early 2008 period, and after the crisis. It can be clearly seen that emerging markets assets holdings have continued to expand after their drop in 2008, roughly at the same speed in the case of equities and really taking off in the case of bonds. However the expansion has been more volatile than the pre-crisis period, as it can be seen in the flat cumulative flows line in late 2011, which possibly reflects the escalation of the eurozone crisis, and at the end of the sample period in mid-2013, likely reflecting the early fears of the announced FED Quantitative Easing "tapering", as it will be discussed in section 4.3.

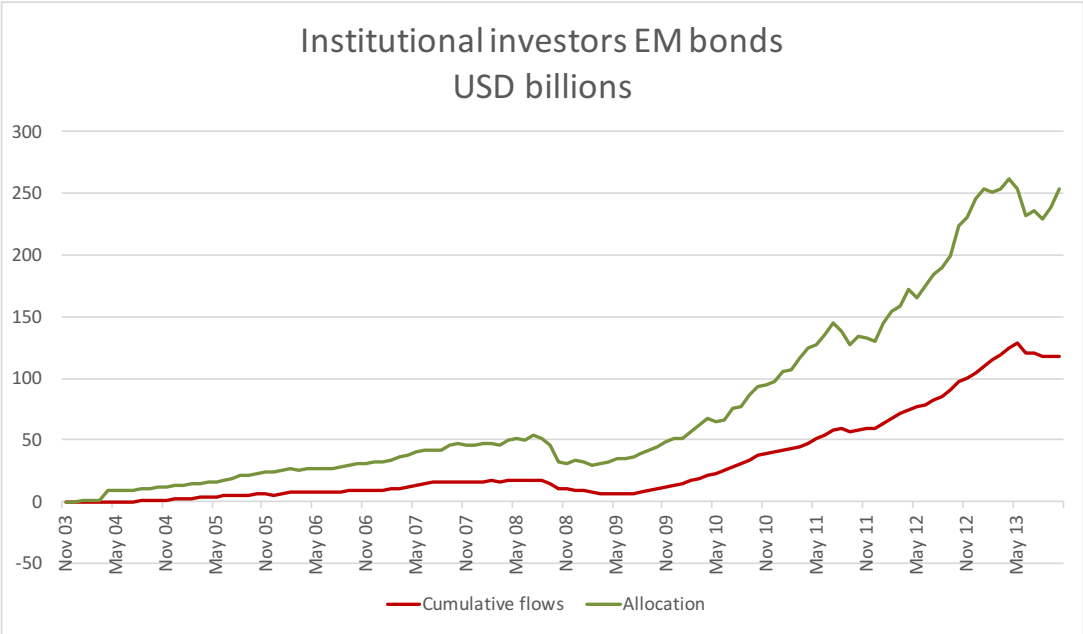
[41] The difference between the two being valuation changes.

Figure 4.14: Institutional investors EM equities allocation and cumulative flows



Source: EPFR

Figure 4.15: Institutional investors EM bonds allocation and cumulative flows

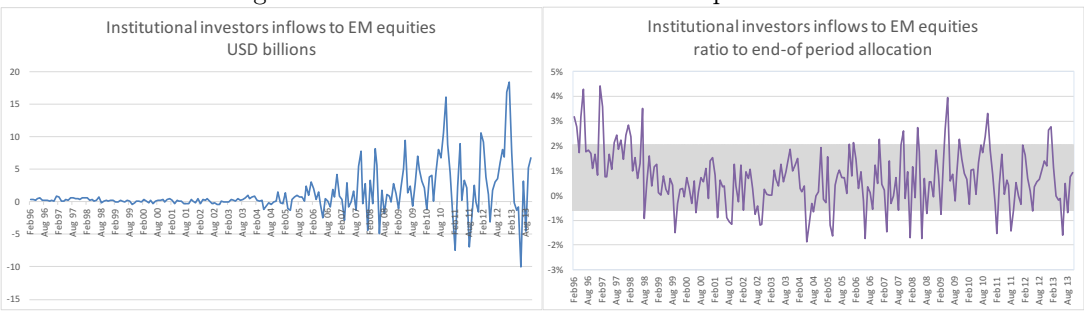


Source: EPFR

What these figures also show is the importance of holding gains in driving allocations to emerging markets. As both figures show there is an sizable gap between allocations and cumulative inflows. Such a gap represents the capital and currency gains - the appreciation of emerging markets currencies against the US dollar - made by investors on these assets. While the gap widens over-time in the case of bonds, reflecting currency gains, its growth in the case of emerging equities looks less pronounced in the post-crisis period, reflecting the smaller impact of holding gains on asset allocations. This is probably due to the unimpressive performance of emerging equity markets as it will be shown in section 4.3.

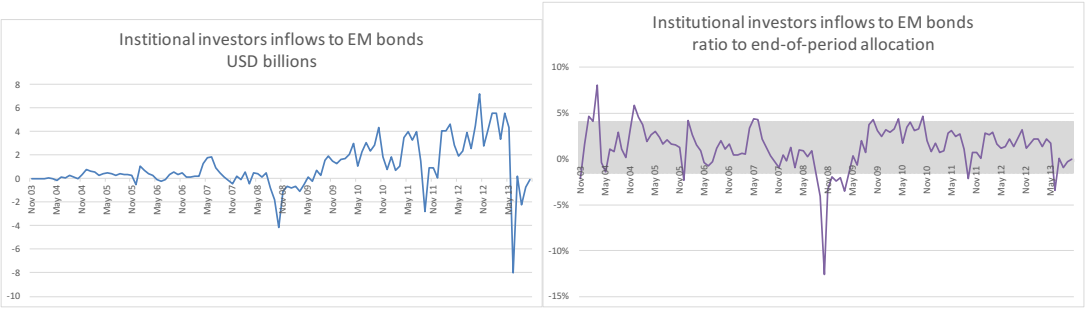
Figure 4.16 and Figure 4.17 confirm the growing magnitude of institutional investors portfolio flows to and out of emerging markets. The capital flows swings have amplified considerably over-time, especially after 2008. Interestingly the recent sell-off periods appear to be remarkably bigger than the one associated with the global financial crisis. For example, institutional investors alone have pulled out $18 billions out of emerging equity and bonds markets in a single month (July 2013), a sell-off that was twice as big as the one in October 2008. Considering the expansion in emerging markets assets holdings this is not surprising, but shows nonetheless the macroeconomic relevance of institutional investors on the balance of payment. When compared to allocation levels, the figures show that flows volatility does not seem to decrease over-time, and rather seems to have increased for emerging markets equities, with swings often exceeding one standard deviation from the average level over the sample period.

Figure 4.16: Institutional investors EM equities flows



Source: EPFR
The grey area is one standard deviation above and below the mean flows over the period.

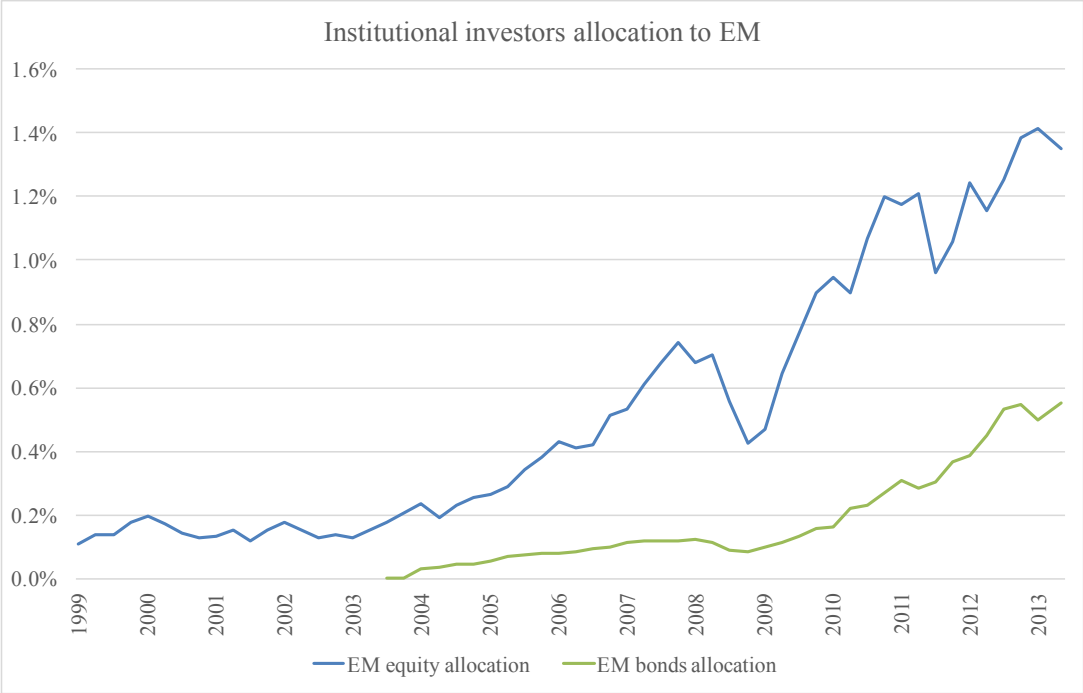
Figure 4.17: Institutional investors EM bonds flows



Source: EPFR
The grey area is one standard deviation above and below the mean flows over the period.

Figure 4.18 shows advanced countries allocation to emerging markets as a percentage of total portfolio. This was calculated by taking data from quarterly financial accounts databases for the US, the UK, the Eurozone, Japan, Canada, Australia for total holdings by Pension Funds and Insurance Companies, converting the non-US dollar denominated statistics into USD using IMF exchange rates reports, and sum up the resulting figures. Finally, the ratio between the EPFR and such figures was taken to calculate the allocation.

Figure 4.18: Institutional investors EM allocation



Source: Author's calculations based on EPFR, national sources (ECB financial accounts, Bank of Japan flow of funds, FED financial accounts of the United States, CANSIM, ABS Australian National Accounts: Financial Accounts) and IMF exchange rates archives

The resulting figure shows quite clearly that not only holdings of emerging markets assets have increased in absolute terms but also within the portfolio of institutional investors. It is important to remember that while the resulting figures are still relatively small (about 2% at the end 2012), the EPFR data only take into account the assets that are intermediated by mutual funds, and the actual allocations may be higher if institutional investors invested directly in emerging markets. Moreover the figures are an average for all countries and insurance companies and pension funds combined, and the variability across sectors and countries could give a more detailed picture. Nevertheless, these figures clearly show that the weight of emerging markets assets has increased especially fast after the crisis - their level in the first quarter of 2013 compared to the first quarter of 2008 almost doubled in the case of equities and almost five-fold in the case of bonds.

All the evidence reviewed in this subsection strongly confirms to the relevance of the

research hypothesis: institutional investors have considerably increased their allocations to emerging markets, especially after the global financial crisis. With their demand (or lack thereof) for emerging markets assets, institutional investors have therefore become a crucial actor in determining capital flows to these countries. In the following sections, in line with the discussion of made in chapter 3, institutional investors' demand for emerging market assets will be explored in relation to their behaviour, and the characteristics of such assets.

4.2 Changing balance sheets of institutional investors

As chapter 3 discussed, a key historical development in the financial system - and the economy in general - is the emergence of institutional investors. The previous section explored the subordinate nature of emerging markets' financial integration, and highlighted the importance of private portfolio flows and institutional investors in particular in shaping such characteristics. This section will relate these trends with the broader dynamics of the institutional investors sector.

Firstly it will look a the evolution of institutional investors asset allocation. It will be shown that over the past fifteen years their assets have shifted out of traditional domestic equities, while the interest for international assets and "alternative" investments has grown. Secondly it will look at the sectors' liabilities, pointing out the growing fragility of the sector's balance sheets, in light of an environment of low interest rates and financial returns and increasing fund maturity. Finally these will be linked together in light of the regulatory and institutional mechanisms, among which the most important is the rise of liability-driven investment. Emerging markets assets are part of the sector's strategy to enhance returns, while simultaneously containing as much as possible the overall allocation to risky assets.

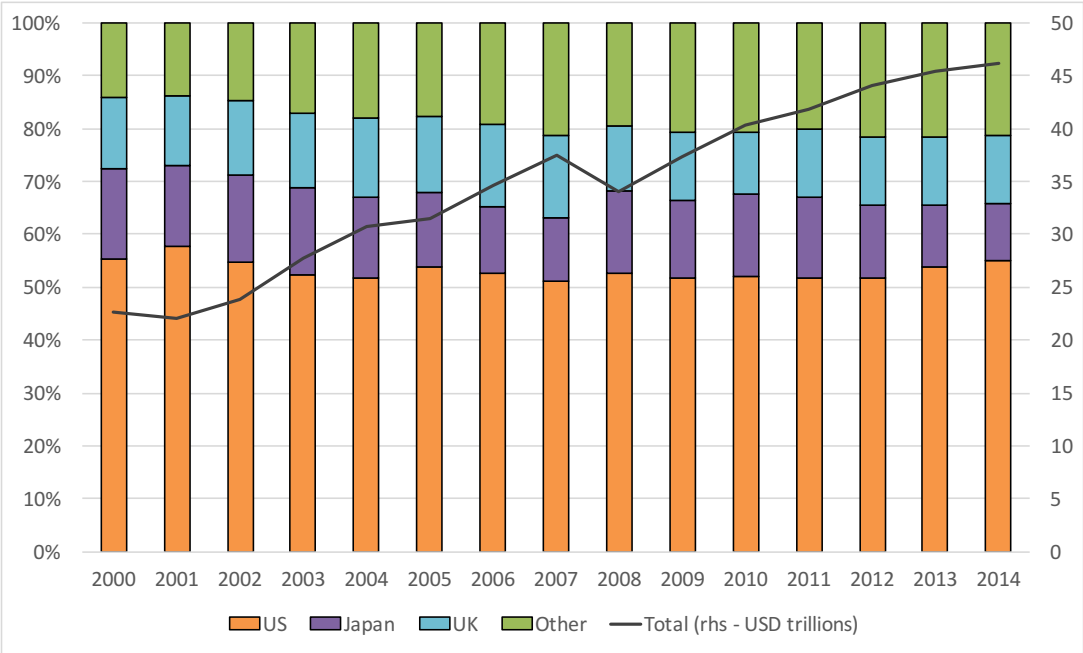
4.2.1 Asset side

Institutional investors own a substantial share of the world's financial markets. As shown in Figure 4.19, at the end of 2014, they collectively held about 47 trillions of US dollars worth of financial assets, equal to about 60% of global GDP or 30% of total world bonds and stocks outstanding[42]. As shown in a report by McKinsey (Roxburgh *et al.*, 2011) this makes them

[42] Source: Sanyal (2014)

the second biggest wealth holders at the global level, after households' direct asset holdings. There is a high degree of geographical concentration, with the top three countries, US UK and Japan, representing about 80% throughout all the period. Only the size of Japanese institutional investors appears to have decreased, from 18% to about 9%.

Figure 4.19: Institutional investors - total assets and country shares

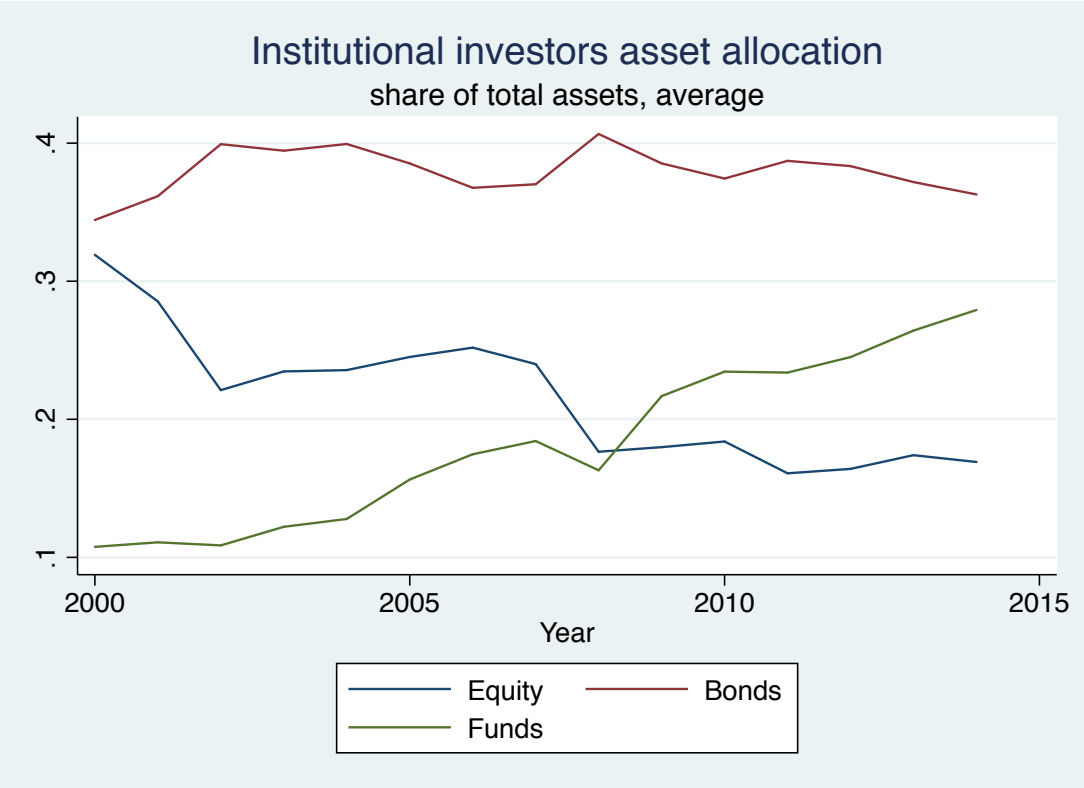


Source: OECD Institutional investors statistics (IIS)

The composition of institutional investors' portfolio has been changing. As shown by Figure 4.20, the trend over the past ten years has been one of declining equity allocations, which dropped from about 30% of total assets in 2001, dropping to about 18% in 2013, with cyclical movements, depending on the performance of equity markets - e.g. a modest increase in the 2002-2007 period. While bonds have remained roughly unchanged at slightly above 35% over the whole period, allocations to "funds" increased from 10% to almost 29% over the same period. Funds allocations effectively reflect the increase in allocations to "alternatives", a number of different assets, such as private equity or commodities, which do not fall in the broad equity and bonds categories, as well as the increase in indirect holdings of equity and bonds, through the acquisition of shares in externally managed funds. Different asset

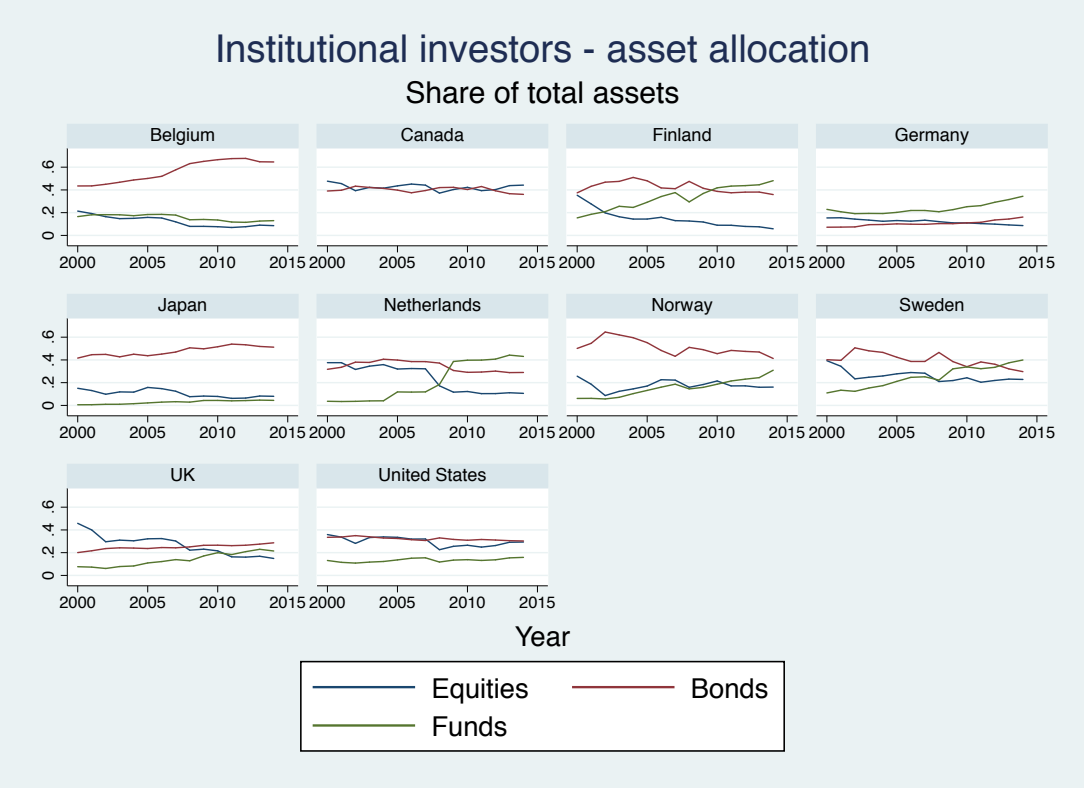
allocations across countries remain, as Figure Figure 4.21 shows, with Japan and Norway, whose institutional investors sector is mainly based on a few big state-controlled institutions, allocating a substantially higher proportion to bonds. But no county has been immune to the afore-mentioned trends, especially for what concerns the growth of allocations to external funds within the portfolios.

Figure 4.20: Average asset allocation



Source: Author's calculation based on OECD IIS

Figure 4.21: Asset allocation by country

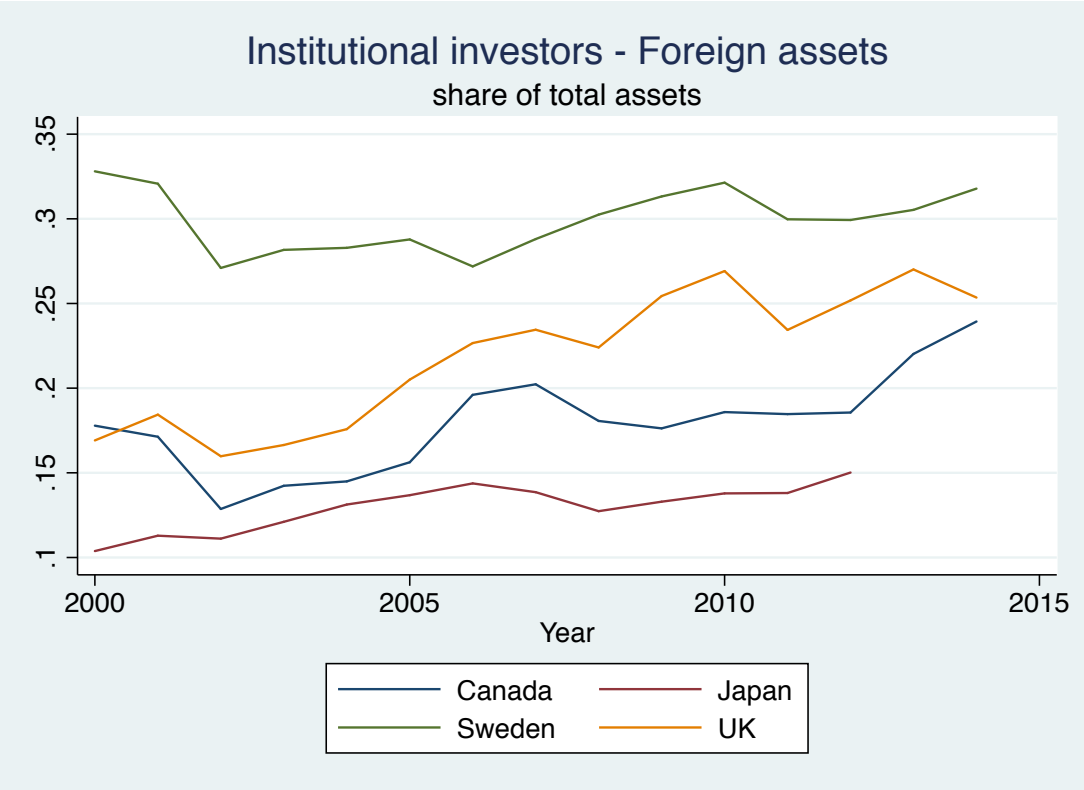


Source: Author's calculations based on OECD IIS

Not only institutional investors have rearranged their portfolio across asset classes, but they also expanded their geographical reach. As Figure 4.22[43] shows, over the past decade, institutional investors' portfolio of a few major countries has become more internationalised. The share of foreign to total assets increased most notably in the UK and in Japan, which have respectively the second and third biggest institutional investors sector in the world.

[43] As also pointed out in BIS (2007) relevant data for many countries, most notably the US, is missing. Only a selection of major countries, for which data was cross-checked across different sources, is therefore presented.

Figure 4.22: Share of foreign assets - Selected countries



Source: Author's calculation based on OECD IIS and Japan Flow of Funds data.

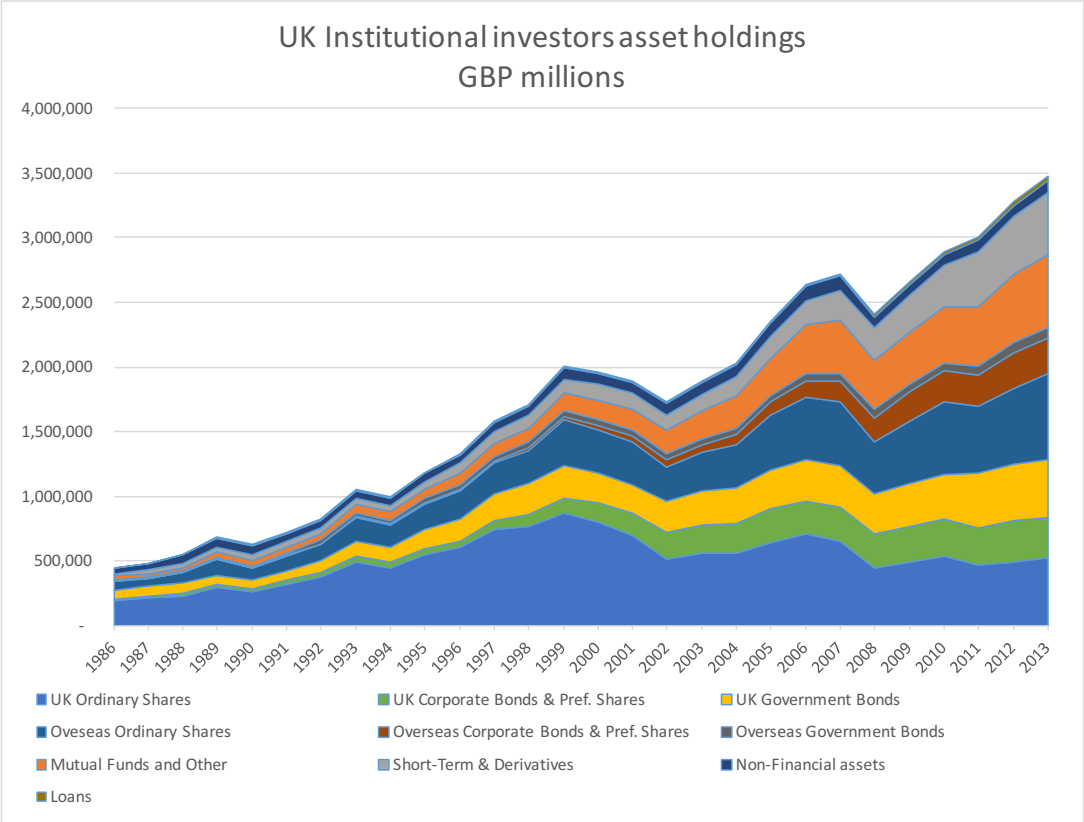
The data presented so far from the OECD institutional investors statistics give a broad overview of the major trends in asset allocation. A more detailed analysis can be made for the UK institutional investors, taken here as an example case. As mentioned, the UK institutional investor sector is the second largest in the world after the US (Figure 4.19). As data for the UK are substantially more detailed than for the US or Japan[44], the country is taken here as an example to better dissect some of the the trends discussed.

Figure 4.23 provides a detailed picture of UK institutional investors holdings over a longer period of time. The overall financial holdings seem to follow the financial cycle over the period, as the overall data shows a secular increasing trend, with visible stops in crisis years, such as 2000-2001 and 2008. Equity holdings are unsurprisingly the most responsive of the asset categories to the financial cycles. The figure also suggests the increasing diversification

[44]Thanks to the Office For National Statistics, which compiles detailed asset allocation data for US pension funds and insurance companies.

of UK institutional investors' portfolio: the three UK asset categories - UK corporate bonds, UK shares and gilts - in 2013 amounted to about the same level as in 1999 in absolute terms. The expansion of asset holdings therefore has been been assets other than direct holdings of UK securities.

Figure 4.23: UK institutional investors portfolio

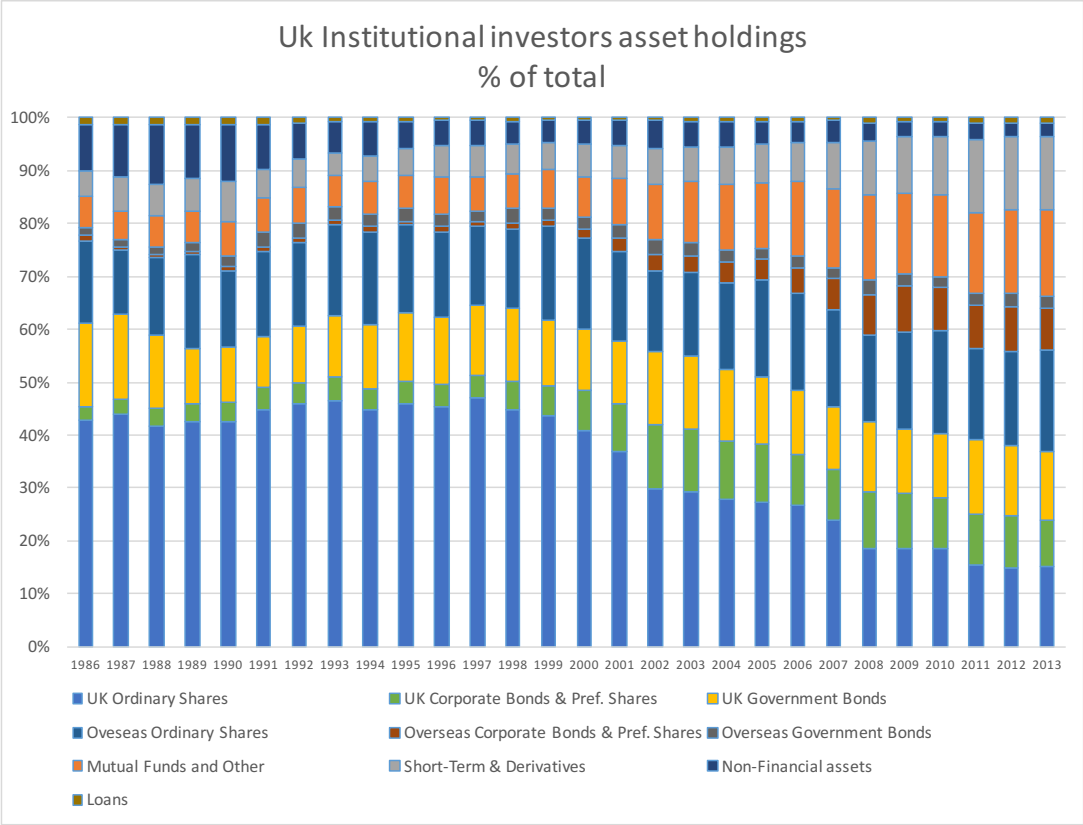


Source: Author's calculation based on Office of National Statistics, MQ5: Investment by Insurance Companies, Pension Funds and Trusts

This is confirmed in Figure 4.24, which can almost be divided into two parts. In a first phase (1986-1999) portfolios were dominated (around 45%) by UK shares, with the other categories remaining roughly constant: UK (corporate and government) bonds and foreign equities weighted about 15-17% each, and all others asset classes around 5%. The second phase (2000-2011) is primarily characterised by a sharp fall in UK shares holdings, sharply dropping 30% in 2002, as a result of the dot.com stock market crash, and then falling at a slower but constant pace until another sharp drop in 2008, due to the global financial crisis.

As of 2013, they account for about 15%.

Figure 4.24: UK institutional investors holdings, % of total



Source: Author's calculation based on Office of National Statistics, MQ5: Investment by Insurance Companies, Pension Funds and Trusts

Except for UK government bonds, whose share remained more or less constant throughout the whole period at about 12%, all the others categories have risen. UK corporate bonds and foreign equities increased modestly, respectively from about 5% to 9% and 15-17% to about 20%. More remarkable are the rise in holdings of funds, which rose from 6% to 16%, short-term assets and derivatives, from 5% to 14%, from and foreign bonds to 3.6 to 7%.

Furthermore, Figure 4.24 documents the increasing importance of foreign assets into UK institutional investors' portfolios. From 1999, when they accounted for over 60% of total assets, domestic assets have declined to about 38%, or from 65% to 50%, including short-term assets[45]. Table 4.1 confirms that within the broad asset classes of bonds and equities, foreign

[45]It is reasonable to assume that short-term assets are mostly domestic deposits and other similar assets.

assets have become more important over time: UK equities account for less than half of total equities, and bonds account about two-thirds, down from 70% and 82% respectively.

Table 4.1: UK institutional investors holdings, geographical allocation

Asset type	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
UK Shares	70.37	68.31	66.14	64.92	62.95	59.74	59.36	56.29	52.92	50.38	48.97	47.63	45.41	44.19
Foreign Shares	29.63	31.69	33.86	35.08	37.05	40.26	40.64	43.71	47.08	49.62	51.03	52.37	54.59	55.81
UK Bonds	82.90	80.39	81.76	81.99	80.19	79.87	75.51	72.86	69.95	67.31	67.97	69.62	67.92	67.87
Foreign Bonds	17.10	19.61	18.24	18.01	19.81	20.13	24.49	27.14	30.05	32.69	32.03	30.38	32.08	32.13

Source: Author's calculation based on Office for National Statistics, MQ5: Investment by Insurance Companies, Pension Funds and Trusts

Summing up, institutional investors, which are highly concentrated in a handful of advanced countries, have seen important changes in their asset allocation over the past 15 years. Their portfolio has become more diverse, both in terms of asset classes and geographical scope. The case of the UK, the second biggest country by institutional investors asset holdings, is representative of this trend. UK institutional investors portfolios', previously highly skewed towards to holdings of domestic equities, now contains substantial amount of indirect holdings, through mutual funds and alternative assets, as well as much more internationalised portfolio.

It is therefore not surprising that, as reviewed in the previous section, portfolio holdings of EMs in general, and by institutional investors in particular, have grown in importance. This is part of the broader evolution of institutional investors' asset allocation over the past decade. Their portfolio is increasingly diversified internationally and includes funds, which as seen through EPFR data, includes substantial amounts of emerging markets' assets.

4.2.2 Liabilities and fragility

As the previous subsection has described, asset allocation shifts have been substantial for institutional investors as a whole. However, as this dissertation has argued, portfolio choice is closely linked to the conditions of liabilities. In this subsection the key trends and determinants of institutional investors' liabilities are described, pointing out the sources that led to their

However not much can be inferred as to the origin of mutual funds.

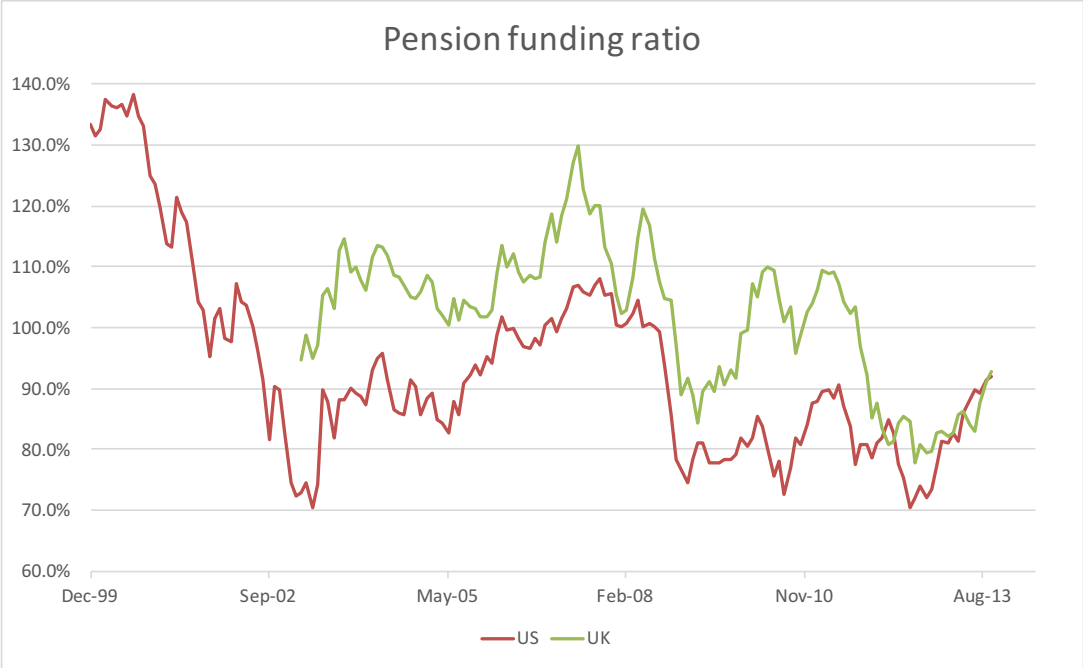
increase and the resulting fragility of the sector's balance sheet.

Differently from banks, for pension funds and insurance companies liabilities come in the form of long-term cash flow obligations. Conceptually, liabilities represent the present value of future payable pensions or insurance claim benefits. The calculations of such liabilities is however not straightforward, as several assumptions have to be made with respect to the evolution of future variables, such as wages, mortality rates, inflation and, crucially, the discount rate. These institutions on the other hand do not need short-term liquidity to conduct their business, and can focus on ensuring that their liabilities are covered in the long-run by sufficiently high returns but at the same time stable pools of assets. Given that liabilities are effectively a technical provision rather than debt, the market valuation of assets of a pension fund need not be equal to its liabilities. The gap or ratio between asset and liabilities therefore does not indicate bankruptcy, but is crucial indicator to measure the health of institutional investors' balance sheet.

The funding ratio, i.e. the assets/liabilities ratio, of UK and US pension funds is shown in Figure 4.25[46]. Overall the trend is one of declining funding ratios, particularly since the crisis. Pension underfunding, as it will be discussed in the next subsection, is a major issue, widely discussed in policy circles, as well as in the pension industry itself. Both regulators and pension managers have been trying to act as to revert this trend, and ensure pensions are adequately provided for.

[46] The UK figures liabilities are calculated by the Pension Protection Fund through the so-called s179 method, that is estimating the cost of securing future benefits through an insurance contract. The Milliman indicator estimates the funding status, by taking the actual quarterly balance sheet data of the 100 US large corporate pension funds and projects their liabilities and assets monthly.

Figure 4.25: Pension funding ratio



Source: Pension Protection Fund, Milliman and Bank of Japan Flow of Funds

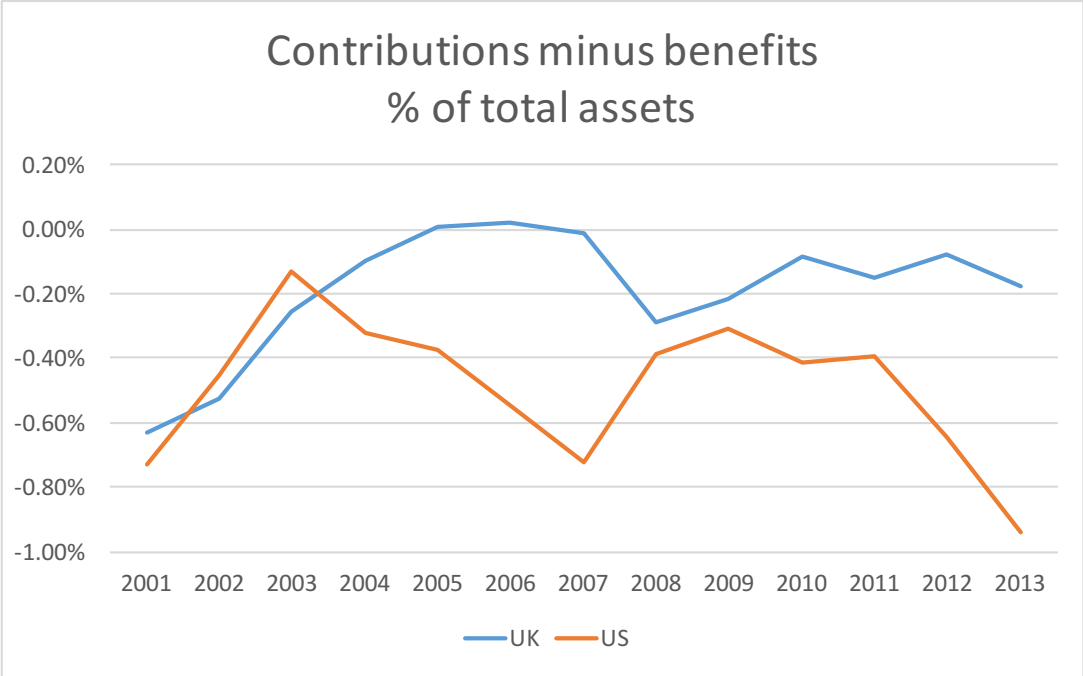
From a systemic perspective, two factors directly affect these ratios. Firstly, asset price collapses during crisis, as in 2001 and 2008, evidently push pension funds to an underfunded position. Similarly, asset price booms, such as in 2005-2007 and some of the post-crisis years, substantially improve the funding status.

