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La liquidité mondiale et ses effets de report

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Titre : La liquidité mondiale et ses effets de report

Résumé :
L'intérêt pour la liquidité mondiale s'est accru ces dernières années, motivé essentiellement par la complexité de ce concept et ces effets encore peu connus sur l'économie, les marchés financiers et les économies émergentes. Les travaux de cette thèse visent à contribuer à cette littérature en étudiant, dans un premier temps, les facteurs macroéconomiques et financiers à l'origine de la dynamique de la liquidité mondiale et de son allocation sur les différents marchés du globe. Dans un second temps, quelques effets de l'évolution de la liquidité mondiale sont analysés en se focalisant sur les économies émergentes et les déséquilibres globaux. Nous montrons tout d'abord que l'état de l'économie réelle ainsi que celui des marchés financiers déterminent considérablement l'évolution de la liquidité mondiale avec des nuances selon qu'il s'agit d'une période de crise ou d'une période de croissance. Les autorités monétaires, et dans une grande mesure la Réserve Fédérale américaine, ont un rôle très important dans cette dynamique globale et sa répartition dans le monde. Les pays émergents, receveurs de capitaux, sont impactés par ces flux qui affectent considérablement leur économie réelle. Toutefois, l'effet sur les marchés financiers dans ces pays reste limité, contrebalancé par les acquisitions d'actifs libellés en devises étrangères détenus par les investisseurs locaux. Quant aux déséquilibres globaux, la liquidité mondiale pourrait être intégrée aux indicateurs avancés permettant d'expliquer l'évolution de ces déséquilibres. L'intérêt pour la liquidité mondiale et son suivi sont donc tout à fait justifiés.

Mots clés : Liquidité mondiale, liquidité officielle et privée, politique monétaire, flux de capitaux, stabilité financière, déséquilibres globaux.

Title : Global liquidity and its spillover effects

Abstract :
The interest in Global Liquidity has increased in recent years due essentially to the complexity of the concept and its less known effects on the real economy, the financial markets, and the emerging economies. This dissertation contributes to the Global Liquidity literature by studying, firstly, the macroeconomic and financial determinants, which drive global liquidity dynamics and its allocation on different markets of the world. Secondly, some of global liquidity effects, focusing on emerging economies and global imbalances are analysed. The results of these works prove that the state of real economy as well as those of financial markets impact dramatically the global liquidity dynamics depending on boom and bust periods. The monetary authorities, and to a greater extent the U.S. Federal Reserve, have a significant role in this global dynamics and its global allocation. The real activity in emerging economies is significantly impacted by capital inflows. However, the effects on financial markets are dampened by the offsetting effects of assets purchased in foreign currencies from local investors. In regard to global imbalances issues, global liquidity can be added to leading indicators, which help explaining the dynamics of these imbalances. It is therefore, useful to track the dynamics of global liquidity.

Keywords: Global liquidity, official and private liquidity, monetary policy, capital flows, financial stability, asset prices, global imbalances.

A mes parents,

à mes frères & soeurs,

et à DM.

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Avertissement

Cette thèse a été réalisée dans le cadre d'une convention CIFRE, associant l'Université de Bordeaux à la Banque de France.

Les opinions développées lors de ces travaux sont celles des auteurs et ne représentent pas nécessairement le point de vue des institutions affiliées.

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Introduction

La liquidité mondiale a suscité de plus en plus d'intérêt ces dernières années et davantage après la crise financière de 2009. Cette expression prend tout son sens dans les années 1990 avec l'abaissement des barrières aux échanges et le développement des flux internationaux que ce soit dans les pays avancés, que ce soit dans les pays émergents. Ces changements institutionnels associés aux innovations financières favorisent les transferts de capitaux avec des délais de plus en plus courts, et des coûts de moins en moins élevés, permettant donc de diversifier davantage les portefeuilles des agents économiques et d'améliorer le couple rentabilité-risque.

Ainsi dans les années 1990, les stratégies de *Carry-trade* contre le yen se développent de plus en plus étant donné les taux très faibles que proposent la Banque centrale du Japon (Gagnon and Chaboud [2007]). Les investisseurs empruntent sur ce marché japonais et adoptent des positions longues sur d'autres marchés monétaires plus attractifs. Cette stratégie largement développée dans la littérature économique est une belle illustration de la pertinence de la liquidité mondiale. En effet, en l'absence de barrières règlementaires, la liquidité émise dans un espace monétaire n'est pas nécessairement limitée à sa zone d'émission initiale. Elle peut tout à fait être utilisée et de manière significative au delà de ses frontières monétaires. Ainsi, les faibles taux adoptés par la Banque du Japon en 1990, ou plus récemment les politiques monétaires très accommodantes des pays avancés peuvent tout à fait servir au refinancement d'autres actifs libellés dans des devises étrangères.

Pour faire face à la crise financière de 2009 et à la grande méfiance des agents économiques, les autorités monétaires ont eu à adopter plusieurs mesures afin de restaurer la liquidité sur différents marchés et approvisionner les économies en liquidité. Ces mesures ont consisté dans un premier temps à des baisses successives de taux directeurs que ce soit par une réponse isolée d'une banque centrale, soit par des réponses conjointes d'une ampleur plus ou moins grande. Ces mesures traditionnelles sont rapidement accompagnées, dans un second temps, d'un élargissement des actifs recevables par les autorités monétaires pour obtenir un refinancement; et cela, afin de faciliter l'accès aux guichets de la Banque

centrale et de contourner la dégradation globale des bilans des Banques. Mais l'ampleur de la crise ne permet pas aux autorités monétaires, notamment des pays avancés, de relancer leurs économies par ces mesures traditionnelles. Les taux d'intérêt se rapprochent de plus en plus de zéro et il faut donc recourir à d'autres instruments. Ainsi, en troisième réaction, les autorités monétaires mettent en place des mesures dites *non conventionnelles*. Ces mesures sont diverses. Il y a le *quantitative easing* qui consiste à racheter des bons du trésor afin de faire baisser les taux d'intérêt sur ces actifs et, par rééquilibrage du portefeuille des agents, d'entrainer une baisse des taux des actifs substituables. Il existe également le *credit easing*, au travers duquel les autorités monétaires refinancent directement certains marchés et la *forward guidance* qui donne des indications sur la politique monétaire future des autorités monétaires afin d'impacter les taux à moyen-long terme. Toutes ces mesures traditionnelles ou moins conventionnelles ont pour objectif principal de fournir la liquidité.

Dans un contexte de globalisation financière, comme indiqué précédemment, l'affectation de cette liquidité impulsée par les autorités monétaires est laissée à l'appréciation des acteurs économiques privés. Ceux ci peuvent soit répartir les actifs de leur portefeuille sur des marchés locaux, soit opter pour une diversification à l'international. L'expérience récente a plutôt mis en évidence des épisodes d'appréciation et de dépréciation de plusieurs devises. La forte appréciation du yen notamment contre le dollar en 2011 et du Franc Suisse a conduit les autorités monétaires respectives à réagir et dans le cas de la Suisse à fixer un taux plancher(1,20 contre euro). Quant à la Corée, la Chine, l'Indonésie, le Brésil et le Mexique, ces devises connaissent une dépréciation réelle brutale entre 2008 et 2009, puis une appréciation réelle jusqu'en 2012. Ces variations des taux de change pas nécessairement associées à une meilleure productivité locale (Artus [2014]) conduisent à envisager, à l'origine de ces variations de taux de change, des mouvements massifs de capitaux en direction de ces pays dans un contexte d'abondance de liquidité dans les pays avancés.

Ce sont ces inquiétudes relatives aux effets de report de la liquidité mondiale et la méconnaissance de ce concept qui ont par la suite orienté les agendas des organismes

internationaux, des groupes de travail et suscité une plus grande curiosité de la part des chercheurs. En 2011, la BRI (Banque des Règlements Internationaux) mandate le CGFS (Committee on the Global Financial System) pour travailler sur la définition, les mesures et l'identification des facteurs stimulant la dynamique de la liquidité mondiale. Sur cette même période, la double présidence française du G20-G8 retient parmi ces principaux axes de recherche la liquidité mondiale. Le FMI ainsi que les banques centrales ne restent pas en retrait. Des études et des batteries d'indicateurs sont proposées. Et de ces différents travaux se dégagent un consensus autour du concept de liquidité mondiale.

La liquidité mondiale est un concept pluridimensionnel qui intègre à la fois la liquidité impulsée par les autorités monétaires (sa dimension publique) et celle issue des activités de transformation ou de financement des acteurs privés (sa dimension privée). La complexité de ce concept nécessite toutefois d'adapter la définition de la liquidité mondiale à la problématique de l'étude. Comme l' affirme Charles Goodhart (Goodhart [2008]), elle "*a tellement de facettes quil est souvent contre-productif de l'utiliser sans considérer une définition bien précise*". La littérature économique propose trois approches de la notion de liquidité : la liquidité monétaire, la liquidité de marché (*Market liquidity*) et la liquidité de bilan(*Funding liquidity*).

La liquidité de bilan est un concept de liquidité propre aux entreprises, financières comme non-financières. Elle peut être définie comme la capacité de l'entreprise à honorer ses engagements à court terme. Dans ce but, l'entreprise peut soit recourir à des actifs de court terme disponibles dans son bilan (liquidité de bilan stricto-sensu, cf. Goodhart [2008]), soit lever des fonds dans des délais assez courts (liquidité de refinancement, Nikolaou [2009]).

La liquidité de marché est définie par Baks and Kramer [1999] comme la capacité d'un marché financier à absorber les fluctuations temporaires de demande et d'offre, sans modifier significativement la structure des prix. Elle intègre trois paramètres : la profondeur, l'étroitesse et la résilience du marché considéré (Fernandez [1999]). La liquidité de marché représente donc la facilité avec laquelle un actif peut être échangé sur ce marché.

La liquidité monétaire renvoie aux conditions de politique monétaire (Baks and Kramer

[1999]; Fernandez [1999]) et est constituée de l'ensemble des actifs liquides circulant dans l'économie (Goodhart [2008]). Elle représente également le montant des ressources en devises immédiatement disponibles, compte tenu des sorties nettes tant prévues que potentielles sur les dites-ressources (Kester [2001]).

Sur la base de ces trois approches, plusieurs autres notions de liquidité sont construites, à l'instar de la liquidité interne/ externe, la liquidité macroéconomique/microéconomique. Le sens affecté à la liquidité dépend donc du contexte dans lequel la notion est utilisée. Cependant, quelque soit le contexte, la liquidité renvoie à la possibilité pour un actif d'être échangé rapidement contre un autre actif, sans perte de sa valeur et sans coût.

Dans son acception la plus large, elle renvoie à la facilité d'accéder à un financement (CGFS [2011]). Elle peut également être définie comme l'ensemble des liquidités susceptibles d'être utilisées de manière significative dans les échanges internationaux.

Les travaux effectués lors de cette thèse visent à contribuer à cette littérature naissante et en plein essor en se focalisant tout d'abord sur la compréhension du concept de liquidité mondiale (partie 1), puis sur les effets de cette liquidité abondante sur les pays émergents (partie 2).

La première partie de ces travaux a pour objet de présenter le concept de liquidité mondiale, de le définir et le mesurer sous ses différents angles et d'en étudier les mécanismes à l'origine de sa dynamique. Pour ce faire, cette première partie est organisée autour de deux documents de travail. Tandis que le premier document se focalise sur une vision plus traditionnelle de la liquidité mondiale impliquant la politique monétaire et la distribution du crédit, la deuxième étude porte plutôt sur les facteurs financiers mondiaux qui stimulent l'affectation de la liquidité dans l'espace via les mouvements de capitaux. Ces deux études fournissent donc une analyse plus complète des facteurs à l'origine de la dynamique de la liquidité mondiale.

Il ressort de la première étude, effectuée sur la base d'un modèle FAVAR (Factor Augmented VAR), que la liquidité mondiale est essentiellement guidée par l'activité économique et la stabilité financière. Toutefois les acteurs privés et les acteurs publics

ne réagissent pas de la même manière selon qu'il s'agisse de la période avant la crise (1990-2007) et celle après la crise (2007 - 2011). Le caractère procyclique des agents privés les conduit à freiner davantage la liquidité en période de crise qu'en période de croissance. Ceci justifie le comportement contra-cyclique des autorités monétaires et de facto son rôle de fournisseur de liquidité en dernier ressort. Cette étude permet donc de tester empiriquement la pertinence de certains facteurs énoncés dans le rapport du CGFS [2011].

Quant au second papier concernant les effets des chocs financiers mondiaux sur les flux de capitaux, qui représentent une autre mesure de la liquidité mondiale (Bruno and Shin [2012]), il permet de mettre en évidence la réaction des investisseurs locaux et étrangers et souligne les éventuelles compensations qui peuvent exister. Cette étude est basée sur une analyse empirique de 1990 à 2013. Il ressort de cette analyse que les investisseurs locaux peuvent jouer un rôle stabilisant lors de certains chocs. Le rapatriement des capitaux locaux observés suite à une plus grande incertitude ou suite à une hausse du taux d'intérêt américain de long terme donne des indications sur l'orientation de la liquidité mondiale et l'effet final nuancé sur la stabilité des économies receveuses de capitaux. Cependant une remontée des taux directeurs américains entrainerait une très importante sortie nette de capitaux des pays émergents vers les Etats-Unis. La dynamique de la liquidité mondiale ne dépend donc pas seulement de facteurs locaux comme indiqué dans l'étude précédente, mais également des chocs financiers globaux.

La seconde partie des travaux de cette thèse porte sur les effets de report de la liquidité mondiale sur les pays émergents depuis 1990. Ces effets sont étudiés suivant deux approches . Il s'agit d'une part d'étudier les effets de la liquidité mondiale sur les prix des actifs dans les pays émergents et d'autre part d'en étudier les effets sur les déséquilibres mondiaux. Pour chacune de ces études, l'analyse en Panel VAR est retenue. Le choix de ce modèle économétrique est justifié par la volonté d'obtenir des résultats robustes malgré les spécificités de chaque pays non intégrées dans le modèle, et l'interdépendance des variables.

Concernant la première étude de cette seconde partie, c'est plutôt l'approche traditionnelle

de la liquidité mondiale qui est retenue. Avant d'étudier l'effet de la liquidité mondiale sur les prix des actifs dans ces économies émergentes, une mesure d'excès de liquidité est calculée conformément à la théorie quantitative de la monnaie. Puis l'effet de cet excès de liquidité sur la croissance, l'inflation et les prix d'actifs financiers de pays émergents d'Amérique Latine et d'Asie est évalué de 1990 à 2010. Il ressort de cette analyse que l'excès de liquidité mondiale a un effet significatif sur l'activité économique et l'inflation, et un effet nuancé sur les prix des actifs. Ce résultat est cohérent avec les autres études précédentes réalisées dans les pays avancés.

Le second article tente d'étudier l'éventuel effet déstabilisant de la liquidité mondiale en termes de déséquilibres mondiaux. Pour ce faire, l'on teste d'abord la réaction monétaire de différents groupes de pays à un choc monétaire des Etats-Unis. Suite à ce choc, les pays réagissent positivement et de manière significative. Ceci traduit une hausse de plus en plus croissante de la liquidité mondiale suite à une baisse de taux par la Réserve Fédérale américaine. Le taux directeur américain peut donc être considéré comme un indicateur avancé de la liquidité mondiale. De plus, l'étude empirique de 1990 à 2011 sur les déséquilibres mondiaux fait état d'un impact significatif en faveur de l'accroissement des déséquilibres mondiaux.

Part I

Understanding the Dynamics of Global Liquidity

Part 1

Studying Global liquidity requires to well understand this multifaceted concept in a first step. This first part introduces the concept of global liquidity by defining it and suggesting a set of indicators, which allows to follow the dynamics of global liquidity.

According to the definition of global liquidity and its relative indicators, driving factors are studied. These determinants of global liquidity focus on both factors which cause an increase or a decrease in global liquidity and factors which impact the global allocation of liquidity flows.

This first part is organized as follow. The first chapter works on the definition of global liquidity and studies the macroeconomic and financial factors which have contributed to the dynamics of global liquidity since 1990. Then, the second chapter focuses on the effects of global financial shocks on the allocation of global liquidity in the world.