Secondly, falling interest rates, have a negative effect on funding, by increasing the size of the liabilities. Discount rates for liabilities are generally linked to bond yields, which are behind the soaring liabilities in the post-crisis years. This in turn led to underfunding, despite the good performance of stock markets, as liabilities increased by more than assets. Secular declines in interest rates are therefore largely responsible for the long-run decline in funding ratios on the one hand, and asset prices for their cyclical movements.

Aside from interest rates and asset price dynamics, demographic changes are behind the dynamics of pension funds assets and liabilities. Due to population aging, and the policy shifts towards individual pension accounts, traditional employer sponsored schemes are increasingly "mature", i.e. they have a higher proportion of members receiving retirement benefits compared

to employees paying contributions. As a result, since 2008 benefits have exceeded contributions payments in the US and the UK (Figure 4.26). While this may not be a new phenomenon, as this was also the case in the early 2000's, remarkably the balance has worsened despite increases in contributions, shown in Figure 4.27. These have grown over-time as a result of higher contribution rates, but not enough to compensate for the increasing payments to retired members, a sign of their increasing maturity. As several pensions schemes have become closed to new members in the UK[47], these trends are going to become more pronounced in the near future.

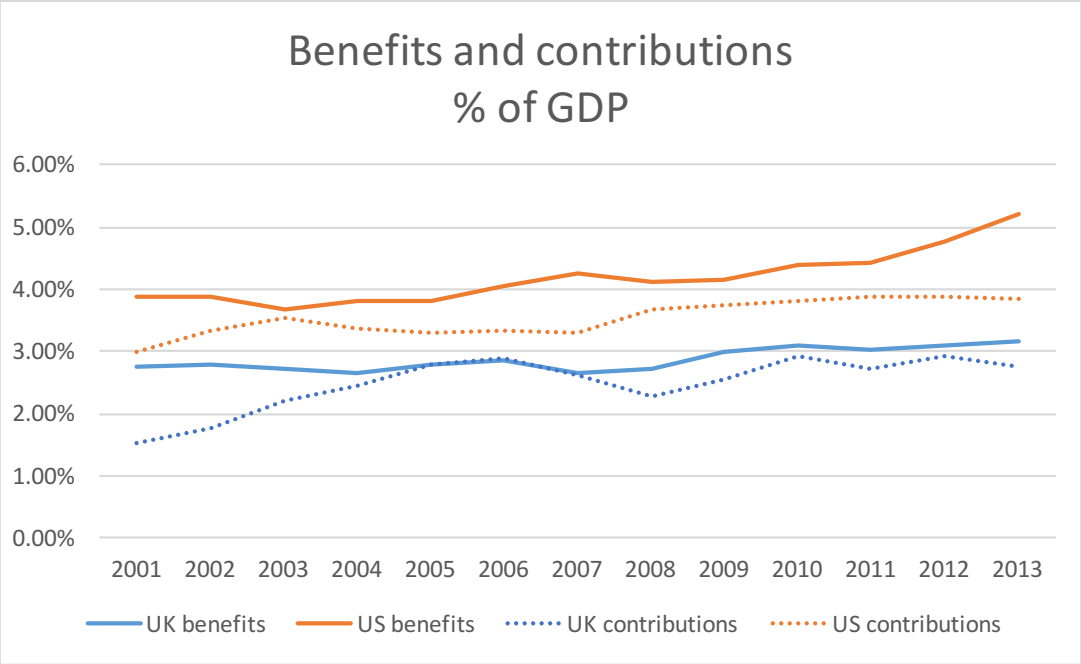
Figure 4.26: Benefits and contributions I



Source: Author's calculations based on OECD Funded pension indicators

[47]The great majority of defined benefit private sector pension funds in the UK does not allow new employee to join them, although it often allows existing members of the scheme to accure new future benefits. See the Purple Book for details
http://www.pensionprotectionfund.org.uk/DocumentLibrary/Documents/purple_book_2014.pdf.

Figure 4.27: Benefits and contribution II

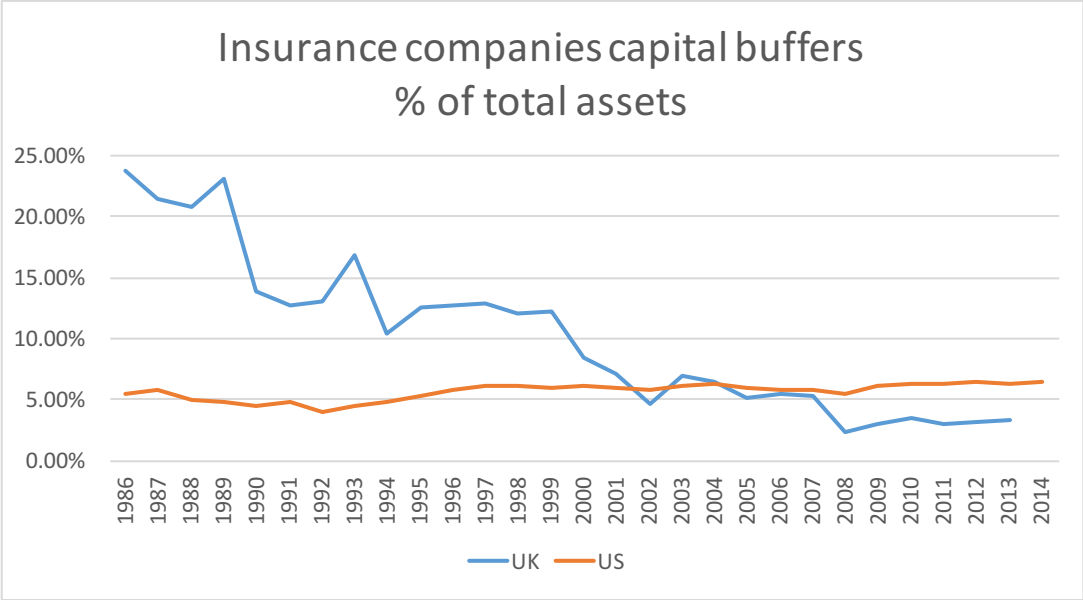


Source: Author's calculations based on OECD Funded pension indicators

Similar dynamics occurred in the insurance sector. Figure 4.28 shows the balance sheet of US and UK life-insurance companies. In the UK the long-run decline of capital margins is particularly evident, as this balance has decreased from almost 25% in 1986 to as low as 3.3% in 2013. Margins in the US have always but thinner, but are roughly stable throughout the period, at about 5-6%. Furthermore, as shown in Figure 4.29, financial income in terms of both yields and total returns has declined over-time. Similar trends affected US insurers [48]. The fragility of insurance companies is therefore a growing concern. As it will be discussed in the next subsection, new regulations have been put in place to contain such fragilities, and prevent them from having negative systemic effects on the financial system.

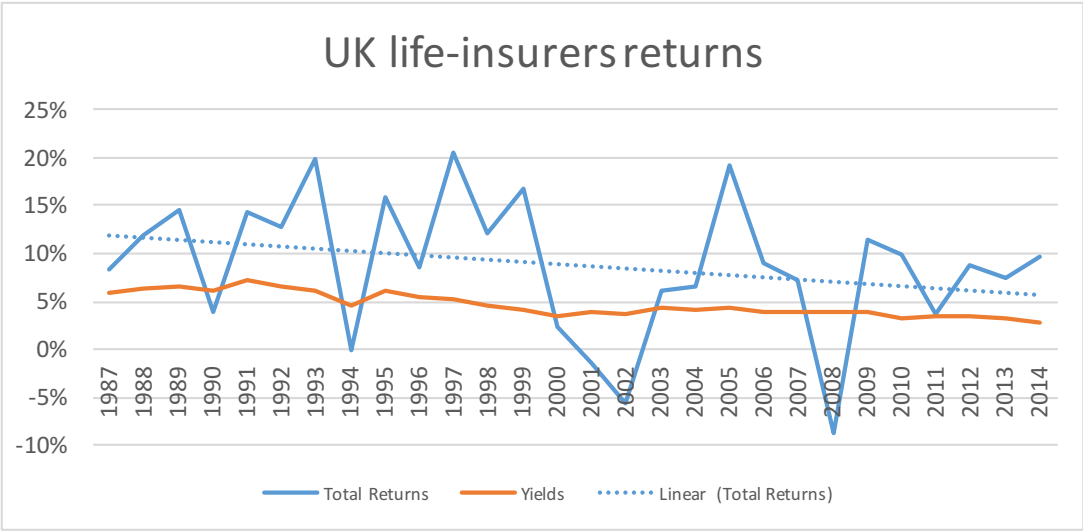
[48] No similar data are publicly available, but see page 16 of the report by the Federal Insurance Office of the US Treasury at https://www.treasury.gov/initiatives/fio/reports-and-notices/Documents/FIO%20Annual%20Report%202013.pdf.

Figure 4.28: US and UK Insurance companies balance sheet



Source: FED Financial accounts of the United States and UK Office for National Statistics. The figures are calculated as total assets minus total liabilities over assets, for long-term insurance companies.

Figure 4.29: Financial income of UK life-insurers



Source: Author's calculations based on UK Office for National Statistics

Overall these trends suggest declining margins, and increasing fragility for advanced countries' institutional investors. In the case of pension funds this is reflected in increasing under-

funding of liabilities and their growing maturity, while for insurance companies, this comes in the form low capital buffers and declining investment income. Under such conditions, the pressure to generate returns becomes more intense. At the same time, protection against excessive volatility given by portfolio sensitivity to asset prices and interest rates becomes paramount. Indeed as it will be shown, these conflicting goals, have become embedded and institutionalised in institutional investors' portfolio management practices.

4.2.3 Institutional changes and regulation

As discussed, institutional investors have changed substantially the composition of their assets, and experienced at the same time growing pressure in order to be prepared face their long-term obligations. The declining margins and funding ratios have painfully reminded institutional investors of their exposure to asset prices and interest rates. Furthermore, the global financial crisis has made the whole investors world aware of the limits to conventional asset allocation practices. The shifts in asset allocation described in subsection 4.2.1 can be located within the changing investment practice of these investors, in light of their increasingly fragile balance sheets.

A first key element has been the adoption of *liability-driven investment* strategies. Instead of focusing, as most financial investors, on benchmarks and peer-groups, institutional investors increasingly put at the core of their investment process their liabilities. The goal of asset allocation is therefore, not simply to maximise returns for a given level risk, but ensure that assets adequately provide for the institution's liabilities. As liabilities are affected by interest rates and inflation - as this increases wages and therefore benefit payments -, it is important to invest in assets that would be equally affected by such shocks. For example, long-term bonds are good hedges against interest rate risk, since their value, like that of liabilities, is inversely related with respect to interest rates.

In practice, liability-driven investment typically involves splitting assets into two portfolios. The first is a return-seeking portfolio, whose purpose is generating sufficiently high returns in order to increase the asset size in line with the growth of liabilities. The second is a liability-matching portfolio, whose purpose is protecting the funding ratio, by investing in assets that hedge liability risk. Liability-matching portfolios typically consist of bonds, and to some extent

derivatives, whereas return-seeking portfolios are typically much more diversified across several asset classes.

The increasing maturity of pension funds described in the previous subsection, is also likely to be behind the adoption of liability-driven investment strategies. As discussed, mature pension funds become cash flow neutral or negative, therefore becoming net sellers rather than buyers of assets. This means having a slowly shrinking pool of assets to face obligations. Appropriate asset allocation becomes therefore particularly crucial, as cash flow margins become thiner. Mature pension funds are likely to invest a greater proportion of their assets in highly liquid securities, which can be sold as this becomes necessary to pay out benefits, therefore having to rely on a smaller proportion of assets to generate the necessary returns. As Engelen (2003, p. 1366) puts it, "as soon as pension funds mature, their need to push the envelope of existing investment norms and practices grows, resulting in increasingly speculative behaviour and a frantic search for financial innovations". The trends described in the previous section can be rationalised in this sense, with equities being slowly replaced with a more diverse range of assets for return generation, and short-term securities increasing in importance to face short-term liabilities.

Secondly, aside from the adoption of liability-driven investment, institutional investors have been affected by changes in practice within the asset management industry at large. There is widespread acknowledgment that modern portfolio theory was not of much use during the crisis, and that diversification failed as a mechanism to avoid losses when all financial markets became all of a sudden almost perfectly correlated, i.e. they crashed all together (IMF, 2011). Some institutions have in fact started to adopt new asset allocations strategies, based on the so call risk-factor approach, according to which portfolio diversification should be based on an optimal combination of exposure to different risk categories rather than asset classes (IMF, 2011; Page and Taborsky, 2011). This theory is based on the evidence of low correlation between risk factors, an in particular their resilience during episodes of turbulence, as opposed to traditional assets.

Whether this is a truly path-breaking new system of allocation or a slightly modified version of the standard mean-variance framework remains nonetheless to be seen (Lee, 2011). However

it is notable that the 300 Club, a group of leading investment professionals has strongly put forward the view that financial investment practices need to go through more fundamental changes. Rajan (2012) goes as far as to say that the CAPM and the efficient market hypothesis "promoted a world view detached from the on-the-ground reality... for they rode on the back of the strong pro-market anti-regulation sentiment unleashed by the Thatcher-Reagan era in which faith mattered more than facts." Institutional investors have been advised to take a more holistic approach to investment that acknowledges the inherently dynamic nature of risk-appetite, which is a dynamic function of wealth and risk-premia, as opposed to the static risk-averse utility functions employed by modern portfolio theory (Brown, 2013).

A third element has been changing regulation. Across several countries, marked-to-market accounting has become the norm for insurance companies and pension funds (BIS, 2007, 2011). Both assets and liabilities need to be measured at levels consistent with financial markets asset prices and yields. In Europe, a regulation named Solvency II[49] has recently been implemented, according to which insurers need to comply with risk-based capital requirements, in a very similar spirit of the Basel III regulation for banks. In some countries, notably the Netherlands and Scandinavian countries, pension funds also need to comply with similar regulations (Pugh and Yermo, 2008).

These three developments explain the changes in asset allocation described in section 4.2.1, i.e. the reduction in traditional equity investments, and the substantial increase in "funds" investments, in light of the liabilities dynamics discussed in section 4.2.2. Equities are not fit for liability-matching purposes, and they represent a traditional class which is highly exposed to common market risk factors. Furthermore they tend to be volatile and carry high capital requirements. On the other hand investing in alternative assets and funds gives exposure to a much more diverse range of assets and risk factors, thus potentially increasing returns without the need to increase allocation to return-seeking assets as a whole. In general, the long-run implication of these trends would be to engage in portfolio "de-risking", i.e. reduce allocation to risky assets in favour of liability-matching assets (BIS, 2011). Indeed, as documented by the Bank of England (BoE, 2014), several corporate pension funds in the UK have been increasing allocation to government bonds.

[49] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2009:335:FULL&from=EN

However, as described in section 4.2.1, while there has been a decisive move out of equities, bonds allocation do not seem to have sizably increase across countries. The main reason behind this is the low interest rates environment, which contributes to make the balance sheet of institutional investors more fragile, as described in the previous subsection, and may have induced institutional investors to take on risks in other forms through their expansion into non-traditional asset classes. In other words, with low interest rates, institutional investors struggle to earn sufficient returns, and cannot afford to "de-risk", but equally do not wish to remain overexposed to assets that left them vulernable to shocks. The result is to keep their liability-matching and return-seeking components roughly unchanged, while substantially altering the composition of their return-seeking portfolio, in order to achieve their return targets.

Therefore, in spite or their implicit or explicit risk reduction goal, these trend may have simply changed the nature of risk: "in the context of low interest rates, institutional investors may be tempted to deviate from pure ALM[50] [asset-liability-management] and search for yield. They may adopt core-satellite structures in portfolio management, in which they cover a large part of their liabilities with traditional portfolio allocation strategies (e.g. bond/equity index tracking) and try to achieve "extra" returns by investing smaller parts of portfolios in alternative assets (e.g. *emerging market assets*, hedge funds, commodities, credit derivatives and infrastructure)." (BIS, 2007, p.27, emphasis added).

In this sense, regulations such as Solvency II may indeed create new vulnerabilities rather than reduce systemic risks. These regulations tend to push pension funds and insurance companies towards safer low-yielding government bonds, but, given the current low-interest rate environment, they contribute to tilt their return-seeking portfolio towards riskier assets:

> "The pressure to enhance yields in the low interest rate environment is growing, and the requirement for insurance companies to hold the bulk of their assets in safe, low-yielding assets may push them to become more aggressive with the remainder of their portfolio and may shorten their investment perspective. Their investment behavior regarding this risky part of their portfolio might well become more volatile, leading to a risk of sudden reversals in some less liquid markets, including in

[50] i.e. Liability-driven investment.

emerging economies." (IMF, 2011, p. 80)

The growing interest in emerging markets assets by institutional investors therefore has to be understood with reference to these trends. With fragile balance sheets and low interest rates, institutional investors are looking for ways to increase their returns, while (seemingly) not excessively increasing risk exposures. Emerging markets assets must therefore have risk/return characteristics that make them suitable for inclusion in the return-seeking portfolio of institutional investors that follow liability-driven investment strategies.

4.3 The Emerging Markets asset class

Having explored the growing allocations to EMs and the evidence of institutional investors' balance sheets evolution, this section explores the characteristics of the emerging markets' asset class. While the discussion so far warrants an expansion into "alternative" assets, in the daunting task to search for yield while reducing volatility, the inclusion of emerging markets bonds and equities into this pool also depends on their characteristics. As discussed in chapter 3, beside traditional mean-variance metrics, emphasis should be given to "Keynesian fundamentals", i.e. the systemic conditions of the asset class as a whole, both in terms of domestic factors and exposure to global factors. The role of liquidity, in particular currency liquidity, and its macro-determinants needs to be assessed.

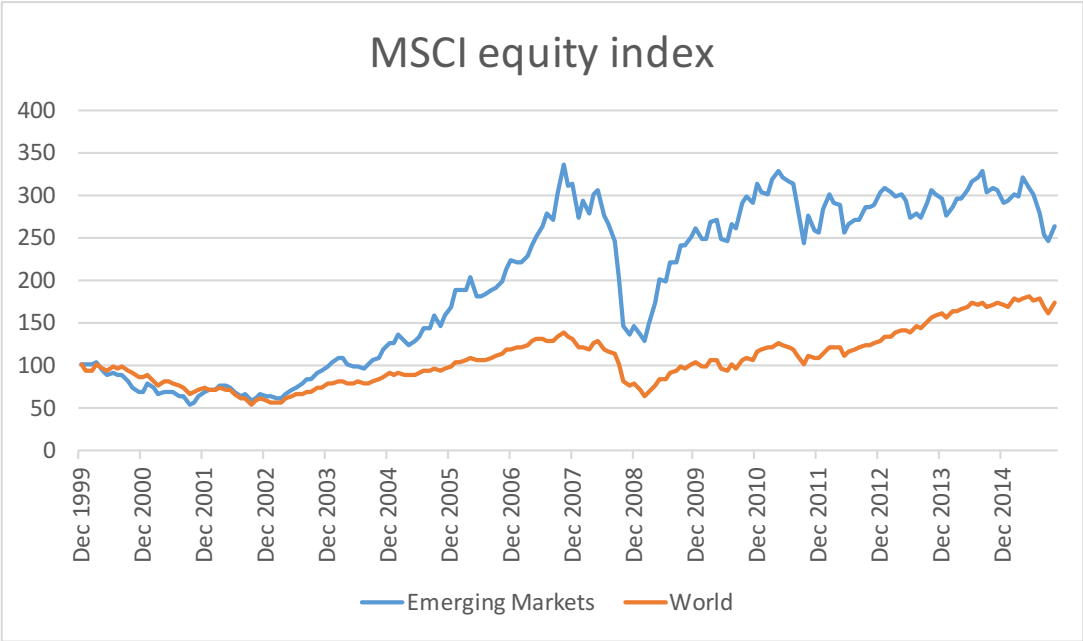
Section 4.3.1 assesses the evidence on economic growth and financial market returns, and finds it less remarkable than it would seem. Section 4.3.2 looks more closely at the "Keynesian fundamentals", pointing out those features that have led emerging markets to be perceived as less risky, by effectively enhancing the liquidity premium of their currency. Section 4.3.3 discusses these trends in relation to the global economic and financial environment.

4.3.1 Returns and growth

Returns in emerging markets are generally expected to be higher, given their perceived higher riskiness. Figure 4.30 shows the comparative total return stock market performance of

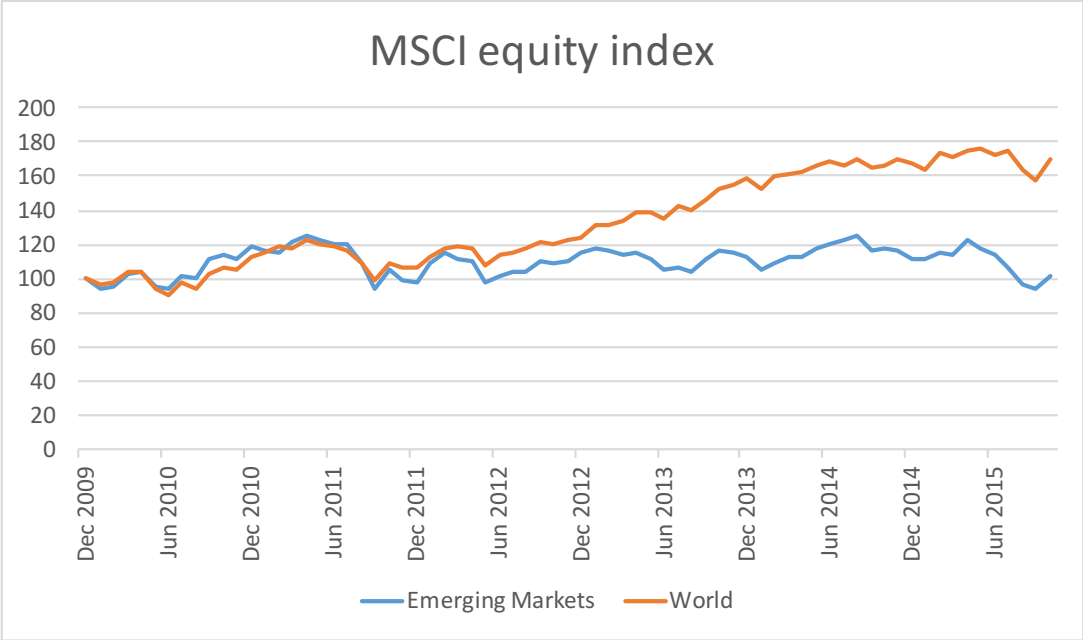
emerging markets compared to advanced markets in general (the "world" index). Emerging stock markets have experienced a real rally in the 2002-2007 period, outperforming advanced countries by a wide margin. They were heavily hit by the 2008 crisis but have recovered relatively quickly since. However, their performance since 2011 appears less remarkable: as Figure 4.31 shows, the EM index has been virtually flat since 2012, clearly underperforming the World index. Higher volatility during this period was certainly not accompanied with higher returns.

Figure 4.30: Stock markets



Source: MSCI
Index level 31/12/1999=100, total return index in US dollars

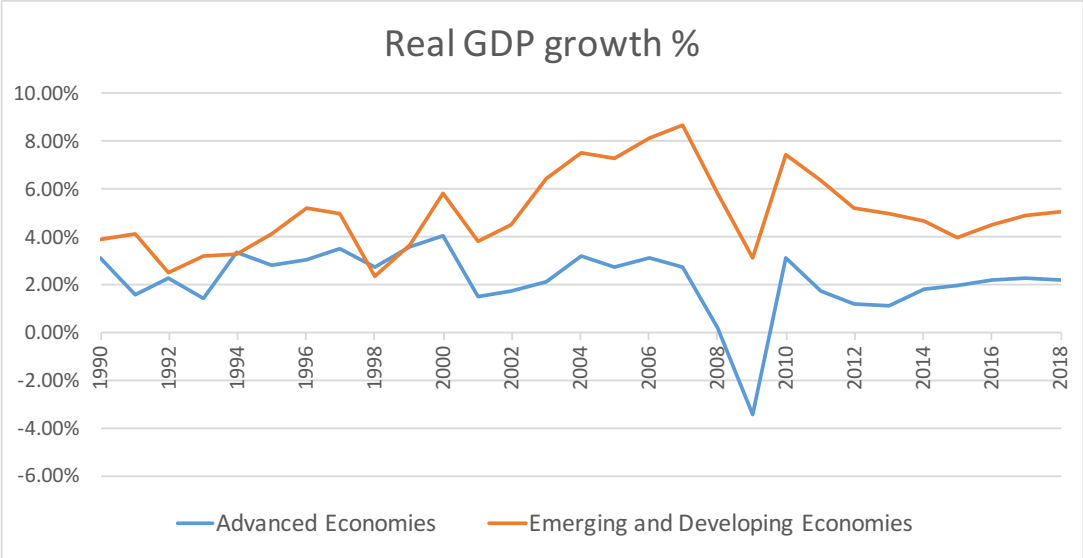
Figure 4.31: Stock markets since the crisis



Source: MSCI
Index level 31/1/2008=100, total return index in US dollars

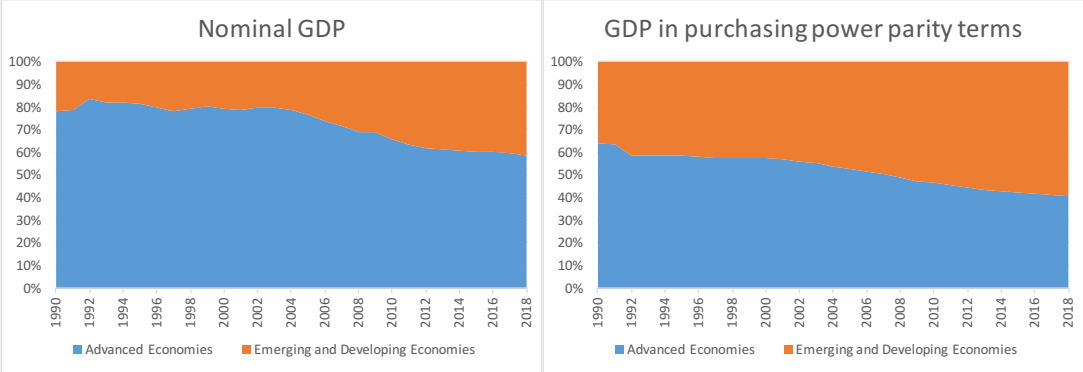
The boom in institutional investors allocation to emerging markets equities during the 2002-2007 came therefore with booming stock markets. The more sober post-crisis environment, while potentially explaining the shift to emerging markets bonds, did not however severely affect their exposure. This may be caused by the good growth performance of emerging markets vis-à-vis advanced economies: as Figure 4.32 shows, emerging markets have consistently grown more than advanced economies since 2000, and are projected to continue growing at around 5% on average in the next few years. As a result, emerging and developing economies share of global GDP will be higher than 40% and almost 60% in purchasing power terms by 2018. As it is generally thought that high GDP growth will spillover to good equity performance, this could provide a justification for continuous high exposure to stocks performing modestly since 2012.

Figure 4.32: GDP growth



Source: IMF WEO

Figure 4.33: GDP shares



Source: IMF WEO

While advanced stock markets performed well compared to emerging markets in recent years, the picture looks different for fixed-income securities. As Table 4.2 shows, short-term interest rates in advanced countries have always been lower than in emerging markets on average since 2000. Everywhere interest rates have been declining over time, but since the crisis such a difference becomes particularly meaningful: while interest rates in all major advanced countries below 1%, effectively providing almost zero returns, interest rates in emerging countries range from 2.49% in South Korea to 10.86% in Brazil, therefore providing high returns

even on a short-term basis.

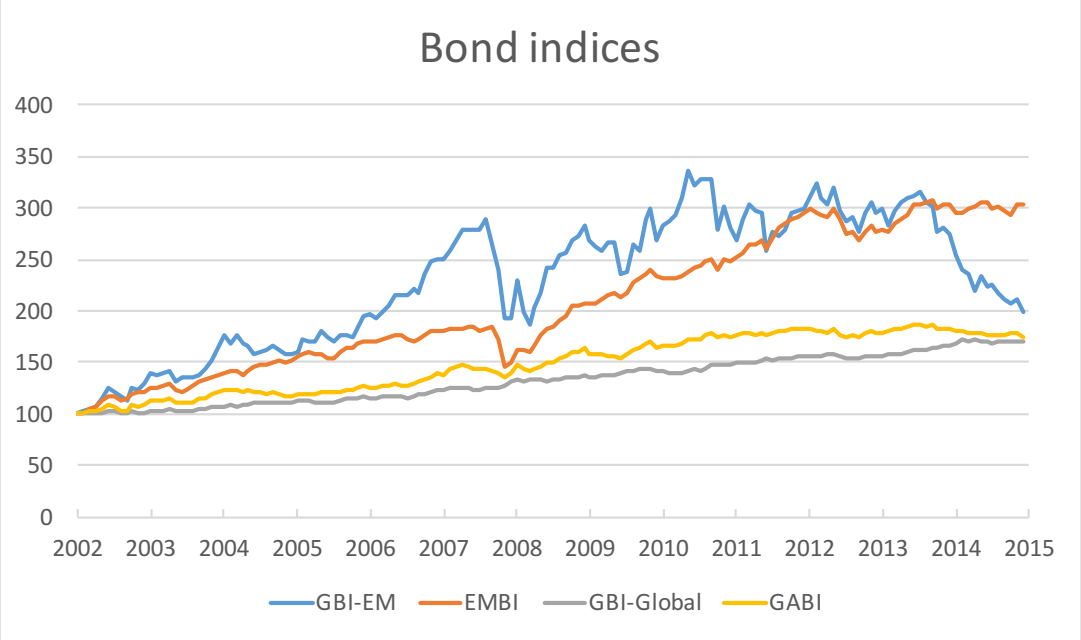
Table 4.2: Short-term interest rates

	1998-2000	2001-2003	2003-2005	2006-2008	2009	2010	2011	2012	2013	2014
Canada	5.23	3.20	2.69	4.02	0.69	0.78	1.17	1.16	1.16	1.17
France	3.64	3.30	2.21	4.00	1.23	0.81	1.39	0.57	0.22	0.21
Germany	3.63	3.30	2.21	4.71	1.23	0.81	1.39	0.57	0.22	0.21
United Kingdom	6.30	4.21	4.31	4.94	1.20	0.69	0.89	0.84	0.49	0.54
United States	5.75	2.19	2.08	8.83	0.56	0.31	0.30	0.28	0.17	0.12
Brazil	24.45	19.98	19.58	8.28	10.06	9.80	11.67	8.53	8.18	10.86
China	4.37	2.43	2.42	4.20	1.59	2.64	5.14	4.31	4.98	4.80
Korea	9.70	4.81	3.91	7.17	2.63	2.67	3.44	3.30	2.72	2.49
Indonesia	25.77	13.86	8.37	8.55	9.28	7.02	6.93	5.95	6.26	8.76
Mexico	22.65	9.30	7.86	7.82	5.93	4.91	4.82	4.79	4.28	3.52
Russia	21.89	10.17	7.02	8.47	13.05	5.16	5.49	7.29	7.49	9.40
South Africa	13.17	10.50	8.37	9.11	7.85	6.42	5.49	5.29	5.08	5.80

Source: Author's calculations based on OECD and Economist Intelligence Unit. These are representative money-market rates at short-term (3 months) maturity.

Such differences are even more sizable when comparing long-term bonds returns. As Figure Figure 4.34 shows, emerging markets bonds have outperformed both advanced countries and global bond benchmarks. From January 2002 until December 2013, local currency and hard currency emerging market bonds yielded respectively 9.1% and 8.6% on a logarithmic return basis, compared to 3.6% and 4.8% for advanced countries and global bonds. Even including the substantial fall in the past two years, local currency bonds outperform advanced countries', at 5.3% compared to 4.1% throughout the period.

Figure 4.34: Emerging markets bond indexes

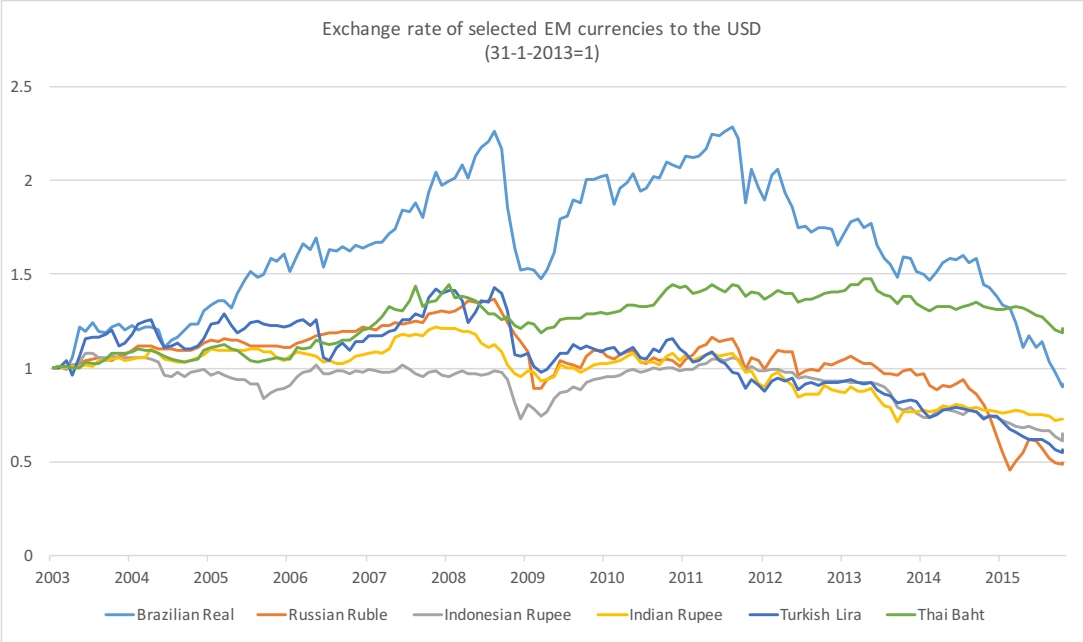


Source: Bloomberg
Note: the GBI-EM tracks local currency sovereign bonds from major emerging markets, the EMBI tracks hard currency sovereign bonds from a large number of emerging markets, the GBI-Global tracks advanced countries government bonds, and the GABI is a global aggregate bond index. All indices are in total return and US dollar terms.

The substantially higher volatility of emerging markets equities and local currency bonds, has been mostly driven by the dynamics of the exchange rates. Exposure to local currency debt and equities implies that exchange rate appreciation compared to the base currency translates into currency gains for foreign investors. Indeed, as Kaltenbrunner (2011) documents, currency movements have become a crucial component of returns on emerging markets assets, to the point that currency itself becomes an investable asset class.

As Figure 4.35 shows, emerging market currencies per US dollars exchange rates have been highly correlated with stock market prices, as well as local currency bond prices. The substantial fall of the latter in the past two years has been at least partly driven by exchange rate depreciation, which has been particularly pronounced for some the key components of the index, e.g. Brazil and Indonesia.

Figure 4.35: Exchange rates



Source: Bloomberg

Overall, the long-run performance of emerging markets over the past fifteen years has been mixed. Both equities and bonds have outperformed advanced countries remarkably in the 2002-2012 period, with a sharp but short-lived fall during the global financial crisis. Since 2012 however, their performance has been much less impressive, which may cast doubt about their potential for higher returns. Economic growth may induce investors to endure these short-term pains, in the hope that this may translate into higher returns in the future, but this has also declined compared to the pre-crisis years. This shows that, although emerging markets' returns remain attractive in relative terms considering the current low-yield environment, in absolute terms they represent a less compelling story than they used to be.

4.3.2 The "Keynesian fundamentals"

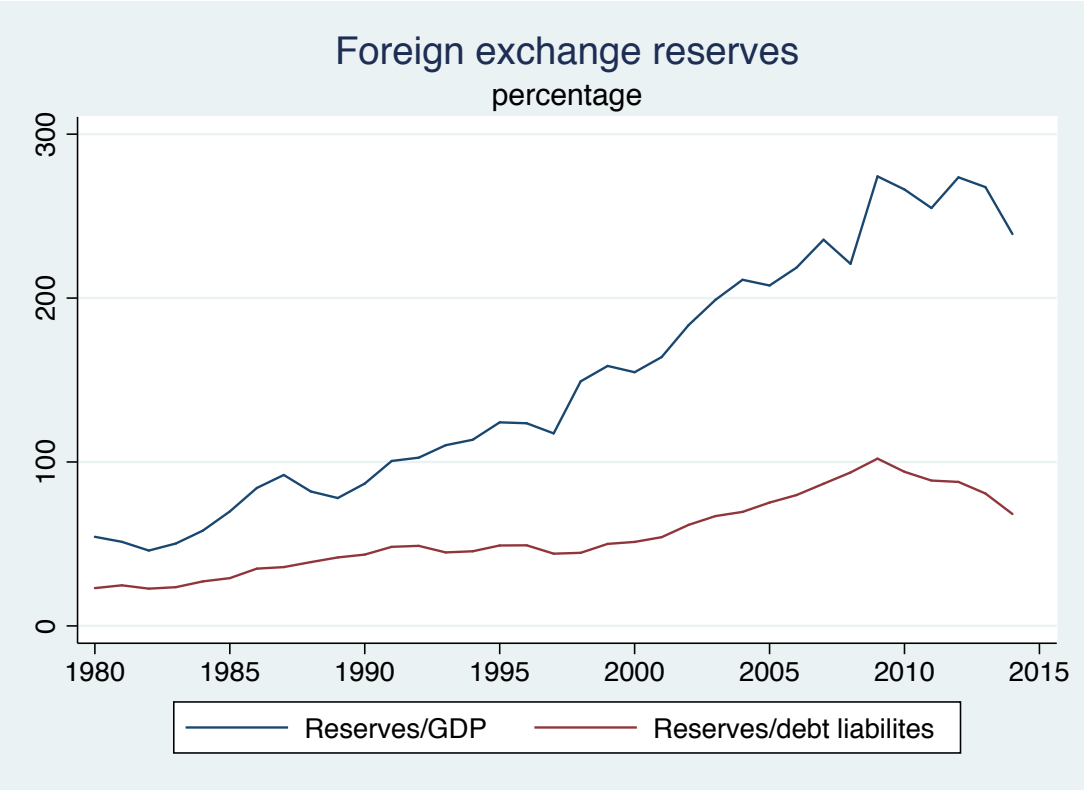
Aside from growth, some other context-specific fundamentals may matter. As discussed in chapter 3, a crucial element is the liquidity of the currency, which depends in turn on a number of "Keynesian fundamentals" relating to the country's systemic ability to face its liabilities. As shown in section 4.1, emerging markets current accounts have improved, implying a smaller

need for external capital flows to finance current transactions. However, in line with the considerations made in chapter 3, current accounts in isolation do not say much about a country's financial fragility.

In general the "fundamentals" that matter are context and time-specific. Precisely what matters for the systemic stability of emerging markets therefore changes over-time, depending on the global context. In the context of increasing financial integration, new vulnerabilities coming from foreign investment themselves generate potential for instability (Kaltenbrunner and Painceira, 2015). A country's central bank ability to intervene and contain such instability becomes therefore increasingly important as a "fundamental".