Chapter 1

Determinants of Global Liquidity Dynamics: a FAVAR approach

Marie-Louise DJIGBENOU

1.1 Introduction

Over recent years, Global liquidity has been one of the main issues in academic and policy debates. Economists, central bankers and international institutions have focused on this subject in order to better understand this concept. This willingness has impulsed many studies. In this context, the Bank of International Settlements (BIS) established for instance an ad-hoc global liquidity working group in 2011 [1], having as an output a definition of global liquidity and its measures (CGFS [2011]). According to this report and previous works as the study of Baks and Kramer [1999] , global liquidity can be considered as a multifaceted concept which is related to the "ease of financing". It can be approached by both the monetary view and the funding and market view. Traditionally, it is the monetary approach that is used in the literature. This approach refers generally to the official contribution in global liquidity via monetary authorities. Many papers as those of Rüffer and Stracca [2006], DeNicolò and Wiegand [2007] have used this definition of global liquidity. The funding and market liquidity, which concerns the provision of private liquidity, are also increasingly considered in the literature. The paper of Bruno and Shin [2012] reflects this idea by focusing on a cross-border funding via the channel of international banks.

All these works focus essentially on the study of the effects of global liquidity. Baks and Kramer [1999] as well as Darius and Radde [2010] study the spillover effects of Global

[1] This working group has been chaired by JP Landau, Banque de France deputy-governor.

liquidity on asset prices in order to identify any impact of liquidity on another market. Sousa and Zaghini [2007] focused on the effects on global output and inflation in the G5 economies (United-States (US), Euro area (EA), Japan(JP), United Kingdom(UK) and Canada(CN)), while Brana et al. [2012] analyze the effects on emerging economies. This growing literature highlights the increasingly interest in global liquidity. However, few recent works have analyzed the main drivers of the dynamics of global liquidity. CGFS [2011] outlines the main drivers and some channels of global liquidity but does not test empirically these determinants and their impacts in periods of crisis. One of the main contributions of this paper is to study the macroeconomic and financial determinants of global liquidity dynamics and how they impact global liquidity in crisis period according to the respective behaviors of private and official agents.

For achieving this objective, I follow mainly the methodology adopted by Bernanke et al. [2005] which describes a Factor Augmented - Vector Autoregressive (FAVAR) model. This econometric choice is justified by the multifaceted dimension of global liquidity. In fact, the factor model in this method permits to summarize a large number of variables and extract the common factor which is supposed here to be global liquidity. And the VAR approach allows to get the responses to shocks. Based on this econometric method, I used in this paper a large definition of global liquidity which includes both official liquidity and private one proxied here by funding liquidity. Furthermore, as in few recent works, the indicator of global liquidity takes into account not only the liquidity provided by advanced countries but also the liquidity issued by emerging countries. This last part of global liquidity has been neglected for a long time. However it represents almost 40% of the global official liquidity[2] (figure 1.1). Therefore, it is more reflective of the global liquidity to include in the analysis, not only advanced countries, but also emerging ones.

Concerning the potential drivers of global liquidity dynamics, there are extracted from the literature of Augmented Taylor rules and private determinants of liquidity. In accordance with the basic objectives of central banks, inflation and economic conditions are

[2] In this paper, only the official part of liquidity issued by emerging countries is used for being sure of the capacity of the currency to be used outside its monetary area.

considered as potential determinants. Exchange rates and financial stability objectives are also integrated to the analysis as suggested by the literature and the new approaches of central banks. These factors can also impact the funding liquidity. For instance, as mentioned by Forbes and Warnock [2012] and showed by Bruno and Shin [2012], the risk or the uncertainty, measured by VIX, plays a significant role in cross-borders flows.

This study considers as advanced countries the G5 economies United-States (US), Euro area (EA), Japan (JP), United Kingdom (UK) and Canada (CN) and as emerging countries Brazil (BR), India (IN), China (CH), Qatar(QA), Saoudi Arabia(SA), Venezuela(VN), Nigeria(NG), United Arab Emirates(UA) for defining global liquidity. The sample covers the period from 1990 to 2011, on a quarterly basis. The potential drivers are extracted only from advanced countries due to lack of data from emerging countries. And a global factor are calculated by potential determinant. This work highlights two main determinants of global liquidity dynamics which are real activity and financial stability factor. The impact of inflation stays mitigate. Moreover, the responses of agents are impacted by the crisis essentially with the rise of uncertainty.

The outline of this paper is as follows: The second section describes the concept of global liquidity and its dynamics. The next section, section III, presents the potential determinants. In section IV, the econometric method of FAVAR model and hypothesis related to this study are detailed. This section also highlights the adequacy of this model with the issue of global liquidity and its determinants. Section V reports the empirical results, while Section VI concludes.

1.2 Global liquidity dynamics

Even though, the concept of global liquidity could be quiet intuitive, its definition, most of time differs based on the problematic of the study. Three main approaches are however considered in the literature. As the recent paper of Eickmeier et al. [2013], this study integrates the multifaceted definition of global liquidity and emphasizes the role of both advanced and emerging countries in the expansion of global liquidity.

1.2.1 A multifaceted concept

Global liquidity is a multifaceted concept. It includes the liquidity provided by official and private sectors (CGFS [2011]).

The official view, which is the traditional one, refers to the liquidity provided by monetary authorities. The monetary authorities inject liquidity in the economy by defining the initial conditions of agents refinancing. Traditionally, they cut the main policy interest rates which drives the corridor of interest rates variations. And over the recent period, they adopt unconventional monetary measures such as quantitative easing. By these both policy measures, monetary authorities impulse the dynamics of the liquidity in the domestic economy but also at the world scale. In fact, if the currency of the given country can move easily and be used without many restrictions outside its own monetary area, the liquidity provided by domestic authorities contribute to expand global liquidity. For traditional instruments, as the lowering of key policy rates, the local liquidity is directly spread as for carry-trade strategies, whereas for quantitative easing, the increase of global liquidity pass by the rebalancing of investors portfolio. So, through a direct or an indirect funding of the economy, the monetary authorities policies contribute to increase or decrease the liquidity across the world. And this is particularly relevant with the reduction in barriers to international trade and investment and the development of cross border flows.

This traditional view has been adopted by many economists, who consider both quantitative and price indicators for measuring global liquidity. The price measures are essentially calculated on the basis of key policy rates. It can be a simple average of interest rates of countries considered in the study (GFSR [2010]) or a more complex calculation (DeNicolò and Wiegand [2007]). There are also some price measures based on global real short term interest rate and 10 year nominal term premium as shown in the following papers DeNicolò and Wiegand [2007], CGFS [2011], etc. Concerning the quantity indicators, different measures are also presented in the literature. First of all, monetary base is used as reflecting the initial condition of access to liquidity defined by the monetary authorities(Artus [2009]).DeNicolò and Wiegand [2007] and Darius and Radde [2010] in-

clude the base money as a component of global liquidity as CGFS [2011]. Other narrow and broader monetary aggregates (M1, M2 or M3) are also cited in the literature. Sousa and Zaghini [2007] define global liquidity in their paper as the "the sum of the monetary aggregates of the US, the euro area, Japan, the UK and Canada" . Another official global liquidity measure, very convenient for emerging countries is the foreign reserves. This part of monetary authorities balance sheet is directly usable for exchanges outside the domestic monetary area. It has been used by Domanski et al. [2011], DeNicolò and Wiegand [2007] and Darius and Radde [2010]. All these indicators can be considered for taking into account the impact of monetary policies on global liquidity and highlights the official contribution of global liquidity dynamics. But they do not represent all the liquidity available in the economy. The private sector contributes also significantly to the global liquidity dynamics.

The private liquidity is the liquidity provided by private agents via banking and financial institutions. It consists of *funding liquidity* and *market liquidity* which represents respectively " the ease with which agents can obtain funding" and "the ease with which an asset is traded" Brunnermeier and Pedersen [2009]. As the official liquidity, funding and market liquidity can also be measured by quantity and price indicators. Concerning quantitative measures, credit aggregates are often used as indicator of funding liquidity (CGFS [2011]). Domanski et al. [2011] consider bank liquidity ratios, maturity mismatch measures and commercial paper volumes. And as price indicator, they suggest Libor-OIS spreads, foreign exchange swap basis, bond -CDS basis or surveys of funding conditions. In a market liquidity perspective, transaction volumes as a quantity measure, as well as Bid-ask spreads on selected global asset, yield differential between less frequently traded and more frequently traded, and qualitative fund manager surveys as a price indicator (DeNicolò and Wiegand [2007], BOE [2007] ,Domanski et al. [2011]) are considered.