A very important phenomenon in these respects has been the accumulation of foreign exchange reserves. As Figure 4.36 shows, this accumulation has been remarkable, both to GDP and external debt. Foreign exchange reserves constitute an important systemic buffer, as they provide a stock of liquid assets that the central bank is able to use to contain the volatility of foreign exchange markets. Having accumulated high levels of reserves, emerging markets are now, at least potentially, much more capable to cope with external financial shocks. It has been argued that foreign exchange reserves can be considered as collateral that countries provide to foreign investors, which represents a defining feature of today's global financial system (Dooley *et al.*, 2004, 2014).

Figure 4.36: Reserves accumulation



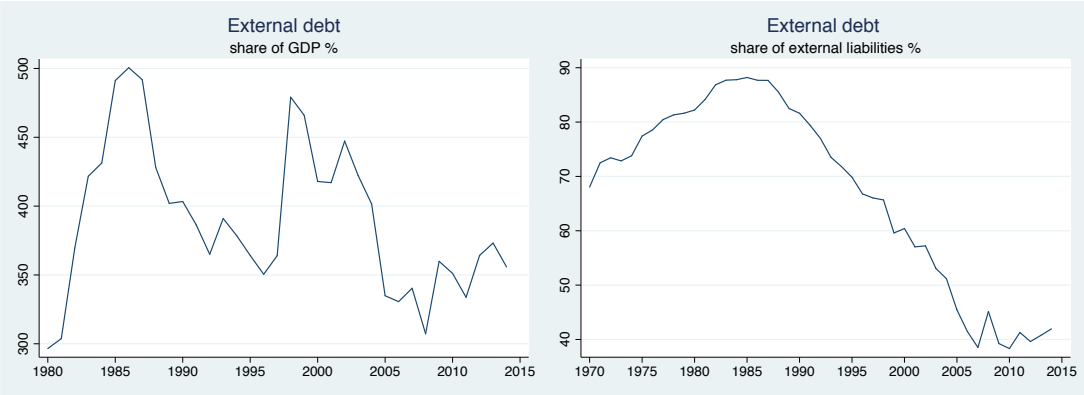
Source: Author's calculations based on updated and extended version of dataset constructed by Lane and Milesi-Ferretti (2007) and IMF BOPS

Emerging markets have also become less vulnerable in terms of foreign debt. Figure 4.37 shows how external debt has been a shrinking component of GDP and total external liabilities until the 2008 crisis. In the post-crisis period this trend has stopped, but the overall indebtedness profile of many emerging markets has not substantially worsened. Compared to advanced economies, as shown in Figure 4.38, emerging economies' governments remain less indebted at 40% to GDP on average compared to 100% GDP in advanced countries, and still present a primary budget surplus.

Furthermore, increasingly government debt is denominated in local currency (Figure 4.39). Although more expensive in terms of interest payments, it does not carry the same potential for balance-of-payment driven default that was typical of emerging markets in the 1990's. Many emerging markets may be slowly redeeming themselves from their "original sin" (Eichengreen

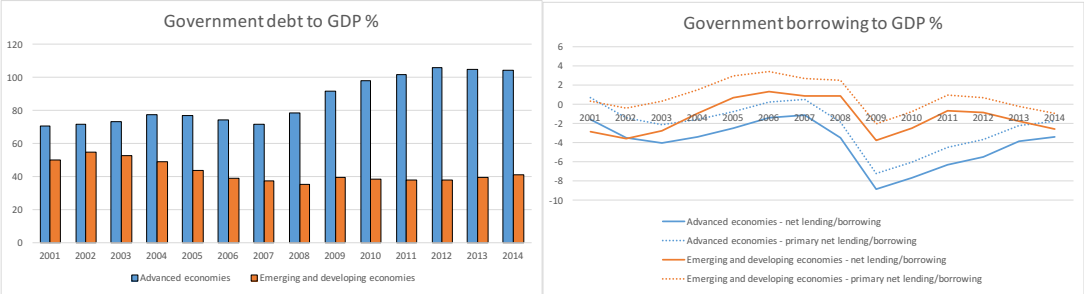
and Hausmann, 1999), i.e. their inability to use their currency in international transactions, and for long-term borrowing purposes in particular. The increasing importance of local currency debt is also a further sign of the increasing confidence of foreign investors in the liquidity of emerging markets currencies.

Figure 4.37: External debt



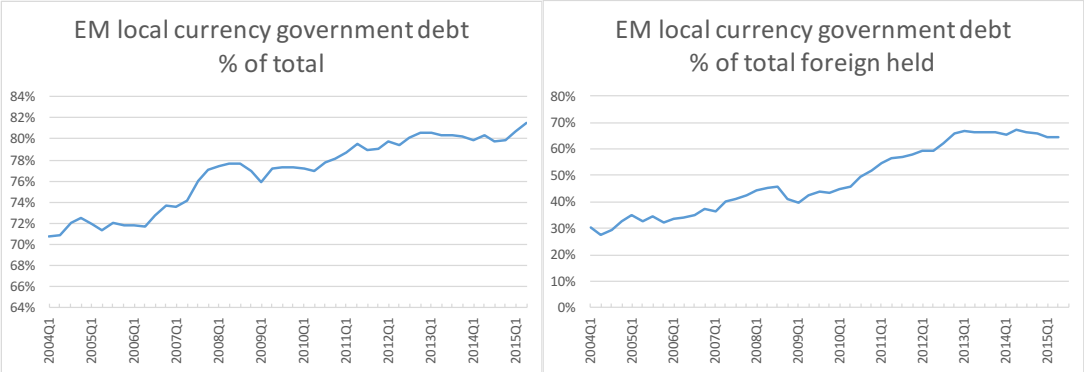
Source: Author's calculations based on updated and extended version of dataset constructed by Lane and Milesi-Ferretti (2007) and IMF Balance of Payments Statistics (BOPS)

Figure 4.38: Government indebtedness



Source: IMF WEO

Figure 4.39: Local currency debt

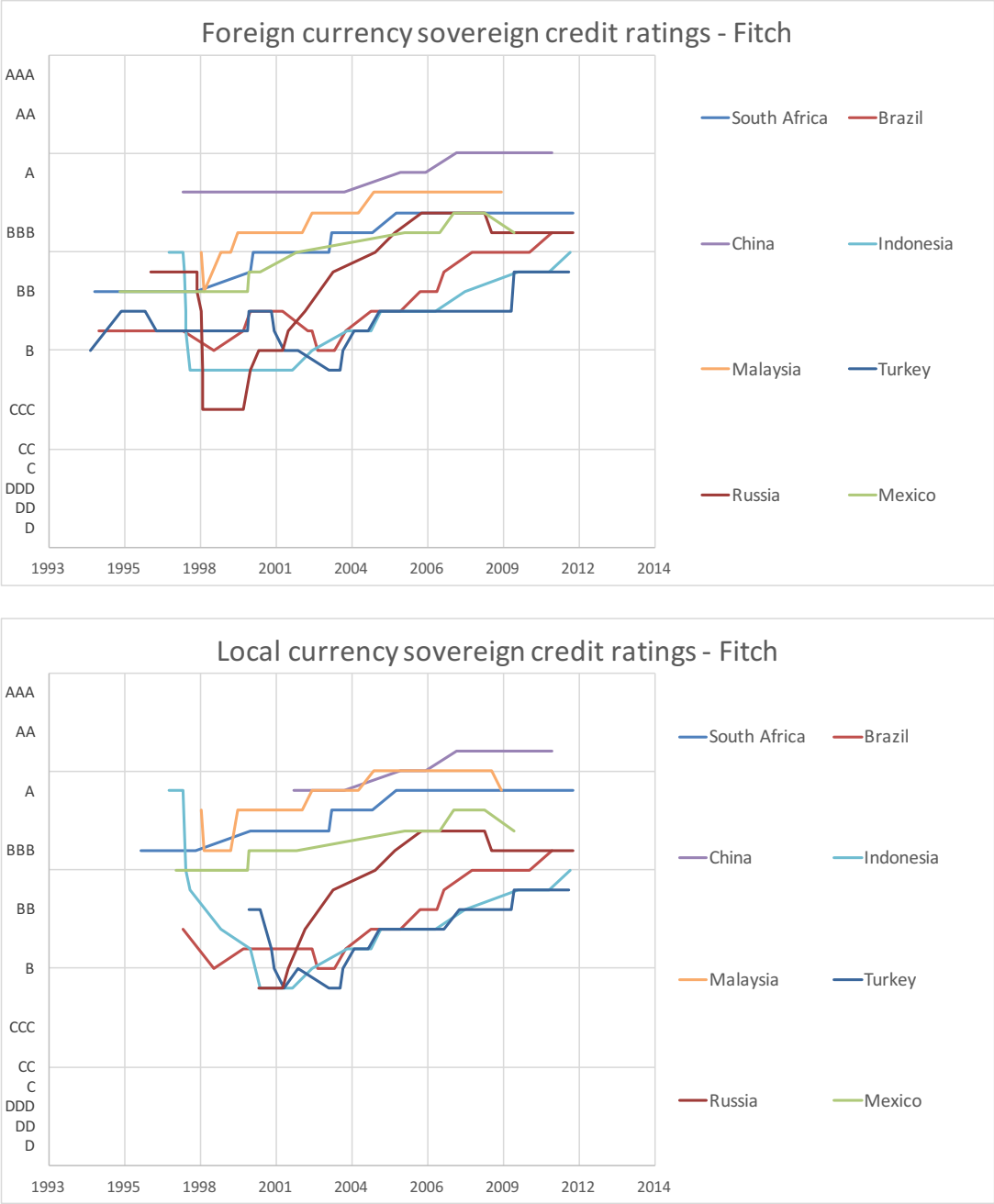


Source: Author's calculation based on Sovereign Investor Base Estimates by Arslanalp and Tsuda (2012)

These improvements are reflected in most emerging markets' sovereign credit ratings have improved Figure 4.40. As of 2012, sovereign debt securities in local and foreign currencies across many emerging markets are "investment grade", i.e. has a rating of BBB- or higher. This is important as institutional investors, either due to regulatory constraints[51] or their own risk-management practices, often look at credit rating thresholds as a variable.

[51] E.g. Solvency II requires different capital buffers for assets with higher credit risks, as measured by credit rating.

Figure 4.40: Sovereign ratings



Source: Author's elaboration based on Fitch ratings

From a systemic perspective, emerging markets look much less risky than they used to. They have accumulated vast amount of reserves, have become much less indebted and in-

creasingly borrow in their domestic currency, all of which is reflected in their improved credit ratings. Indeed, they endured the global financial crisis and recovered from it in a way much quicker than advanced countries. As discussed in chapter 2, these factors enhance the ability of emerging markets currency to fulfill their role as "money". Improvements in the overall ability of a country to face its liabilities at the aggregate level enhance the liquidity of its domestic currency, and therefore the willingness of foreign investors to hold it, as the ongoing process of internationalisation of emerging markets currencies testifies (Kaltenbrunner, 2011; Ma and Villar, 2014). The risk/return profile of emerging markets assets considerably improves, in the eyes of return-hungry institutional investors.

A final word of caution is however in order. While historically speaking, all indicators point to a much more stable situation of EM "fundamentals", the long-term improvement in these trends seems to have slowed down in the post-crisis period. While this has yet to revert the situation, it nonetheless signals that the booming allocations to EMs in the post-crisis period, documented in previous sections, cannot be attributed simply to improvement in fundamentals, as these have become rather stable.

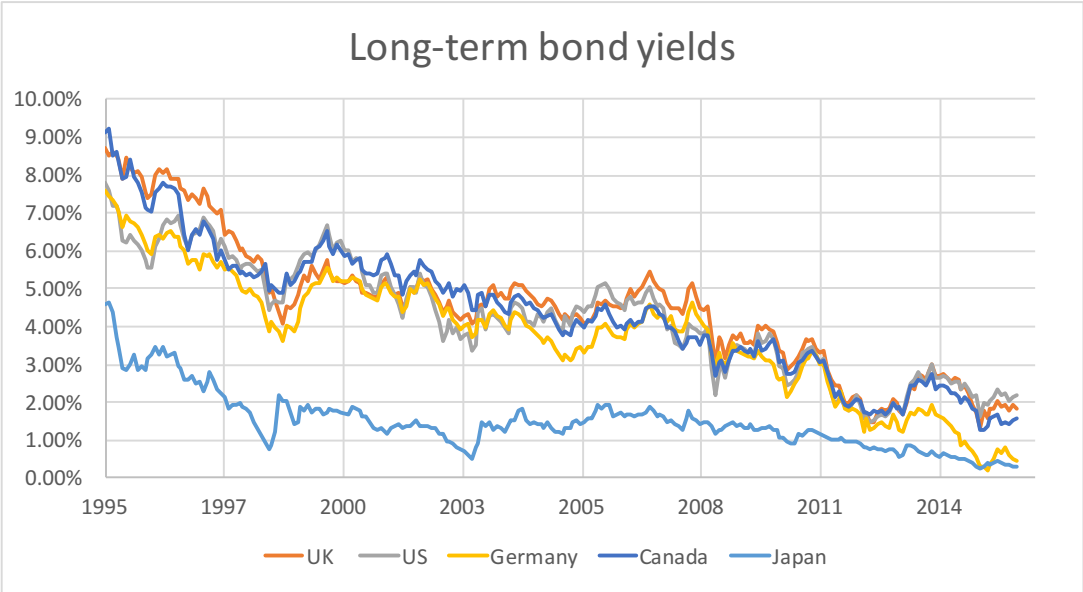
4.3.3 Global factors

While domestic factors point to decreased risks in emerging markets, factors beyond their control often affect the profile of their assets, contributing to determine their attractiveness to foreign investors.

One key global factor has been the decline of advanced countries' government bond yields Figure 4.41. As discussed throughout the chapter, low bond yields make institutional investors balance sheets weaker, due to booming liabilities, and make it at the same time harder for them to generate returns. Low-yields, especially when resulting from expansionary monetary policy operations, also tend to be associated with higher liquidity provision in advanced countries. How liquidity spills over from core bond markets into other financial markets as a result of monetary policy operations, potential generating problems, has become a topical debate, as discussed in chapter 2. While institutional investors are more directly affected by liability-driven investment framework, indirectly a vast pool of investors moving into "alternative" asset categories increases the potential for herding behaviour and benchmark following, especially

when investments are delegated to external managers.

Figure 4.41: The decline in long-term yields



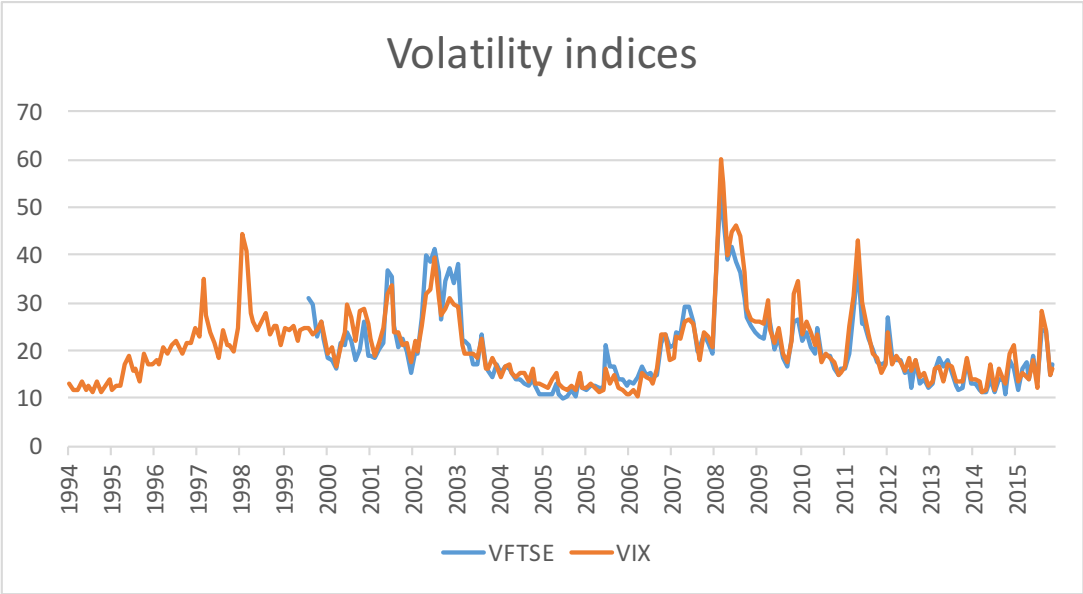
Source: Bloomberg, generic 10 years government bond yields

Furthermore, institutional investors, as discussed in chapter 3, can be affected by global shifts in risk-appetite. As documented in chapter 2, there is now ample evidence that low interest rates and ultra-expansionary monetary policy have increased global risk-appetite (Rey, 2013; Shin, 2012; Bruno and Shin, 2015). A commonly used proxy of risk-appetite is the VIX (Volatility-index), a measure of the implied volatility of global stock markets, calculated on the basis of option prices of the S&P 500 index. A similar indicator exists for the FTSE 100, named VFTSE.

Figure 4.42 indicates how stock market booms are accompanied by lower volatility expectations, and conversely crises situations by fears of highly volatile prices. The VIX present spikes in 1997-1998, during the East-Asian crisis and long-term capital management burst, then remains at high levels spiking in 2002, with the burst of the dot.com bubble. During the period between 2002 and 2008 the index has been low and steady, until reaching its greatest historical peak in late 2008. The post-crisis era is characterised by a decreasing trend, but through a highly volatile pattern suggesting a more unstable overall situation. What emerges

from these pictures is a situation of higher general uncertainty in financial markets after the crisis: 2008 marked the end of an era of optimism and financial market stability, but while conditions have considerably improved from their negative peak in late 2008, markets react quickly and nervously, and are more prone to panic. It is not surprising therefore that emerging markets have gone through several phases of pain during this period. So far however, as these indices suggest, these phases have been short-lived, and investors risk-appetite remains high, if volatile, justifying higher allocations to emerging markets.

Figure 4.42: Volatility index

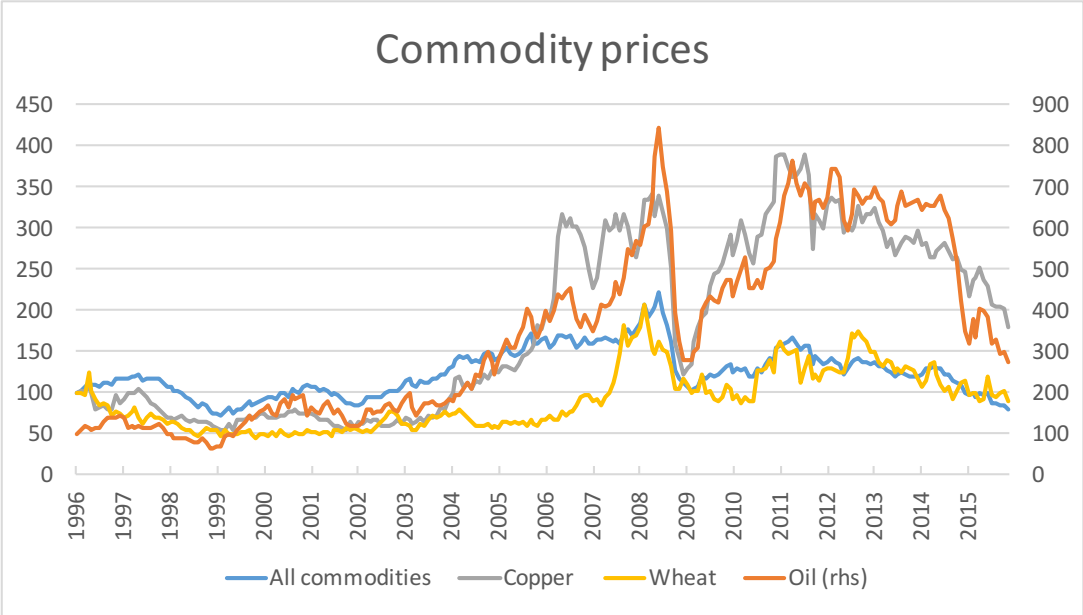


Source: Bloomberg

A final global factor that may affect emerging markets is commodity prices. In some of these countries, improvements in the current account were also led by trade surpluses, given by high commodity prices. As shown in Figure 4.43, commodity prices seem to follow quite closely the dynamics of exchange rates in emerging markets. The ultimate impact that recent falls in commodity prices, especially oil, will have on emerging markets is however likely to affect each country differently, depending on whether the country is primarily an exporter or importer of commodities. Coupled with the slowdown of China, a major commodity importer, it is likely to generate, at least in the short-run, some problems for commodity exporters.

But low oil prices can equally boost global economic growth, thus potentially offsetting these trends. As the vulnerabilities of emerging markets have shifted to the financial side, trade issues, while obviously very important in determining the economic and productive structure of these countries, are likely to be much less crucial in determining their overall macroeconomic stability.

Figure 4.43: Commodity prices



Source: Bloomberg

4.4 Conclusion

This chapter has provided evidence on institutional investors demand for emerging market assets. Emerging markets have become increasingly integrated into the global financial system, but primarily as recipient for global investors, hedging these liabilities with foreign exchange reserves. Institutional investors have been key actors in driving such integration, allocating more of their assets to emerging markets, particularly to equities initially, and increasingly to (local currency) bonds since the crisis.

These increasing allocations fit into the broader changes affecting the institutional investors

sector as a whole. Regulatory changes, evolving asset allocation mechanisms, and pressure to generate returns in a low-interest rate environment and fragile balance sheets, have led institutional investors to move away from direct holdings of domestic equity towards funds and international diversification.

The evidence presented suggest emerging markets assets are part of the institutional investors' strategy to search for returns from alternative assets. These assets still provide potentially high returns, at least in comparison to advanced countries. More importantly emerging markets, compared to the past, present very sound "Keynesian" fundamentals: their (governments') external debt is low and increasingly in local currency, they have accumulated high foreign exchange reserves and their currencies are increasingly internationalised.

In the post-crisis period, however, the risk/return profile have become less attractive: returns have become lower, especially due to the fall in several EM currencies, and there are signs that the long-run improvements in fundamentals has come to an end. At the global level, the slowdown of economic growth in China for example may create some troubles for those countries who are reliant on commodity exports to the Chinese industrial sector. Nevertheless, allocations and capital flows to EMs have continued to increase, although their volatility has increased too. This serves to reinforce the idea that the "search for yield" by institutional investors remains a compelling pressure, despite the weakening of the EM risk/return attractiveness.

Overall, this chapter's empirical findings establish the background for the theoretical framework described in chapter 3, and the research questions defined in the introductory chapter. Foreign institutional investors do seem to have a substantial and growing presence in emerging markets. This seems to be induced by general trends in asset allocation, with liability-driven investments playing a key role in driving the search for returns. Low global yields and lower - from an historical perspective - external vulnerability in emerging markets have made emerging markets assets attractive. The next section will be devoted to test these observations with econometrics methods.

Chapter 5

A Panel autoregressive distributed lags approach to the demand for emerging market assets

Introduction

This chapter evaluates econometrically the theoretical framework proposed in chapter 3, for which evidence in the data was found in chapter 4. As discussed, (portfolio) capital flows are understood as the demand for emerging markets financial assets, resulting from the portfolio decisions of foreign institutional investors. Chapter 4 located capital flows to emerging markets into the broad process of financial globalisation, the evolution of institutional investors balance sheets and investment practices, and the characteristics of emerging markets assets. It was pointed out that emerging market assets are part of institutional investors' demand for alternative return-seeking assets, in light of their fragile balance sheets, and the improvements of emerging markets "Keynesian fundamentals".

Econometric evidence will draw further inferences on these relationships. Innovative econometric techniques will be used for the estimation of asset demand equations for emerging

market bonds and equities. In particular the chapter will use novel estimators, proposed for dynamic macro-panel setting with cross-sectionally dependent errors, in a panel autoregressive-distributed lags model.

The main contribution of this chapter lies in its findings about the determinants of asset demand. In line with the discussions made thus far, the two main testing variables are the funding levels of advanced countries pension funds, measuring the impact of institutional investors liabilities, and the level of foreign exchange reserves, seen as the key development enhancing the macro-financial stability and therefore the liquidity of emerging markets currencies, as discussed in chapter 3.

Moreover, the chapter contributes to expand the asset demand literature, by applying new econometrics techniques and by extending it to the context of international financial investment in emerging markets. This application moreover provides empirical backing to the relationships which will be used in chapter 7 for the construction of the Stock-Flow Consistent model.

The chapter is structured as follows. Section 5.1 describes the asset demand approach, starting from its origins in the Tobinesque tradition and the more recent Almost-Ideal asset demand approach, and its application to the issue of international portfolio investment to emerging markets. Section 5.2 describes the data and the variables. Section 5.3 discusses the econometric framework and the model specification, in light of some tests results. Section 5.4 discusses the estimation results and perform some robustness checks. Section 5.5 gives an interpretation of the results and some of their possible implications. Section 5.6 concludes.

5.1 Asset demand approach

This section tracks the evolution of the modeling framework of the econometric estimation, the asset demand approach. It tracks its historical evolution from the work of Tobin and its subsequent developments coming from of Angus Deaton's Almost Ideal Demand Approach. It finally discusses their application to the context of international demand for emerging market

assets by institutional investors.

5.1.1 "Pitfalls" flow of funds models

The approach to asset allocation taken by this chapter is that of asset demand equations, in the spirit of James Tobin and his colleagues (Brainard and Tobin, 1968; Backus *et al.*, 1980) and more recently Wynne Godley and Marc Lavoie in the Stock-Flow Consistent modeling approach (Godley and Lavoie, 2012). In their original "pitfalls in financial modeling" paper, Brainard and Tobin (1968) emphasised the importance of interdependencies of financial markets, particularly financial accounting consistency, when modeling the economy, arguing that failure to respect these results in serious issues for econometric estimation. They propose a model taking such interdependencies into account, showing the relationships between three sectors (government, banking sector and private sector) and seven assets. Demand for assets is modeled as a function of wealth, income and rates of return on own assets and on all the other assets Smith (1975, p. 510):

$$\frac{a_i^*}{w} = b_{i0} + \sum_{j=1}^{q} b_{ij} r_j \tag{5.1}$$

The desired share a^* of asset i relative to wealth w depends linearly on the returns r_j on q different assets plus a constant b_0. This formulation implies that households allocate assets as to keep a fixed proportion b_0 of their wealth in each one of them, but this is allowed to vary according to the returns of different assets. Positive/negative returns on one asset will increase/decrease the desired allocation to that asset, while at the same time higher/lower returns on other assets will decrease/increase such a proportion. Finally, the allocation is sometimes considered to also be proportional to current income (e.g. Brainard and Tobin, 1968, p. 107), which represents the transaction motive of asset demand. The wealth constraints are essential to the model, in that they determine a constraint on the value of the parameters. Since clearly the sum of desired holdings equals total wealth (i.e. $\sum_i a_i^* = w$) it must be that:

$$\sum_{i=1}^{n} \frac{a_i^*}{w} = 1 \tag{5.2}$$

$$with \sum_i b_{i0} = 1 \;\; \sum_i b_{ij} = 0$$

The sum of all asset shares must by definition be equal to 1, for each asset i the sum of the constant terms b_0 must be equal to 1, and the sum of the return coefficients must be equal to 0. These constraints imply that parameters in the demand for asset i determines the sum of the parameters the demand for other assets, ensuring consistency to the point that, with n assets, parameters specifications for n-1 equations logically imply the n-th one. Moreover, as Hendershott (1971) points out, for each asset, the sum of the parameters measuring the positive impact of the "own" asset return should equal the negative sum of the parameters on the alternative asset returns. This follows from the idea that "an equal rise in the yields on all financial assets should not affect demands for the assets" (Hendershott, 1971, p. 819)[52].

This paper, along with Tobin (1969), gave rise to a vast literature estimating asset demand equations, using data from flow-of-funds accounts[53]. Several authors attempted to estimate demand equations of either a complete system of both sets and assets (Backus *et al.*, 1980), or a demand for a set of different assets by a single sector (Hendershott, 1971; Hendershott and Lemmon, 1975; Backus and Purvis, 1980; Walsh, 1981), or a demand for a single or a limited set of assets by a complete set of investors (Friedman, 1977; Roley, 1980a). The literature was particularly keen in respecting the parameters constraint that Brainard and Tobin (1968) had emphasised, and further refined some of them. Additionally the literature typically assumed that agents were unable to achieve their desired holdings immediately, so that asset shares evolve through a partial adjustment mechanism (Smith, 1975, p. 510):

$$\triangle a_i = \epsilon_i (a_i^* - a_{i,-1}) \tag{5.3}$$

Again, to ensure consistency, this implies that, unless $\epsilon_i = 1$ for all assets (i.e. agents always

[52]This is analogous to what Godley and Lavoie (2012, p. 144-145) call the "horizontal constraint".

[53]This research line was indeed part of the bigger research in flow-of-funds models and empirical application. See Bain (1973); Roe (1973) for a survey.

manage to fully adjust their holdings to their desired level), there should be at least one asset absorbing the residual funds from the the gap between desired and actual holdings in the other funds[54]. An equivalent formulation is:

$$\triangle a_i = \theta_{ij}(a_j^* - a_{j,-1}) \tag{5.4}$$

where θ_{ij} "should be interpreted as the partial effect on holdings of the i-th asset of a unit increase in desired holdings of the j-th asset accompanied by an equal increase in" wealth. This implies yet another constraint in the form of $\sum_i \theta_{ij} = 1$, which simply means that an increase in wealth must be absorbed within the portfolio (Smith, 1975, p. 512). Estimation based on (5.4) are also used by Backus *et al.* (1980) and Backus and Purvis (1980)[55].

The empirical estimation faced problems. As the number of parameters to be estimated increase, especially in the partial adjustment model, the high correlation between returns taken from aggregate time-series data inevitably resulted in serious multicollinearity issues. Often the models presented incorrectly signed or insignificant parameters. Researchers have tried to overcome these problems by imposing restrictions on the parameters. One of such ways was to impose "symmetry" in the values of the return parameters (Parkin, 1970; Hendershott, 1971; Hendershott and Lemmon, 1975; Saito, 1977; Friedman, 1979; Taylor and Clements, 1983): the impact of the return on asset j on the holdings of asset i should be equal to the impact of the return on asset i on the holdings of asset j (i.e. $b_{ij} = b_{ji}$). This condition can find its theoretical justification in neoclassical consumer demand theory, since it is analogous to the

[54] A similar mechanism applies to the (Godley and Lavoie, 2012) models. However, they assume that agents are always able to achieve their desired holdings, so that the gap may arise as a result of errors in the expectations of future wealth, rather than assets. Such a gap is absorbed by a residual asset, typically cash or bank deposits.

[55] Friedman (1977) further added to the adjustment process by emphasising the role of transaction costs. The mechanism described by (5.3) and (5.4) implicitly assumes that the portfolio adjustment out of new net savings and existing assets follows exactly the same patterns. Friedman argued that if transaction costs are realistically considered, it is clear that allocating new funds is easier than reallocate existing funds, which should be explicitly modeled in the adjustment equation. He therefore proposed a slight variation, so that new savings are allocated according to the new desired holdings parameter, while existing assets follow the standard portfolio adjustment process

symmetry of the Slutsky substitution effects (Roley, 1980b).

Imposing such a condition allows for a reduction in the number of the independently estimated parameters, which can ease the problems of multicollinearity. For example, Taylor and Clements (1983), in their study of holdings of four financial assets in Australia, find that with the imposition of symmetry and homogeneity - the "horizontal" constraint - results are significant and correctly signed, while without such restrictions many of the parameters become insignificant or wrongly signed. At the same time these restrictions may be empirically rejected, and imply further theoretical assumptions which may be unwarranted. Roley (1980b) works out the theoretical implications of the symmetry, and shows that they imply a particular behaviour, where agents have constant mean-variance risk aversion with respect to wealth. He then proposes and applied statistical tests of such behaviour and finds that overall "the evidence appears to favour rejection of the symmetry hypothesis". Taylor and Clements (1983) also fail to find statistical evidence confirming the symmetry restrictions.

An alternative methodology was formalised by Brainard and Smith (1976), and later employed in several other works (Backus and Purvis, 1980; Backus *et al.*, 1980; Smith, 1981). The authors suggest to estimate the parameters combining the data with a priori plausible values in a Bayesian fashion. This can potentially be a formidable task, since it requires to assign plausible values to the parameters but also to the variance and the covariance of the errors of the priors, and requires simplifying assumptions[56]. This methodology has had mixed outcomes: as Backus *et al.* (1980) show, adjustment coefficients in the form of (5.4) substantially improved with the adoption of mixed estimation, but interest rate parameters, especially cross-rate parameters, do not. In conclusion, as Buiter (2003, p. 7) claims, "the empirical implementation of complete systems of portfolio balance and flow-of-funds models has been a mixed success at best".

5.1.2 Almost-ideal demand systems

It is perhaps also due to this relative unsuccessful performance, that the development of an alternative methodology quickly emerged at the beginning of the 1980's and establish itself as the most commonly adopted way to estimate demand equations. This is based on the "Almost-

[56]The typical assumption is to assume that the variance and the covariance are the same for each equation Brainard and Smith (1976, p. 1306)

Ideal Demand System" (AIDS) approach, developed by Deaton and Muellbauer (1980). This is essentially an empirical implementation of a demand system based on neoclassical consumer theory. In the case of portfolio choice, agents are assumed to maximise utility given by assets, subject to the inter-temporal wealth constraint. By making use of the associated "dual" problem of cost minimisation, and choosing a PIGLOG cost function, one can show that Blake (2004, p. 613)[57]:

$$s_{it} = a_i + b_i \ln(W_t(1 + r_{Wt})) + \sum_{j}^{n} c_{ij} \ln(1 + r_j) + \sum_{j}^{m} h_{ij} Z_{jt} \tag{5.5}$$

The portfolio shares s_i depend on the logs of wealth plus the return of the total portfolio, the log-returns on n assets, and m additional variables Z. The model is similar to the original "pitfalls" specifications, but adds the possibility of wealth effects on shares, as well as potentially additional variables[58]. For example, a typical variable which is often added is current income or expenditure (Barr and Cuthbertson, 1992; Adam, 1999), which, as Blake (2004, p. 614) argues, can be thought as a liquidity constraint. Due to its origins in neoclassical demand theory, the AIDS approach also implicitly assumes that homogeneity and symmetry hold, although the validity of such assumptions can also be tested. In fact, typically the literature assumes a general-to-specific approach, by initially estimating an unrestricted equations and then adding restrictions, following successful tests.

The AIDS model has been employed in several studies, although its application to portfolio choice has been much less common than in consumption studies. Weale (1986) is a first application on the holdings of short-term assets in the UK. The papers by Barr and Cuthbertson (1991, 1992, 1994) are the clearest example of the application of the AIDS system to portfolio choice. They formally derive the equations to be estimated and apply them to different portfolio choice contexts, and are able to find satisfactory results, when homogeneity and symmetry are imposed. The appropriateness of such restrictions is also confirmed in all of their studies.

[57] The procedure, described in the original chapter by Deaton and Muellbauer (1980) and then applied to the context of portfolio choice by Barr and Cuthbertson (1991) involves the application of a specific logarithmic functional form, and then, using Shepherd's Lemma, its logarithmic differentiation with respect to price to obtain portfolio shares, and then inverting the resulting "Hicksian" demand function to a standard Marshallian demand function.

[58] It also specifies the independent variables in logarithmic terms, thus suggesting an interpretation of the coefficients in relative terms.

While the focus of the early "flow-of-funds" literature was entirely on a complete set of purely financial assets, a complete set of investors, or both in the more "complete models" of (Backus *et al.*, 1980), the AIDS inspired literature has concentrated on slightly different empirical questions. Some studies focus on a very specific set of assets and/or investors. For example, Barr and Cuthbertson (1994) applies the methodology to the UK holdings by the overseas sector. Since portfolio shares must sum up to one, total UK assets held by foreigners is considered to be total wealth - implicitly making the assumption that the overseas sector as a whole has a predetermined part of its portfolio dedicated to UK assets, and allocate assets within it. Dinenis and Scott (1993) focus on UK pension funds asset allocation. Interestingly for the purpose of this chapter, they do initially consider to give a role to wealth over liabilities (the surplus or funding status of the pension fund) in determining portfolio allocation. They however drop such a variable in the empirical implementation of their model, following the successful testing for homotheticity of the demand functions, which leads to the parameter measuring the impact of the fund surplus to be restricted to zero (Dinenis and Scott, 1993, p. 302)[59].

Another line of studies based on the AIDS system focuses on a complete set of assets held by households, but extends the set to non-financial assets. The most obvious example is Blake (2004), who estimates portfolio choice between financial, housing and durables, pension wealth (private and public) and human capital in the UK. Overall, his findings suggest that wealth effects - along with demographic variables - have a much greater impact on asset allocation than relative returns. Interestingly similar studies were conducted in the context of developing and emerging countries: Adam (1999); Moore *et al.* (2005); Al-Zu'bi and Murinde (2011) have conducted studies respectively for Kenya, India and three middle eastern countries. All these studies also take into account liabilities, typically netting them out from financial assets.

5.1.3 An asset demand approach for emerging markets

Generally speaking, the literature on asset demand equations, whether of the original "pitfalls" kind or following the AIDS methodology, does not seem to be particularly flourishing in contemporary economics. There are however some signs that the increasing attention to fi-

[59] This is due to the specific form of their short-term adjustment equation, following the assumption of equal costs of adjustment.

nance, following the financial crisis, is renewing interest in their estimation (Avouyi-Dovi *et al.*, 2011; Ramb and Scharnagl, 2011; Duca and Muellbauer, 2013; Ochmann, 2013). Moreover the relative popularity of the Stock-Flow Consistent modeling approach (Godley and Lavoie, 2012), which models portfolio choice as in Brainard and Tobin (1968) may spark interest in the econometric estimation of such relationships.

This chapter will adopt this approach, as it provides a clear link between investors' portfolio choice and capital flows to EMs, a key concept of this thesis. Portfolio investments in EMs are, in this sense, analysed as the demand for EM assets from foreign institutional investors, the aim being to uncover the direct link between the financial behaviour of investors and the resulting cross-border asset positions.

In line with the considerations made in the previous chapters, two additional factors are going to be introduced in the basic formulation of the model: the level of foreign exchange reserves held by EMs and the funding level of advanced countries' pension funds. The former will be used as an indicator of the protection that EMs give to foreign investors against currency risk, whereby the accumulation of FXR increases EM central banks' possibility of intervening in the foreign exchange market and stabilising the exchange rate. Higher reserves would therefore encourage increased allocations to EM assets, by constituting the key "Keynesian fundamental" that enhances the liquidity premium of EM currencies.

The funding level of advanced countries' pension funds is used as a proxy for the balance sheet conditions of institutional investors from advanced countries. As discussed in chapter 3, funding levels represent the total asset over liability ratio, i.e. the net worth of a pension fund. Underfunded pension funds have to enhance their portfolio return to have a sufficient pool of assets to face their liabilities. In conditions of very low yields, a lower funding level may increase the allocation to riskier investments. This would include EM assets, thus establishing a negative relationship between asset allocation to EMs and funding levels.

Aside from the additional variables chosen, the application of the asset demand approach in this chapter is innovative in three ways. Firstly, this is the first study adopting a panel approach[60]. The demand for EM assets is analysed by pooling or grouping the observations

[60] A partial exception is Al-Zu'bi and Murinde (2011), who seeks to apply panel cointegration techniques but reverts to SUR methods following unsuccessful statistical tests.

for individual countries, to obtain parameters for the EM assets as whole. Two separate single equations of asset demand for EM equity and bond portfolios will be estimated. The restriction of parameters, typical of AIDS approaches, is therefore ruled out. Secondly, this chapter applies the approach in the context of international portfolio choice, which is also novel, as the literature typically focuses on a closed-economy, complete set of assets[61]. Finally, more broadly, this chapter represents a contribution to the empirical grounding the relationships of theoretical Stock-Flow Consistent models, since it provides econometric evidence which will be used in chapter 7 for the construction of the model[62].

5.2 Data and variables

All data are measured at a quarterly frequency or converted to it when the frequency is higher[63]. The period considered is from the first quarter of 2003 for equities and the first quarter of 2004 for bonds to the first quarter of 2013, although the panels may be unbalanced as some countries' series may be shorter. While this may seem a short time span, longer datasets do not exist for constructing all the variables. The cross-sectional dimension is 20 countries for equities and 17 countries for bonds[64].