As global liquidity is impacted by these different approaches , this study focuses on both official liquidity and private liquidity. Furthermore, because of recent developments on global liquidity, not only advanced economies are considered, but the liquidity issued by emerging countries is also integrated.

1.2.2 Advanced and Emerging countries implications

The study of global liquidity dynamics has to integrate the liquidity provided by both advanced and emerging countries, especially with the recent development. In a worldwide perspective, the liquidity created in a country has to be able to move outside its monetary area and used easily in this new environment without a significant lost of its value. In other words, this liquidity or the underlying currency, has to be exportable or useable in a sizeable part of the international trade. According to this criteria, the national liquidity issued by emerging countries has often been neglected. On the private side, the access of foreigners to credit is often limited by regulation, and on the official side the liquidity created by local central banks can be non-convertible. These arguments had justified the focus on only advanced economies. However, considering the assets side of their balance sheet can allow integrating this part of global liquidity.

Emerging countries are now the most foreign reserves holders. Since the end of the 90's with the asian crisis, they have built up more reserves especially for precautionary motives and other motivations. This liquidity, which is directly usable outside their monetary area, reflects also a part of their local monetary policy. Therefore foreign reserves can be used as a proxy of the contribution of emerging countries to global liquidity. Moreover the management of reserves impulses also purchases of foreign risk-free assets in order to reduce the opportunity costs. These acquisitions drive liquidity to another foreign market which becomes more liquid. Thus the integration of foreign reserves from emerging countries is justifying[3]. This idea is also supported by data.

For capturing the share of each group of countries, a global liquidity indicator is constructed on the basis of foreign reserves of emerging countries (Eme[4]) and Base money of advanced countries (Adv[5]): figure 1.1.

This indicator shows a significant contribution of both groups of country. Emerging

[3]According to TIC data from US Treasury Department, China stays the most foreign holder of Treasuries in 2011. And this holding represents around 60% of total foreign reserves of PBoC.

[4]Brazil (BR), India(IN), China(CH), Qatar(QA), Saoudi Arabia(SA), Venezuela(VN), Nigeria(NG), United Arab Emirates(UA)

[5]United-States (US), United Kingdom(UK), Japan (JP), Euro Area (EA), Canada (CA)

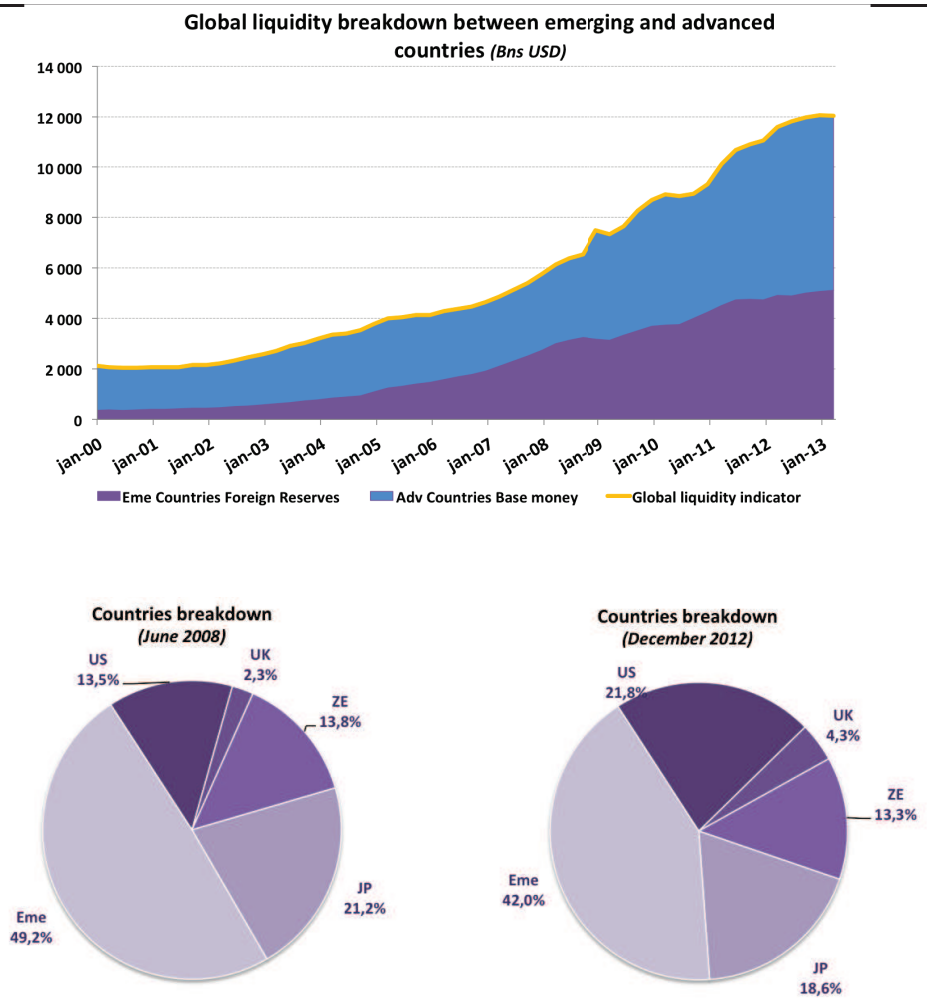


Figure 1.1: Breakdown of global liquidity between Advanced and Emerging countries

countries, representing by the main holder of foreign reserves, shares half of the liquidity provided by monetary authorities with the advanced countries in 2008. Their contributions to global liquidity have increased gradually since the end of the 90's and justify the interest for integrating this group of countries in the global liquidity indicators, even though, over recent period, its share has been reduced to 42% due to the liquidity dynamics in advanced countries. The share of the United states has been increasing dramatically due to the implementation of a continuous Quantitative easing policy since 2008 . Her contribution has increased from 13,5 % in June 2008 to almost 22% of the total in December 2012. The United Kingdom has quasi-doubled her share over this same period, whereas the share of Euro area remained quasi stable, while Japan's share had declined

relatively to the rest of the world. This induces a decrease in the weight of emerging countries, which stayed however significant (42%).

For a more robust and complete description of the dynamics of global liquidity, different indicators are being constructed.

1.2.3 Development of global liquidity

As mentioned earlier, global liquidity in this paper is defined by both its public and its private components. The liquidity provided by monetary authorities is measured by key policy rates and monetary base for the advanced countries (US, UK, JP, EA, CN) and by foreign reserves for the emerging countries (BR, IN, CH, QA, SA, VN, NG, UA). For a longer period empirical analyse, only credit and short term interest rates (3-months and 6-months interbank rates) are considered as a measure of private liquidity. Moreover, the combination of both official indicators and credit permits to get a better view of the dynamics of global liquidity. The interest of that considerations could be for instance to monetary authorities to better focus their monetary decision on improving the financial stability. These relationship have been studied by Christiano et al. [2011]. The authors conclude in their paper that a greater role of credit growth in the interest rate targeting rule would moderate the volatility in the real economy and in asset prices, and therefore would improve the financial stability.

I consider also narrow and broader monetary aggregates M1 and M2. These indicators integrate *de facto* the actual monetary policy and reflect also the credit distribution.

All these indicators are extracted from Central banks, IFS, WEO, OECD, Reuters databases and other national sources from 1990 to 2012. For quantitative indicator, I follow the calculation method proposed by Baks and Kramer [1999] which consists in expressing each domestic indicator in terms of local GDP, then to weight them by their relative GDP in terms of PPP. Concerning the price measures, the global liquidity indicator is obtained by a simple average of national interest rates.

On the whole, until 2008, the indicators of global liquidity in figure 1.2 reports an upward trend of global liquidity. In spite of some episodes of rate rises, the policies adopted

by monetary authorities have been wholly accommodative and credit has continued to grow. The cut of key policy rate following the NTIC crisis in 2001 has permitted to inject liquidity inside the economy until 2004. The credit, slowed-down by the crisis, is relaunched after the monetary policy actions. So in 2004, the global liquidity is sustained by both monetary policy and by private sectors. To keep downing these dynamics, the monetary authorities increased their key policy rate which passed in average from 2,3% in March 2004 at 4% in September 2007. This increase is reflected through the monetary base volume which stayed quasi constant over this period. On the contrary of this restrictive policy, the credit continues to grow on that period.