The dependent variables, *lem_alloc* and *lbem_alloc*, are the logarithms of the portfolio shares of EM equities and bonds held by institutional investors from advanced countries. The allocation variables are constructed as the ratio between the Emerging Portfolio Fund Research (EPFR) end-of-period holdings over the total wealth of institutional investors of the Eurozone, Japan, the UK, the US, Australia and Canada, taken respectively from the European Central Bank, the Bank of Japan, the UK Office for National Statistics, the Federal

[61] A possible alternative would be to follow Barr and Cuthbertson (1994), in considering EM assets holdings as total wealth, and analyse the distribution of assets between bonds and equities, or across countries. This, however, would not allow one to tackle the international dimension of portfolio allocation, including the push-pull factors.

[62] As of now, Reyes and Mazier (2013) seems to be the only direct example of an estimation of portfolio equations for utilisation in a Stock-Flow Consistent model. They empirically estimates all the parameters of the balance sheet of the firms sector, which they then insert into their model and perform the usual dynamic simulation experiments with it.

[63] As this happens only for the EPFR holdings variable, the end-of-month value is chosen for March, June, September and December.

[64] The countries considered are: Argentina, Brazil, Chile, China, Colombia, Czech Republic, Hungary, India, Indonesia, South Korea, Malaysia, Mexico, Peru, Philippines, Poland, Russia, South Africa, Taiwan Thailand and Turkey. In the bonds equations, due to data availability and consistency issues, Taiwan, Argentina and the Philippines are excluded.

Reserve Economic Data, the Reserve Bank of Australia and Statcan. These represent the vast majority of institutional investors world-wide. For all these countries, the end of quarter total assets figures for insurance companies and pension funds are used, as a measure of institutional investors total wealth. All individual countries figures are converted to US dollars, with the exchange rate data used taken from the IMF Exchange Rate Report, and then aggregated to create the denominator of the portfolio shares variables.

The EPFR dataset, which has already been used in other studies related to portfolio investments in EMs (e.g. Fratzscher, 2012), collects flows and holdings data from a very large number of mutual funds and ETFs. As discussed, this chapter uses the "Country Flows" database, which extracts the information from each fund and aggregates it by recipient country. The database, as shown in chapter 3, also allows to distinguish between institutional and retail underlying investors clients, and in this paper only the former are used. The data used in this chapter for the construction of the allocation variables are the estimated end of period holdings for each of the countries included in the sample, which is used as the numerator of the ratio between holdings and total wealth, as discussed. Although the fund coverage has increased overtime, the database has been shown to be a consistent representation of both balance-of-payment and fund-level data for the sample period considered (Jotikasthira *et al.*, 2012; Pant and Miao, 2012; Kroencke *et al.*, 2015).

These variables have some limitations as indicators of asset shares. Firstly, they only capture the part of the EM holdings of institutional investors that is intermediated by funds, rather than the total allocation. Secondly, while the advanced countries considered to construct the variables constitute the biggest share of the of the global institutional investor sector, some of the holdings captured in the EPFR database may still be held by other institutional investors. Finally, the variable averages out portfolio shares over countries and sectors, since it is based on the sum of the total holdings over the total wealth of insurance and pension funds, while important differences may exist among investors both across countries and within countries. Despite these limitations, as detailed data on the geographical breakdown of institutional investors' portfolios is not available, the data are the best possible approximation to macro-level portfolio weights for EMs allocated by foreign institutional investors.

The following is a list of the independent variables with the expected parameter sign given in brackets:

- lem_fx are the FXR officially held by EMs, in billions of US dollars on a logarithmic scale, collected from the Economist Intelligence Unit. As discussed, this variable is used to measure the collateral function of FXR, enhancing the liquidity of EMs currencies. (+)
- lem_ret and $lbem\_ret$ are the logarithmic returns of EMs equities and bonds. Logarithmic returns can be calculated from an index as $log = (\frac{p_t}{p_{t-1}})$, where p_t is the value of the index at time t. The indexes used are the Morgan Stanley Capital International (MSCI) total return index for equities and the JP Morgan EM-GBI index for bonds. The EM-GBI, which tracks local currency bonds, is used rather than the EMBI, which tracks hard currency bonds, due to its ability to capture the return effects of the appreciation and depreciation of the nominal exchange rate, which are likely to be an important determinant of the returns, much as they are for equities. Four-period averages of the returns are used, in order to avoid excessive return volatility and further reduce the problem of endogeneity. (+)
- $lwbret$ is the logarithmic returns of the JP Morgan GBI global index. The index tracks sovereign bonds from the world's advanced countries and is used as an indicator for global "safe" returns. This is different from what is commonly used as a "push" factor, i.e. the US interest rate. This provides a more general indicator of low-risk assets, in that, while US-dollar-denominated assets represent the safest alternative, all advanced countries' sovereign liabilities represent a qualitatively different type of asset than EM assets. This is consistent with the evidence that institutional investors typically use advanced countries' government bonds as liability-matching securities rather than as return-seeking assets. Therefore, despite being a simplification, this variable allows for a greater degree of generality than is commonly achieved. (−)
- lfg is the pensions "funding gap". This is the weighted average of the difference from full funding - i.e. a funding ratio equal to 1 - of the aggregate defined benefits pension funds

sector in Japan, the UK and the US[65]. These are collected respectively from the Bank of Japan flow of funds accounts, the Pension Protection Fund 7800 index, and the Milliman Pension Funding Index. As discussed, this variable serves as an indicator of institutional investors balance sheet fragility, denoting their potential incentive to "search for yield" by investing in EM assets. (+)

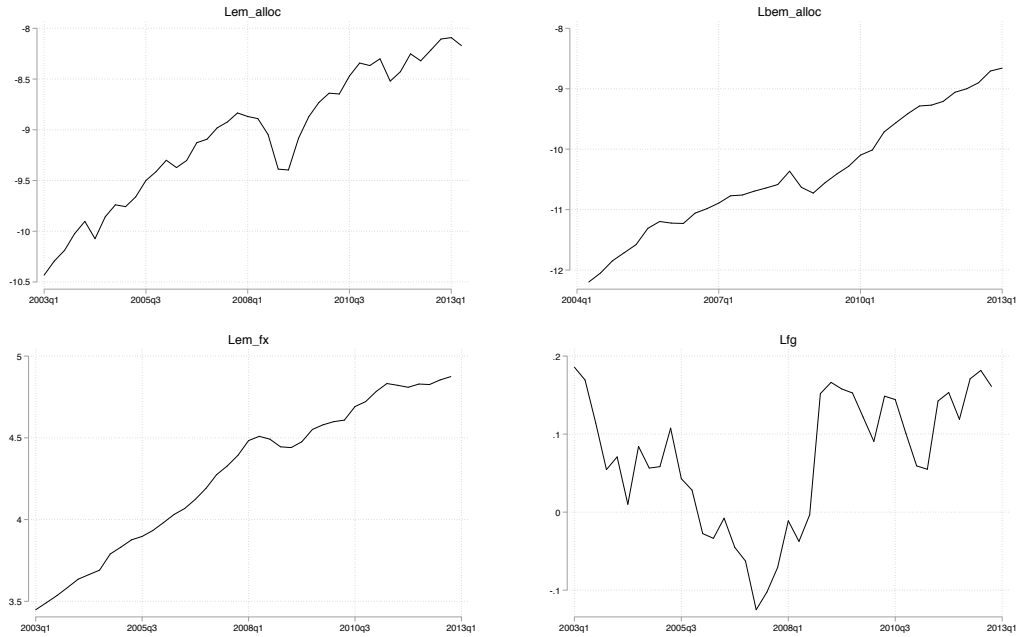
The most notable exclusion from this list is GDP growth. Firstly, it does not fit the asset demand approach very well: the approach is based on a direct relationship between asset shares and their financial determinants, as well as the wealth of the investor. Asset allocation and GDP growth are indirectly related, unlike balance sheet conditions and FXR. Secondly, the rationale for the link is that higher GDP growth will yield higher long-run returns, but since returns are already entered in the equation specification this could result in double counting the same variable, possibly resulting in multicollinearity issues, in a framework that is already known to suffer from this problem. Finally, if anything, the variable should be expected GDP growth rather than current GDP growth, but long-run expectations data do not exist for all variables, and would be subject to considerable heterogeneity across investors. Despite these considerations, as a robustness check, estimation results with additional variables in the baseline specification, including GDP growth, will be provided.

Figure 5.1 confirms allocation to EM bonds and equities has increased over the past decade, roughly at an exponential pace, although equities allocation have increased more slowly since the crisis. Funding ratios, as also discussed in chapter 4, have worsened since the crisis, oscillating around a 10% gap. FXR also increased over the whole period, though the pace seems to have slowed down since 2008. Table 5.1 shows basic statistics for the rest of the variables: EM assets returns have been higher, with a correspondingly higher volatility. FXR also increased over the whole period, though the pace seems to have slowed down since 2008. Funding levels, on the other hand, show no similar trend. They improved substantially in the period of 2003-2008 - i.e. the funding gap becomes smaller and negative - but then worsened and have remained negative with a slightly higher than 10% funding gap since then. Most of

[65] Unfortunately sufficiently long data series on a quarterly basis do not exist for other countries. These three countries represent nonetheless the biggest three defined benefits sectors by portfolio size, as shown in section 2.

these trends have already been described in the previous chapter.

Figure 5.1: Variables



Note: All variables are on a logarithmic scale. Figures shown for *lem_fx, lem_alloc* and *lbem_alloc* are averages across countries.

Table 5.1: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
lwbret	1220	.01189	.03712	-.048641	.10741
lem_ret	1260	.02033	.19407	-1.39260	.81344
lbem_ret	729	.02190	.07357	-.29291	.30402

Note: *lem_ret* and *lbem_ret* are averages across countries and over-time

Before moving to the estimation stage, one element should be checked for. Changes in portfolio shares, rather than being the result of deliberate choice may be the result of the changes in the assets valuation. Therefore, until the portfolio is rebalanced, portfolio shares may just follow the market performance. The high correlation between market performance and asset shares can be easily shown by means of this accounting identity[66]:

[66]This is very similar to the expression of Bohn and Tesar (1996), who used it to assess whether flows to some assets were "chasing returns" or rather rebalancing portfolios.

$$\triangle a_i = flows_i + Ret_i \tag{5.6}$$

which simply states that changes in holdings of asset i are driven by either flows or return into the assets. This can be rearranged as (see appendix for detail):

$$flows_i = \triangle(\frac{a_i}{W})W_{(-1)} + (\frac{a_i}{W})\triangle W - Ret_i \tag{5.7}$$

This expression shows that flows to a certain asset i are equal to the change in the portfolio weight - whose determinants are indeed what is going to be assessed with the estimation - plus the allocation of the changes in wealth according to the current portfolio weight for asset i, minus the return. Analysing the correlation between these elements could provide several insights about the relationship between flows and portfolio allocation. Firstly, the correlation between flows and changes in portfolio weight represent the straightforward but important link between changes in portfolio allocation and capital flows. Secondly, positive correlation between returns and flows coupled with positive correlation between returns and changes in portfolio weights, suggest that "return-chasing" may be a behavioural trait of investors: holding gains on an asset induce investors to both let the corresponding portfolio weight grow, and actively increase such an allocation by purchasing new assets.

Table 5.2: Equities - Correlation

Covariance Analysis: Ordinary Sample (adjusted): 1999Q2 2013Q2 Included observations: 1083 after adjustments				
Correlation Probability	DWEALTH	DWEIGHT	EM_CG	EM_FL
DWEALTH	1.000000			
	—			
DWEIGHT	0.628814	1.000000		
	0.0000	—		
EM_CG	0.709188	0.963956	1.000000	
	0.0000	0.0000	—	
EM_FL	0.469255	0.601956	0.413469	1.000000
	0.0000	0.0000	0.0000	—

The data come from the EPFR allocation and flows, and the calculated total institutional investors wealth.
The table shows the correlation coefficients and corresponding p-values between the variables. EM_CG is calculated as the difference between the change in holdings and the flows (EM_FL). DWEALTH and DWEIGHT are respectively $(\frac{a_i}{W})\triangle W$ and $\triangle(\frac{a_i}{W})W_{(-1)}$.

Table 5.3: Bonds - Correlation

Covariance Analysis: Ordinary Sample (adjusted): 2004Q3 2013Q1 Included observations: 476 after adjustments				
Correlation Probability	DWEALTH	DWEIGHT	BEM_CG	BEM_FL
DWEALTH	1.000000			
	—			
DWEIGHT	0.448284	1.000000		
	0.0000	—		
BEM_CG	0.474447	0.953336	1.000000	
	0.0000	0.0000	—	
BEM_FL	0.538522	0.680292	0.458735	1.000000
	0.0000	0.0000	0.0000	—

The variables are analogous to the ones in Table Table 5.3.

As Table 5.2 and Table 5.3 show, there is a very high correlation between the change in portfolio weights and valuation changes for both bonds and equities. A change in valuation of an asset is therefore extremely often accompanied by a change in the portfolio weight. Although weaker, the relationship between flows and portfolio weights is also quite substantial, more so for equities than bonds. With the exception of the relationship between changes in wealth and valuation for equities, all the others, while significantly positive, are less remarkable. Overall this shows that the change in portfolio weights is the key variable "absorbing" both increased net purchases and valuation changes: capital flows to emerging markets are associated to changes in asset demand rather than static allocations.

5.3 Econometric methodology

5.3.1 Macro-panel issues

Most of the works in the "pitfalls" tradition estimated long-run responses to interest rates in the form of (5.1) or partial-adjustment models in the form (5.4) or both as in Backus *et al.* (1980), and implicitly or explicitly use of a system of equations approach to estimate the asset shares with either restrictions or mixed-bayesian estimators. However, beside the described issues with multicollinearity, the literature does not deal with other potential sources of problems in the estimation process. In particular, there are no references to the potentially serious issues of non-stationarity in the variables. Returns and especially asset prices and portfolio shares could however be non-stationary which could create issues, since it is well known that this may lead to "spurious" inference, unless there is cointegration between the variables(Granger and Newbold, 1974; Phillips, 1986; Engle and Granger, 1987).

The AIDS literature does on the other hand tackle these issues explicitly. The methodology followed is to estimate long-run parameters by pre-testing for cointegration between the variables for each equation, and then estimate the model as a system of equations using Zellner's (1962) seemingly-unrelated-regression (SUR) method (Moore *et al.*, 2005; Al-Zu'bi and Murinde, 2011), or three-stages least squares (Zellner and Theil, 1962) to correct for en-

dogeneity especially when estimating short-run dynamic equations (Barr and Cuthbertson, 1991, 1992, 1994; Adam, 1999; Blake, 2004). Since the models adopt a system of equations approach, the cointegration tests are applied equation by equation, typically using Engle and Granger (1987) residual-based test approach, except Moore *et al.* (2005), who complement it with **?**'s (1988) maximum likelihood test and the ARDL bounds test by Pesaran *et al.* (2001).

The chapter is also going to explicitly deal with the issues emerging from the growing literature in panel-time series econometrics[67]. With macro-panels, where both the time-series and cross-sectional dimension are equally "large", several issues can emerge. First, as the time-series dimension grows, the possibility of non-stationarity arises, which led to the formulation of unit roots tests for panel data (Maddala and Wu, 1999; Breitung, 2000; Choi, 2001; Levin *et al.*, 2002; Im *et al.*, 2003). The issue of non-stationarity naturally leads to the possibility for panel cointegration. Similarly to the time-series case, panel cointegration tests can be either based on the residuals of a cointegrating regression (Kao, 1999; Pedroni, 1999), maximum likelihood procedures in a multivariate vector model (Johansen, 1988) or testing for error correction (Westerlund, 2007).

In addition to these issues, which are common to time-series econometrics, panel data presents two further complications. Firstly, as the time dimension grows and it becomes theoretically possible to individually estimate N time-series regressions, the possibility of obtaining heterogeneous slope parameters arises. In the presence of such heterogeneity, pooled estimators can produce biased results, while mean-group (MG) estimators, which estimate panel parameters as averages of the N individual slope parameters, are consistent estimators (Pesaran and Smith, 1995). This also applies to the context of cointegration, where homogenous cointegration represents a pooled cointegrated relationship between variables, while heterogenous cointegration allows the possibility that individual cross-sections may cointegrate with different slope parameters and estimate the panel common parameter as an average of the individual specific parameters (Phillips and Moon, 1999). Unit root and cointegration tests have different assumptions in these regards[68]. Cointegrating relationship can also be esti-

[67] The literature has been evolving extremely rapidly over the past fifteen years or so, what follows is a very synthetic overview of the themes that are relevant for the purpose of this chapter

[68] For example, the Kao (1999) test assumes homogeneity, while Pedroni (1999) allow for both homogenous and heterogenous cointegration.

mated through pooling, e.g. the pooled fully modified-OLS (FMOLS) (Phillips and Moon, 1999), or MG estimators such as the MG FMOLS (Pedroni, 2000) or even combining pooling with grouping, as in the dynamic error-correction specification pooled mean group (PMG) estimator (Pesaran *et al.*, 1999).

The second set of issues relates to cross-sectional dependence (CSD), that is the correlation between the cross-sectional observations of a panel variable, giving rise to correlation between the cross-sectional errors. Cross-sectional dependence creates serious inference problems: estimation can be biased, and tests holding under the assumption of cross-sectional independence can provide unreliable results (Phillips and Sul, 2003; Banerjee *et al.*, 2004; Gengenbach *et al.*, 2006). To address this issue, researchers have a typically assumed factor error structure (Pesaran, 2006, p. 971):

$$y_{it} = a_i d_t + \beta_i x_{it} + e_{it} \tag{5.8}$$

$$e_{it} = \gamma_i f_t + u_{it} \tag{5.9}$$

equation (5.9) states that the error term of a panel equation can be decomposed in a common unobserved factor f_t plus an idiosyncratic individual specific error term u_{it}. CSD is therefore driven by a common factor, which can be modeled as a stationary or non-stationary variable. Since however the factor is unobserved, a method must be implemented to estimate it. Three main routes have been suggested by the literature. The first one is to estimate the factor directly as a principal component of the residuals or the variables of a first stage regression, "decomposing" them into their idiosyncratic and common components (Bai and Ng, 2004). The second is to approximate the factor by taking cross-sectional averages of the dependent variable and the individual specific regressors, which are then added to the model specification as variables. As shown by Pesaran (2006), these cross-sectional averages are a good approximation of the unknown factors, and OLS estimation including those approximations - the so-called correlated common effects (CCE) estimators - is consistent. A third method has recently been suggested by Eberhardt and Bond (2009). The authors propose a three-steps estimator, which

they call the augmented-mean group (AMG): in the first step, a first-difference OLS regression with time dummies is estimated; the coefficients of the time dummies are then entered in N level regressions as "common dynamic factors"; finally, the cross-sectional specific parameters are averaged as in the MG estimators.

All these issues are relevant for this chapter. Emerging markets holdings have grown considerably over the past decade, which is likely going to reflect in non-stationarity of the asset shares. If other variables are also found to be non-stationary, then cointegration can be tested. Cointegrating relationships could provide an understanding of the causes behind the long-run emerging markets asset holdings increase. Similarly, cross-sectional dependence is likely to be an issue, given the high degree of comovement between emerging markets asset holdings and returns. Using factor error structures, tests and estimation can be made, taking into account cross-sectional dependence. The issue of heterogeneity will also be taken into account, as a "grouped" estimation - rather than pooled - will be used.

5.3.2 Tests and model specification

Before testing for unit roots and cointegration, a look at the CSD of the unit specific variables can give an idea of the extent of its importance in the estimation and testing. Although the presence of some cross-sectionally invariant common variables ($lfg\ vix\ lwbret$) should itself work as common factor and reduce CSD, the latter's presence cannot be ruled out a priori. In fact as table 4 shows, the cross-sections of all the variables are highly correlated, all failing to reject the null of no CSD, according to the Pesaran (2004) test. This provides a good reason to perform testing and estimation by taking CSD into account.

Table 5.4: Cross-sectional dependence test

Average correlation coefficients & Pesaran (2004) CSD test			
Variable	CSD-test	p-value	corr
lem_alloc	72.05	0.000***	0.840
$lbem\_alloc$	60.63	0.000***	0.903
lem_ret	57.38	0.000***	0.662
$lbem\_ret$	21.44	0.000***	0.322
lem_fx	58.83	0.000***	0.877

Notes: Under the null hypothesis of cross-section independence CSD ~ N(0,1)
These are the results of the xtcd Stata routine (Eberhardt, 2011b).

A quick look at the figures hints that non-stationarity may be an issue for some of the variables. For the panel cross-sectional specific variables, the unit root tests by Pesaran (2007), which allow for the presence of CSD, is chosen. The test is based on an augmented version of the Im *et al.* (2003) test, which is a panel version of an Augmented-Dickey Fuller (ADF) equation. With p-lags this is:

$$\triangle Y_{i,t} = a_i + b_i Y_{i,t-1} + c_i \overline{Y}_{t-1} + \sum_{j=1}^{p} \delta_{ij} \triangle Y_{t-j} + \sum_{j=0}^{p} d_{ij} \triangle \overline{Y}_{t-j} + \delta_i t + u_{it} \tag{5.10}$$

The panel test statistic is based on a truncated average of the OLS t-ratios of b_i. For the non cross-sectional specific variables lfg, vix and $lwbret$ standard time-series ADF tests are used.

Table 5.5: Panel Unit Root Test

Pesaran (2007) Panel Unit Root test (CIPS)								
Variable	lags	Zt-bar	p-value		Variable	lags	Zt-bar	p-value
lbem_alloc	0	0.415	0.661		*lem_alloc*	0	0.591	0.723
lbem_alloc	1	1.384	0.917		*lem_alloc*	1	0.824	0.795
lbem_ret	0	-14.849	0.000***		*lem_ret*	0	-19.731	0.000***
lbem_ret	1	-10.374	0.000***		*lem_ret*	1	-15.729	0.000***
lem_fx	0	0.584	0.720					
lem_fx	1	0.335	0.631					

Notes: The null hypothesis is the presence of a unit root. The table shows the results for the Pesaran (2007) unit root test, for the specification without a time trend. The multipurt Stata routine was used (Eberhardt, 2011a).
*,** and *** denote rejection at the 1%, 5% and 10% level.

As shown in Table 5.4 the asset shares and foreign exchange reserves do not reject the null of unit root and are treated as non-stationary, while returns variables strongly reject the null of a unit root, and are therefore treated as I(0).

Table 5.6: Time-series Unit Root Test

Augmented Dickey-Fuller Test			
Variable	No constant	Constant	Constant and trend
lfg	0.0531*	0.206	0.1689
lwbret	0.000***	0.000***	0.000***

Note: The null hypothesis is the presence of a unit root. The time-series length is chosen in line with the length of the estimated equations, and the sample therefore only considers values from the first quarter of 2003.
*,** and *** denote rejection at the 1%, 5% and 10% level.

The evidence for the common variables is less clear-cut. As Table 5.5 shows, global returns are stationary. However, the test for lfg rejects the null at the 10% level in the case of no deterministic variables, but does not do so when a constant and trends are added. The funding gap should ideally fluctuate around 0, i.e. the fully-funded position, which could make the ADF specification without deterministic component relevant. In practice, however, as it seems to be the case in the period considered, pension funding may significantly and persistently differ

from full funding. For these reasons, lfg is treated as non-stationary.

The findings of the unit root tests present a challenge. As the literature review on asset demand equations showed, economic theory suggest a relationship between the levels of return and the asset shares. In the cointegration framework, long-run relationships can however only exist between I(1) variables. As returns are stationary, this would imply that no long-run relationship could exist between returns and asset shares.

However, as Pesaran and Shin (1998) argue, this is not the only possible way to investigate long-run relationships. They suggest that economic theory should provide the background as to whether a long-run relationship exists, rather than just statistical properties of the data. Econometrically, such relationships can be represented by an autoregressive distributed lags (ARDL) model. In the panel case, with p and q lags respectively for the regressors and the dependent variable, this is expressed as

$$Y_{i,t} = \sum_{j=0}^{p} \boldsymbol{\delta}_{ij}^{'} \mathbf{X_{i,t-j}} + \sum_{j=1}^{q} \lambda_{i,j} Y_{i,t-j} + \mu_{i,t} + u_{i,t}$$

which can be conveniently reparametrised in an error-correction form:

$$\triangle Y_{i,t} \quad = \quad \phi_i Y_{i,t-1} + \boldsymbol{\beta}_i^{'} \mathbf{X_{i,t}} + \sum_{j=1}^{p-1} \lambda_{i,j}^{*} \triangle Y_{i,t-j} + \sum_{j=0}^{p-1} \boldsymbol{\delta}_{i,j}^{*'} \triangle \mathbf{X}_{i,t-j} + \mu_{i,t} + u_{i,t}$$

$$\phi_i = -\left(1 - \sum_{j=1}^{p} \lambda_{i,j}\right), \ \boldsymbol{\beta}_i^{'} = \sum_{j=0}^{q} \boldsymbol{\delta}_{i,j}, \ \lambda_{i,j}^{*} = -\sum_{m=j+1}^{p} \lambda_{i,m}, \ \boldsymbol{\delta}_{i,j}^{*} = -\sum_{m=j+1}^{p} \boldsymbol{\delta}_{i,m}$$

As shown by Pesaran *et al.* (1999), the advantage of ARDL models of this kind is that they can be estimated with I(0) and I(1) variables, provided that some assumptions, which will be discussed below, are met. This seems to be particularly appropriate in the case of asset demand equations, since it would allow for the inclusion of returns variables in the long-run relationship. Moreover, as these models are autoregressive, they do not suffer from the endogeneity bias (Chudik and Pesaran, 2013), which would otherwise be a serious issue in this chapter, since causality between asset demand and returns or foreign exchange could run both

ways.

In the panel case, ARDL models can be estimated with different assumptions in terms of heterogeneity: with heterogenous parameters, utilising the MG estimator (Pesaran and Smith, 1995). An alternative specification could be to assume that the coefficients were homogeneous, so that all coefficients were equal for all the N cross-sections, which could be estimated with standard panel estimators, such as in the fixed effects model. An intermediate technique is the pooled-mean group (PMG) estimator proposed by Pesaran *et al.* (1999), which imposes homogeneity on the long-run coefficients but allows the short-run dynamics to be heterogenous.

In order for the ARDL models, including the PMG estimator, to be consistent, some assumptions must be met. The first one is the absence of serial correlation in the residuals, which can be tackled by adding further lags to the specifications, so that the regressors become exogenous. The second one is the existence of a long-run relationship between the variables of interest, ensuring that the model is dynamically stable, and therefore $\phi_i < 0$.

There is no formal way to pre-test the existence of a long-run relationship in the panel case. Therefore, aside from economic theory considerations, the long-run relationship between the variables can be inferred in three ways. Firstly, the cointegration tests show that the non-stationary variables are cointegrated in the traditional sense, suggesting that, at least between them, a long-run relationship exists (table 7). Two tests are used, both accounting for the possibility of CSD: the first one is based on the significance of the error-correction term Gengenbach *et al.* (2008)[69], the second on the stationarity of the residuals (Holly *et al.*, 2010)[70]. Rejection of a unit root indicates the presence of cointegration. Secondly, as the CCE estimators are consistent "irrespective of the order of integration of the data observed"

[69] As in the test of Westerlund (2007), the test statistic pools the individual t-ratios of the parameters of the lagged dependent variable, with the null of insignificant error correction. The test is based on a factor error structure, and is therefore robust to CSD, even in the presence of non-stationary factors. The authors suggest augmenting the model specification with cross-sectional averages, as in the CCE estimators, to account for the factors.

[70] After estimating a relationship with the CCE pooled estimators, the residuals $u_{it} = Y_{it} - \widehat{\beta}_{CCEP} X_{it} - \hat{\alpha}_i$ are collected and then tested for stationarity using the test fromPesaran (2007)

(Kapetanios *et al.*, 2011, p. 338), a unit root test on the residuals of a CCE mean group (CCEMG) regression between the variables, in the spirit of Cavalcanti *et al.* (2011b), is conducted, yielding the results of stationary residuals for up to five lags. Finally, the negative sign and significance of the error-correction parameters are to be taken as a further indicator of the existence of a long-run relationship (Cavalcanti *et al.*, 2011a; Albuquerque *et al.*, 2014).

A final condition to be met, in the panel case, is the absence of CSD. As shown above, this assumption is most likely not met. However, suitable modifications to the estimators can be made to estimate parameters in the presence of CSD. Panel ARDL models augmented with cross-sectional averages have recently been proposed (Cavalcanti *et al.*, 2011b; Chudik and Pesaran, 2013; Chudik *et al.*, 2013). For example, a CCE version of the PMG (CCE-PMG) estimator has been used by Cavalcanti *et al.* (2011a) and Albuquerque *et al.* (2014). The estimator used in this chapter for the baseline specification however is the AMG estimator, which has also been used in the context of ARDL models (Albuquerque *et al.*, 2014; Sadorsky, 2013; Elliott *et al.*, 2014). This is due to its approach in dealing with the unknown source of CSD, which, as discussed, is based on the estimation of a common-dynamic process based on time dummies. As some of the variables in this chapter are not cross-sectional specific, there would be fewer cross-sectional averages estimating the factor than independent variables. The AMG approach to CSD, not being subject to this issue, is therefore preferred. The chapter will, however, also use other estimators, including the CCE ones, to check for result robustness.

Table 5.7: Panel Cointegration Tests

	Error-correction test (Gengenbach *et al.*, 2008)		CCE Residuals-based test (Holly *et al.*, 2010)	CCE-MG Residuals-based test (Cavalcanti *et al.*, 2011b)
	Panel t-test (0 lags, 1 lag)	Panel t-test trend (0 lags, 1 lag)	CIPS statistic (0 lags, 1 lag)	CIPS statistic (0 lags, 1 lag)
Equities	-2.793**, -2.745**	-3.037*, -3.003*	-2.122*, -2.078	-10.839***, -10.673***
Bonds	-3.017***, -2.8**	-2.936, -2.732	-2.407***, -2.150*	-12.925***, -11.226***

Notes: The first two columns show the panel t-test statistic specification of the Gengenbach *et al.* (2008) test. This test was computed in Stata using the routine described by Prof. Markus Eberhardt on his website (http://goo.gl/zBpLJM).
The third column shows the CIPS test statistic, resulting from the residuals-based testing procedure used byHolly *et al.* (2010).
The fourth column shows the results of a CIPS test on the residuals of a CCE-MG regression with all the variables included in levels, as done by (Cavalcanti *et al.*, 2011b).
*,** and *** denote rejection at the 1%, 5% and 10% level.

5.4 Estimation results

5.4.1 Baseline results

The baseline specification of the equation is:

$$\begin{aligned}\triangle Y_{i,t} &= \phi_i(Y_{i,t-1} - \boldsymbol{\beta_i'}\mathbf{X}_{i,t} - \boldsymbol{\gamma_i'}\mathbf{W}_t) + \sum_{j=1}^{p-1}\lambda_{i,j}^{*'}\triangle Y_{i,t-j} + \sum_{j=0}^{p-1}\boldsymbol{\delta}_{i,j}^{*'}\triangle\mathbf{X}_{i,t-j} + \sum_{j=0}^{p-1}\boldsymbol{\theta}_{i,j}^{'}\triangle\mathbf{W}_{t-j} \\ &\quad +\rho_{i,t}CDP_t + \mu_{i,t} + u_{i,t} \qquad (5.11)\end{aligned}$$

$$\mathbf{X} = \begin{bmatrix} lem\_fx \\ lem\_ret \\ \\ \end{bmatrix} \text{ and } \mathbf{W} = \begin{bmatrix} lfg \\ lwbret \\ \\ \end{bmatrix}$$

with $\mathbf{X}$ being the vector of cross-sectional specific variables and $\mathbf{W}$ that of common variables. CDP is the common dynamic process of the AMG estimator, calculated as discussed.

In order to cope with the issues related to the lag augmentation, three different model specifications are estimated. The first two model specifications apply the same lag augmentation to all variables, respectively one lag for model (1) and two lags for model (2). Model (3) allows the lag length to be selected according to the Schwarz information criterion, up to 3 lags[71]. This results in choosing the following lag structure: one for lfg, two for lem_fx, one for $lwbret$, two for $lbem\_ret$ and lem_ret, and one for the dependent variables. Given the relative short time dimension of the panels, longer lags specifications are unfeasible.

The results of the estimation are shown in Table 5.8 and Table 5.9. In all models, the error-correction terms are in the dynamically stable range, since they are strongly significant, negative, and between 0 and -1. As stated above, this confirms the existence of a long-run relationship between the variables. Also, there does not seem to be a major difference between the speeds of convergence for bonds and equities

As expected, returns and asset allocation are positively related. For EM equities, a 1% return

Table 5.8: Estimation Results - Equities

ARDL model, dep. variable: △lem_alloc			
Model	AMG (1)	AMG (2)	AMG (3)
Long Run			
lem_fx	0.577*	0.683	0.807**
lem_ret	2.792***	2.199***	2.181***
lwbret	-0.566	-0.44	-0.627
lfg	0.661***	0.583*	0.593***
Short run			
ec	-0.535***	-0.681***	-0.556***
△lem_ret	0.827***	0.878***	0.829***
△lwbret	0.166	0.181	0.127
CDP	0.845***	0.873***	0.85***

Notes: Models (1), (2) and (3) refer to the different lag augmentations described in the chapter. CDP is the common dynamic process estimated by the augmented mean group; ec is the error correction term. All models contain individual constants and time trends. Long-run standard errors were computed using the delta method.
The following Stata routines were used: xtpmg (Blackburne and Frank, 2007), xtmg (Eberhardt, 2013), nlcom

increase implies a response of more than double that in terms of asset allocation, whereas for

[71] For the country-specific variable the information criterion were applied to the individual time-series, as done by Pesaran *et al.* (1999).

Table 5.9: Estimation Results - Bonds

ARDL model, dep. variable: △lbem_alloc			
model	AMG (1)	AMG (2)	AMG (3)
Long Run			
lem_fx	0.697*	0.897**	0.892***
lbem_ret	4.837**	3.623**	4.565***
lwbret	-0.868	-0.091	-0.577
lfg	1.395**	1.528***	1.317**
Short run			
ec	-0.551***	-0.724***	-0.591***
△lbem_ret	0.03	-0.024	0.098
△lwbret	0.213	-0.13	0.161
CDP	0.678***	0.777***	0.703***

Notes: Models (1), (2) and (3) refer to the different lag augmentations described in the chapter. CDP is the common dynamic process estimated by the augmented mean group; ec is the error correction term. All models contain individual constants and time trends. Long-run standard errors were computed using the delta method.
The following Stata routines were used: xtpmg (Blackburne and Frank, 2007), xtmg (Eberhardt, 2013), nlcom

bonds the response is even higher, ranging from just over 3.6% to more than 4.8%. While these may seem implausibly big parameters, it has to be remembered that asset allocations to EMs are still small, which implies that relative changes may in fact still imply relatively small absolute changes in portfolio weights. The short-run parameters for equities are also all positive and significant. The results for global returns are less decisive. All the parameters are negative, but they are never statistically significant.

The parameters of FXR are always positive and significant. The values of the parameters seem to be slightly smaller for equities, but there does not seem to be a major difference between the two assets. The funding gap parameters are also positive and significant, thus suggesting higher allocations to EMs in the case of underfunding. The impact on bond allocations seems to be particularly notable, being considerably higher than 1% for each percentage point of underfunding, while the impact on equities is smaller, ranging roughly between 0.5% and 0.6%.

The common dynamic process in the AMG models is positive and significant across all models. As Eberhardt and Bond (2009) discuss, the estimator is designed to explicitly account

for and interpret the estimated common factor[72]. In this scenario, it is hard to guess what the process is in fact capturing. Its positive sign suggests it is capturing some unobserved factor positively affecting the growth of EM holdings. This could be, for example, a decrease in risk-aversion regarding the asset class as a whole or the growing accessibility of these countries due to their increasing openness and the creation of new EM funds.

5.4.2 Robustness checks

This section presents the results of alternative model specifications, in order to verify the robustness of the results.

First of all, model (3) is estimated using the cross-sectional averages method, to deal with CSD, as proposed by Chudik and Pesaran (2013). The cross-sectional averages lag length for these CCE models is chosen to be the same as that of the variables. Hausman tests are used to check whether long-run pooling is feasible; in case of rejection, the MG approach is chosen over the PMG.

Secondly, as shown by Chudik *et al.* (2013), while consistent under very general assumptions, panel ARDL models may not always perform well when the sample considered is small. The long-run relationships are therefore also estimated using more standard dynamic panel techniques: the system generalised method of moments (GMM) estimator of Blundell and Bond (1998) and the bias-corrected least squares dummy variables (LSDVC) (Bruno, 2005). As shown in the comprehensive simulation exercise of Flannery and Hankins (2013), these estimators perform well in the presence of (even second-order) serial correlation, and endogeneity. However, while the GMM estimator remains consistent even in the presence of weak CSD, such as spatial dependence (Sarafidis, 2009), these estimators do not, in general, take CSD into account. Moreover, the GMM techniques are designed for large-N-small-T panels, clearly not the case in this chapter.

Finally, three variables are introduced to the baseline specification[73]. The first, the VIX

[72]The authors discuss for example the estimation of total factor productivity in a neoclassical production function.

[73]Tests on these variables have also been conducted, but are omitted due to space limitations.

index, which measures the volatility of the Standard and Poor index, is added in levels to check for the impact of short-term risk appetite, which has been found to have a significantly negative impact on capital flows in many recent studies (e.g. Ahmed and Zlate, 2014; Rey, 2013; Ananchotikul and Zhang, 2014). The second, to check for the standard portfolio theory contention that higher return volatility *ceteris paribus* should reduce an asset's desirability, is the four-period standard deviation of the return variable. This variable is added to both the long-run and the short-run relationship. The third is GDP growth[74], as it is often the presumption that higher growth in these countries is a major "pull" factor for foreign investors. These variables are added one at the time and all together to the baseline AMG specification, with the number of lags included chosen according to the Schwarz Information Criterion.

The results of all these robustness checks are shown in Table 5.10 and Table 5.11. The impact of the VIX is negative, as expected, for equities allocation, denoting a decrease in allocations to EMs when risk-aversion is high. On the other hand, it is positive in the bonds equation. This may result from the closer link between the VIX index and equity markets, thus predicting higher demand for bonds, including EM bonds, when volatility in equity markets is higher. Nevertheless, the values of the parameters are small at little over 0.01%, therefore indicating a very small impact of short-run risk-aversion swings on allocations to EMs. These results are not affected by the inclusion of other control variables. The other two variables have the expected sign, positive for growth and negative for standard deviation. However, standard deviation is only significant in the equities equation, while growth is significant in the bonds equation[75].

The inclusion of the control variables does not substantially change any of the results. In the equity equations, the only notable change is obtained when including the VIX, which makes the global return variable statistically significant. In the bond equations, the notable result is the statistical insignificance of FXR in the long run. However, the short-run FXR variable becomes statistically significant and positive when the VIX is controlled for. This could indicate that, in conditions of turbulence, increasing buffers of safety represented by FXR become more important than the level of FXR per se.

[74] Quarter-to-quarter yearly real GDP growth was used.

[75] It is no longer statistically significant if entered with the other control variables. Neither is it statistically significant if a time trend is added, although the time trend itself is not statistically significant.

The alternative estimators used do not yield substantially different results either.

Table 5.10: Robustness Checks - Equities

Dep. variable: △lem_alloc for ARDL models, lem_alloc for GMM and LSDVC							
Long Run							
model	AMG	AMG	AMG	AMG	CCE-PMG	GMM	LSDVC
lem_fx	0.684*	0.767*	0.981**	0.733*	0.942***	0.168***	0.122***
lem_ret	2.395***	2.16***	1.923***	2.175***	2.335***	0.977***	1.014***
lwbret	-0.89**	-0.576	-0.404	-0.522	-0.144	0.06	0.57
lfg	0.546***	0.624**	0.487**	0.392*	0.627***	0.34***	0.375***
lem_sd		-0.391***		-0.465***			
growth			0.242	0.032			
Short run							
ec	-0.594***	-0.564***	-0.582***	-0.643***	-0.266***		
△lem_ret	1.023***	1.101***	1.145***	0.961***	1.797***		
vix	-0.014***			-0.014***			
△lwbret	0.224**	0.102	0.07	0.07	-0.076		
△lem_fx	-0.05	-0.031	-0.156	0.000	0.256		
CDP	0.932***	0.855***	0.868***	0.973***			
Hausman test					7.96 (0.093)		

Notes: Lag structure of ARDL models chosen according to the Schwarz Information Criterion. CDP is the common dynamic process estimated by the augmented mean group; ec is the error correction term. The Hausman test reports the p-value in brackets: non-rejection allows long-run pooling. All models contain individual constants and time trends. Long-run standard errors for the AMG model were computed using the delta method.
The following Stata routines were used: xtpmg (Blackburne and Frank, 2007), xtmg (Eberhardt, 2013), nlcom, xtdpdsys and xtlsdvc.

5.5 Interpretation and implications

These results provide evidence for the hypothesised relationship. Institutional investors seem to conform broadly to the asset demand specifications proposed. Several observations can be made in terms of the interpretation and implications of this finding.

First of all, the size of the error correction is above 50% in the majority of the equations. This implies that investors do not instantaneously achieve their desired portfolio shares, but

Table 5.11: Robustness Checks - Bonds

Dep. variable: △lbem_alloc for ARDL models, lbem_alloc for GMM and LSDVC							
Long Run							
model	AMG	AMG	AMG	AMG	CCE-PMG	GMM	LSDVC
lem_fx	0.106	0.383	0.346	-0.109	0.543	0.246***	0.155***
lbem_ret	3.912***	3.519*	2.599*	2.175***	2.174	1.827***	1.346***
lwbret	-0.936	-1518*	-0.857	-1.969**	-1.246	-0.708**	-0.65**
lfg	1.037**	1.008**	1.256***	1.125**	0.388	0.22***	0.178
lbem_sd		-1.173		-0.988			
growth			2.535***	0.007			
Short run							
ec	-0.637***	-0.624***	-0.656***	-0.758***	-0.717***		
△lbem_ret	-0.174	0.165	0.668	0.885	0.271		
vix	0.025***			0.034***			
△lwbret	0.414	0.439	0.07	0.885	0.076		
△lem_fx	0.653*	0.609*	0.365	0.767**	0.454		
CDP	0.603***	0.575***	0.609***	0.757***			
Hausman test					15.41 (0.004)		

Notes: Lag structure of ARDL models chosen according to the Schwarz Information Criterion. CDP is the common dynamic process estimated by the augmented mean group; ec is the error correction term. The Hausman test reports the p-value in brackets: non-rejection allows long-run pooling. All models contain individual constants and time trends. Long-run standard errors for the AMG model were computed using the delta method.
The following Stata routines were used: xtpmg (Blackburne and Frank, 2007), xtmg (Eberhardt, 2013), nlcom, xtdpdsys and xtlsdvc.

are able to adjust to them relatively quickly, correcting half of the gap in one period. This is in contrast to most of the AIDS literature, which often finds slow adjustment processes, even for institutional investors (Blake, 2004; Dinenis and Scott, 1993). This finding suggest that frictions, such as transaction costs, may not be a major obstacle to foreign institutional investors reaching their desired EM asset allocations.

Secondly, FXR positively affect asset allocations to EMs. This is in line with the ideas discussed in this and previous chapters of this dissertation: FXR can be interpreted almost as a protection provided by EMs to foreign investors, which reduces the overall riskiness and thus increase demand for their assets.

Thirdly, the investor's balance sheet also matters. The finding of the positive impact of the funding gap on allocations to EM assets is perhaps the most relevant finding of this chapter. In line with the hypothesis made in this dissertation, institutional investors' demand for EM

assets is increased when they are in need of higher returns to reinforce their balance sheets. In policy terms, this may add to the list of important "push" factors that need to be taken into account when assessing capital flows. The finding that the impact on bonds is higher is particularly relevant, since the rise in the flow of bonds to EMs really exploded after the 2008 crisis. A recovery of institutional investors' balance sheets may have important adverse consequences on these patterns.

Returns on safe assets do not seem to be a major determinant of allocations to EM assets. This could suggest that the allocation to EMs is not necessarily "pushed" by low interest rates in advanced countries per se. However, two caveats are in order here. Firstly, the findings could reflect a problem with the variable itself. It is hard to find a single variable for advanced markets' "safe" returns. In practice, portfolio choice is not a binary selection between the safe government bonds of advanced countries and risky EM assets. Secondly, it is important to point out that, while global safe returns per se may not have a direct influence on portfolio allocation, they still matter indirectly through the balance sheet conditions. The funding gap is influenced by the size of the pension liabilities, which in turn depend on a discount factor, usually linked to the value of bond yields. As a result, ceteris paribus, an increase in interest rates will decrease liabilities, thereby reducing the funding gap. In this way, an increase in advanced countries' bond yields may still generate a decrease in the allocation to EMs.

Finally, institutional investors seem to care about long-run returns. Only in the case of equity are short-run returns positively related to allocations, which could also partially reflect the effect of increasing asset prices on the weights when the portfolio is not rebalanced on a quarterly basis. The finding that the VIX has a very small impact further suggests that these investors are not overly concerned with sudden shifts in global market volatility. However, the statistical insignificance of GDP growth seems to indicate that investors, when seeking returns, are not always mindful of the underlying real economic growth in EMs.

Overall, these findings indicate, on the one hand, a long-term approach taken by institutional investors in their demand for EM assets, and a lack of concern over immediate returns and sudden shifts in risk appetite. However, these investors respond to changes in their balance sheet conditions and the level of FXR in EMs, over a relatively short – i.e. quarterly –

"long"-run, with rather quick adjustment to their desired levels, and this may be unrelated to the economic growth of such countries.

This suggests that demand for EM assets over a medium-term horizon may decrease, should funding levels start to improve. An increase in interest rates implemented by advanced countries' central banks could cause allocations to EMs to decrease, as it could improve the funding levels of pension funds, which would therefore be under much less pressure to generate high returns by investing in EMs. This could also be procyclically reinforced by EMs' decumulation of FXR, therefore potentially generating issues for financial stability.

5.6 Conclusion

This chapter has provided evidence on the demand for EM assets from advanced countries' institutional investors. It has applied innovative estimators for ARDL models to the estimation of asset demand. This contributes, on the one hand, to the literature on the determinants of portfolio investment by providing a link between international portfolio investment and the behaviour of investors. On the other hand, it expands the application of the asset demand approach to international portfolio choice, and to the demand for EM assets in particular.

The findings of the chapter broadly confirm the relationship hypothesised in this dissertation. Institutional investors do care about long-run returns, but their demand for EM assets is affected by two additional factors: the amount of FXR that EMs hold and the conditions of their balance sheets, proxied by the funding ratio of advanced countries' pensions funds. These results are robust to the inclusion of additional control variables.

These results provide evidence for two key hypotheses of this dissertation. Institutional investors' balance sheet fragility lead to higher allocations to EM assets in the long-run. The same can be said for foreign exchange reserves, which therefore confirms the importance of this crucial "fundamental", which is interpreted in this dissertation as a key indicator of EM's currency liquidity.

Appendix

This appendix shows that (5.7) can be derived from (5.6).

Multiplying $\triangle a_i$ for $\frac{W}{W}$, and writing a_i as a for convenience:

$$\triangle a = \triangle a \frac{W}{W} = \left(\frac{a - a_{-1}}{W} \right) W \,, \tag{5.12}$$

which, using $W = W_{-1} + \triangle W$, can be rewritten as

$$\triangle a = \frac{a}{W} W_{-1} + \frac{a}{W} \triangle W - \frac{a_{-1}}{W} W_{-1} - \frac{a_{-1}}{W} \triangle W \,. \tag{5.13}$$

Writing the fourth term of 5.13term as $-\frac{a_{-1}}{W} W_{-1} + \frac{a_{-1}}{W} W$ and simplifying:

$$\triangle a = \frac{a}{W} W_{-1} + \frac{a}{W} \triangle W - \frac{a_{-1}}{\cancel{W}} \cancel{W} \,. \tag{5.14}$$

Multipliying the third term of 5.14for $\frac{W_{-1}}{W_{-1}}$:

$$\triangle a = \frac{a}{W} \triangle W + \frac{a}{W} W_{-1} - \frac{a_{-1}}{W_{-1}} W_{-1} \,, \tag{5.15}$$

which is equal to

$$\triangle a = \frac{a}{W} \triangle W + \triangle \left(\frac{a}{W} \right) W_{-1} \,. \tag{5.16}$$

Combining (5.16) with (5.6) and rearranging, results in (5.7).

Chapter 6

Semi-structured interviews with European pension funds

Introduction

In the previous chapters, this dissertation has considered the various factors affecting the growth in institutional investors asset allocation to emerging markets. In particular, chapter 5 has explored quantitatively the importance of some of these determinants, by estimating asset demand equations. The contention that, aside from returns, balance sheet conditions and the level foreign exchange reserves matter for institutional investors demand for emerging markets assets was by and large confirmed.

However, there are several reasons why gaining further insights through the assessment of qualitative data is important. Firstly, as discussed, the asset allocation variables constructed and examined so far are an approximation of the actual values, as they are constructed as "macro" variables from the whole advanced world rather than micro-data from individual funds. As discussed in the introduction, although the thesis is mostly concerned with a macroeconomic understanding of the phenomenon of capital flows, the consistency of micro-level behaviour with the macro-level findings of the previous chapters is deemed to be important. "Triangulating" the quantitative results with qualitative data, by focusing on different levels of analysis,

increases the reliability of the findings.

Secondly, as also discussed in the introduction, qualitative data may help uncover aspects that are hard to capture with quantitative methods. Some factors affecting the decision to invest in emerging markets (EM) are just not quantitative in nature - e.g. political risk[76] -. More importantly, qualitative data also sheds light on the processes and institutional mechanisms that underly the decision to invest in EM. The findings of this chapter contribute in locating the demand EM assets within the actual process of liability-driven investment strategies. The causal inference originating from the previous chapter therefore acquire a deeper meaning in being located in the institutional and historical reality of pension funds.

Finally, while quantitative methods were key in providing a synthetic answer to the relative importance of different factors, interviews highlight the heterogeneity of such factors for different investors. Chapter 5, showed, econometrically, how lower pension funding ratios results in higher allocation to EM assets. However this may depend on country-specific factors, such as regulations and institutions, all of which can be more clearly captured with qualitative methods. Moreover the same broad factor can be subject to different interpretation by different investors, leading to diversity in the implementation of investments strategies, which a purely quantitative analysis may fail to capture.

The rest of the chapter is organised as follows. Section 6.1 discusses the sample of and interviews method. Section 6.2 provides an overview of the different pension schemes institutional arrangements in the countries included in the sample. Section 6.3 deals with the investors' factors, particularly the role of liabilities in determining the asset allocation. Section 6.4 discusses the role of EM assets in pension funds' and the domestic factors and external affecting their risk/return characteristics. Section 6.5 concludes.

6.1 Interviews method and sample choice

The qualitative data-gathering method used is semi-structured interviews. This involves asking a series of questions to the interviewees following an "interview guide", listing themes that the researcher is interested in exploring, but allowing interviewees to expand and touch upon themes beyond such a guideline.

[76] Indices of political risk do exist, but the extent to which they are meaningful is questionable.

Semi-structured interviews are a qualitative method, since the nature of the data gathered is often not quantifiable for several reasons, most prominently the small sample size, which does not allow the kind of inference typical of statistical methods. They differ in this sense from surveys or structured interviews, which, although not starting directly from numeric data, are used to make synthetic inferential statements about the frequency of some answers. At the same time they differ from unstructured interviews, as the guide allows for "testing" hypothesis rather than only having an exploratory nature.

The potential interviewees targets were selected out of a subsection of the advanced countries institutional investors' population: the European pension fund sector. While the focus on pension funds has been an overarching theme of the whole dissertation, the choice of geographical focus on Europe has been driven by two main reasons. Firstly, the assistance provided by Investment and Pensions Europe[77] made it possible to choose potential interviewee targets from a large database of European pension funds. This allowed the sample to be chosen within a large initial population. Secondly, European countries allow for an easier comparison of the heterogeneity of pension funds across countries: as the economic conditions in which they operate are very similar, diversity in their behaviour will reflect the country-level specificities of their pension fund sector - e.g. regulation or institutional arrangements.

Within the European pension fund sector, interviewees profiles fall broadly into two categories: the first are officers and/or trustees of the pension funds, the second are investment consultants and/or asset managers who work - not necessarily exclusively - with institutional investors clients. This latter category was chosen with particular reference to the pension fund sector of the United Kingdom and the Netherlands, where often, as it will be shown in the rest of the chapter, pension funds rely on external consultants for their investments allocation, and sometimes asset management as well.

In order to test one of the main research hypothesis of this dissertation, the role of balance sheets conditions and liabilities, the focus has been primarily on defined benefits (DB) pension funds. As discussed, unlike defined contribution (DC) schemes, DB pension funds' assets need not be equal to liabilities at all times, and the sign and size of such a difference may have

[77] The author has been was awarded IPE scholarship grant in 2013 and has been in touch with the institution since then.

important implications for asset allocation. This led to focus primarily on those European countries where the pension fund sector has a sizable DB component [78]: UK, the Netherlands and Denmark.

Most interviewees come from larger institutions, as smaller schemes often do not have an independent investment management team. However this is unlikely to create a serious bias, as in Denmark and the Netherland the sector is highly concentrated, while in the UK, smaller schemes typically rely more heavily on external consultants and managers, which are part of the interviewed sample. As a result the sample, while purposively selected, is fairly representative.

Following these criteria, a sample of about 25-30 interviewees was chosen initially, with 14 eventually accepting to be interviewed. Three interviews were conducted in person, while the rest were phone calls. All of the interviews were recorded and transcribed. The transcripts obtained constitute the source for the analysis of the following sections[79].

6.2 Organisation and institutional arrangements

The organisation of pension funds, from the provision of benefits to the asset allocation, is quite complex. There is considerable heterogeneity across countries and sectors, on several dimensions. This section will give an overview of the main characteristics.

The first is benefits provision. In the UK pension funds are traditionally defined benefits (DB) final salary or career-average schemes, where the level of benefits depends on the years of employment and the wage level. These funds are sponsored by employers - either a company or the government in the case public sector employees - who are ultimately responsible for the financial provision of the benefits. Decisions on these funds are taken by a board of trustees in the interest of the beneficiaries. Although many DB funds in the private sector are now closed to new employees, they still hold the majority of pension assets (BoE, 2014). The remaining assets are kept in defined contribution (DC) schemes, whereby employees have an individual contract with a pension provider, sponsored by their employer. In DC schemes the

[78] The definition of a DB used here is broader than what is commonly used, and it includes all schemes where benefits are not exactly tied to the value of the assets. For example DC schemes with minimum return guarantees, although different from UK or US traditional "final salary" schemes, would be included in the definition.

[79] Due to the anonymity of the interviewees, the quotations will only distinguish respondents by nationality.

fund members bear the full risk of financial investment, with their retirement account being equal the market value of the assets they own.

In both the Netherlands and Denmark pension funds there exist more hybrid regimes. The Dutch system is mostly based on industry-wide funds and benefits are usually calculated through DB-like accrual based rules - typically career-average salary based. However, unlike standard DB schemes, employees and employers often share the risk of benefits provision, so that in case of severe deficits pension entitlements can be lowered. Similarly, Danish pension funds are usually organised as collective DC schemes with guaranteed minimum returns or conversion rates of their pension pots into annuity contracts at retirement [80].

A second related element of diversity across pensions from different countries is size. UK pension schemes are company or government authority based, which makes the UK pension fund system quite dispersed across several funds of varying size, reflecting that of the sponsoring employer. On the other hand, the pension fund sector in the Netherlands is much more concentrated into a smaller number of bigger collective and industry-wide schemes. Similarly, in Denmark, large pension providers manage pension and investments of most occupational schemes.

A third dimension concerns the relationships between the pension scheme, the consultants and the asset managers. The traditional configuration in the UK, in the words of an interviewee, is one where "the pension fund is managed by a group of trustees - the trustees are not investment professionals they tend work at the company who is responsible for the pension fund - these trustees have ultimate responsibility to set the investment strategy of the pension fund, but they will usually get investment advice, from a specialist investment advisory firm, [...] they would advise trustees on specific strategic allocations, and then they also usually advise the trustees on which funds to implement the investment strategy with" (UK interviewee 1).

An alternative arrangement is the "fiduciary management model", which is widespread in the Netherlands and has been introduced in the UK too in recent years. "The fiduciary management model is where the trustees hand over their investment decision-making entirely to a single provider. Now that might be the investment consultant, who effectively become

[80] See Pugh and Yermo (2008) for an overview of different kinds of DB arrangements across OECD countries.

the asset manager and the adviser all in one, or it may be the asset manager, so the asset manager may advise and also implement strategies. So you see a kind of a blurring between the adviser and the asset manager or the implementer" (UK interviewee 1).

The Danish pension system is effectively similar to this, since pension administration providers, usually owned by the occupational pension funds themselves, effectively manage the whole pension fund activities, from benefits provision to investment strategy and asset allocation. As these pension administration providers are quite large, often they would manage their investments directly, rather than relying on external asset managers.

A final element of heterogeneity is regulation. Most importantly for this dissertation, this concerns regulation on funding levels and/or solvency margins[81]. UK pension funds do not need to be fully-funded at all times, and the recovery plan in case in case of underfunding may take up to 10 years. Danish pension funds on the other hand need to respect a fully-funded status at all time, and have to comply with a risk-based funding margins regulation: riskier assets carry higher capital requirements, and therefore a anything else being constant a higher funding level[82]. Dutch regulations are somewhat in the middle, with recovery plans to full funding (105%) lasting up to three years, and newly introduced risk-based funding requirements, which have however a long 15 years compliance period.

As it will be shown these different institutional arrangements and regulations may have an impact on pension funds' asset allocation to EM. For example, bigger pension funds investing directly could have a different perspective towards EM assets and the role they play in a portfolio than a smaller pension fund accessing EM assets through an externally managed global equity fund. Similarly, different regulations lead to a different relationship between funding levels and asset allocation, and the allocation to return-seeking assets - which include EM assets - in particular.

[81] For a comprehensive overview of different regulations across OECD countries see Pugh and Yermo (2008)

[82] These regulation are very similar in spirit to the capital requirements regulations such as Solvency II for insurance companies or Basel III for banks:

6.3 Investors factors

As argued in this dissertation, while most of the literature has focused on local and global factors affecting EM assets, investors' factors are a crucial determinant of asset demand. In particular, the conditions of institutional investors' liabilities can be a very important determinant of institutional investors' risk appetite, reflected in the split between "growth" and "protection" assets. Aside from liabilities, some other behavioural factors, such as shifts in risk-aversion and herding, whether rational or panic-driven, may also contribute to put pressure on EM assets, especially in times of crisis.

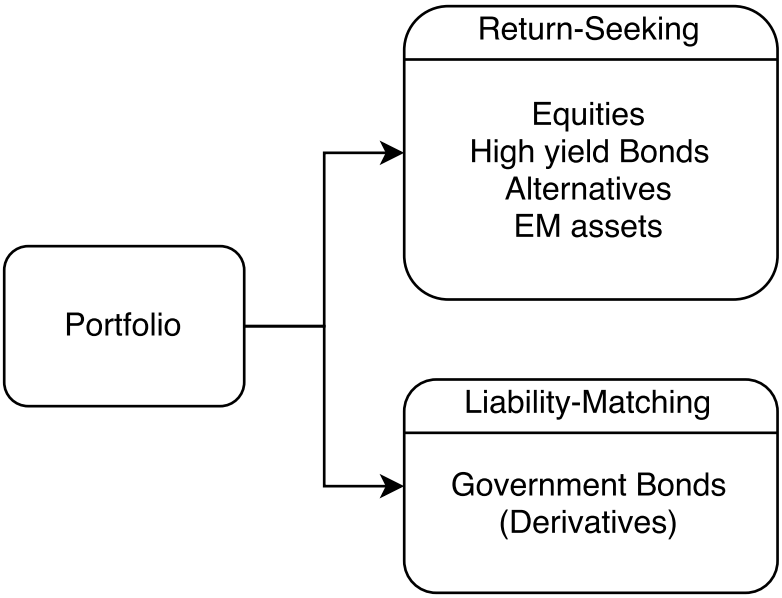
6.3.1 Liabilities

The centrality of liabilities in the implementation of investment strategies came to the fore prominently in the interviewees responses, regardless the heterogeneity of institutional arrangements described in the previous section. Liabilities for pension fund trustees and officers at the broad institutional level, are akin to benchmarks for asset managers at the investment fund level: "Of course it [the condition of liabilities] is very important because that's almost a like benchmark you need to beat, because the regulator always gives a target of a certain coverage ratio and that coverage ratio is very much tied to the liabilities and how they are measured" (Dutch interviewee 3).

"Underperforming" in this context means not having enough assets to cover for long-term liabilities, and requires a rethinking of the asset strategy. On the other hand, reducing volatility is constrained by the need to generate returns to grow the portfolio in line with liabilities. Liabilities are therefore central to the asset allocation strategy, but in a complex tension between the need for hedging and the need for growth.

As discussed in chapter 4, this results in the portfolio allocation along the lines of Figure 6.1. All interviewees that explicitly referred to such a distinction pointed out that EM equity or debt are never used for liability-matching purposes, and are therefore part of the return-seeking portfolio. This confirms the discussions made in chapter 3 and 4: emerging markets assets remain a peripheral part of a return-seeking strategy, as their assets cannot be used to directly

Figure 6.1: Portfolio split



match institutional investors liability. This is likely due to the currency of denomination, as well as the marginal impact that these assets have on long-term bond markets which constitute the basis upon which liabilities are valued. As a result changes in the demand for EM assets within a pension fund's portfolio can come from two sources. Firstly, the relative size of the return-seeking and protection portfolio, which reflects the overall allocation to risky assets by pension funds, i.e. their risk-appetite. The second, the EM assets characteristics, which determine their risk/return tradeoff and therefore their attractiveness vis-a-vis other "return-seeking" assets.

Risk-appetite is itself dependent on liabilities structure. A clear message from the interviews is that the impact of liabilities on asset allocation varies across countries, crucially depending on the regulatory framework. In Denmark, risk-based funding regulations impose an evaluation of risks and returns under an overall risk constraint determined for the portfolio of the fund, which then determines the attractiveness of an asset:

> "The way this is managed and this goes for all of our investment is that we have our own internal risk system that is kind similar to what we are going to have with Solvency II. A stress system. So each investment we make is stressed based on the risk of the asset ... We consider EM as one element in the investment strategy, we think we put together the optimal portfolio compared to the overall risk level that has been set for the pension fund" (Danish interviewee 1)
>
> "There is risk weighting for all the assets, and so one decides how much risk you can take totally. And then it's about optimising your assets. And whether EM is attractive depends" (Danish interviewee 2).

EM assets need therefore to have an attractive risk/return profile to be included in Danish pension funds. Indeed the turmoil in the summer 2013, amidst speculation of unwinding of expansionary monetary policy in the US, have led the interviewed institutions to decrease allocations to EM equities.

Risk-based funding regulation therefore creates a tighter relationship between assets and the liabilities. To the extent that low interest rates generate a "search for yield" behaviour (OECD, 2015), this is constrained within the boundaries imposed by regulation, determining the attractiveness of asset classes with respect to their impact on regulatory limits. If EM assets were to severely underperform, the cost of holding them in terms of additional capital buffers may be too high compared to the risk/return profile of the assets, warranting a lower portfolio allocation. This may be particularly harmful in times of financial crisis, potentially leading to pro-cyclical negative effects on EM assets: "when a crisis hits people need to cut down on the risk side and they would take down what is most expensive in terms of risk budget, which tends to be the EM part of the portfolio" (Danish interviewee 1).

In the Netherlands, the regulatory structure is such that it implies an asymmetric response by pension funds depending on funding levels. Regulations are strict in case of underfunding:

> "If a fund gets underfunded (<105% in the Netherlands) it has to submit a recovery plan to the regulator (DNB) on how it will achieve a funding ratio above

> the limit. Within that regime funds are generally not allowed to increase the riskiness of their assets" (Dutch interviewee 1).

In a situation of underfunding, allocations to risky assets, which may include EM assets, would not increase. Dutch interviewees pointed out that this a peculiarity of their country's pension system - "it's not like in some other countries where if you are underfunded you look for more for the return-seeking portfolios" (Dutch interviewee 1) - and how this depends on the special risk-based regulations about funding and risk-taking. It is also due to these regulations that Dutch pension funds are generally overfunded: "here if you go below 105% the regulator gets in and gives strict rules and you have to obey them. So it is generally overfunded in the Dutch system, when you compare it to the UK system" (Dutch interviewee 3). In other words the relationship between risk taking and funding is asymmetric with a clear floor under which the relationship changes or break down.

UK pension funds do not have, as discussed, the same type of regulations with respect to funding levels. The relationship between asset allocation and funding ratios is much more in line with the central hypothesis of this dissertation:

> "if you are underfunded then you need to close that funding deficit, and you can do that from earning money on your investments, or you can do that from cash coming in from your sponsoring employer, so the contributions. And obviously most schemes would rather earn the money from investments, than they would from sponsoring employers, *so if you got a deficit you need your investments to do more work, and that means investing in things that have a higher expected return, and would usually mean things like equities.* If you get better funded, growth is less of an issue, because once a scheme is fully funded, if you get overfunded for example you can't get that money back, it's locked up. So it's asymmetric, for the schemes that get very well funded there is very little incentive to take investment risk, so they tend to de-risk" (UK interviewee 1, emphasis added)

For UK pension funds, the relative size of return-seeking and liability-matching portfolio is closely related to their funding ratio: lower funding levels imply a higher allocation to "return-seeking" assets compared to "protection" assets. Funding levels are in this sense the variable governing the balance between the need for growth vis-a-vis the need for risk reduction. Searching for returns in the UK is therefore less constrained by regulation, which may explain the very substantial changes in asset allocation described in chapter 4.

While this general mechanism is at play, it is important to note how this fits in the specific historical context of UK-DB pension schemes. In the long-run "you see a general trend that is reducing the allocation to things like equities, and that would include EM equities, in favour of things such as fixed-income" (UK interviewee 1). UK pension funds have increased the size of their liability-matching assets, creating a tighter connection between the variability of their assets and that of their liabilities, thus containing the volatility of their funding ratio. This is due, at least partially, to the fact that many private schemes are closed to new members, which results in a situation with "a lot of maturing schemes, which were cash flow positive and now are turning cash flow neutral, ... and so the types of assets they are looking to hold will start to look more like insurance companies and bit less like endowments" (UK interviewee 2). As discussed in chapter 4, mature pension funds place a greater importance in having a stable funding ratio increases and this is reflected in their higher allocation to liability-matching assets.

However, "the [de-risking] trend is fairly slow moving. ... we are on the whole expecting allocations to equities to reduce in the future. But the pace of that will depend on a number of things in particular the price bonds and funding levels of pension funds in general" (UK interviewee 1). In the meanwhile, the lower yields and funding levels may result in an increasing - or non-decreasing - allocation to growth assets in general, and EM in particular: "if you got a large deficit and you have a ... a big bridge to build to full funding, then you need to make your assets work harder, and generally may allocate more to growth assets, which would result in higher allocation to EM, if you keep a fixed proportion of your growth assets to EM" (UK interviewee 3). The allocation to EM does not necessarily have to be proportional to overall size of the return-seeking/growth portfolio. As de-risking plans start to pick up, EM equities

may decline less than proportionally than the overall risky portfolio allocations: "rather than just take down EM, [de-risking] may be bringing down the overall equity, so the allocation across the board for equities comes down but not proportionally for developed markets and EM". (UK interviewee 6).

In the long-run however, the de-risking trend is likely to reduce allocations to EM:

> "In general, de-risking is definitely a trend, most of the schemes we deal with when they are de-risking, they de-risk into UK bonds strategies and not EM debt, though they might increase their allocation to multi-asset credit or absolute return bond funds, but I would say probably more it is going to result in an outflow from EM, because you are getting out of your global equities and your DGF [diversified growth funds]. So yes de-risking is a trend and will result in fewer assets being in EM" (UK interviewee 3)

So overall the interviews confirm the very important relationship between liabilities and risk-appetite of investors. However, this relationship crucially depends on the country-specific regulations and institutions. Countries with risk-based funding rules, or strict requirements about underfunding recovery plans, do not seem to present a straightforward positive relationship between risk-taking and funding ratios. In countries where these rules are not implemented, the combination low funding ratios create a pressure to generate returns, which results in an increasing - or non-decreasing within a de-risking strategy - proportion to return-seeking assets. "The search for yield" driven by the current low-interest rate environment plays out differently in different countries, crucially depending on their regulatory structure. These heterogenous results represent a caveat to the findings obtained in the econometrics estimation of chapter 5. The positive relationship between the funding gap and allocations to EM likely reflects the much bigger size of pension funds from countries with no risk-based funding regulations, such as the UK, Japan and the US.

Aside from this heterogeneity, it is clear that the demand for EM assets by European pension funds is contingent on the situation of their liabilities. Substantial improvements in

their liabilities may lead pension funds from countries such as the UK and the Netherlands to "de-risk", thereby leading to decreasing allocation to EMs. In Denmark, risk-based funding regulations may lead to decreasing allocations to EMs in case their risk/return profile worsens in such a way that they would not offset their costs in terms capital buffers. Overall, it is highly likely that with higher interest rates in advanced countries, the attractiveness of EM assets will decrease through their impact on liabilities. How liabilities evolve over time is therefore crucial for tracking demand for EM assets by institutional investors.

6.3.2 Other behavioural mechanisms

While liabilities arguably represent the most crucial determinant of pension funds' risk-appetite, their investment behaviour may be affected by other factors.

Shifts in overall risk-aversion remain an important determinant even for long-term institutional investors: "Well I think that most investors tend to look at EM as a very risky asset class. So when the crisis hits, the first thing that people do is trying to get out of the most risky asset classes. So this is really the main argument" (Danish interviewee 1).

These shifts may result from rational considerations, about the actual riskiness of these asset. In a crisis situation, EM assets are expected to fall more then other assets, and this may induce investors to shift away from EM: "whenever there's a crisis people will expect that EM will underperform DM, so they would have a tendency to cut their positions first and put them back in the DM in the short term and when markets start to improve or recover they go back into the EM again. " (UK interviewee 5)

The informational asymmetry explanation of herding and contagion also seems to be confirmed: "[these countries are] Far enough away that if there's going to be people closer to the ground they would know more than you will so if they are going down real fast probably better to be out of it" (Other interviewee 1). Information about EMs is less transparent and more difficult or costly to obtain. As the asset class starts to fall, this will induce people to follow the tide, as other - local - investors are perceived to be better informed about the situation. This pattern may be rational from the point of view of the investor but is clearly suboptimal

for the asset class.

Aside from these rational mechanism the evidence of other "less rational" behavioural mechanism is mixed:

> "We all know people overreact and oversell and become negative and the opposite end things appear to be going well people become overoptimistic so I guess if something is perceived to be 'a' more risky and 'b' more volatile and it's hard to quantify those risks inevitably when people become pessimistic and cautious overly anxious then these are the areas that tend to suffer the most" (UK interviewee 6).

This highlights a "pure panic" channel of transmission. Regardless of informational asymmetries that might exist, panic selling and herding behaviour are always present, "and you have good companies, good securities, being totally sold out just because investors are very scared to lose all of their capital, irrationally" (UK interviewee 3). This may be reinforced by non-professional nature of pension funds trustees: "as I said trustees are not really that professional in the investment markets, so when they see the pain and when they see the fall, they don't want this to happen again" (UK interviewee 5).

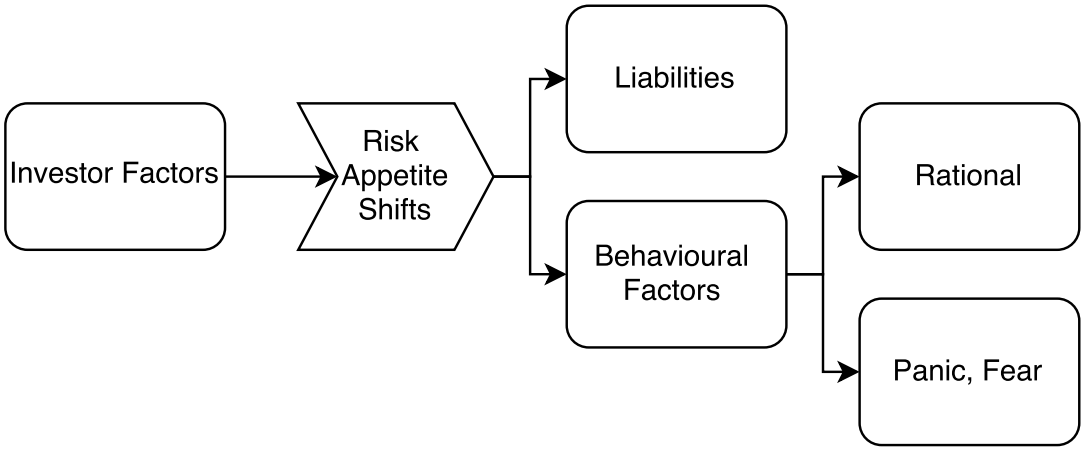
On the other hand most interviewees pointed out how pension funds do in fact remain less panic-prone and more stable investors than individuals. They make strategic investment allocation plans over the long-run, and tend not to be overly affected by short-term trends "pension funds are always long-term investors and they don't make asset allocation change due to market events or something" (Dutch interviewee 3), "pension funds in the most traditional model are very slow moving, and don't tend to make very big knee-jack asset allocation changes in any circumstances to be honest. Even in June 2008, the changes to investment strategy were fairly limited in the UK" (UK interviewee 1).

As short-run moves are likely to be uncommon in the pension fund sector, tendencies for herding behaviour come in a more indirect way, and tends to depend on the institutional structure of each country. In the UK, given the industry structure discussed in the previous section, with many funds reliant on the advise of a few investment consultancy companies, "the

advices tend to be common and those consultants are mostly saying the same thing, and also there is sort of an intellectual ideology about what is a sensible thing for a pension scheme to do, which is kind of difficult to break away from" (UK interviewee 2). The overall attitude to EM assets is therefore likely to find common themes, so that investment strategies including or excluding them are likely to be common across several funds, which could promote a form of long-term herding. Being for-profit businesses competing for pension fund clients, investment consultants and asset managers can on the other hand look at the practices of other companies in order to maintain or expand their market shares. Pension providers in Denmark, the large fiduciary management companies in the Netherlands and investment consultancies in the UK can therefore be subject to forms of herding behaviour in a more traditional sense.

It would therefore seem that, while certain elements of panic spread or rational shifts in risk-aversion remain, pension funds do seek to conform with their "long-term" nature. Shifts in their risk-appetite are much more likely to follow from regulation and liabilities rather than irrational "mood" or tactical decisions. Indeed short-term investment horizons, such as pro-cyclical selling of EM assets during a crisis, tend to be present only in countries where risk-based funding allocation force pension funds to act in such a way. Herding behaviour may nonetheless be present even within the pension fund sector, a situation that the reliance on external asset managers or fiduciary managers may worsen, to the extent that these are likely to compete with each other around common measures.

Figure 6.2: Investors' factors



6.4 Emerging Markets Assets Characteristics

The previous section discussed which investor's factors emerge as determinants of EM asset demand. These factors primarily affect the appetite for risky assets as a whole, including EM assets. In this section the factors affecting EM markets asset characteristics will be discussed. These will include both EM specific factors affecting risk and returns of their assets, and global "push" factors.

6.4.1 The complex relationship between returns and economic development

> "Clearly, the long-term case for investing in this area, the reason why we do so, is to generate attractive returns, and as things currently stand clearly EM offer relatively to the developed world reasonably good long-term growth prospects" (UK interviewee 4)

As part of the return-seeking portfolio, EM assets are expected to deliver higher returns to pension funds. Such returns are linked to the higher economic growth and development that emerging economies are supposed to achieve in the long-run, as they catch-up with developed economies.

There are however several possible ways through which economic development will translate into higher returns, and therefore different possible strategies that institutional investors may adopt. Some investors may follow a simple argument directly relates high economic growth to high returns: "I think the most common reason probably is individual investors clients want to gain access to high growth rates they see in EM. Typically investors equate higher growth rates with higher equity returns for example" (UK interviewee 3). Typically this is in the form of share appreciation: "I think what we generally see in what most people think is that the higher economic growth which leads to higher profits within the corporations therefore lead to higher share prices" (Dutch interviewee 2).

However interviewees were sceptical about this argument, as "historically economic growth

is not the best indicator of stock market returns and it's a limited indicator of bond returns"(UK interviewee 3). Economic growth may therefore generate interest in EM assets in other, more indirect ways.

Firstly, in pure scale terms, economic growth has made these countries too large to simply be ignored from a financial point of view: "they are about 44% of the world GDP, ... so you have to have a very good argument against EM, because you would be excluding a large part of the world". Since economic growth has often been accompanied by processes of financial liberalisation in many of these EMs, the investable EM spectrum has grown very rapidly and very quickly:

> "Ten years ago the equity market wasn't really open in a lot of ... EMs. Due to the fast growing economic nature of those countries, the market cap or the market value of those companies in the equity and also debt markets have increased quite substantially in the last few years ... So, the first reason to include them is opportunity: the opportunity set is getting bigger and bigger, markets are getting bigger" (UK interviewee 5).

A second way through which economic growth in EM may deliver attractive returns is currency appreciation:

> ".. but what we see when we research it is that all the structural changes in EM that become more and more developing leads to appreciation of the foreign exchange of the currencies. So I think most of the returns is made on the foreign exchange side side" (Dutch interviewee 2).

This view originates from the Balassa-Samuelson effect (Balassa, 1964; Samuelson, 1964), which predicts an appreciation of the real exchange rate in developing countries as a result of higher productivity gains: "if you believe in that convergence principle then you have to

buy into the fact that you should inevitably get some strengthening from the currency" (UK interviewee 6). Many interviewees pointed out that precisely to capture these FX gains, currency hedging is less common than investments in developed markets assets: "over the long term having currency exposure to EM currencies ought to be a net positive than net negative ... So it's a sort of another reason for not getting too much into hedging" (UK interviewee 2).

Finally, the growth prospects of EM is also believed to translate into potential for higher returns through the general low valuations of EM assets. Although this is arguably an important factor for all assets, the low starting valuations are very often a key element in explaining the rise of allocations to EM during the 2002-2008 period, and remains a point of attraction of EM assets in both the debt and equity markets:

> "So I think that the basic point, relatively to the developed world, although EM are more mature and are growing more slowly than they were in the 80's and 90's, you still have a combination of attractive growth and reasonable valuations" (UK interviewee 4).
>
> "For example in EM debt we see we can get yields, which we can't get in developed markets" (Danish interviewee 1).

Beside these common themes, the interviewees point to a rather complex relationship relating economic growth and development and returns in emerging countries. It is therefore not surprising that, at least for what concerns equities, funds may have very different types of strategies to capture EM returns:

> "you got very top-down macro-orientated strategies which may just look at the growth prospects of different companies, you might have thematic approaches, which may look for things such as demographics or natural resources, that sort of thing, and you got bottom-up approaches, which would actually look at the companies first and foremost in making investment decisions". (UK interviewee 1)

Indeed, when looking at EM assets, it is very important to be able to distinguish between the different companies and sectors. What may matter is the type of economic growth that EMs are having, and how this is reflected in the financial markets, as often these tend to be dominated by companies that are less likely to deliver consistent returns to investors. As a result, an active asset management strategy is generally preferred:

> "[EM stock markets] tend to be dominated by state-owned particularly in banks and resource stocks and what you get is a big concentration among resource-heavy companies, and this tends to be reflected in the market cap index. And when you get an index that is concentrated particularly on what you would characterise as less good quality companies, the oversight that you would get from an active perspective is what we'd like to see" (UK interviewee 6).

While the precise ways through which pension funds invest in EM depends on their size, with the bigger and more sophisticated funds having dedicated allocations and the smaller funds typically accessing them through global or multi-asset funds, an actively managed portfolio seem to be widely accepted as best practice across the board for both equities and bonds. Different fund managers implement the fund-specific strategies, which may significantly differ as discussed, but rarely follow simple market-capitalisation weightings. The increase in EM asset holdings by foreign institutional investors has grown in parallel with the growing importance of EM financial markets into the global financial markets, but does not seem to be a pure passive consequence of it.