With the beginning of the crisis in 2007, started first series of lowering interest rates. These rates passed from 3,90 to 2,95% in september 2008. But with the crisis worsening, other plans have been implemented, leading the rate close to zero in september 2009. This substantial decline is followed by a dramatically increases in monetary base which continues to grow with the implementation of unconventional monetary policy (quantitative easing, credit easing, etc.) although the interest rate remained close to zero. On the side of private liquidity, the sustained growth of credit in terms of GDP is interrupted in 2009 and is declining. Therefore the ample liquidity provided by monetary authorities is implemented in a context of weak and unstable private liquidity.

The monetary aggregates M1 and M2 follow the dynamics of monetary policy but integrate information from private sector too by slowdowns in 2009. For emerging countries, the part of foreign reserves in terms of GDP has continued to grow since the 1990's until September 2008. After a short decrease, the build up of reserve start again but with a lower speed.

All these indicators are so useful for understanding the dynamics of global liquidity. The monetary base as a quantity measure permits to take into account the non-conventional measure which are not reflected in interest rate data, especially with zero lower bound. In addition many configurations can be considered according to the policy adopted by monetary authority and the dynamics of private liquidity. For studying the macroeconomics and financial factors behind this dynamics, it can be interesting to focus

on the determinants of each component.

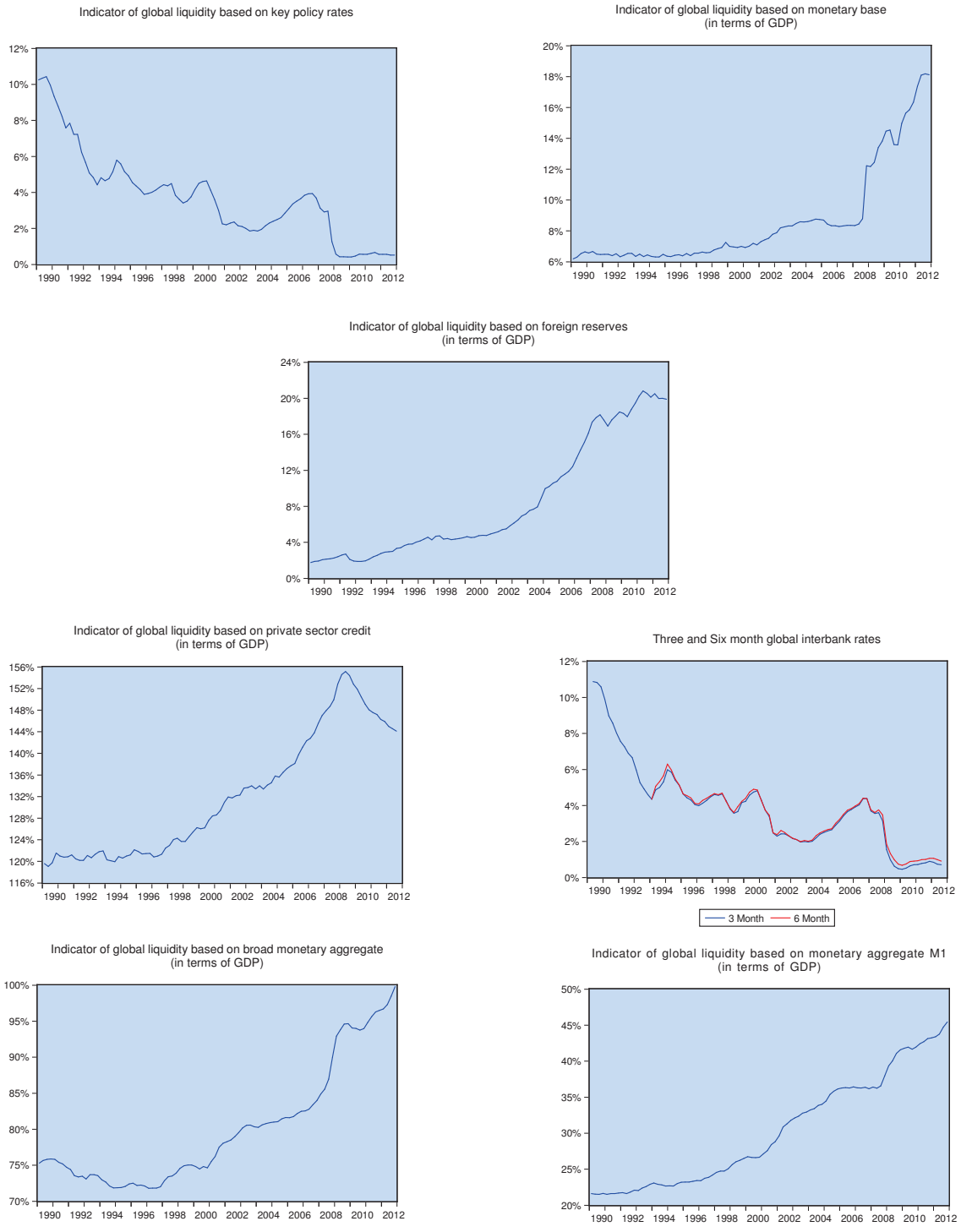


Figure 1.2: Global liquidity indicators

1.3 Potential determinants of global liquidity

Determinants of global liquidity are defined in terms of macroeconomic and financial factors which drive the monetary policy and the dynamics of private liquidity proxied in this paper by funding liquidity or by credit. Concerning the determinants of monetary policy, the price stability is the main objective of monetary authorities. In accordance with the experience of monetary authorities, a broad consensus arose from the central banks and the economists around the priority to price stability [6]. The control of inflation permits to guide the evolution of purchase power in the economy and therefore fosters an environment conducive to economic growth. Central banks also consider as another objective the economic growth. This second objective is most of the time combined with the inflation controlled in a Taylor rule according to the preferences of monetary authorities. These two objectives are the traditional objectives chosen by almost all central banks. But other objectives can also be enumerated in the macroeconomic determinants of monetary decisions.

The financial stability and the exchange rates have also be raised as potential factors which drive monetary policy. In spite of the debate around the integration of asset prices in the monetary policy, some central banks have already integrated this variable in their decision. For instance, the Bank of Canada outlines: "*as made clear in the past, to the extent that financial imbalances affect the near-term outlook for output and inflation, financial stability considerations are already taken into account in the setting of monetary policy*". And more recently, the Canadian monetary authorities have considered also integrating some flexibility due to financial stability in its inflation-targeting agreement. This choice of taking into account financial stability is essentially based on the capacity of asset prices to help forecasting the output and to some extent the inflation. Cecchetti et al. [2000] find also in their paper that taking into account the asset prices in the monetary policy improve the monetary policy and can reduce the output volatility, those which satisfies the traditional and main objective of central banks. Moreover the "**Great**

[6] Friedman [1982] "*there is today a worldwide consensus, not only among most academic economists but also among monetary partitioner, that the long-run objective of monetary policy must be price stability*"

deviation" [7], observed over recent years, which describes the gap between the observed and the Taylor rule rates, could suggest other factors in the rule of central banks. Hofmann and Bogdanova [2012] show also this deviation and explain it by different potential factors, and particularly the asset prices and the exchange rates. Taking into consideration the exchange rates in monetary decision can be justified by the willing to keep a quite stable differential rates with other monetary areas in order to limit the unwelcome capital inflows. Therefore, inflation, economic activity, financial stability and exchange rates could be determinants of global liquidity.

Concerning the private sector, these previous variables can also be considered as determinants of private liquidity. Hofmann [2004] studies the determinants of private sector credit and justifies a role of real activity and real estate prices in the dynamics of credit. The real activity impacts both the demand and the supply side of credit. Households and firms define their demand of credit according to current and expectation of economic activity dynamics. And if the expectations are less beneficial, the demand of credit can be reduced because agents want to be able to pay off principal and interests of the loans. As the dynamics of economic activity induce the degree of creditworthiness, the suppliers are also more reticent to lend. The role of real estate is linked to wealth effect on the demand and the value of collateral required for getting a loan. So asset prices and economic activity could be also used as macroeconomic factors of private liquidity. Inflation impacts by definition the real interest rates. And the effects of exchange rates dynamics are integrated in carry trade strategies which also impact the dynamics of credit and private liquidity. Empirical studies as those of Hoffmann [2012] and Clarida et al. [1998] have already highlighted respectively this taking into account of exchange rates in the monetary decision of ECB and in Bank of Japan.