In sum, European pension funds consider EM assets as part of their return-seeking strategy, and overall associate these expected returns to the good economic prospects of these countries. However, while common themes exist, especially with respect to long-run currency appreciation and low valuations, there is no single EM growth/returns narrative. As a result, most pension funds access these economies through actively managed funds, whose managers follow a wide range of different strategies. Moreover, as they develop, emerging countries differentiate themselves from one another, making the growth-returns links even less generalisable:

> "These countries are becoming quite big in terms of size and markets. So it's a very diverse asset class, therefore it's becoming harder and harder to generalise things, you cannot talk about one EM class" (Dutch interviewee 3)

It is therefore likely that, in seeking returns from EM, investors will look for even more differentiated strategies in the future.

An important caveat to this statement is however, while diverse, all these strategies ultimately depend on these countries growing in the long-run. The offset is that a general growth slowdown in EM is perceived as a potential threat for the asset class in the future: "if growth does disappoint in some of these economies then you could see some of these parts of these markets sell off" (Danish interviewee 2)

These findings highlight that investors have an idea about fundamental underlying factors driving their returns. However, the ways through which these fundamentals generate returns for investors are extremely complex, which generate a substantial diversity in the practical strategies adopted to achieve them. Nevertheless, if these fundamental factors would substantially change for the worse, or perceived to be so, interest in the asset class will likely decrease.

6.4.2 Domestic risks: Keynesian fundamentals and non-economic factors

As with any financial investment decision, the other side of the coin of potentially higher returns are the additional risks that EM assets bring. Standard risk/return considerations, such as market volatility certainly apply. However, as discussed in chapter 3, a monetary understanding of the process of international financial investment would point to a number of "Keynesian fundamentals" as determining the liquidity premium of EM currency, and therefore the attractiveness of EM assets. The interviewees seem to point broadly to three major areas of risks: financial markets risks, macroeconomic and macro-financial stability risks, and non-economic country risks.

Within the first group, there is unsurprisingly a standard financial argument about higher volatility of EM assets:

> "I did the analysis looking at the volatility of EM from 1994 to 2010 and what I found was that EM during that period were as volatile as they had ever been. Maybe the 2000's period was less than the 90's period if you break that down by decade, but what I found was that there were sill very high levels of standard deviation, very high levels of volatility, especially compared to developed market" (Other interviewee 1).

In order to be attractive, therefore EM need to produce high returns to justify these high levels of volatility. When in recent times, EM financial markets started to underperform, this quickly reduced the interest for these assets.

Another financial market concern is liquidity[83]. EM assets are in general perceived to be less liquid, which is also one of the reasons why they are more aggressively sold off during crises: "I think liquidity is one thing. Getting trapped into the asset class. EM are not as liquid as developed markets" (Other interviewee 2). Liquidity however changes within the asset class, with some areas clearly being less liquid than others, generating concerns:

> "Liquidity is clearly worse, the markets are less liquid. But it depends what you're doing. If you want to you can buy and sell Vanguard EM ETF or Ishares ETF for more or less nothing, so to get exposure in aggregate to EM is not an expensive or particularly illiquid thing to be doing. But clearly if you are buying individual stocks in frontier markets then it's a completely different question" (UK interviewee 2)

[83]It is noticeable how this was pointed out by all UK interviewees but none of the non-UK ones. It is not clear, by looking at the interviews, if and how this factor actually represent something concretely different across the different countries.

However, given their long-term orientation, market liquidity may not be a top concern for pension funds:

> "I think most pension schemes would like to think of themselves as reasonably long-term investors, who don't need short-term liquidity particularly. We are not a bank who suddenly needs to change its exposure, or a mutual fund that is suddenly going to be hit by lots of redemptions, we have a very clearly perspective as to what our cash flows are likely to be over the next 20 or 30 years, so we might want to change our mind on some things, and you might want to have some flexibility to do that. But ultimately we don't need that (UK interviewee 2)

A second class of risks that is closely monitored is macroeconomic and macro-financial stability. A first element within this category is represented by currency risk: EM currencies are more volatile and this volatility does in fact constitute most of the risk on EM bonds, according to some interviewees. As noted however, currency risk is not hedged against, partially because of the currency gains that would be lost, and partially because of the additional particularly high costs of hedging. In the case of EM bonds, hedging currency risks would not be a meaningful strategy given the existing alternative of investing in hard currency bonds: "If you buy a local currency bond and hedge out the currency risk then the returns would be literally almost the same as an equivalent hard currency bond. And you would think, what's the point to buy that?" (UK interviewee 5).

Beside currency swings, the overall external financial vulnerability of EM is closely monitored. This is a particularly important issue especially when looked from an historical perspective, as that used to be the defining vulnerability of EM, as it led to their financial crises in the 1990's. But the situation seems to have changed:

> "So if you compare with them now debts are way lower, and not only that but also throughout the years, also with the assistance IMF and the World Bank, they also learned how to be proactive and how to put some reserves on the side and they have accumulated a lot of reserves. When you look at them, some of those countries are net creditors rather than borrowers" (Dutch interviewee 3)

> "Central banks that are managed in a more sound way, and especially we have foreign exchange reserves that compared to GDP are three and six times what they were in the 90's in many countries" (Other interviewee 2)

There seems to be general agreement with the view that EM have become much less fragile to traditional external shocks originating in high external debts. The reforms and policies implemented allowed EM to "shift a substantial part of their issuance into local currency, borrowing in their own currency, and that gives a lot of leeway to manipulate their debt "badly", but at least they will be never forced to not to be able to pay" (Danish interviewee 2). These shifts have contributed to substantially alleviate the perceived systemic riskiness of these countries:

> "Systemic risk is still very very low. And that's something you have created over the last 10-15 years. And it's still there. If you start to play with that, then it will go. If you suddenly erode the reserves of Brazil or Indonesia, and you start questioning the governments' ability to pay their dues, then things will look remarkably different. And that has never come up, not even in 2013, that you could actually go to a point in time where they couldn't pay their dues. You will have some companies going bust, you will have a couple of banks going under, but the general story wouldn't totally dissolve. But in the 90's you had survival crises, when you had sovereign defaults in a lot of these countries, and you don't have that and I don't foresee that either" (Danish interviewee 2).

An exception to this could be the risk posed by high dollar-denominated debt accumulated by the corporate sector, especially as this interacts with global factors such as the USD appreciation. "There's a fear that EM corporates have borrowed too much US dollar denominated debt" (Other interviewee 1). This factor on the other hand can also be interpreted as a sign of financial maturity by EM: "now the corporates can borrow instead of the government, but

that's not necessarily a bad thing. They should, if they can borrow at a better rate and create growth" (Danish interviewee 2).

A third class of risks that emerges and really distinguish EM from developed markets are non-economic country risks. This can be divided into two subcategories. The first is political instability, which some interviewees pointed out as being a key risk when it comes to EM: "It really depends on what particular emerging market you are looking at, but of course the political risk is a risk that is very often high on the list and of course we have seen several cases where political issues have been become a problem for investments" (Danish interviewee 1). Political risks are unpredictable and can affect even core EM and override other risks, as interviewees pointed out by referring to the current situation in Russia:

> "what scared markets is the political and military escalation of the situation in Ukraine, now the sanctions, and the possibility of greater isolation of Russia. Despite the fact that Russia, among EM, is one of the countries with the highest GDP per capita, with the lowest external debt, with the highest FX reserves, with a record CA surplus - until last year - despite all these positive factors, it's been the worst EM currency" (Other interviewee 2).

The second non-economic risk factor that many interviewees referred relates to the lower quality of economic institutions of EM. Particularly when investing in equities, additional risks with respect to corporate governance or legal protection become important factors to consider. Indeed the increasing transparency of EM regulations and institutions has been an historically important factor contributing to the development of those countries. Choosing and finding the right manager is in this sense a more complicated task, which could be regarded as a risk itself: "one thing is how attractive is the underlying investment another thing how we implement this exposure to EM, and that sometimes involves elements of risk, finding the right manager and managing the exposure in the most optimal way is much easier in the developed world compared to EM" (Danish interviewee 2). These findings can be broadly interpreted as a confirmation that informational asymmetries and transaction costs are indeed an important

friction for foreign investors allocating their portfolio to EM.

However most investors agreed that non-economic risks, while extremely important, are very hard to to measure and therefore to "price":

> "A part of that is really how you judge geopolitical risks, and I think opinions differ very much: there are some managers who think that fundamentally Russia is undervalued, and if the situation normalises somewhat, then you should absolutely overweight Russia, whereas some others think that the geopolitical risk is so hard to judge that we rather go neutral or even underweight because we don't feel comfortable to make a call and that's due to geopolitical risks" (Dutch interviewee 2).

Indeed this reinforces the importance of having actively managed portfolios:

> "... corporate governance and additional risks, such as environmental issues as well as the extra volatility that's associated with EM because of issues around currency volatility, the importance of the role of policy makers in these regions and I guess the potential for corruption, there's a lot more risks at play that we think need to be captured, and they can be captured by an active managers who understands and knows the market and meet with managers and/or has the ability to analyse and understand companies' financial statements and that can be quantitative or qualitative mechanism or a combination of both" (UK interviewee 6).

These findings give credit to the view of EM asset risks as determined by factors that broadly overlap with post-Keynesian theories of asset prices and exchange rates, and the theoretical framework developed in chapter 3. The notion that currency volatility is a crucial risk factor in EM is in accordance with the idea of currency hierarchy: the lower position of EM currencies

in the hierarchy makes them more subject to volatile changes, a risk that investors expect to be rewarded with higher returns. The preoccupation with lower financial market liquidity, as the fear of being "trapped into the asset class", is also very closely connected to the Keynesian concept of liquidity, and the rise of liquidity preference during turbulent times.

Furthermore, it is very clear that what changed historically and determined a substantial increase in interest for EM assets is their improvement of their macro-financial stability. This view echoes clearly what Kaltenbrunner (2011, 2015) sees as a liability-side driven liquidity premium of EM currencies, and by extension EM assets: the accumulation of reserves, the reduction in external - especially foreign currency - debt, the reduction of government and current accounts deficits, all contribute to the ability of a country to "pay its dues". A generalised sell-off of EM assets could therefore result from a substantial reversal of these situation.

Finally, as for economic growth, while institutional investors do seem to care about three broad categories of fundamentals, which define the risk characteristics of EM assets, in practice these cannot be directly linked to unique indicators. In accordance with what discussed in the rest of this dissertation, foreign exchange reserves do seem to be a crucial variable in determining a country's macroeconomic stability. However, they are looked in conjunction with other variables such as "terms of trade, fiscal and monetary outlook" or current accounts. And even in their own terms, "what matters the internal flow dynamics, so it's never the just stock but the flow" (Other interviewee 2), i.e. it is not a simple snapshot indicator that matters, but its change over-time, its trend, and its relationship with other variables. Political risks, which seem to be a crucial factor, being non quantitative in measure are subject to even more interpretative troubles.

All this confirms the "Keynesian" nature of such fundamentals: the precise ways in which they are measured and considered changes over-time, according to market conditions and conventions. In these respects, the exercise of pinning down exchange rates and asset prices to single "fundamentals", as commonly done in macroeconomic models, is questionable.

6.4.3 External factors

Aside from domestic conditions, EM are also susceptible to external shocks, which may play an important role in investors' outlook about the attractiveness and future performance of the asset class.

Most interviewees referred to the Quantitative Easing and more in general the monetary policy outlook of the FED as a primary concern. This affects pension funds views about EM in a number of ways. The first is a standard comparison of the potential returns:

> "in relative terms the risk/return profile of EM has worsened compared to the risk-free. Because obviously with a 5% return with a volatility of 6-7% with the alternative of 0-1% returns is one thing, but if now the FED is saying that rates will have to increase to their natural levels within 2-3 years at around 3%, then of course 3% risk-free in dollars, so the global reserve currency and also the most stable one, makes 5-7% average returns of EM much less attractive" (Other interviewee 2)

US interest rates are the quintessential global risk-free returns and as a result of Quantitative Easing (QE) were effectively almost zero. A future with higher US interest rates makes EM much less attractive, as the troubles seen amidst the QE tapering announcements in 2013 showed: "So when the FED does decide to, not taper QE which has happened, reverse QE or when rates rise, that is going to knock on effect on EM. So with a rate rise scenario interest rates are going to go up and that's going to have a big effect on the global financial system. Money could and will flow out of the EM countries" (UK interviewee 3). On the other hand, some interviewees pointed out that, given the relatively slow transition into a period of higher US interest rates and lower global liquidity, this phenomenon "in a way has already been priced in, it's already happened. They started to withdraw QE in October 2013 so it's more than a year now" (UK interviewee 5). Nevertheless, investors remain concerned by a rate rise.

A rise in advanced countries' interest rates may impact on EM asset demand in several ways. Firstly directly, as the return spread becomes smaller and safe assets start yielding return after years of zero-interest rates, investors may simply revert to safer assets. This is

likely affect all risky assets, from equities and high-yield bonds, and include EM assets.

A rate rise may also have important indirect effects in EM markets. For example, the above-mentioned concern about US dollar denominated debts of EM companies becomes even more serious if coupled with rising interest rates and dollar appreciation: "as the dollar continues to appreciate and interest rates begin to rise, ... then that's going to put a big strain on EM corporates" (Other interviewee 1). Similar caveats however apply: "we have seen this coming for a while and therefore enough measures have been put in place and debt has been eased slightly so it won't have too much of a negative impact" (Other interviewee 1). These views echoes the contention of Fernández-Arias (1996) that credit-worthiness of a country is not purely determined by domestic fundamentals, but is itself dependent on external factors.

Another indirect effect of global interest rates, as it has been discussed throughout the thesis, is the interaction of low interest rates with pension funds liabilities. As discussed, higher interest rates are likely to increase all bond yields and thereby increase the discount rates used in the calculation of pensions' liabilities. Improved funding of pension funds around the world is going to have an impact on the exposure to risky assets, including EM assets.

In addition to the country-specific opportunities and concerns about economic growth, a more general growth slowdown will affect EM. Given the reliance on external trade, and their increasing integration in the global world markets, EM are likely to suffer from low growth. For example, a slowdown in China may quickly spill over to other EM: "China is one of the big issues that we see, because it is now 15% of global GDP and their trading partners are very much affected and there's a really big slowdown, and if our view on China changes that could change something" (Dutch interviewee 3). As reviewed, sustained growth is considered to be a crucial determinant of EM returns, so that a global slowdown is likely to reflect in a less positive outlook on EM.

Finally, EM remain exposed to commodity prices. The recent decline in oil prices impacts on EM growth and balance of payment prospects. Although the economic development of EM has allowed them to create an internal market and therefore diversify away from a purely export oriented growth strategy, many of them are still reliant on commodities as either net exporters or importers. Overall lower oil prices add to global growth, which improves the

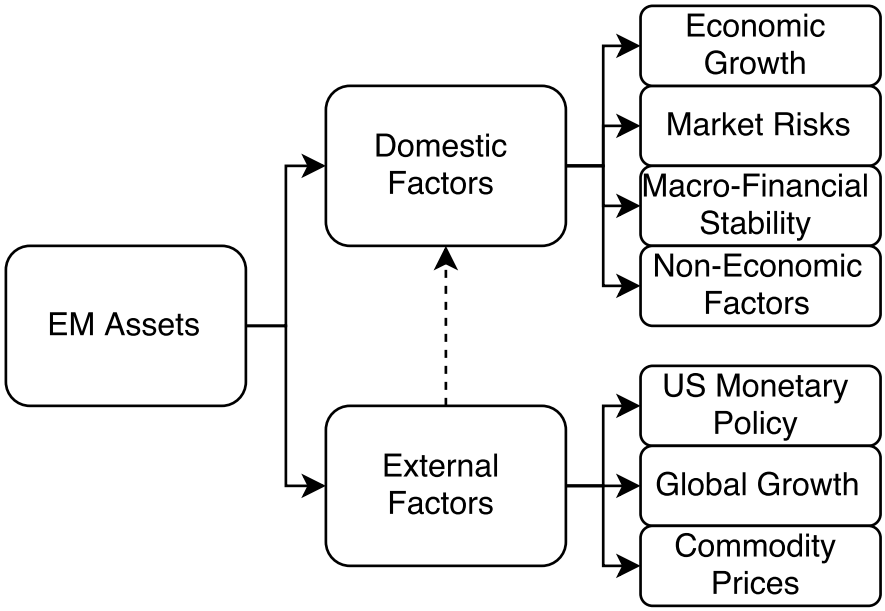
collective outlook. However interviewees pointed out that the impact of such a factor does not affect all countries in the same way:

> "Oil has changed a lot of the equations in the world, when the price came down from about 100$ to now about 40$. A lot of the countries got affected by this. But then some countries were badly hurt and some countries had a very nice boost, because they have been oil importers. Therefore, if you look at EM, the commodity exporters vs commodity importers, the equations have changed, some for the better some for the worse but does that change our outlook on overall EM, no it has changed markedly within the EM. But it doesn't change our view because this low oil price will add to global growth, although it will create risks in certain countries that are oil producers" (Dutch interviewee 3).

Overall, the evidence suggest that the traditional "push" factors - US interest rates, global growth, commodity prices - are important elements in European pension funds' assessment of EM assets. However, the overall impact of these factors depends on their interaction with country-specific conditions and investors risk-aversion. While higher interest rates in advanced countries are, directly or indirectly through a variety of channels, going to lower interest in EM assets, commodity prices may affect countries heterogeneously.

This once again underlines the complexity in interpreting the impact "push" and "pull" factors at the macroeconomic level. "Domestic fundamentals" are very often the combination of domestic conditions and global factors, e.g. a current account deficit may be the result of both the structure of the domestic economy and US interest rates or commodity prices. External factors and domestic factors are therefore often hard to be independently analysed, which serves as a reminder to not excessively engage in the separation of the competing impacts of "push" and "pull" factors.

Figure 6.3: Asset characteristics factors



6.5 Conclusion

This chapter has presented empirical evidence on European pension funds considerations when investing in EM assets. It has done this through the examination of semi-structured interviews with pension funds officers and investment consultants and managers working with pension funds in Europe.

These interviews confirm the centrality of liability-driven investment strategies in institutional investors' portfolio choice. Allocation to EM assets depend both the relative size of return-seeking vis-a-vis liability-matching assets, and the specific attractiveness of EM assets themselves. The former is effectively a measure of pension funds' risk appetite, which, as it has been argued throughout the dissertation and confirmed in the respondents answers, is crucially determined by liabilities themselves.

The way liabilities determine risk-appetite is however mediated by regulation. In Denmark and the Netherlands, where risk-based funding regulations are in place, there seems to be a non-linear relationship as underfunding implies on the one hand a higher need for returns, but on the other hand a smaller margin for increasing allocation to risky assets. In countries

with no such regulation, such as the UK, the relationship is more straightforward, and in line with the evidence of chapter 5: underfunding implies a higher need for return, and therefore a higher allocation to risky assets.

Other factors may affect risk-appetite of institutional investors, including panic and behavioural biases, a situation likely to become more serious as more pension funds rely on external managers to for an increasing part of their portfolio management functions. In this sense herding and short-term investments horizons may grow to the extent that EM assets become part of an increasingly "return-seeking" portfolio that is increasingly delegated in its daily management to firms that try to outcompete each other.

To be included in the return-seeking portfolio, EM assets also need to present an attractive risk/return profile. While economic growth seem to have a crucial but highly complex way in driving the attractiveness of emerging markets, liquidity at both the financial markets and macro-level factors seem to be closely monitored by European Pension funds. This is in line with the idea of "Keynesian fundamentals" as determinants of emerging market's currency liquidity, discussed in chapter 3. Indeed, it is on the improvements in macro-financial stability and their retention in the future that the continuing interest in EM as a return-seeking asset rests.

A crucial insight - and caveat - emerging from these interviews is the view that all these processes are rooted in the historical and institutional conditions of institutional investors. Regulation in particular, and the long-run maturity of many defined-benefits pension schemes, influence the way in which liabilities affect portfolio choice. Similarly the "Keynesian fundamentals" that matter for emerging markets are, since the crisis, closely related to monetary policy, given the "exceptionality" of the low-interest rates environment. Therefore, it is important to highlight that while the impact of liabilities and the importance of macro-financial stability are likely to be general results, the precise positive causal relationship, tested in the previous chapter, between underfunding and foreign exchange reserves levels and investments in emerging markets, may change in the future.

In the following chapter, the evidence presented in this and the past two chapters, will inform the construction of a theoretical Stock-Flow Consistent model, which will be used to

assess the macroeconomic implications of this dissertation theoretical and empirical observations.

Chapter 7

A Stock-Flow Consistent model of institutional investors and emerging markets

Introduction

This chapter presents a Stock-Flow Consistent (SFC) model of the interaction of emerging markets and institutional investors. As discussed in chapter 3, the approach is very well suited to understand the systemic implications of the evidence presented in the preceding chapters. SFC models are intrinsically monetary, explicitly tracking the balance sheets dynamics of the various macroeconomic sectors. This allows these models to take into account an explicit financial sector, which behaves according to behavioural rules of thumbs related to their financial conditions.

The model will therefore be used to assess the macroeconomic implications of institutional investors portfolio choice on emerging markets. Particular importance will be placed on the channels hypothesised and for which evidence was found, namely the funding levels of institutional investors and foreign exchange reserves as a measure of confidence in the currency

stability of emerging markets.

As discussed in the introductory chapter, the purpose of this model is to gain insights on the implications of the theory, research hypothesis and the empirical evidence presented so far. It is therefore not aimed at describing a general theory of capital flows and emerging markets economies, but rather to exploit the logic of SFC models to assess the importance of the empirical findings for the macroeconomic analysis of the demand for emerging markets (EM) assets by foreign institutional investors.

7.1 Stock-Flow Consistent models and the open-economy

As discussed in the rest of the dissertation, the integration of emerging markets into the global financial system has become ever more important in the past ten years or so. As reviewed in chapter 2, dynamic-stochastic general equilibrium (DSGE) have been developed to tackle such issues. These models, collectively fitting in the category of "international macro-finance", feature substantial innovations compared to the standard DSGE models, such as multiple assets in open-economy models, incomplete financial markets and informational asymmetries[84]. These models are able to capture some of the features of international financial conditions EMs, such as the simultaneous expansion of two-ways gross capital flows, which earlier models were not able to capture given their focus on current accounts. Devereux and Sutherland (2009) in particular find that EMs with a long-position in foreign bonds and a negative position in domestic portfolio equities and direct investments from abroad achieve a good degree of international risk-sharing.

DSGE models of this kind however typically have a Real Business Cycle core and therefore largely assume away monetary and financial considerations, with the resulting implications on the money supply and the exchange rate [85]. There is also no explicitly modeled financial sector, since the portfolio choice is made by households seeking to insure their consumption, nor a central bank, which leaves interest rates to be determined by what is effectively a loanable

[84]The inclusion of such features required the development of new techniques (Tille and van Wincoop, 2010; Devereux and Sutherland, 2011). See Pavlova and Rigobon (2010b) for a survey of the literature

[85]Devereux and Sutherland (2009) for example assume that the money supply of the home country grows at a constant rate and determines the price level through a quantity theory of money relationship, with a stochastic velocity term. There is no independent nominal exchange rate determination, as the money supply determined price level therefore also represents the ratio of the home country price to the foreign country price, i.e. the real exchange rate.

funds mechanism.

This is particularly inconsistent with the approach taken in this dissertation, which is based on a monetary and financial understanding of capital flows, and the portfolio choice by institutional investors in particular. Remarkably, this is also at odds with recent developments, discussed in chapter 2, in the literature on financial intermediaries as actors and risk-aversion and monetary policy as determinants of capital flows to EMs and global financial stability in general (Rey, 2013; Shin, 2013; Bruno and Shin, 2015).

For these reasons, this chapter develops an open-economy two-country Stock-Flow Consistent (SFC) model. These models, unlike real-business cycle models, are monetary from the start and explicitly include a financial sector, evaluating its role within a macroeconomic system. In the open-economy a key assumption is that financial assets are imperfect substitutes, so that asset allocation need not be equal across the world. As discussed in chapter 3, given the lower liquidity of EM currencies, it is likely that EM assets will be demanded in smaller quantities compared to those issued in advanced countries, something that cannot readily be featured in DSGE models which assume away money[86].

The standard reference for SFC models with open capital accounts is chapter 12 in Godley and Lavoie (2012), while several additional models have been developed to analyse different open-economy issues[87]. While this model draws substantially on the basic formulation, it presents several elements of novelty. Firstly, the relationship between the two countries is explicitly modeled as asymmetrical: aside from choosing different starting values for stocks and flows[88], only the advanced country invests in EM financial assets, whereas the EM foreign investments are confined to the central bank's holdings of foreign exchange reserves (FXR). This is in line with the evidence presented in chapter 4, where EM financial integration was found to be mostly driven by the liability side, i.e. investments from abroad, and their corresponding foreign holdings mostly held as FXR were largely a consequence of it.

Secondly, and most importantly, the advanced country features an institutional investors

[86] As discussed in chapter 2, imperfect asset substitution could be introduced as the result of informational asymmetries, other imperfections such as credit risk.

[87] See for example Lavoie and Zhao (2010); Lavoie and Daigle (2011); Mazier and Tiou-Tagba Aliti (2012); Bortz (2014). See Caverzasi and Godin (2015) for a more comprehensive survey of the SFC models literature, including open economy models.

[88] E.g. National income in the EM at the beginning of the simulation period is half the size of the advanced country.

sector. To the best knowledge of the author this is the first time this is included in a SFC model. As it will be shown, the sector works as a financial intermediary for the household sector, promising a fixed return on the claims households hold on them, and investing in financial assets to face those obligations. Their financial behaviour is characterised, amongst standard portfolio choice considerations, by the search for returns as high as to ensure their assets are enough to fulfill their long-term obligations. In other words, in line with what discussed in previous chapters, institutional investors seek to achieve and maintain a fully-funded status. Moreover, the role of FXR as a variable enhancing the perceived stability of a currency is also established. It is through institutional investors that international financial flows take places. Their portfolio choice is therefore a crucial variable determining the international financial dynamics of the model.

Finally, EMs' central banks invest in FXR, but in a way that does not result in either completely pegged nor flexible, exchange rate regime, but rather a managed float. This is similar to what is done in Mazier and Tiou-Tagba Aliti (2012), and is very much in line with the empirical reality of EMs, which in most cases have a managed/dirty floating exchange rate regime with the accumulation of vast FXR as a buffer of safety[89].

It will be shown that the combination of these elements can result in large swings in exchange rates and capital flows. As institutional investors responds to shocks that have an effect on both their financial assets and liabilities, their allocation EMs assets vis-à-vis advanced countries change which, considering their relative sizes, can result in notable changes in exchange rates. The macroeconomic implications on income and current accounts are also stressed. Moreover the simulation will highlight the stabilising impact of CB's in a floating exchange rate regime.

7.2 Accounting structure and general model features

Table 7.1 describes the balance sheet of the two countries. As discussed, there are five sectors in the advanced (ADV) country and four in the EM country. The additional sector in the ADV country is the institutional investor (Inst). Households in both countries only hold domestic bills and high powered money, issued respectively by their domestic governments and

[89] See for example Calvo and Reinhart (2002); Aizenman *et al.* (2010)

Table 7.1: Balance sheet

	ADV						EM			
	HH	Prod	Gov	CB	Inst	xr	HH	Prod	Gov	CB
Bills Adv	B_{adv_advh}		$-B_{adv}$	B_{adv_advcb}	B_{adv_inst}	xr				$B_{adv\_emcb} \cdot (1/xr)$
Bills Adv2	B_{adv2_advh}		-B_{adv2_advcb}	B_{adv2_advcb}	B_{adv2_inst}	xr				
Bills EM					$B_{em\_inst} \cdot xr$	xr	B_{em_emh}		$-B_{em\_emcb}$	B_{em_emcb}
Account Inst	Acc				$-Acc$	xr				
Money	H_{adv_advh}			$-H_{adv}$	H_{adv_inst}	xr	H_{em_emh}			$-H_{em}$
Net worth	$-V_{advh}$		$-NW_{advg}$	0	$-NW_{inst}$	xr	$-V_{emh}$		$-NW_{emg}$	$-NW_{emcb}$

central banks. Central banks hold domestic bills, and FXR in the EM country as discussed. The production sector is highly simplified, as in the chapter 12 model of Godley and Lavoie (2012): it does not represent an explicit firm sector and therefore it does not hold fixed capital goods.

The institutional investor sector allocates its assets between domestic B_{adv_inst}, foreign B_{em_inst} bills and cash - the residual asset - , and they also have the opportunity to invest in an additional advanced country bills B_{adv2_inst}, which offers a higher interest rate than the regular bills. These bills effectively take the role of of "risky"[90] domestic assets held by institutional investors, the implications of which will be discussed in the next section. Institutional investors' liabilities are in the form of accounts Acc held by households. These accounts yield benefit payments from the institutional investors sector to households.

Table 7.2 shows the flows between sectors occurring in one period. Given the simplified production structure households receive the whole national production as income, i.e. the sum of consumption, government expenditure plus the trade balance ($Y = C + G + X - IM$). There is no investment, as there is no fixed capital in the model, which implies that the model is a stationary state rather than growth model. Households also receive interest payments on the bills they hold. In addition to that, households receive benefits Ben from the institutional investor sector and pay contributions $Cont$ to it. The sum of these terms plus national income minus taxes represent households' disposable income, which it is used to finance consumption. The rest is saved and allocated across assets: domestic bills ($-\triangle B_{adv\_advh}$) and cash ($-\triangle H_{adv\_advh}$). Every year they also acquire (or lose) value in their accounts held with institutional investors ($-\triangle Acc$). This acquisition, as it will be shown, is connected to contributions made, and to avoid double counting the term is therefore added between brackets, meaning that it is not included in the column sum adding up to 0, but it is just a remind of the accounting change associated with it.

The governments of both countries behave in a standard way for SFC models. The receive tax revenue from households and central bank profits', and they use it to finance government expenditure and service their existing debt. They issue new bills to finance any deficits arising.

[90]The SFC approach so far has not substantially developed stochastic features, which could be applied to this context to give a numerical implication to this "risk". The risk on EM bills does on the other hand come into the model as exchange rate risk.

Table 7.2: Transaction Flows

	ADV					EM			
	HH	Prod	Gov	CB	Inst	HH	Prod	Gov	CB
Cons	$-C_{adv}$	$+C_{adv}$				$-C_{em}$	$+C_{em}$		
Govexp		$+G_{adv}$	$-G_{adv}$				$+G_{em}$	$-G_{em}$	
Trade		$-IM_{adv}$					$-IM_{em}$		
		$+X_{adv}$					$+X_{em}$		
GDP	$+Y_{adv}$	$-Y_{adv}$				$+Y_{em}$	$-Y_{em}$		
Tax	$-T_{adv}$		$+T_{adv}$			$-T_{em}$		$+T_{em}$	
Cont	$-Cont$				$+Cont$				
Ben	$+Ben$				$-Ben$				
Interest payments	$+r_{adv} \cdot B_{adv\_advh,-1}$		$-r_{adv} \cdot B_{adv1,-1}$ $-r_{adv2} \cdot B_{adv2,-1}$	$-r_{adv} \cdot B_{adv\_advcb,-1}$ $-r_{adv2} \cdot B_{adv2\_advcb,-1}$	$+r_{adv} \cdot B_{adv\_inst,-1}$ $+r_{em} \cdot B_{em\_inst,-1} \cdot xr$ $+r_{adv2} \cdot B_{adv2\_inst,-1}$	$+r_{em} \cdot B_{em\_emh,-1}$		$-r_{em} \cdot B_{em,-1}$	$+r_{adv} \cdot B_{adv\_emcb,-1} \cdot 1/xr$ $+r_{em} \cdot B_{em\_emcb,-1}$
CB prof			$+F_{advcb}$	$-F_{advcb}$				$+F_{emcb}$	$-F_{emcb}$
ΔMoney	$-\triangle H_{adv\_advh}$			$+\triangle H_{adv}$	$-\triangle H_{adv\_inst}$	$-\triangle H_{emh}$			$+\triangle H_{emh}$
ΔBills Adv	$-\triangle B_{adv\_advh}$		$+\triangle B_{adv}$	$-\triangle B_{adv\_advcb}$	$-\triangle B_{adv\_inst}$				$-\triangle B_{adv\_emcb} \cdot 1/xr$
ΔBills Em					$-\triangle B_{em\_inst} \cdot xr$	$-\triangle B_{em\_emh}$		$+\triangle B_{em}$	$-\triangle B_{em\_emcb}$
ΔBills2 Adv			$+\triangle B_{adv2}$	$-\triangle B_{adv2\_advcb}$	$-\triangle B_{adv2\_inst}$				
(ΔAcc)	$[-\triangle Acc]$				$[+\triangle Acc]$				
Total	0	0	0	0	0	0	0	0	0

Similarly central banks receive interest payments on the bills they hold, which they give to governments, issue cash and purchase government bills. The EM central bank, as discussed, purchase both ADV bills as FXR and EM bills. The only source of capital gains/losses are exchange rate swings. An appreciation of the EM currency vis-à-vis the ADV currency (i.e. an increase in xr), results in capital gains for ADV institutional investors on the bills they hold, and a capital loss on the EM central bank's FXR. For this reason a full revaluation matrix would be redundant. Institutional investors receive contributions from households, and interest payments on their domestic and foreign bills. They then purchase/sell across those assets. Once again, their liabilities from accounting standpoint increase by an amount that is exactly equal to the net acquisition of accounts by households.

The very simple structure of the real side of the economy of this model means that effectively many issues typical of post-Keynesian models, which SFC models are broadly part of, are missing. For example, assuming away a well specified firm sector implies that the issue of income distribution between capitalists and workers, and the associated issues of inflation and productivity are effectively assumed away. And similarly, the absence of firms and banks means that credit and "inside-money" issues are also absent. This clearly limits the realisticness of the set-up. However, as shown in Godley and Lavoie (2012), with open-economy models the number of equations starts to grow very quickly, greatly increasing their complexity at the expense of clarity. Furthermore, there are examples in which making similar assumptions about fixed prices and comparing the results after relaxing such assumptions did not result in substantial changes (Mazier and Tiou-Tagba Aliti, 2012). Insofar as the model has a theoretical-logical purpose and is not used for policy analysis, it is therefore preferable to make a few simplifying assumptions to gain on clarity and tractability.

7.3 Sectoral equations

7.3.1 Households

$$Cons_{adv} = \alpha_{0adv} + \alpha_{1adv} \cdot Yd^{exp}_{adv} + \alpha_{2adv} \cdot V_{adv,-1} \tag{7.1}$$

$$Cons_{em} = \alpha_{0em} + \alpha_{1em} \cdot Yd_{em}^{exp} + \alpha_{2em} \cdot V_{em,-1} \tag{7.2}$$

$$Yd_{adv} = Y_{adv} + Ben - Cont - T_{adv} + r_{adv} \cdot B_{adv\_advh,-1} \tag{7.3}$$

$$Yd_{em} = Y_{em} - T_{em} + r_{em} \cdot B_{em\_emh,-1} \tag{7.4}$$

$$Cont = \beta \cdot Y_{adv} \tag{7.5}$$

$$\triangle V_{adv} = Yd_{adv} - Cons_{adv} \tag{7.6}$$

$$\triangle V_{em} = Yd_{em} - Cons_{em} \tag{7.7}$$

$$B^{d}_{adv\_advh} = \mu_{adv} \cdot V_{adv} \tag{7.8}$$

$$H^{d}_{adv\_advh} = V_{adv} - B_{adv\_advh} \tag{7.9}$$

$$B^{d}_{em\_emh} = \mu_{em} \cdot V_{em} \tag{7.10}$$

$$H^{d}_{em} = V_{em} - B_{em\_emh} \tag{7.11}$$

As discussed households consume, and allocate their non consumed income to different assets. Households' consumption depends on expected disposable income (Yd^{exp}) and lagged wealth (V_{-1}), as shown in equation (7.1) and (7.2). Disposable income is total national income, minus taxes, plus interest payments, and in the case of advanced countries, contributions minus

benefits from institutional investors (equation (7.3) and (7.7)).

Households' wealth only changes as a result of net saving, since households in both countries do not hold any variable price assets, and therefore experience no capital gain/losses (equation (7.6) and (7.7)). They allocate wealth in fixed proportion to bills and cash (equations (12)-(15))[91].

Contributions in ADV are determined by the dynamics of the economy. equation (7.5) states that contributions are equal to a proportion β of current national income. It is easy to conceive such a relation in terms of a funded pension system: the proportion β is the contribution rate out of income that current workers have to pay in to their pension fund in order to accrue benefits. Much like taxes, this is an automatic deduction to current income. For this reason it is best to treat this as a cash-flow concept that is imposed onto households rather than part of their portfolio choice.

7.3.2 International trade and production

$$log(X_{adv}) = \epsilon_{oadv} + \epsilon_{1adv} \cdot log(xr) + \epsilon_{2adv} \cdot log(Y_{em}) \tag{7.12}$$

$$log(X_{em}) = \epsilon_{oem} + \epsilon_{1em} \cdot log(1/xr) + \epsilon_{2em} \cdot log(Y_{em}) \tag{7.13}$$

$$IM_{adv} = X_{em} \cdot xr \tag{7.14}$$

$$IM_{em} = X_{adv} \cdot 1/xr \tag{7.15}$$

$$Y_{adv} = Cons_{adv} + G_{adv} + X_{adv} - IM_{adv} \tag{7.16}$$

$$Y_{em} = Cons_{em} + G_{em} + X_{em} - IM_{em} \tag{7.17}$$

[91] Superscript s and d indicate demanded, and supplied.

In line with most SFC models, exports are determined by prices and income in logarithmic terms, so that parameters represent elasticities (equation (7.12) and (7.13)). However in this model, as the production process is simplified so that it does not feature flexible prices, the only relevant price is the nominal exchange rate[92]. As it is a two-country model, imports of a country are exactly equal to the exports of the other countries, as represented by the imports equations (7.14) and (7.15), which ensure the consistency of the accounting.

By construction the balance of payments of each country is as follows:

$$CA_{adv} = X_{adv} - IM_{adv} + r_{em} \cdot B_{em\_inst,-1} \cdot xr - r_{adv} \cdot B_{adv\_emcb,-1} \tag{7.18}$$

$$KA_{adv} = \triangle B_{adv\_emcb} - \triangle B_{em\_inst} \cdot xr \tag{7.19}$$

$$CA_{em} = X_{em} - IM_{em} + r_{adv} \cdot B_{adv\_emcb,-1} \cdot \frac{1}{xr} - r_{em} \cdot B_{em\_inst,-1} \tag{7.20}$$

$$KA_{em} = \triangle B_{em\_inst} - \triangle B_{adv\_emcb} \cdot \frac{1}{xr} \tag{7.21}$$

$$CA_{adv} = KA_{adv} \qquad CA_{em} = KA_{em}$$

The current account is the sum of the trade balance plus the net balance of interest payments on foreign assets and liabilities, while the capital account is the difference between the net purchase of assets minus the net incurrence of liabilities. Foreign holdings are only in the form of EM bills held by institutional investors, and FXR held by EM central banks.

7.3.3 Government and central bank

$$\triangle B^s_{adv} = G_{adv} + r_{adv} \cdot B^s_{adv,-1} + r_{adv2} \cdot B^s_{adv2} - T_{adv} - F_{advcb} \tag{7.22}$$

[92]The same is done in Mazier and Tiou-Tagba Aliti (2012, p. 364)

$$\triangle B^s_{em} = G_{em} + r_{em} \cdot B^s_{em,-1} - T_{em} - F_{emcb} \tag{7.23}$$

$$G_{adv} = \overline{G}_{adv} \tag{7.24}$$

$$G_{em} = \overline{G}_{em} \tag{7.25}$$

$$T_{adv} = \theta_{adv} \cdot Y_{adv} \tag{7.26}$$

$$T_{em} = \theta_{em} \cdot Y_{em} \tag{7.27}$$

$$F_{advcb} = r_{adv} \cdot B^s_{adv\_advcb} \tag{7.28}$$

$$F_{emcb} = r_{em} \cdot B^s_{em\_emcb} + r_{adv} \cdot B^s_{adv\_advcb} \cdot 1/xr \tag{7.29}$$

$$B^d_{adv\_advcb} = H^s_{adv} - B^d_{adv2\_advcb} \tag{7.30}$$

$$B^d_{adv2\_advcb} = B^s_{adv2} - B^s_{adv2\_inst} \tag{7.31}$$

$$\triangle B^d_{em\_emcb} = \triangle H^s_{em} - \triangle B^s_{adv\_emcb} \cdot 1/xr1 \tag{7.32}$$

$$B^s_{adv2} = \overline{B}^s_{adv2} \tag{7.33}$$

Equations (7.22) and (7.23) represent the government budget constraint: government expenditures plus interest payments, minus tax revenues and central bank profits, is equal to the

net issuance of government bills, which are assumed to be the only financing mechanism for governments[93]. Government expenditures are fixed (equations (7.24) and (7.25)), and taxes are a fixed proportion on current national income (equations (7.26) and (7.27)). Central banks receive interest payments on government bills they hold, and these profits are then transferred to governments (equations (7.28) and (7.29)).