Therefore, economic activity, inflation, exchange rates and financial stability could be considered as potential determinants of global liquidity either by official part or by private. Some researches also show an asymmetric reactions of some central banks to the volatility of asset prices (VIX). D'Agostino et al. [2005] find that the reaction of the Federal Reserve

[7] Taylor [2011]

(FED) depends of the volatility regime of asset returns, with a more significant reaction during period of falls. This result is also showed by Ravn [2012] and Hoffmann [2012].

One of the main interests of this paper is, on the one hand, to study if these relations are observed empirically in a larger global liquidity approach which focuses on the two components of global liquidity and in a global perspective, and on the other hand, analyze if the behavior of these determinants have changed with the financial crises of 2008. As these studies require a huge number of variables for the definition of concepts and applied to different countries, a Factor augmented- autoregressive vector (FAVAR) model is adopted.

1.4 FAVAR Model and Hypotheses

1.4.1 Methodology and Justification of FAVAR approach

This approach has been proposed by Bernanke, Boivin and Eliasz (2005) and combines a Factor model with structural vector auto-regressive (SVARs) methodology. This econometric method permits to integrate in only one model a rich environment of informations by factor approach.

According to Stock & Watson (2002, 2005) and Forni, Giannone, Lippi & Reichlin (2009) works, I consider that each variable X_{it} has two components linked by a linear relation :

- A common component χ_{it}
- An idiosyncratic component ξ_{it}

By this way,

$$X_{it} = \chi_{it} + \xi_{it}$$

.

I consider also that common components are driven by q macro-shocks u_t, which are a linear combination of Factor F_t

$$\chi_{it} = B_n(L).u_t$$

$$F_t = N(L)u_t$$

such as $B_n(L) = A_n N(L)$.

Therefore initial variables can be expressed by the following relation:

$$X_{it} = A_n.F_t + \xi_{it} \tag{1.1}$$

By this factor equation, more informations known by agents in the economy are put in the model. So an economic concept can be better described by a set of variables due to common macroeconomic component captured in the model. And *Principal component analysis* is suitable as method for achieving it. Applied to Global liquidity, this econometric method allows to summarize the information contained in the different approaches of the concept, and by this way getting a more effective representation of global liquidity. As mentioned earlier, the global liquidity depends on both the official and the funding liquidity. So the liquidity available in a global perspective could be considered as the common factor resulting from dynamics of its components.

Another benefit of Factor model is to make easier the identification of shocks. In fact, adding more information in the model reduces the risk of getting a wrong shock especially for structural VARs model. In other words, it reduces the unfundamentalness risk (Forni, Giannone, Lippi & Reichlin (2009)) and improves the model explanatory power.

According to factor equation (1.1), expression of VARs becomes:

$$\begin{bmatrix} F_t \\ Y_t \end{bmatrix} = \Phi(L) * \begin{bmatrix} F_{t-1} \\ Y_{t-1} \end{bmatrix} + \nu_t \tag{1.2}$$

From this second equation (1.2), the effects of macroeconomic shocks can be assessed. These variables can be extracted from factor equation F_t or can be directly observable variables Y_t.

The FAVAR Model is therefore represented by the following relations (Bernanke, Boivin & Eliazs (2005)):

$$\begin{cases} X_t = \Lambda F_t + e_t \\ \begin{bmatrix} F_t \\ Y_t \end{bmatrix} = \Phi(L) * \begin{bmatrix} F_{t-1} \\ Y_{t-1} \end{bmatrix} + \nu_t \end{cases} \tag{1.3}$$

Therefore, FAVAR model allows us to get a Factor measure of Global liquidity which capture both dynamics of official and funding liquidity. Moreover, it permits to measure the effects of potential determinants on Global liquidity factor by impulsing response functions and studying the direction of causality via Granger causality test. I am also interested by the Variance decomposition, which gives an indication on the explanatory ability of the determinants. But in order to do so effectively, it's necessary to define a structure of the model by identification schemes.

1.4.2 Identification schemes

The identification schemes concern both the identification of factors and the identification of shocks. The idea underlying the identification of factors is to guarantee the structure of the factor and in this paper, to get an economic meaning essential to the interpretation of the factor. As the derived factors issued from the principal component analysis will be afterwards put into a VAR model, the number of factors is restricted to 1. This hypothesis seems not so strong for the explanation power of factors in the main estimation is greater than 30% and the factor of global liquidity is more than 45%.

To keep an economic meaning to economic concept used in this FAVAR model, some restrictions are introduced into the loading matrix (the matrix of the coefficients), as done by Belviso & Milani (2006). The restrictions are described just below with X_i a subset of the whole sample which shared the same economic meaning and F_i the related factor.

$$\begin{bmatrix} X_t^1 \\ X_t^2 \\ \vdots \\ X_t^I \end{bmatrix} = \begin{bmatrix} \Lambda_1^f & 0 & \dots & 0 \\ 0 & \Lambda_2^f & \dots & 0 \\ \dots & \dots & \dots & \dots \\ 0 & 0 & \dots & \Lambda_I^f \end{bmatrix} . \begin{bmatrix} F_t^1 \\ F_t^2 \\ \vdots \\ F_t^I \end{bmatrix} + e_t \tag{1.4}$$

The subsets series X_i are ordered as required by the Cholesky decomposition for defining a structure of the model. This ordering permits to identify the effect of each chock instead of the effect of a combination of chocks issued from a regression without restrictions. The structure of the model retained here considers the global liquidity indicator as the

most endogenous variable according to the "augmented Taylor-rules" presented in the above section. As justified earlier, the dynamics of liquidity could be driven by real activity, inflation, exchange rates and financial stability. Among these variables, exchange rate is considered as the most exogenous, because it results from the decision of many authorities and therefore is less controllable than the local variables. This view is also shared by Darius and Radde [2010], as many other studies who consider also that "output contemporaneously affects inflation". In fact, the general price in the economy are more sensitive to actual and expected output. Agents adjust more quickly the price than the dynamics of the economic. And this pace of adjustment in prices is even more suitable on financial markets where agents integrates directly the information in their price. Therefore the following order will be adopted :

$$\begin{bmatrix} X_t^{er} \\ X_t^{gdp} \\ X_t^{cpi} \\ X_t^{fstab} \\ X_t^{gli} \end{bmatrix} = \begin{bmatrix} \Lambda_{er}^f & 0 & 0 & 0 & 0 \\ 0 & \Lambda_{gdp}^f & 0 & 0 & 0 \\ 0 & 0 & \Lambda_{cpi}^f & 0 & 0 \\ 0 & 0 & 0 & \Lambda_{fstab}^f & 0 \\ 0 & 0 & 0 & 0 & \Lambda_{gli}^f \end{bmatrix} . \begin{bmatrix} F_t^{er} \\ F_t^{gdp} \\ F_t^{cpi} \\ F_t^{fstab} \\ F_t^{gli} \end{bmatrix} + e_t \tag{1.5}$$

Each subset of variables organized by economic meaning is identified as highlighted by the table 1.1.

1.5 Empirical application

1.5.1 Data

As mentioned earlier, advanced countries create around 2/3 of Global liquidity. Thus determinants can be extracted from data of these countries: United States (US), United-Kingdom (UK), Euro Area (EA) and Canada (CAN). Concerning Euro area, proxies will be gotten by data from Germany, France, Italy and Spain if data are not available. Data are on quarterly frequency from 1990 to 2011 and make stationary.

Based on Principal components analysis, Factors are gotten. Two loadings matrix will be

Economic concepts and its components	
Factor **Exchange rate** : F^{er}	Bilateral exchange rate against USD
Factor **Real activity** : F^{gdp}	Consumption
	GFCF
	Government consumption
	Industrial Production
	Real GDP
	Unemployment rate
	Imports and Exports
Factor **Inflation** : F^{cpi}	Consumption Price index
Factor **Financial stability** : F^{fstab}	House Prices
	Stock exchange
	VIX
Factor **global liquidity indicator**: F^{gli}	Global indicator based on Monetary base
	Global indicator of Foreign reserves
	Global indicator of key central banks interest rate
	Global indicator of narrow monetary aggregate M1
	Global indicator of broad monetary aggregate M2
	Global indicator of Credit to private sector

Table 1.1: Description of economic concepts

calculated for Global liquidity according to the reference period. I distinguish a pre-crisis period from 1990 to 2007 and the whole sample covering the crisis (1990 to 2011).

On the period prior crisis, the main components of Global liquidity factor are monetary liquidity aggregates which integrate the transmission of official liquidity to real economy

and the weight of key policy rate stays significant. This is relatively close to reality before crisis. The policy rate was the principal instrument of central banks for impacting liquidity and transmission channels were sufficiently effective. So I can emphasize these components.

But after the crisis, monetary authorities widen their policy instruments and monetary base fluctuates dramatically. The funding liquidity via credit is monitoring closely for avoiding credit crunch. On the side of emerging markets, the foreign reserve weight on global liquidity decrease relatively to previous period.

For real activity factor, the signs of components are consistent with the economic meaning. In other words, an increase in this factor implies a greater consumption, investment or a decrease in unemployment rate. This principal is applied to all potential determinant factor. The international trade factor measures the growing of exchange between countries, that is an increase of both imports and exports.

1.5.2 Determinants of global liquidity

Real activity, the main driver of global liquidity

Global liquidity is mainly driven by economic activity, which explains almost one third of the forecast error variance. This result is consistent with the priorities of central banks and the high weight of economic background in the distribution of credit. In fact, in absence of high inflation as observed during the pre-crisis period, monetary authorities support economic activity by also limiting the risk of overheating. The global improvement of economic performances until 2008 can therefore contribute to justifying some restrictive measures implemented by monetary authorities as in 2004 and 2005. This reflects the negative and significant relationship between real activity and official liquidity shown by figure 1.6. These monetary policies are integrated in the determination of funding liquidity as suggested by figure 1.8 and 1.10. Private agents in this situation face less favorable financing conditions (figure 1.7), which reduces the private liquidity. So as the whole, the first impact of the economic expansion is a slowdown of global liquidity due to action of

monetary authorities (figure 1.4). However, this effect is not permanent. In the following months, financial institutions dampen progressively the monetary constraints and renew with providing increasing funding to the economy in order to benefit from the growth. Thus increases global liquidity.

Over the recent period with the great recession, the relationship between official and private agents, real activity and global liquidity stays, on the whole, suitable. Monetary authorities impulse the dynamics of liquidity and issue liquidity. Nevertheless, contrary to the growth situation, the reactions of central banks are greater than in the previous case (figure 1.5). In fact, they have to inject more liquidity in the economy in order to contribute to restoring the economy, and offsetting the lack of private liquidity. Private agents, in this crisis context, are more reluctant to loan and become very pessimistic about the recovery of the economy (figure 1.9). The accommodative stance of monetary authorities impacts shortly the behavior of financial agents who continue to tighten significantly the funding in the economy. Consequently, the actions of central banks have to be strong enough to successfully fund the economy directly. This result justifies the reactions of official agents during the crisis and the non-conventional measures implemented. Quantitative easing and credit easing, which have been widely used, have helped provide funds directly to specific markets or agents and compensating the lack of funding liquidity.

So, depending on the economic situation, official and private agents do not have the same role in the provision of global liquidity according to the economic situation. In period of growth, the banks and other financial institutions are the main issuer of liquidity, and central banks try to contain the liquidity dynamics. But during period of recession, these private agents overshoot compare to the growth framework and reduce considerably the liquidity. In that context, monetary authorities increase dramatically the official liquidity and become a stronger and more strategic player. Therefore, the dynamics of global liquidity depend on economic situation, but also on financial stability.

Financial instability and heterogeneities across agents

Financial stability is the second main determinant of global liquidity according to variance decomposition (figure 1.11). As defined previously, the financial stability indicator is calculated by taking into account asset prices especially equity and real estate indexes as well as a measure of uncertainty on financial market, the VIX. An increase of this indicator match with higher asset returns and lower financial uncertainty.

The results of this study suggest that there is a negative significant relationship between the indicator of financial stability and global liquidity (figure 1.4 and 1.3). As for real activity, monetary authorities react contra-cyclicaly. In period of boom, they slowdown the growth of liquidity, especially the market liquidity, which by definition increases dramatically with lower volatility on markets or higher asset prices. However, this action of monetary authorities seems to have just a short and small impact on the distribution of credit (figure1.9). Banks integrate the constraints of monetary authorities but provide credit few quarters later as the financial stability reduces the risk of insolvency. Nevertheless, the impact of financial stability on the distribution of credit seems limited as highlighted by figure 1.11 and the corresponding IRF, contrary to period of stress.

In period of financial instability, as on the recent period, with higher volatility and frozen markets, market liquidity is strongly degraded, weak or nearly inexistent in some markets. Monetary authority react by injecting liquidity for limiting the transmission to the real economy. This accommodative monetary policy is marginally integrated by the banks. However, unlike to period of boom where banks have almost neutral stance, these agents in period of higher uncertainty react significantly by decreasing the volume of credit. This could be as a result of lower demand or supply of credit . But whatever the source, the better funding conditions impulsed by monetary authority does not restore the credit.

This result is emphasized by the variance decomposition (figure 1.11) where the heterogeneities across agents behaviors are very well highlighted. During period of boom, the share of financial stability for explaining credit does not exceed 10% of the variance of the forecast error, whereas after the crisis, it double and represent 20% at the same horizon. For monetary authorities, they are more concerned with avoiding or limiting the

formation of bubbles than responding actively in case of crisis. The impact of financial instability on the official liquidity is lower than the response of monetary authority to financial stability. In average, before the 2007 crisis, financial stability represented 15% of the variance of official liquidity and after the crisis this figure decrease at 6. This result is consistent with the willingness of central banks to limit moral hazard which could follow an extensive involvement of monetary authorities on financial markets.
So real activity and financial stability impact significantly the dynamics of global liquidity by affecting behaviors of official and private agents. However, the relationships with inflation is less obvious.

A mitigating role of inflation

Unlike to what would have been expected, the inflation before crisis has not contributed significantly to explaining global liquidity dynamics. In fact, according to the inflation targeting, a negative relationship between global liquidity and inflation would have been expected. But as suggested by results, Official as well as private agents (respectively figure 1.5 and figure 1.9) do not respond to inflation during the pre-crisis period. As the whole, over this period, it represents only 5% of the variance of global liquidity forecast error. However, with the recent crisis, this impact is much more important (11%). Official and Private agents seem to take into account much more inflation than previously. This can be explained by the dynamics of inflation itself (figure 1.12). As shown by the graph, inflation stays relatively stable between 1% and 3% which did not justify additional reactions from central banks. The credibility of this inflation targeting policy is also integrated by banks which did not react to any inflation shocks during this pre-crisis period or neglect the eventual negative effects of inflation. Consequently, inflation did not contribute significantly to the dynamics of global liquidity before 2007.
However, over the recent period, higher variability in inflation drives monetary authorities to adjust their policy and the weight of inflation becomes more significant. In addition to this, the adoption of unconventional measures, whose the effects are less well known by central banks, can induce distrusts and fears from private sectors. This permits to justify

the bigger role of inflation after the crisis.

Concerning exchange rate, it did not play a significant role in the dynamics of global liquidity no matters the agents and the specifications.
This results are robust to the ordering and remain stable even if only the VIX is considered as measure of financial stability.

1.6 Conclusion

The dynamics of global liquidity rely essentially on the economic performance, financial stability and to some extent on inflation. Real activity and financial stability, which are the main drivers of liquidity dynamics, hide heterogeneous behaviors between official and private agents. Generally private sector respond by a pro-cyclical manner, which is emphasized with recession and exacerbated with higher uncertainty. In period of financial stress, banks reduce dramatically the distribution of credit, whereas they were quasi neutral during period of financial stability. This reaction of private agents is very useful for better understanding the reactions of monetary authorities. As a whole, monetary authorities limit the expansion of private liquidity (funding or market) by restrictive policies in period of economic and financial booms. However, during recession or financial instability, they inject liquidity as a *liquidity supplier of last resort*. This response of central banks quite match their objectives and permit to offset partially, at least, an eventual lack of liquidity. Even when they provide liquidity in period of financial distress, official agents limit their actions in order to avoid moral hazard which could induce from an extensive involvement.