Central banks balance sheets identities are expressed in equation (7.30) and (7.32). From equation (7.33), it can be seen that the high-yield asset's existing stock is constant, with the central bank acting as a dealer of last resort, depending on institutional investors' demand (7.31). Realistically, these securities should represent private sectors' liabilities, such as equities or corporate bonds. But under the simplified framework of this model, where the production sector has no fixed capital holdings, liabilities can only be issued by the government. The high-yield government bills could represent securities with a long-term maturity[94], or issued by other public sector bodies - e.g. agencies or local authorities-, which, given the higher default and/or holding risk, could justify the higher the higher returns.

7.3.4 Institutional investors

$$Acc = Acc_{-1} + Cont - \chi \cdot Acc_{-1} \tag{7.34}$$

$$Ben = Acc_{-1} \cdot \hat{r}_{inst} + \chi \cdot Acc_{-1} \tag{7.35}$$

$$V_{inst} = V_{inst,-1} + CF_{inst} + CG_{inst} \tag{7.36}$$

$$CF_{inst} = Cont - Ben + r_{em} \cdot B^{s}_{em\_inst,-1} \cdot xr + r_{adv} \cdot B^{s}_{adv\_inst,-1} + r_{adv2} \cdot B^{s}_{adv2,-1} \tag{7.37}$$

[93]This choice is made to avoid the complication of bond prices, which in the open economy would have considerably complicated the determination of exchange rates and asset prices.

[94]Indeed the addition of this bill has the same impact of long-term bonds in Godley and Lavoie (2012) chapter 4's model, at least for the case where central banks act to keep the price of such bonds fixed.

$$CG_{inst} = \triangle xr \cdot B^s_{em\_inst,-1} \tag{7.38}$$

$$r_{inst} = (r_{em} \cdot B^s_{em\_inst,-1} \cdot xr + r_{adv} \cdot B^s_{adv\_inst,-1} + r_{adv2} \cdot B^s_{adv2,-1} + CG_{inst})/V_{inst,-1} \tag{7.39}$$

Institutional investors are the key innovation of the model. As previously discussed, they receive contributions from the household sector and give them in return an account balance. Such accounts therefore accumulate with new contributions from households minus a proportion χ that is returned to households ((7.34)). Similarly, benefits are equal to the previous period outstanding balance in the accounts times a guaranteed return $\hat{r}_{inst}$, plus the same proportion χ ((7.35)).

The logic behind these equations is the following. Current workers pay contributions to build up their accounts with institutional investors. Institutional investors pay benefits to households, both by delivering the guaranteed returns, and by returning part of the account balance that workers have hitherto accumulated[95]. This latter element is again easily exemplified by a funded pension scheme: workers accumulate benefits entitlements, but these are drawn down as benefits are paid. Therefore, as a whole the household sector accumulates claims on institutional investors whenever their current contributions exceed the level of repayments, formally when $Cont = \beta \cdot Y_{adv} > \chi \cdot Acc_{-1}$. It is easy to see that this effectively occurs whenever national income increases from one period to another, i.e. in conditions of economic expansion: as contributions are directly proportional to current income, in a stationary setting they will increase above drawdown of past accounts only if income increases above the previous period's level. Equivalently, if the national income falls the level of contributions will keep falling, and as a whole the households sector will be losing its claims on institutional investors, as benefits are paid out[96].

Institutional investors assets are the sum of the previous period's assets, plus the net cash

[95] Logically this is very similar to a loan with repayments on the principal, with households being the lender and institutional investors the borrower.

[96] This suggests an interpretation of χ as a measure of longevity of the population: the higher it is the longer it takes for accounts to be drawn down.

flows balance, plus/minus capital gains/losses (equation (7.36)). The cash flow of institutional investors is the balance between benefits and contributions, plus investment income, i.e. interest payments on their domestic and foreign bills holdings (equation(7.37)). Capital gains only occur as a result of exchange rate swings (equation (7.38)). The actual rate of return of institutional investors is equal to investment income and capital gains over previous period wealth (equation (7.39)). It is intuitive to see that institutional investors assets and liabilities can differ, insofar as their rate of return r_{inst} differs from the one they guaranteed $\hat{r}_{inst}$ [97].

$$PBO = Acc \cdot \frac{(1+\hat{r}_{inst})^{t_{pbo}}}{(1+r_{pbo})^{t_{pbo}}} \tag{7.40}$$

$$r_{pbo} = r_{adv} + \tau \tag{7.41}$$

$$fg = 1 - \frac{V_{inst}}{PBO} \tag{7.42}$$

Equations (7.40), (7.41) and (7.42) define the accounting valuations of institutional investors' liabilities. Institutional investors such as pension funds and insurers, typically estimate their liabilities by discounting the future value of benefits. Aside from making assumptions about the future value of benefits/premia to be paid, a key variable to be chosen is the discount rate. This is very often closely related to a highly-rated bond yield. In this model the benefits calculation is simplified, and only depends recursively on the previous year accounts' balance. Projected benefits obligations (PBO) therefore are approximated with a 10-year forward looking rule-of-thumb, calculated as end of period's accounts, carried forward by maturing t_{pbo} years at the rate $\hat{r}_{inst}$ and discounted back with the r_{pbo} discount rate (equation (7.40)). The discount rate is a simple markup over interest rates on bills (equation (7.41)).

[97] This can also be shown formally. By merging (7.34) and (7.35) the following is obtained:

$$Acc = Acc_{-1} \cdot (1+\hat{r}_{inst}) + Cont - Ben$$

and likewise by replacing (7.37) and (7.38) into (7.36), and making use of the relationship expressed by (7.39), the following is obtained:

$$V_{inst} = V_{inst,-1} \cdot (1+r_{inst}) + Cont - Ben$$

The funding gap (fg) measures the magnitude of the deviation from full funding, i.e. when current assets are equal to PBO (equation (7.42)).

$$\frac{B^d_{adv\_inst}}{V^{exp}_{inst}} = \lambda_0 - \lambda_1 fg + \lambda_2 \cdot r_{adv} \tag{7.43}$$

$$\frac{B^d_{em\_inst}}{V^{exp}_{inst}} = [(1-\lambda_0) + \lambda_1 fg - \lambda_2 \cdot r_{adv}] \cdot \left[(1-\lambda_{01}) + \lambda_{02} \cdot r_{em} - \lambda_{03} \cdot r_{adv2} + \lambda_{04} \cdot \left(\frac{B^s_{adv\_emcb} - \bar{B}^s_{adv\_emcb}}{\bar{B}^s_{adv\_emcb}} \right) \right] \tag{7.44}$$

$$\frac{B^d_{adv2\_inst}}{V^{exp}_{inst}} = [(1-\lambda_0) + \lambda_1 fg - \lambda_2 \cdot r_{adv}] \cdot \left[\lambda_{01} - \lambda_{02} \cdot r_{em} + \lambda_{03} \cdot r_{adv2} - \lambda_{04} \left(\frac{B^s_{adv\_emcb} - \bar{B}^s_{adv\_emcb}}{\bar{B}^s_{adv\_emcb}} \right) \right] \tag{7.45}$$

$$H^d_{adv\_inst} = V_{inst} - B^s_{em\_inst} \cdot xr - B^s_{adv\_inst} - B^s_{adv2\_inst} \tag{7.46}$$

Equations (7.44), (7.43) and (7.46) define the asset allocation of institutional investors. The general structure is the standard Tobinesque portfolio choice mechanism typical of all SFC models, with a decomposition of EM returns into a interest rate plus expected exchange rate appreciation (dxr^{exp}). However, in line with this dissertation, the portfolio choice follows a liability-driven investment mechanism[98].

As discussed in previous chapters, a primary consequence of this framework is to split the portfolio into two parts, a liability-matching portfolio, whose goal is to protect the current value of the fund's assets from risks - e.g. changes in interest rates -, and a return-seeking portfolio, with the purpose of generating returns sufficient to fulfill those obligations. While government-bonds are typically the only asset included in the liability-matching portfolio, any risky asset can potentially be included in the return-seeking portfolio. In this model the return-seeking portfolio consist of high-yield bills and emerging market bills.

Portfolio choice is in this sense a two-step procedure. In the first stage institutional investors decide how much to allocate to domestic bills and how much to the return-seeking portfolio,

[98] See Appendix for further details on the equations.

which depends on two factors. The first is the impact of their funding gap fg, which has a positive impact on the allocation to return-seeking assets[99]. The higher the gap, the higher the need for returns to fill such a gap and therefore the higher the allocation to higher-yielding assets. The second is the level of base interest rates - what is measured by the impact of λ_2 -, which can be interpreted as both a return factor, which makes domestic bills more attractive by definition, but also as a risk-appetite factor: as the literature reviewed in chapter 2 discusses, monetary policy is the crucial determinant of the overall level of investors risk-appetite, generating an in inverse relationship between the policy rates and risk-taking.

In the second stage they decide the composition of the return-seeking portfolio, i.e. they allocate assets between EM and high yield ADV bills, depending on their relative characteristics. Such characteristics are the usual linear combination of returns, plus the component is the element in brackets after λ_4, which represents the impact of FXR. As discussed throughout the dissertation, FXR are seen as an element that increases the systemic liquidity of EM currencies, and therefore accumulating them makes EM bills more attractive vis-a-vis high-yield advanced countries' bills. The positive parameter λ_4 is supposed to capture this relationship: whenever FXR are higher than a set level - $B^{\bar{s}}_{adv}$ allocations to EM increases.

Realised cash holdings, as in all SFC models, are the residual element from asset allocation.

7.3.5 Asset supplies and exchange rate regime closure

$$H^s_{adv} = H^d_{adv\_inst} + H^d_{adv\_adh} \tag{7.47}$$

$$H^s_{em} = H^d_{em\_emh} \tag{7.48}$$

$$B^s_{adv\_advh} = B^d_{adv\_advh} \tag{7.49}$$

$$B^s_{adv\_inst} = B^d_{adv\_inst} \tag{7.50}$$

[99]This is implicitly assuming no risk-based funding regulation.

$$B^s_{adv2\_inst} = B^d_{adv2\_inst} \tag{7.51}$$

$$B^s_{em\_emh} = B^d_{em\_emh} \tag{7.52}$$

$$B^s_{adv\_advcb} = B^d_{adv\_advcb} \tag{7.53}$$

$$B^s_{em\_emcb} = B^d_{em\_emcb} \tag{7.54}$$

Equations (7.47) to (7.53) describe asset supplies. Households and institutional investors achieve their desired levels of domestic bills holdings, and cash is supplied on demand. Central banks also purchase as much bills as they need.

$$xr = \frac{B^d_{em\_inst}}{B^s_{em\_inst}} \tag{7.55}$$

$$B^s_{em\_inst} = B^s_{em} - B^s_{em\_emcb} - B^s_{em\_emh} \tag{7.56}$$

$$\triangle B^s_{adv\_emcb} = \gamma_1 \cdot \triangle B^d_{em\_inst} \tag{7.57a}$$

$$\triangle B^s_{adv\_emcb} = \gamma_2 \cdot \triangle Y_{em} \cdot xr \tag{7.57b}$$

$$B^s_{adv\_emcb} = \bar{B}^s_{adv\_emcb} \tag{7.57c}$$

The above equations define the exchange rate, and FXR accumulation by the EM central bank, and together determine the closure of the system. The exchange rate is determined in the EM bills market, depending on the relative excess demand or supply by foreign institutional investors (equation (7.55)). The supply of EM bills to institutional investors $B^s_{em\_inst}$ depends

on the total supply minus domestic demand, and therefore crucially depends on the holdings of the central bank, and its FXR level. Therefore the three different closures of the system are determined by equation (7.57), which represent different behaviours by the EM central bank with respect to its accumulation of FXR. Equations (7.57a) and (7.57b) show two different versions of a managed floating regime: in the first one, which represent the baseline scenario, the central bank simply tries to counterbalance part of the private capital inflows coming from abroad, effectively trying to avoid excessive volatility of the exchange rate and create a buffer against the new liabilities of the country; in the second one the central bank FXR increase with GDP expressed in foreign currency[100]. Equation (7.57c) represent a pure floating exchange rate regime, where the level of FXR is constant.

A fixed exchange rate regime has been deliberately discarded as it is a non-realistic description of current exchange rate arrangements for the great majority of EM economies[101]. A pure float is also quite uncommon in EM countries, but it is used as a control case to see the effect of foreign exchange intervention.

7.3.6 Expectations

$$V_{inst}^{exp} = V_{inst,-1} + CF_{inst,-1} \tag{7.58}$$

$$Yd_{adv}^{exp} = Yd_{adv,-1}^{exp} + \phi(Yd_{adv,-1} - Yd_{adv,-1}^{exp})\{7.59\} \tag{7.57}$$

$$Yd_{em}^{exp} = Yd_{em,-1}^{exp} + \phi(Yd_{em,-1} - Yd_{em,-1}^{exp})\{7.60\} \tag{7.58}$$

$$dxr^{exp} = \bar{dxr}^{exp}\{7.61\} \tag{7.59}$$

Expectations are treated in a rather simplified way. Institutional investors' wealth expectations are equal to the previous period's value plus the previous period's cash flow (equation

[100]This is chosen for convenience, different values such as a fixed ratio to imports, showed no substantial differences.
[101]See Ghosh *et al.* (2015)

(7.58)). Households' disposable income expectations follow a standard adaptive process (equation (7.57) and (7.58)). Following chapter 12 model in Godley and Lavoie (2012), there are no specified expectations about the exchange rate value, but only expectations about appreciation/deprecation, which is zero on average.

7.4 Initial values and stationary steady state

The structure of the model is now complete. With 60 equations (excluding a number of "control" equations which have no causal role but only serve to track the evolution of other variables) and 104 variables, the model is relatively compact, considering it features two economy and the addition of new sector [102]. This is mostly due to the simplifications on trade and production, with no separate equations for 'real' values, which would effectively almost double the amount of existing equations.

As with all SFC models, values for parameters, exogenous variables and the initial values for the endogenous variables had to be chosen. What follows is a brief overview of some of these choices, also presented schematically in Table 7.3. As a general choice method, most parameters were chosen with values in line with those of the SFC literature, or using stylised facts from the empirical evidence. Moreover, these values have to comply with the stationary steady state of the model, which forms the baseline scenario.

[102] The model in chapter 12 of Godley and Lavoie (2012) has over 90 equations.

Table 7.3: Parameters and variables values

Parameter	Value	Exogenous variables	Value
α_{1adv}	0.8	G_{adv}	300
α_{2adv}	0.15	G_{em}	150
α_{1em}	0.8	r_{adv}	0.025
α_{2em}	0.14	r_{em}	0.05
β	0.05	$\hat{r}_{inst}$	0.033
μ_{adv}	1/6	Initial values endogenous variables	
μ_{em}	0.2	Y_{adv}	1000
θ_{adv}	0.3245	Y_{em}	500
θ_{em}	0.31	B^s_{adv}	1200
χ	0.075	B^s_{em}	400
τ	0.005	B^s_{adv2}	166.667
λ_0	0.6	H^s_{adv}	500
λ_1	3	H^s_{em}	300
λ_2	5	xr	1
λ_{01}	0.625	Acc	666.667
λ_{02}	4.2	V_{inst}	666.667
λ_{03}	5	$\bar{dxr}^{exp}$	0
λ_{04}	0		
γ_1	0.5		
γ_2	0.4		
ϕ	0.3		
$\epsilon_{1adv} = \epsilon_{1em}$	0.7		
$\epsilon_{2adv} = \epsilon_{2em}$	1		

In a stationary state there should be not changes in balance sheets, and therefore no net saving. As a result, the α parameters determining consumption are chosen with values very close to Godley and Lavoie (2012), but slightly higher to ensure that $Yd = Cons$ in both countries. Asset allocation of households was chosen to consist mostly in cash holdings, since ADV households hold much of their financial assets indirectly through institutional investors, and EM households being from a non-advanced country do not invest much in financial markets.

The portfolio allocation of institutional investors has been chosen to be heavily skewed towards advanced countries bills - 60% to B_{adv}, 25% to B_{adv2} and 15% B_{em}. These parameters result in a 60-40 allocation to liability-matching vs return seeking assets, and also reflect the well known phenomenon of home-bias. The behavioural parameters λ determining such allocation were chosen to values close to 5, as in Godley and Lavoie (2012). The funding gap parameter λ_1, was chosen to be smaller than the returns parameter. λ_4 was chosen to be zero

in the baseline case, but will be activated in alternative scenarios to assess its impact.

Parameters β and χ were chosen to be 0.05 and 0.0875. This was a rather arbitrary choice, but reasonable considering it implies a stationary pension fund balance sheet - i.e. a funding gap equal to zero - with a 5% contribution rate in the baseline steady state. Tax to GDP parameters θ are higher than those chosen by Godley and Lavoie (2012), but are actually much closer to the OECD average level of 33.7% as of 2012[103]. Chosen values for elasticity parameters to trade ϵ are the same as in Godley and Lavoie (2012).

Interest rates were chosen to be 2.5% in ADV, 4.2% for the high-yield ADV bill, and 5% in EM. Again this is to reflect the existing reality of bonds issued in emerging markets promising a higher yield. The guaranteed rate of return $\hat{r}_{inst}$ on institutional investors' account is 3.3%, chosen to ensure a higher rate than domestic government bills. The parameter τ is 0.05, a spread over the ADV' interest rate. This implies that in the baseline steady state $\hat{r}_{inst} = r_{inst} = r_{pbo}$ and likewise $V_{inst} = Acc = PB$.

Values chosen for γ_1 is again rather arbitrarily chosen expressing that the EM central bank will purchase FXR by exactly half the amount by which EM's foreign liabilities increase in foreign currency terms in the baseline scenario. The value chosen for γ_2 on the other hand is very much in line with the data, e.g. the average of developing Asia FXR to GDP was 40% in 2008 (Park and Estrada, 2009).

The supply of financial assets was also chosen to respect existing stylised facts. Public debt to GDP levels are higher in ADV than in EM, although government expenditures are more or less the same. ADV's GDP is twice as big as EM's. The size of the institutional investors sector is slightly smaller than in the real world, e.g. the OECD average for pension funds' assets to GDP is 86%[104] compared to 66.67% of the model. This is essentially due to the absence of a production sector supplying equities, which would be otherwise push up the holdings of institutional investors[105].

[103] Source: OECDstat
[104] Source: OECDstats
[105] Without changing the structure of the model, increasing the size of the institutional investors' sector would also be unfeasible, as it would require the increase in the supply of either cash, or bills, which would make the model asset to GDP levels implausibly high, or reduce institutional investors return below the base interest rate.

In the simulation exercises, the value of some of these parameters will be changed, as means of a robustness check. Especially those parameters expressing the most crucial and/or novel relationships, such as λ_1 and γ_1 will be tested with different values, as to ensure the model's result are not only a reflection of the initial choice of the parameters' values.

7.5 Simulation

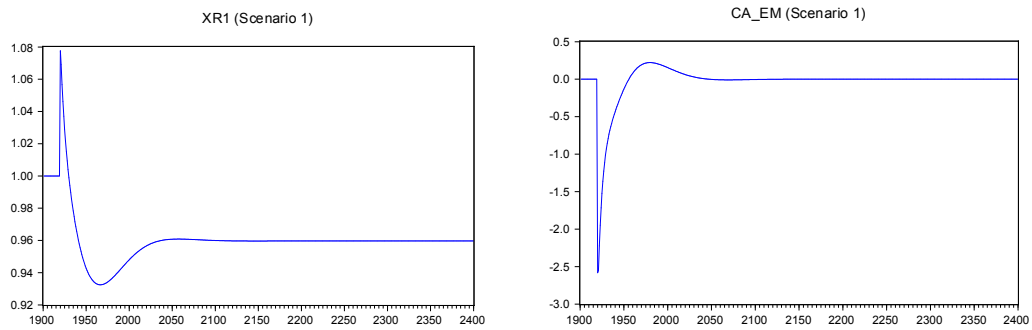
Three different scenarios are generated, where the baseline model - the stationary case - is shocked by modifying the value of exogenous variables or parameters. All the scenarios are simulated for 500 periods. The main variable of interest will be the exchange rate, as it effectively summarises how most of the other variables will change.

7.5.1 Scenario 1: emerging markets' growth story

In the first scenario, the λ_{01} parameter is shocked downwards, thus increasing the allocation to EM bills within the return-seeking portfolio. The interpretation of such a change is that institutional investors see potential in the EM assets, following for example a new positive outlook for the future of the country, or simply because they find information about it more accessible, and therefore are induced to increase their allocation to EM bills.

The initial effect on the exchange rate is straightforward: as shown in Figure 7.1, there is an initial spike in the exchange rate, since the higher allocation to EM bills generate excess demand and, through (7.55), an appreciation of the EM currency. The appreciation generates a trade deficit (Figure 7.2), which in turn generates a government deficit, increasing the supply of government bills. The excess supply of government bills generates a depreciation of the exchange rate, and over time improves the trade balance and eventually the current account balance, which registers a surplus. As a result the excess supply of government bills reverses, the exchange rate appreciates until it stabilises at a new lower equilibrium level.

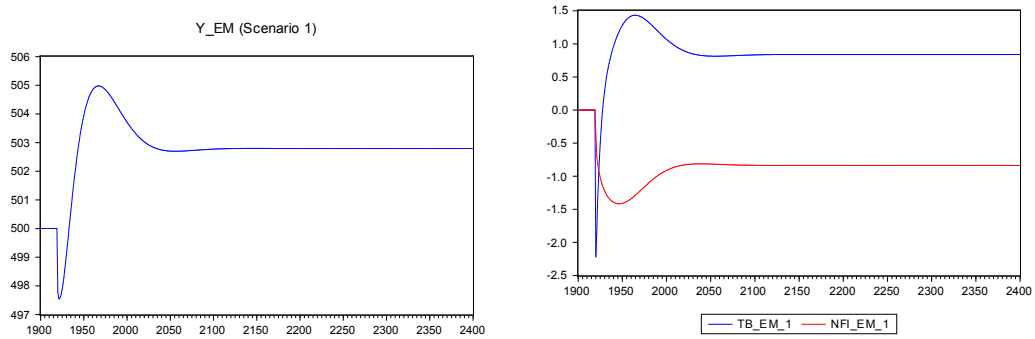
Figure 7.1: Exchange rate and funding gap



Response of the exchange rate and EM current account after an increase in desire to hold EM bills

At the new lower level for the exchange rate, the trade balance is in a surplus, and as a result GDP is also at a higher equilibrium level (Figure 7.2). As the current account is in balance, the trade surplus is offset by a net factor income deficit. Despite the higher level of reserves held by the central bank, the increased allocations to EM by foreign institutional investors generate a higher foreign debt level, therefore worsening the net factor income surplus.

Figure 7.2: GDP and current account components

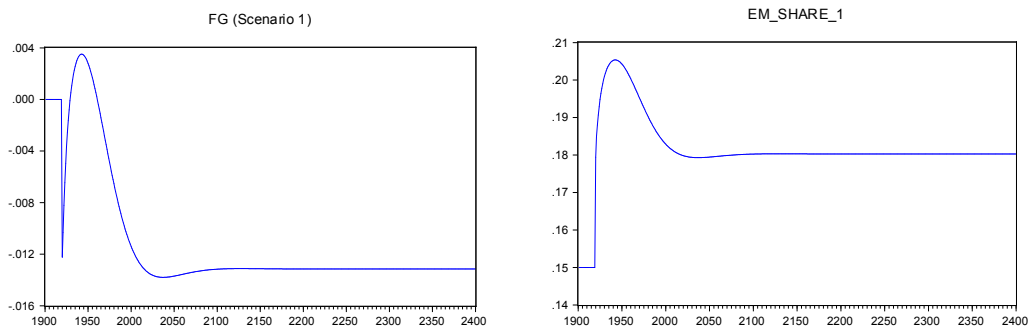


Response of GDP, trade balance and net factor income after an increase in the desire to hold EM bills

A key force shaping the dynamics of the system is the funding gap on portfolio choice (Figure 7.3). The initial increase is allocation to EM bills is mitigated by the effect of the funding gap: the higher returns initially earned by institutional investors, due to exchange rate appreciation and higher income returns as a result of the portfolio shift, improve the funding

levels of the sector. The result of this process is that the exchange rate initially appreciates by less than in it would have been with households investors, therefore generating a smaller current account deficit. After the initial shock however, due to the lower funding gap levels institutional investors starts selling their EM positions, thus putting downward pressure on the exchange rate. This improves the trade balance, which, despite being smaller than it would have been in a situation without institutional investors is able to push the EM current account into a surplus. This is due to the lower debt levels originated at the beginning of the shock period, which generated a much smaller debt servicing burden, thereby lowering the borrowing requirements of the government, and lowering the increase in foreign debt payments. The resulting current account surplus effectively induces a shortage of EM assets, which increases the exchange rate through (7.55). Notably, the new equilibrium level has a negative funding gap, i.e. a funding surplus.

Figure 7.3: Funding gap and share of EM bills



Effect on the funding gap and the share of EM government bills in the portfolio of institutional investors, after an increase in the desire to hold EM bills

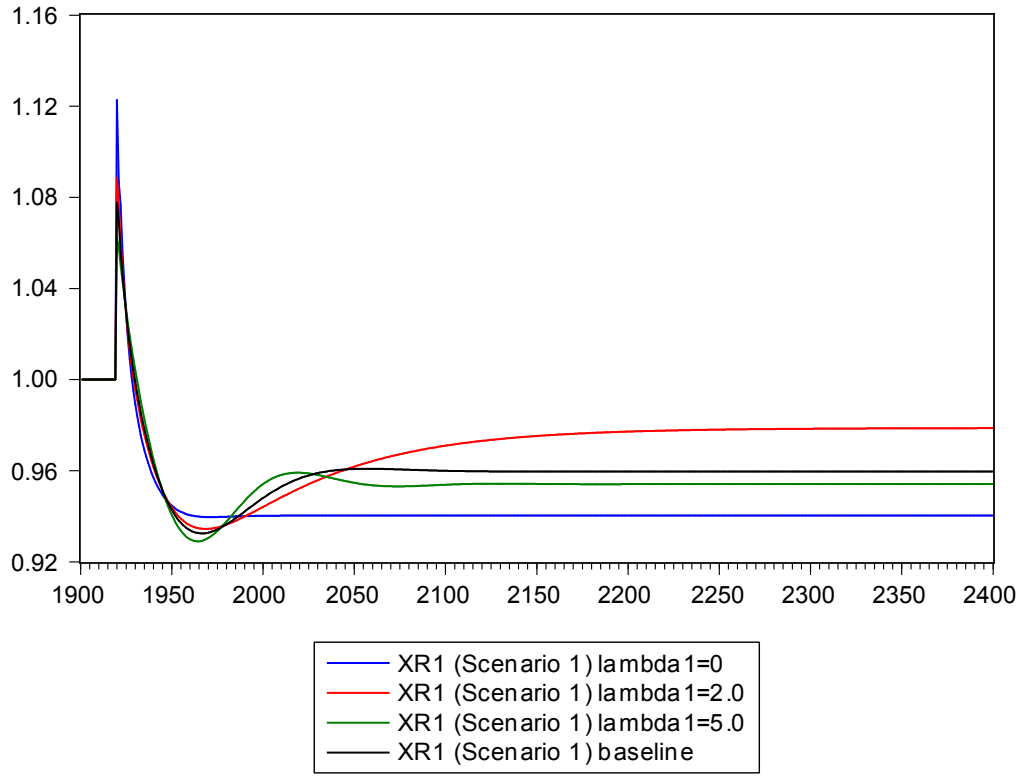
Given the importance of the funding gap, it is important to study the sensitiveness of the system the value of the parameter λ_1. This is shown in Figure 7.4. The result is clear: the higher the value of λ_1 the smaller the magnitude of the swings in the short-run and the lower equilibrium level of the exchange rate. A higher λ_1 represents a higher willingness of institutional investors to closely stick to a full funding level ($fg = 0$), as a result any action resulting in a deviation from it will induce counterbalancing moves, hence dampening their impact. Therefore with a very high λ_1 the asset allocation will change little in both the short

and the long-run, and the funding gap will remain closer to zero. It is not surprising therefore that, conversely, with $\lambda_1 = 2$ the magnitude of the swings is bigger, therefore amplifying the chain of events describe in the previous paragraph, and ultimately inducing a higher equilibrium exchange rate level.

Finally note the comparison with the $\lambda_1 = 0$, the case where institutional investors act as simple intermediaries distributing all returns as they achieve them[106]. The case shown with the $\lambda_1 = 0$ in Figure 7.4, shows effectively the same chain of events that can be obtained as a result of a similar shock in Godley and Lavoie (2012): after a liquidity preference shock, the initial response of the system is the same, with a sudden spike in the exchange rate and then a depreciation following a current account deficit. However the exchange rate falls to a stabilise at a lower level, compared to all the other cases. This is due to the higher initial appreciation, giving rise to higher external debt, which in turn requires a lower exchange rate and a higher trade surplus to face the higher net factor income deficit. The counterbalancing force given by the funding levels, which contains the initial increase in allocation to EM bills, results in less sharp movements of the exchange rate, both in the short-run (the initial appreciation) and the long-run (the higher new steady state exchange rate).

[106]This is obtained by simply replacing $r_{inst} = \hat{r}_{inst} = r_{pbo}$in all equations, and $\lambda_1 = 0$.

Figure 7.4: Exchange rate



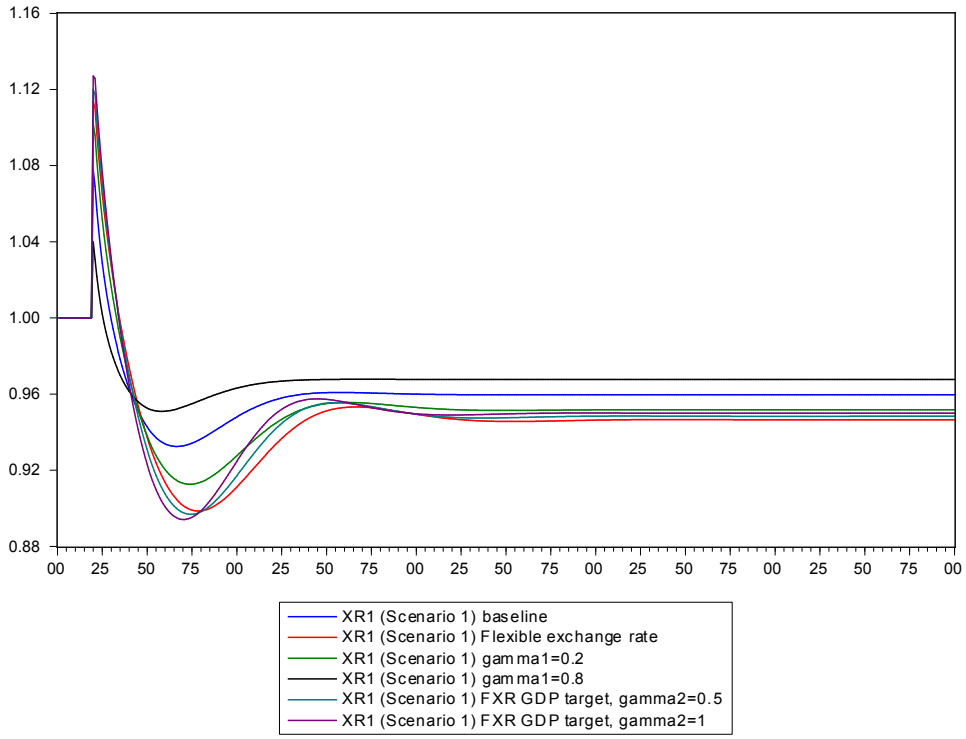
Response of the exchange rate under different assumptions for λ_1, the portfolio choice sensitivity to funding levels, after an increase in desire to hold EM bills

So far the simulations have been made under the exchange rate regime described by 7.57a, with the baseline parameter values. Figure 7.5 shows what would happen under different values for γ_1, under a FXR accumulation regime targeting GDP growth as in 7.57b, and under a flexible exchange rate regime.

Qualitatively the results are very similar under the three regimes. However the EM central bank seems to be more successful at realising its intents when accumulating FXR according to 7.57a, i.e. targeting capital inflows. Under this regime, the exchange rate movements are substantially dampened compared to the flexible exchange rate regime, and the adjustment quicker. Unsurprisingly, this stabilizing impact is higher the higher parameter γ_1 is. The GDP target seems to be on the other hand less successful as a stabilising working rule for central

banks: in the short-run it fails to substantially contain the initial appreciation, and even amplifies the subsequent fall, although it does stabilise the exchange rate at a less depreciated level than in the pure floating case.

Figure 7.5: Exchange rate under different regimes



Response of the exchange rate, under different exchange rate regimes after an increase in desire to hold EM bills

The advantage of having a managed floating exchange rate regime is clear by looking at these dynamics. It gives the central bank the opportunity to accumulate FXR, without having to resort to a pegged exchange rate, which may be risky for EM central banks that are facing balance of payments deficits. Following a simple rule of thumb, like purchasing and selling FXR in accordance to capital inflows and outflows may well be useful policy strategy: as the simulations suggest a "path-dependence" for the system as a whole, and in particular for exchange rate movements - the smaller the initial appreciation, the smaller the subsequent

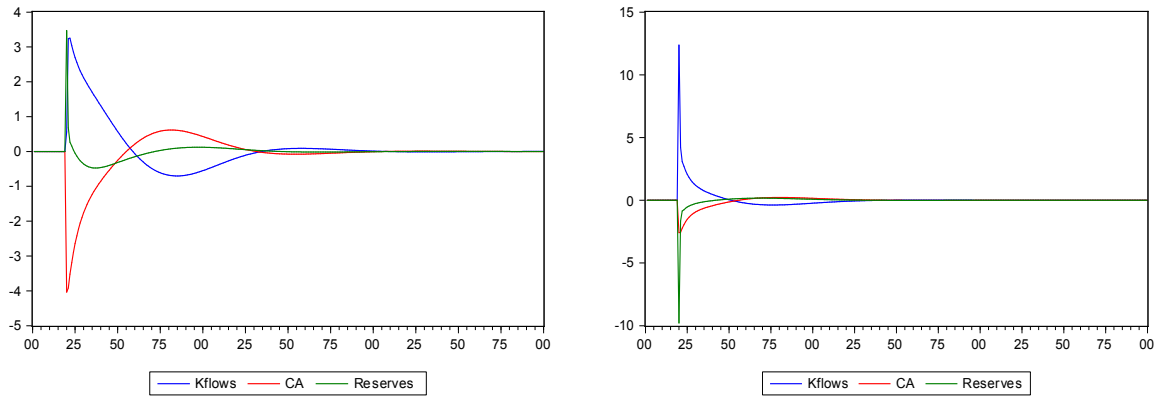
depreciation - containing the short-run volatility of exchange rates results a good strategy to contain the volatility of exchange rates in the long-run.

Intermediate exchange rate regimes also are perfectly consistent with an interest-rate targeting monetary policy. Although no equation directly relates H^d_{em} and H^s_{em}, the supply and demand for cash balances in EM, the two are equal in all the simulations, while at the same time, the central bank's balance sheet identities remain true. Just like Godley and Lavoie (2012) find for the fixed-exchange rate case, in a managed floating exchange rate regime the EM central bank is still able to keep its interest rate fixed, without losing control on the high-powered money supply. This is perfectly consistent not only with a flexible exchange rate, but also with a managed float.

It is interesting to note, that under such a regime, the accumulation of FXR does not seem to be particularly correlated with current account movements. As shown in Figure 7.6, when the EM central bank choose to target capital inflows, FXR accumulation is entirely driven by them, with current accounts leaning in the same direction as reserves to offset capital inflows. When the EM central bank targets GDP, FXR are much more stable - which explains why under this regime the exchange rate is much more volatile -. But even in this case, FXR seem to mostly respond to capital flows rather than current account changes.

These figures show the important point made in chapter 3 that in a monetary economy, such as that depicted by SFC models, there is no necessary link between current accounts and FXR accumulation. Two-way gross capital flows very often dwarf net flows, represented by current accounts, and it is therefore wrong to attach any particular flow to current accounts. "In fact, causality between the current account and the accumulation of reserves is more likely to run the other way: the accumulation may reflect the wish to resist the appreciation of the currency, when the authorities face strong foreign demand for domestic currency assets, manifested in gross capital inflows" (Borio and Disyatat, 2011, p. 12). This is exactly what occurs in this model, even with a highly simplified two way gross flows system, with only one asset traded internationally by private agents.

Figure 7.6: Balance of payments components

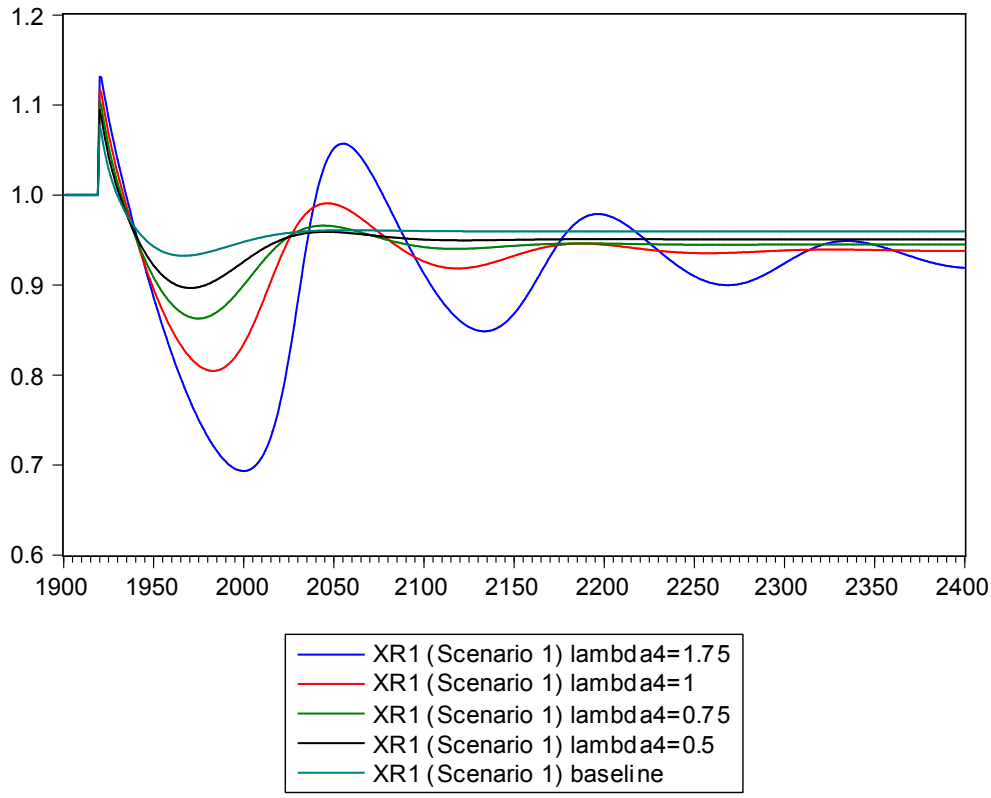


Response of the balance of payment components, under different exchange rate regimes, after an increase in desire to hold EM bills. The figure on the left shows the cases of FXR accumulating according to equation (7.57a) respectively. The figure on the right shows the cases of FXR accumulating according to equation (7.57b). Kflows shows private capital inflows, that is net purchases of institutional investors of EM bills.

As a last simulation exercise for this scenario, the parameter λ_4 representing the positive impact of FXR on allocation to EM assets is activated. The figures, shown in Figure 7.7, present two clear results. Firstly, the higher the value of the parameter the higher the volatility and the longer the adjustment to the equilibrium level. A positive λ_4 gives a pro-cyclical twist to allocations and the exchange rate, as allocations to EM bills increase as new capital inflows generate accumulation of FXR, and decrease as FXR falls fall as a result of capital outflows, which amplifies the exchange rate swings. Secondly, the equilibrium level is lower the higher the value of the parameter. Effectively at the new equilibrium level, allocations and FXR are higher, but the net factor income has worsened due to the higher external debt, which results in an exchange rate depreciation.

This suggests that FXR, which as argued in this dissertation work as a "fundamental" that improves the perceived macro-financial stability of EMs, are a rather volatile anchor for foreign investors. Indeed to the extent that FXR accumulation follows foreign capital inflows, they tend to be a rather destabilising pro-cyclical force. In line with the empirical evidence shown in previous chapters, lower demand for EM assets can generate vicious cycles of lower FXR and allocations to EMs.

Figure 7.7: Exchange rate with active λ_4



Response of the exchange rate, under different values of λ_4 after an increase in desire to hold EM bills

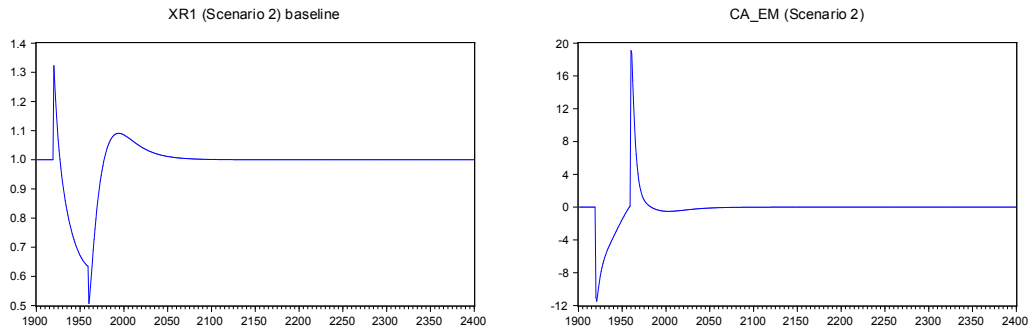
7.5.2 Scenario 2: a "search for yield"

The second scenario presents multiple shocks to r_{adv}, the interest rate on ADV bills. The interest rate is first decreased from 2.5% to 1% for forty periods and then is brought back up. This is supposed to simulate a scenario similar to what investors have been facing since 2008, with bond rates dramatically falling as a result of ultra-expansionary monetary policy by advanced countries' central banks. The increase of interest rates represents the ongoing "tapering" process, and forthcoming interest rate reversal.

The results of this experiment are shown in Figure 7.8. The overall chain of events is similar to that described in the previous scenario. As a result of the interest rate shock, institutional

investors allocate more to EM bills, which appreciates the exchange rate. This generates a current account deficit, which sparks higher supply of EM bills, due to higher borrowing needs from the government. This pushes the exchange rate downwards, therefore improving the trade balance. When interest rates are increased back, the exchange rate drops a little more, and this time the trade balance starts to improve substantially as to bring back to current account closer to balance. Indeed, with the rates back to their initial level, the correction is such that economy experiences a current account surplus, such that it cancels the net additional debt previously accumulated. The exchange rate therefore initially overshoots its long-run target, before the economy goes back to initial equilibrium levels.

Figure 7.8: Exchange rate and current account



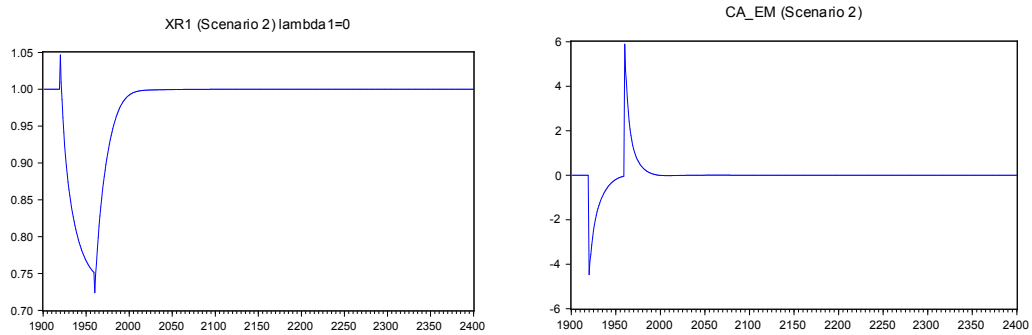
Response of the exchange rate and EM current account, with a double interest rate shock

It is useful once again to compare this to what would happen in the absence of institutional investors[107]. In such a situation, shown in Figure 7.9, the dynamics are similar to the previous scenario. The economy experiences an initial appreciation of the currency due to the lower returns on ADV bills and the subsequent change in asset allocation. This generates a deficit in the current account, due to the same higher financing needs of the EM government, which is slowly corrected by a depreciation and an improvement in the trade balance. However, after the second interest rate shock, the exchange rate simply adjusts back to equilibrium. Indeed for the case without an explicit behavioural mechanism for institutional investors, this scenario produces exactly the same results as the previous scenario: a change in interest rates has the

[107]Again this is done by putting $\hat{r}_{inst} = r_{inst} = r_{pbo}$ so that effectively institutional investors are pure intermediaries for households.

same effect as a change in liquidity preference, just like in the model of Godley and Lavoie (2012).

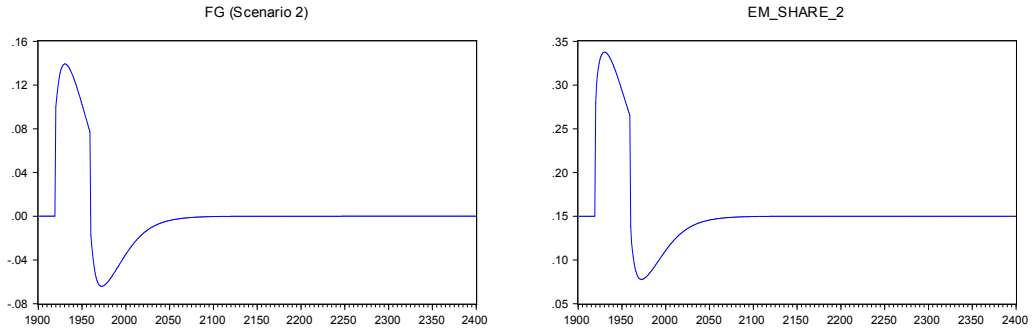
Figure 7.9: Exchange rate and current account - no institutional investors



Response of exchange rate and EM current account, with a double interest rate shock, under $\hat{r}_{inst} = r_{inst} = r_{pbo}$

Once again the key role in affecting the dynamics of the system is played by the funding gap (Figure Figure 7.10). Since a lower value of r_{adv} generates a positive funding gap - both through assets reductions and liability increases -, it amplifies the initial shock on the exchange rate, contains its subsequent fall, and slightly amplifies the second interest rate shock. This effectively results in a higher buildup of a current account deficit and foreign debt. As a result the exchange rate needs to depreciate even further in order for the system to be brought back to balance.

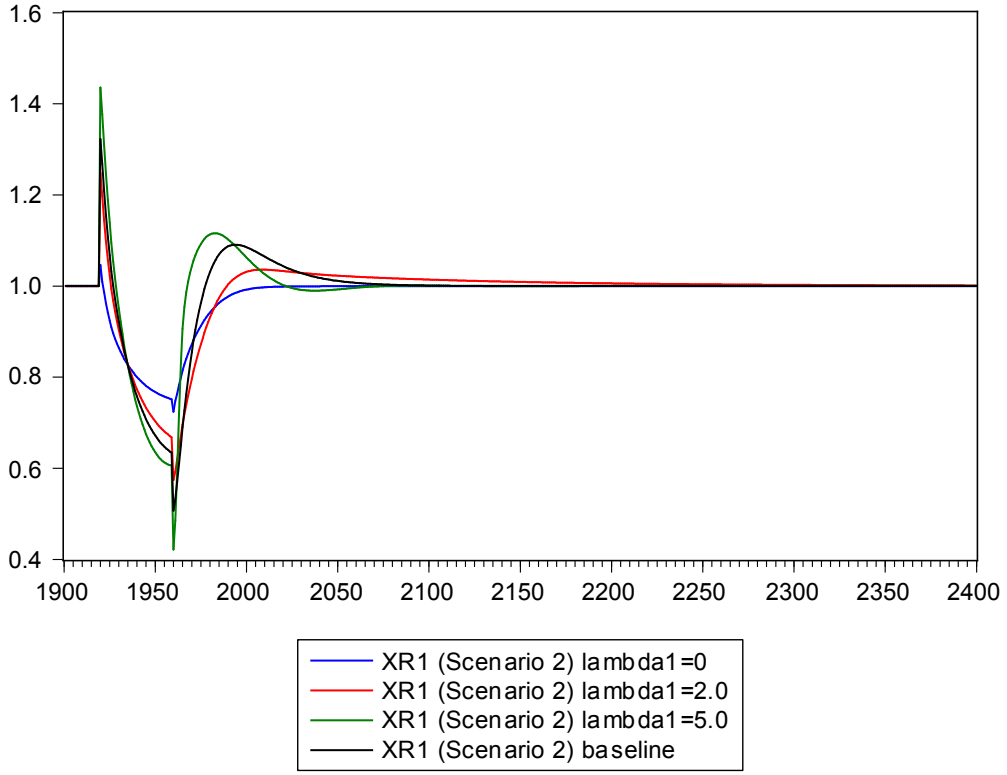
Figure 7.10: Funding gap and share of EM bills



Effect on the funding gap and the share of EM government bills in the portfolio of institutional investors, with a double interest rate shock

Importantly, the process is enhanced for higher values of λ_1, as Figure 7.11 shows. The higher the value the higher the initial appreciation and the sharper the subsequent depreciation. This can be explained by the fact that with higher values for λ_1 investors care more about their initial higher underfunding, and therefore invest more aggressively in EM bills and retain the higher allocation for longer, so long as they remain underfunded. When interest rate rise, the rapid improvement of funding levels generates a bigger selloff of EM assets, which combined with the higher buildup of imbalances generates a much sharper depreciation and adjustment process. Unlike the previous scenarios therefore, the impact of the funding levels on institutional investors portfolio choice, has a destabilising rather than stabilising role on exchange rates.

Figure 7.11: Exchange rates under different parameter assumptions

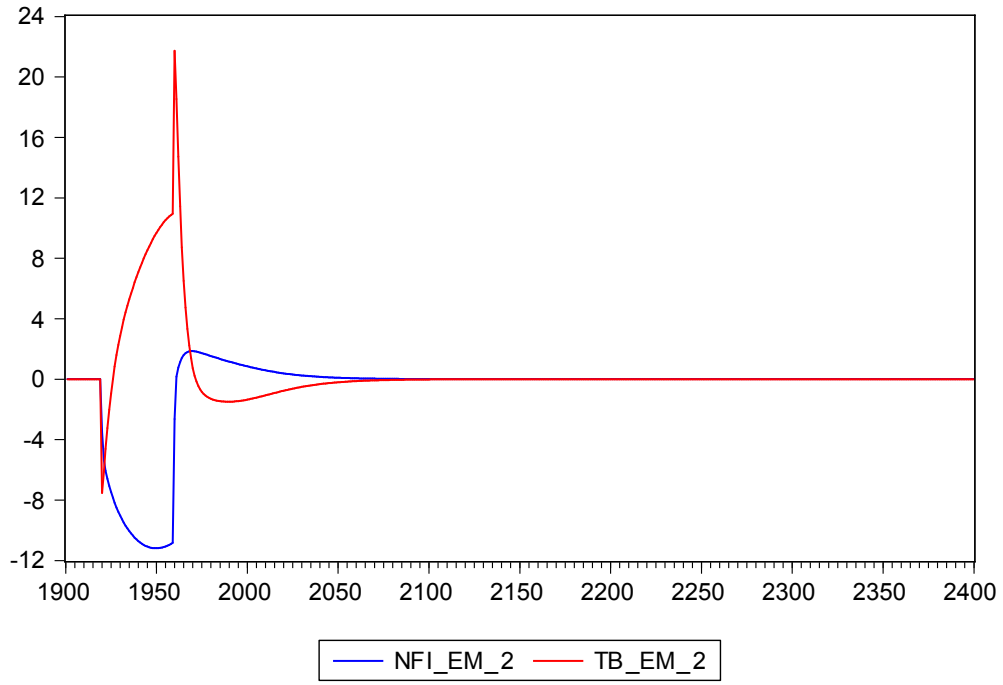


Response of the exchange rate under different assumptions for λ_1, with a double interest rate shock. The black line shows the case above, with $\hat{r}_{inst} = r_{inst} = r_{pbo}$

Overall the process shows how lower interest rates, when increased back to "normal" levels, generates a process akin to an EM cycle. As rates are lowered, capital inflows appreciate the currency, generating a current account deficit (Figure 7.12). The high foreign indebdtedness generates a net factor income deficit, and forces the currency to depreciate, despite the fact that capital keeps flowing in. The longer and larger the debt buildup the longer and larger the subsequent fall in the exchange rate will be to bring back the system to equilibrium.

Indeed the increase in exchange rates and their subsequent deterioration since the 2008 crisis, as was shown in chapter 4, is similar to the initial phases of the simulation of this scenario. It is indeed well known that a number of EM, known as the "fragile five" (Johnson, 2015), have faced sharper depreciations since the "tapering" announcements, coupled with higher foreign indebtedness and current account deficit pressures.

Figure 7.12: Balance of payments components



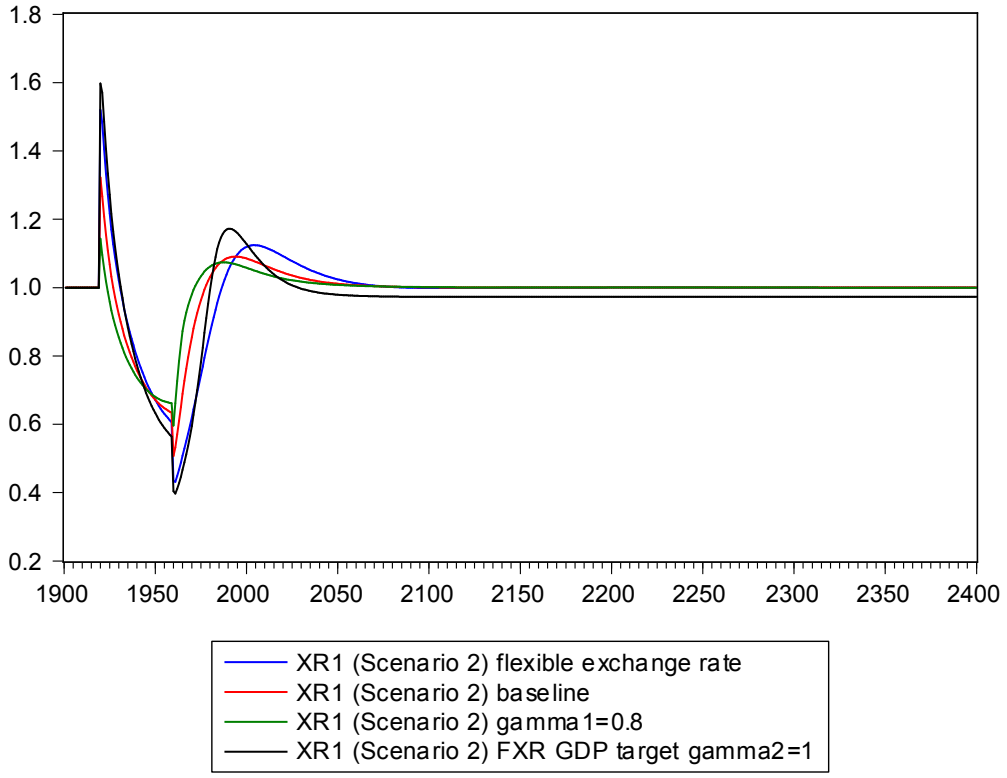
Response of the balance of payments components, with a double interest rate shock

Finally, in this scenario as in the previous one, the intermediate exchange rate regime,

which sees FXR accumulated as a share of capital inflows, is able to contain the exchange rate swings. As clearly shown in Figure 7.13, the higher the parameter γ_1 the higher the reduction in exchange rate volatility, and the quicker the adjustment to the long-run equilibrium. Once again, a GDP target does not seem to be as successful.

However it is important to notice that, despite their action, central banks are not able to fundamentally change the patterns. They can contain the volatility of the exchange rates, but its long-run movements are determined by the asset allocation choice of EMs.

Figure 7.13: Exchange rate under different regimes



Response of the exchange rate, under different exchange rate regimes with a multiple interest rate shock

7.6 Conclusion

This chapter has developed an open-economy Stock-Flow Consistent model, representing the relationship between advanced and emerging markets developed throughout the dissertation. The model features an advanced country with an institutional investor sector, allocating its assets between safe and "return-seeking" assets. The sector promises a certain guaranteed return, thus generating the possibility of gaps between asset and liabilities. The sector follows a liability-driven investment, responding to funding gaps with increasing allocation to "return-seeking" assets, which include EM assets, and likewise increases allocation to safe advanced country's bills, when funding levels improve.

The two scenarios presented in the chapter show the importance of the liability-driven investment mechanism in determining the dynamics of the model. The funding gap acts as a crucial determinant of portfolio choice, and therefore of the exchange rate, which is the key macroeconomic variable of this simple model. The effect of institutional investors on EM financial stability is mixed, depending on how the funding-gap interacts with the shocks and the other variables. In the case of a shock positively affecting the allocation of EM - or equivalently a rise in the EM interest rate - it acts as a countercyclical variable, dampening the effects of capital inflows that such shocks generate and containing the exchange rate movements. However, when a negative shock to interest rates in advanced countries, it plays a destabilising role, amplifying the cycles. To use the standard macroeconomic terminology, institutional investors that have funding targets act procyclically with respect to "push" factors, and countercyclically with respect to "pull" factors.

The model also shows the importance and consistency of managed floating exchange rate regimes. A central bank accumulating reserves as a fixed proportion of capital inflows is successful at containing exchange rate movements, achieving a quicker stabilisation, and also containing the changes in the long-run equilibrium exchange rates, when these are produced by the model. This may explain why so many EM resort to these exchange rate regimes.

However it is important to stress that while effective, these measures only contain the instability and do not manage to change what ultimately drives the mechanisms of the model: the portfolio choice of institutional investors. Furthermore, to the extent that reserves accu-

mulation itself acts as an attractor, being interpreted as a sign of financial strength by foreign investors, the dynamics of FXR may still generate instabilities.

The overall message of the model confirms the riskiness of the current situation in EMs. The boom in EM allocation by institutional investors following the 2008 crisis has been nurtured by the low yields in advanced countries. Such a situation is however conducive of a buildup of imbalances and vulnerabilities in EMs, and as a matter of fact a few EMs have been facing current account deficits and deteriorating external balance sheets in very recent times. An interest rate rise in advanced countries could trigger further depreciation, which may ultimately correct these imbalances, but may create substantial harm in the meanwhile. Emerging markets therefore remain under the threat of interest rate rises in advanced economies, a situation which unfortunately long-term institutional investors do not seem to improve in the current circumstances, and EM central banks can only smoothen but not fundamentally change.

Appendix

In this model, low-rate bills represent the liability-matching portfolio, whereas high-rate and emerging markets bills constitute the return-seeking portfolio. The key variable representing allocation between the two is the funding gap. Equations (7.43) (7.44) and (7.45), which represent the portfolio choice mechanism of institutional investors, are the result of such a paradigm. This can be shown in a few mathematical passages. Institutional investors split their portfolio into a liability matching and a return-seeking portfolio, with weights w_{LM} and w_{RS}, so that $w_{RS} + w_{LM} = 1$. In case of full funding ($fg = 0$), then:

$$w_{LM} = \lambda_0 + \lambda_2 \cdot r_{adv} \qquad w_{RS} = 1 - \lambda_0 - \lambda_2 \cdot r_{adv}$$

with λ_0 being the parameter which makes institutional investors' returns equal to the one promised to households - and thus maintains the fully funded status:

$$\hat{r}_{inst} = r_{inst} = r_{LM} \cdot (\lambda_0 + \lambda_2 \cdot r_{adv}) + r_{RS} \cdot (1 - \lambda_0 - \lambda_2 \cdot r_{adv})$$

$$\lambda_0 = \frac{\hat{r}_{inst} + \lambda_2 \cdot r_{adv}(r_{RS} - r_{LM}) - r_{RS}}{r_{LM} - r_{RS}}$$

where r_{RS} and r_{LM} are the returns of the returns-seeking and liability-matching portfolios[108].

If there are deviations from the fully-funded status the portfolio is supposed to respond linearly on the funding gap term:

$$w_{LM} = \lambda_0 - \lambda_1 fg + \lambda_2 \cdot r_{adv}$$

$$w_{RS} = (1 - \lambda_0) + \lambda_1 fg - \lambda_2 \cdot r_{adv}$$

The allocations to each individual asset class in the total portfolio, are determined by the relative size of the two portfolios (w_{LM}, w_{RS}) as well as their weights within each one of the portfolios:

$$w_i = w_{i,LM} \cdot w_{LM} + w_{i,RS} \cdot w_{RS} \tag{7.60}$$

where $w_{i,LM}$ and $w_{i,RS}$ are the portfolio weights to asset i within the liability-matching portfolio and the return-seeking portfolio.

Be $w_{adv,LM}$ the allocation to low-yield advanced country's bills within the liability-matching portfolio. Since the liability-matching portfolio only contains this type of assets $w_{LM,adv} = 1$, and therefore:

$$w_{adv} = \lambda_0 - \lambda_1 fg + \lambda_2 \cdot r_{adv}$$

Assuming that, within the return-seeking portfolio, assets are allocated according to the

[108] λ_0 in the model is kept exogenous, for the parameters that solve the relationship in the baseline steady state. Endogenising it according the expression above does not change substantially any of the results, especially if in a dynamic context returns are taken as long-term averages rather than only previous period returns.

tobinesque principles, plus the FXR impact discussed in the chapter:

$$w_{adv2,RS} = \lambda_{01} - \lambda_2 \cdot r_{em} + \lambda_3 \cdot r_{adv2} + \lambda_4 \left(\frac{B^s_{adv\_emcb} - \bar{B}^s_{adv\_emcb}}{\bar{B}^s_{adv\_emcb}} \right)$$

$$w_{em,RS} = (1 - \lambda_{01}) + \lambda_2 \cdot r_{em} + -\lambda_3 \cdot r_{adv2} + \lambda_4 \cdot \left(\frac{B^s_{adv\_emcb} - \bar{B}^s_{adv\_emcb}}{\bar{B}^s_{adv\_emcb}} \right)$$

with $w_{adv2,RS}$ and $w_{em,RS}$ being the allocation to the high-yield and emerging market bill within the return-seeking portfolio. Replacing into (7.60):

$$w_{adv2} = (\lambda_0 + \lambda_1 fg - \lambda_2 \cdot r_{adv}) \cdot \left[\lambda_{01} - \lambda_2 \cdot r_{em} + \lambda_3 \cdot r_{adv2} + \lambda_4 \left(\frac{B^s_{adv\_emcb} - \bar{B}^s_{adv\_emcb}}{\bar{B}^s_{adv\_emcb}} \right) \right]$$

$$w_{em} = [(1 - \lambda_0) + \lambda_1 fg - \lambda_2 \cdot r_{adv}] \cdot \left[(1 - \lambda_{01}) + \lambda_2 \cdot r_{em} - \lambda_3 \cdot r_{adv2} + \lambda_4 \cdot \left(\frac{B^s_{adv\_emcb} - \bar{B}^s_{adv\_emcb}}{\bar{B}^s_{adv\_emcb}} \right) \right]$$

Chapter 8

Conclusions

8.1 Research summary

This dissertation has been divided into eight chapters. The first chapter discussed the background, research hypothesis, and methodological considerations. In chapter 2, the "mainstream" literature on the determinants of capital flows was surveyed. It was argued that the literature's main points could be summarised into two main categories: fundamental factors - plagued by market imperfections - and investors' risk-appetite. The chapter has argued that the literature is limited in its understanding of the nature of investors and portfolio choice, being based on representative agents optimising over risk/return considerations, and fundamentals - and deviations from them - as main explanatory factors behind their actions. Furthermore, it is theoretically rooted on a *real* rather than *monetary* analysis of the economy. The recent developments focusing on risk-appetite and monetary policy suggest that renowned scholars are taking steps to move beyond these limitations.

Chapter 3 moved from the considerations of what constitutes an explicitly monetary analysis of the economy, based on post-Keynesian monetary theory. If capital flows are understood as monetary flows resulting mainly from asset purchases and sales, the analysis should therefore focus on portfolio choice - or better "asset demand"- from investors, rather than the conditions of the current account. In these respects a crucial role is given to currency liquidity, which

needs to be understood as the capability of such currencies to work as "money", and in particular their usage to face liabilities. Emerging markets are therefore at a disadvantage, since their currency cannot readily be used to face liabilities, and are therefore at a constant risk of volatile swings in international liquidity preference, although their currency liquidity is also determined by a number of "Keynesian fundamentals" that affect the macro-financial stability of a country. The chapter argued that liquidity preference is not just an a-priori theory but needs to be related to the historical development of the financial system and its institutions. Institutional investors in particular have become pivotal actors, so that a substantial part of financial investments, including cross-border, is originated by their behaviour. The chapter concluded by proposing a number of channels affecting institutional investors' behaviour. Aside from standard portfolio considerations - i.e. risk/return tradeoffs-, the analysis should focus on factors affecting the liquidity of emerging markets' currency, such as the accumulation of foreign exchange reserves. Even more importantly the overall liquidity preference of institutional investors - or risk appetite to use a more "mainstream" term - is likely to be substantially influenced by the conditions of their liabilities. The following three chapters constitute the core of the thesis. Based on the insights developed by the critical review of mainstream theorising and the relevance of post-Keynesian theories, they explore, in a triangulation of methods, the fundamental aspects that need to be addressed for a more in-depth understanding of the role of institutional investors.

Chapter 4 provided empirical evidence on several of these aspects. It was shown that emerging markets' financial integration mainly comes from the liability side, i.e. from capital inflows, while the expansion of their international assets is mainly in the form of reserves accumulation, and that the institutional investors have a increasingly important role in these trends. Institutional investors themselves have seen important shifts during the past fifteen years. Their asset allocation, previously skewed towards domestic equities, towards international assets and indirect asset holdings through funds. Changing regulation and the historical experience of the dotcom and global financial crisis have made them more conscious of the centrality of liabilities in determining their investment strategy, culminating in the paradigm of "liability-driven" investment. Low funding ratios, indicating an insufficient coverage of as-

sets over liabilities, coupled with low interest rates have pushed them towards riskier assets, including emerging market assets. Emerging markets assets at the same time become more attractive, primarily in terms of lower vulnerability to external debt shocks - chiefly by accumulating foreign exchange reserves, as well as high economic growth and returns. However, in very recent years some of these trends have slowed down or even reverted, as it can be seen in the decline of foreign exchange reserves to GDP ratios and the unimpressive performance of equity and bond markets. Investments in emerging markets assets has become more volatile, but allocations are yet to substantially fall, contributing to the explanation that the "search-for-yield" behaviour, rather than only improving fundamentals, is a powerful force behind capital flows to emerging economies.

Chapter 5 tested such contentions econometrically. Based on a Tobinesque asset demand approach, the chapter has used an autoregressive distributed lags panel specification, to explore the determinants of institutional investors' allocation to emerging markets assets. The hypotheses of the dissertation were largely confirmed. Lower funding ratios in advanced countries induce a higher demand for emerging markets bonds and equities, in line with the liability-induced search for yield behaviour. Higher levels of foreign exchange reserves also attract foreign investments, in line with the idea that these serve as to lower the risk of exchange rate and macro-financial volatility and therefore enhance the liquidity of emerging markets' currency.

Chapter 6 presented the results of semi-structured interviews with European pension funds on the subject of their investment to emerging markets. This chapter sheds light on the investment choice mechanisms of institutional investors. Everywhere, emerging markets assets are part of a "return-seeking" strategy, although the ways through which this is affected by economic fundamentals is complex. Economic growth, for example, is supposed to translate into higher returns, but it less clear how it will do so, and similarly political risk is closely monitored, but is very hard to operationalise in practice. On the other hand, liquidity, both at the financial market and systemic - especially currency - level, emerges as a key concern, in line with the theories exposed in chapter 3. The chapter also confirms once more the crucial role of liabilities as a determinant of institutional investors asset demand. The precise

way in which liabilities affect asset allocation to emerging markets however depends on the regulatory structure, and in particular its stringency on allocations to risky assets for a given funding level. Finally, it is likely that the growing reliance on external managers and fiduciary companies may create additional instabilities, especially in terms of herding behaviour.

Chapter 7 developed a Stock-Flow Consistent model, aiming to represent the relationship between an advanced and an emerging country. The model is innovative in a number of ways, chiefly in its introduction of an institutional investors sector in the advanced economy, that allocates assets according to a liability-driven investment strategy: as funding levels go down, the sector responds by investing more in assets with a higher expected rate of return, including emerging markets bills. Under such conditions, institutional investors seem to provide a counter-cyclical role in allocating assets to emerging markets, when these are driven by "pull" factors, but a pro-cyclical force when their investment is driven by low-interest rates that inflate the value of their liabilities.

8.2 Message and significance

In today's globally interconnected financial system, institutional investors have become pivotal actors. Indeed it can be argued that the process of financial globalisation is partially driven by the institutionalisation of savings themselves. Their portfolio choice is a crucial determinant of capital flows in a monetary economy. Institutional investors will invest in financial assets across the globe primarily driven by the conditions of their liabilities, i.e. the extent to which they need to generate these returns, and the macro-financial conditions determining the liquidity of the assets' currency of denomination.

Institutional investors operationalise this in the framework of "liability-driven investment", which leads them to keep a sizable part of their portfolio into domestic bonds while at the same time expand into non-traditional asset classes to enhance their returns. Emerging markets assets are therefore included in the strategy, because they - potentially - yield good returns, and present substantially improved "fundamentals", particularly as a result of the accumulation of foreign exchange reserves.

In the current context, the pressure to generate returns is substantial. Due to low yields,

combined with the continued long-run structural factors and regulatory pressures, institutional investors liabilities are growing faster than their assets, which in a liability-driven strategy, means that institutional investors cannot "de-risk" their investments, and look for assets that can deliver higher expected returns. To the extent that these conditions still exist, the demand for emerging market assets is likely to continue. And indeed allocations have continued to increase, despite the fact that the risk/return tradeoff of emerging market assets has become less attractive, as returns have fallen, "fundamentals" stopped improving, and economic growth declined.

This story, which represents in a nutshell the message of this dissertation, stems from the understanding of the behaviour of institutional investors, which are at the heart of the global financial system. As cited in chapter 3, Braasch (2010, p. 104) argued that "gaining a better understanding of institutional investors' market behaviour will be one of the key analytical tasks in the next few years, [...] if the behaviour of key global market players is not understood, it will be impossible to understand the process of financial globalisation or to achieve significant progress in analysing the causes and implications of financial crises".

The primary significance of this dissertation is therefore to explain the operations of institutional investors. Since this process is neither a purely microeconomic nor a purely macroeconomic phenomenon, the usage of multiple methods was essential. Quantitative methods served to assess the significance of the macro-level hypothesised relationships. Qualitative methods were crucial to uncover the actual operations and structure behind such relationships. The modeling strategy allowed a better understanding of the implications of such relationships for capital flows.

The contribution of this thesis aims in this sense to expand the literature on the determinants and stability of capital flows. It does so by uncovering the "black box" of risk-appetite, the key emerging theme from the contemporary literature in chapter 2, by rooting it in the behaviour of institutional investors, and by reaffirming the need to have an explicitly "monetary" framework of analysis. It also aims to contribute directly to the post-Keynesian literature, by addressing the implications of a "monetary" framework for the analysis of capital flows, and its relationship to the rise of institutional investors.

8.3 Implications

The processes described throughout this dissertation may create vulnerabilities in emerging markets. Given their role as part of a "return-seeking" strategy, emerging markets assets are likely to be highly susceptible to changes in their risk/return profile. Because of their lower position in the currency hierarchy, emerging markets need to remain an "attractive" destination, by maintaining high levels of foreign exchange reserves, high economic growth and political stability. As exemplified by Russia in 2014, political issues can quickly transmit into sharp drop in allocations, which at the macro-level often lead to currency depreciations. These actions can also be self-reinforcing: if a more bearish attitude to emerging markets assets was to translate into deteriorating domestic conditions - e.g. decreasing levels of foreign exchange reserves - then it may validate investors' concerns and translate into capital outflows. The process may be further amplified by behavioural factors, which while less pronounced than individual investors, appear to be present even within the pension funds sectors, especially when external asset managers are involved.

More fundamentally, lowering pressures to search for returns will affect emerging markets negatively. An increase in advanced countries' bond yields for example, would substantially reduce the need for institutional investors to look for alternative assets, as their liabilities fall and their liability-matching assets start yielding positive returns. Although some heterogeneity across countries exists, due to different regulatory structures, higher advanced countries bond yields are likely induce institutional investors to "de-risk", i.e. decrease allocations to all the riskier asset classes to safer and more liquid assets, as a result of which emerging market assets will inevitably be sold in large quantities. On top of this, increasing interest rates are likely to create also short-term spikes in risk-aversion, as investors adapt to "normalised" market conditions, after years of very low yields. The repeated waves of panic in the past three years amidst speculation of monetary policy tightening clearly testify to such shifts in risk-appetite. Institutional investors are unlikely to be immune to these phenomena, which may create panic and contagion episodes, resulting in sharp depreciations and asset prices collapses. In such a scenario, good "fundamentals" would shield some countries, but not completely save them, especially as many of these "fundamentals", such as the level of foreign exchange reserves, will

deteriorate endogenously.

To the extent that the current situation reflects a threat to financial stability, issues can therefore be raised as to what could be done to avoid major problems for both emerging markets and institutional investors stability, upon which an households' savings and income depend. Although drawing precise policy implications is beyond the scope of this dissertation, three broad areas of focus can be pointed out.

The first refers to the issue of capital mobility. The highly unstable nature of capital flows, which institutional investors do not seem to change, and the increased frequency of financial crashes have cast questions about the process of financial integration itself. The global financial crisis was a major strike against the consensus about the beneficial effects of freely moving capital. As columnist Martin Wolf states "if global finance does little more than bring catastrophe in its wake, it becomes almost impossible to defend existing, let alone increased, levels of financial integration" (Wolf, 2010, p. 1). Indeed prominent economists have argued, that the benefits of financial integration, for which evidence is at best modest, are far outweighed by its costs, and stressed the need to change the global financial architecture (Rodrik and Subramanian, 2009; Obstfeld, 2009; Lane, 2012). This view is shared by post-Keynesian economists, as claimed by Bibow (2008, p. 24): "there is no good sense for developing countries in granting foreign pension funds, hedge funds, or other foreign portfolio investors or bankers free access to participating in the rewards of developing countries' catching-up process".

If so, then clearly there may be a case of introducing some form of capital controls. The IMF (2012), formerly one of the most important supporter of international capital market liberalization, is now adopting an "institutional approach to capital flows", which recognises the risks of financial globalisation and that "there is no presumption that full liberalization is an appropriate goal for all countries at all times", opening at the same the possibility for capital flows management - i.e. capital controls - on a case-by-case basis[109]. The issue with capital controls, aside from the debate on their effectiveness, if implemented by individual countries, they may simply deflect capital inflows to other countries, given that these are driven by common factors (Forbes *et al.*, 2012; Giordani *et al.*, 2014). Implementing capital controls, as it is often the case with country-level policies, should therefore be part of a coordinated

[109]See however Gabor (2010, 2015) for a critical account of the IMF's new position.

strategy.

Secondly, there is a need to rethink the effect of monetary policy and macro-prudential regulation on institutional investors. The effect of monetary policy on the behaviour of institutional investors, as shown in this dissertation, comes most directly from its impact on their liabilities. It is therefore clear that ultra-expansionary monetary policy is an important factor behind their "search for yield". And indeed Borio (2014) has powerfully argued that the monetary policy stance is a primary determinant of the financial cycle. As a result, the current climate has sparked questions as to whether monetary policy should take into account imbalances in the financial markets. In particular it is argued that given that the current bond yields are not reflective of "fundamentals", monetary policy may have to intervene to avoid excessive buildup of such imbalances, if anything to prevent a sharp correction in case of monetary tightening (Feroli *et al.*, 2014; Stein, 2014). This could include an international dimension as argued by Rey (2013, p. 315): "central bankers of systemically important countries should pay more attention to their collective policy stance and its implications for the rest of the world". The IMF's consensus considers unwarranted the usage of monetary policy for financial stability purposes, but recognises the effect that it has in the build-up of financial risks and thus remains open to the possibility in the future (IMF, 2015). Post-Keynesian economists views about monetary policy tend to see little role for monetary policy as a stabiliser of the economy, due to the unreliability of the interest rate transmission channel as well as its ultimate impact on inflation, and therefore generally tend to advocate simple rules that prevent shifts in income distribution[110]. However, there have also been calls to a more active role for central banks in stabilising financial markets and asset prices in particular , although not through interest rate changes (Tymoigne, 2010). Whether central banks will actually do so remains to be seen.

Macro-prudential policies have been the main tool through which policy-makers have been tried to tackle the problem of financial instability (see e.g. Hanson *et al.*, 2011). While most of these interventions have focused on banks, it is increasingly clear that institutional investors must also be taken into account. This could take into account rules to avoid excessive movements across asset classes, as to dampen their volatility. As forcefully argued by Haldane

[110]See Lavoie (2014, pp. 234-238).

(2014, p. 13), "this is the next frontier for macro-prudential policy – whether, and if so how best, to moderate excessive swings in risk premia across financial markets which risk damaging the financial system or wider economy". More care should be taken in extending Basel III-type of regulation to institutional investors: in light of the evidence presented in chapter 7, risk-based funding requirements are likely to create further pro-cyclicality.

The third main area of focus is the stability of institutional investors, and pension funds in particular. Regardless of the relative merits of funded pensions versus pay-as-you-go system, institutional investors, households in most advanced countries rely on them for retirement income. Ensuring the stability of their investments is more than just an exercise of financial stabilisation.

Given the reality of liability-driven investment, a primary concern is the existence of safe assets that generate sufficient returns for investors. Government bonds are the quintessential safe asset, but at present are not sufficient to cover the growth of liabilities. To reduce the "search for yield" behaviour that is currently guiding institutional investors towards risky asset classes, safer assets that provide higher returns are needed. One such way could be the promotion of GDP-linked bonds (Griffith-Jones and Sharma, 2006; Borensztein and Mauro, 2004; Kamstra and Shiller, 2009). These bonds can be a a good match for pension liabilities, which grow more or less in line as nominal GDP. In the present conditions these securities would yield a higher return, therefore easing the pressure on pension funds. Investments in public infrastructure could also provide an interesting asset class, although it has so far only had mixed success[111].

8.4 Avenues for future research and concluding remarks

All this suggests two main potential avenues for future research. A first area would be to expand the macroeconomic implications of this analysis for the context of emerging markets. The model developed in chapter 7 can be in this sense expanded as to allow for more assets, including for example equities. In this sense it could show how foreign investors may be one of the primary source of inflation in the capital markets in line with Toporowski's theory.

[111] http://www.ft.com/cms/s/0/b47e481e-2307-11e5-bd83-71cb60e8f08c.html#axzz41rs98vfD

Similarly, it will be interesting to deepen the analysis of endogenous money in the context of emerging markets. It is certainly true that money remains endogenous regardless of the exchange rate system. However, as discussed in chapter 2, emerging markets may find it difficult to completely ignore capital flows and set interest rates only on the basis of domestic considerations. Although this does not change the endogenous nature of money, it may raise questions about modeling interest rates as exogenous in emerging markets.

A second main area would be expanding the analysis of institutional investors and examine how the mechanisms explored apply to a more general context. Liability-driven investment is a general feature of institutional investors' portfolio choice, that can be expanded beyond its implications for emerging markets. A key question is to what extent the pro-cyclical or counter-cyclical nature of institutional investors that follow such a strategy apply to a growing economy. Another is whether liability-driven investment can be extended beyond institutional investors, for example to households with long-term savings target. This latter point is empirically relevant, given that retirement provision is increasingly being shifted onto individuals. Policy issues will also be assessed, such as the effectiveness of GDP-linked bonds as a stabiliser for pension investments, and the broader task on how to build a sustainable pension system.

The current cycle of capital flows to emerging markets, if left to itself, is unlikely to end in a way much different than the previous ones. Institutional investors may have a long-term horizon, but their ultimate goal is to pay their obligations. They will have little interest in remaining invested in illiquid currencies, if they can achieve such a goal in a safer way. This may lead to a new financial bust. The double challenge is to prevent the most vulnerable countries from taking the biggest blow, and ensure that people's income is not under the constant threat of financial instability. The task for the future is to address this challenge.

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