Concerning inflation, its contribution to global liquidity dynamics has to be nuanced before the crisis because of its relatively stable level. However, its higher variability over the recent period can justify a more significant contribution to the dynamics of global liquidity.

Finally, this study has provided a substantial description of the behaviors of each group

of agents and contributed to better understanding the dynamics of global liquidity from 1990-to-date. As concluded by Eickmeier et al. [2013], it's therefore very useful to integrate the multifaceted aspect of global liquidity and the interlinkages between its different components in an analysis. Considering only private or official views could biased the perception of the effective liquidity dynamics. As the behaviors of agents are identified, it could be consequently very interesting, as the next step, to focus on researching the efficiency of each group in providing global liquidity and the limitations of their actions in emerging and advanced countries.

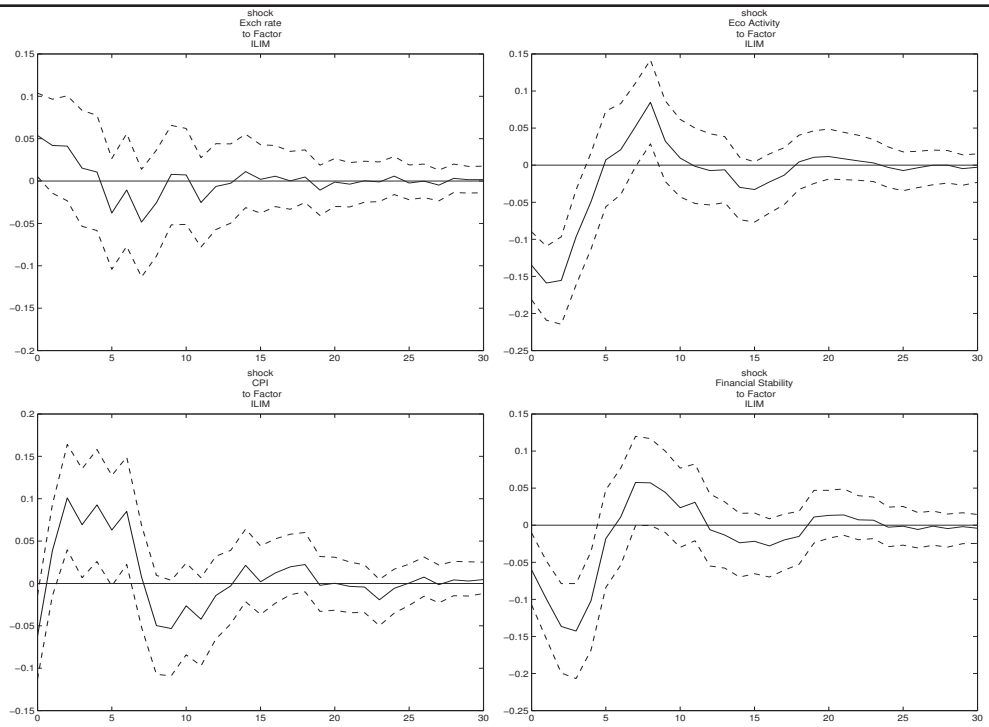


Figure 1.3: Impulse Response function for GLI

1.7 Appendices

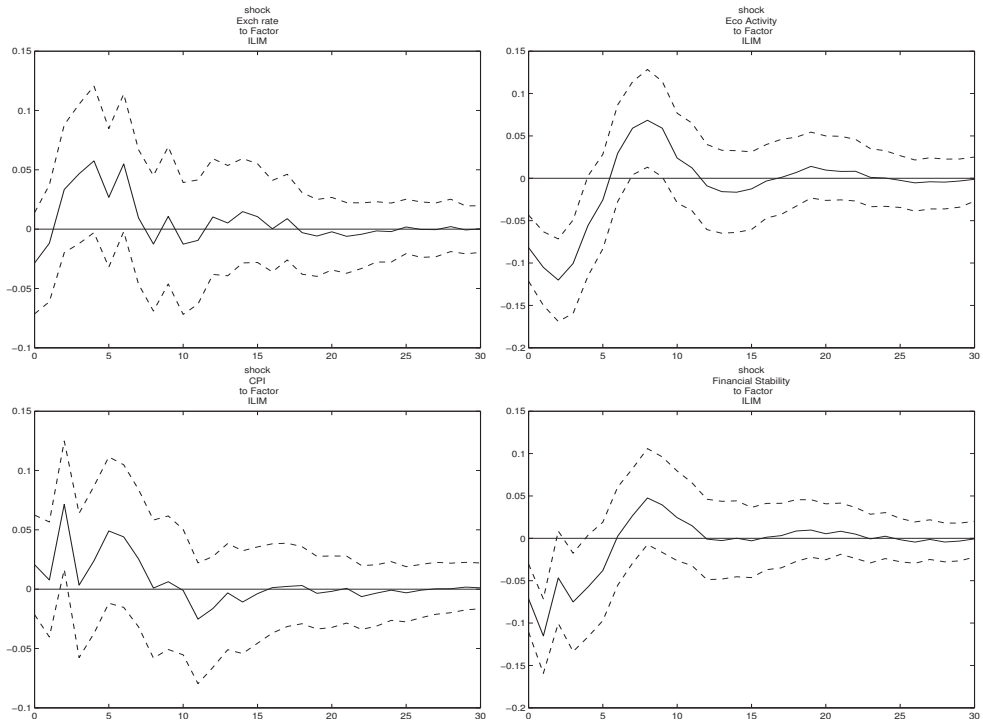


Figure 1.4: Impulse Response function for GLI before the crisis

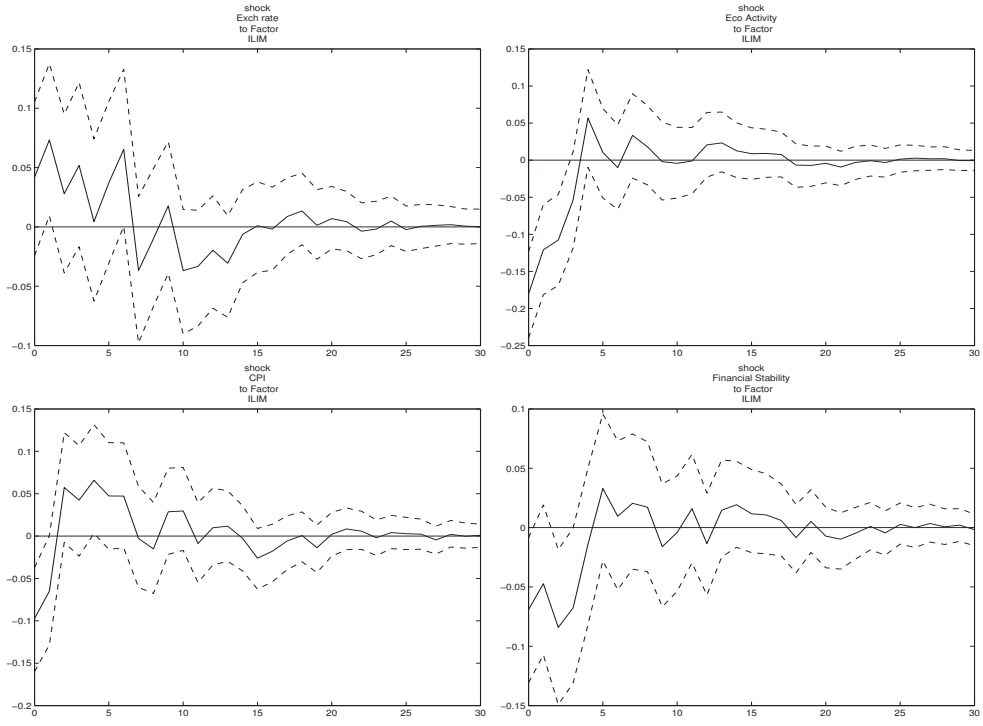


Figure 1.5: Impulse Response function - Official liquidity

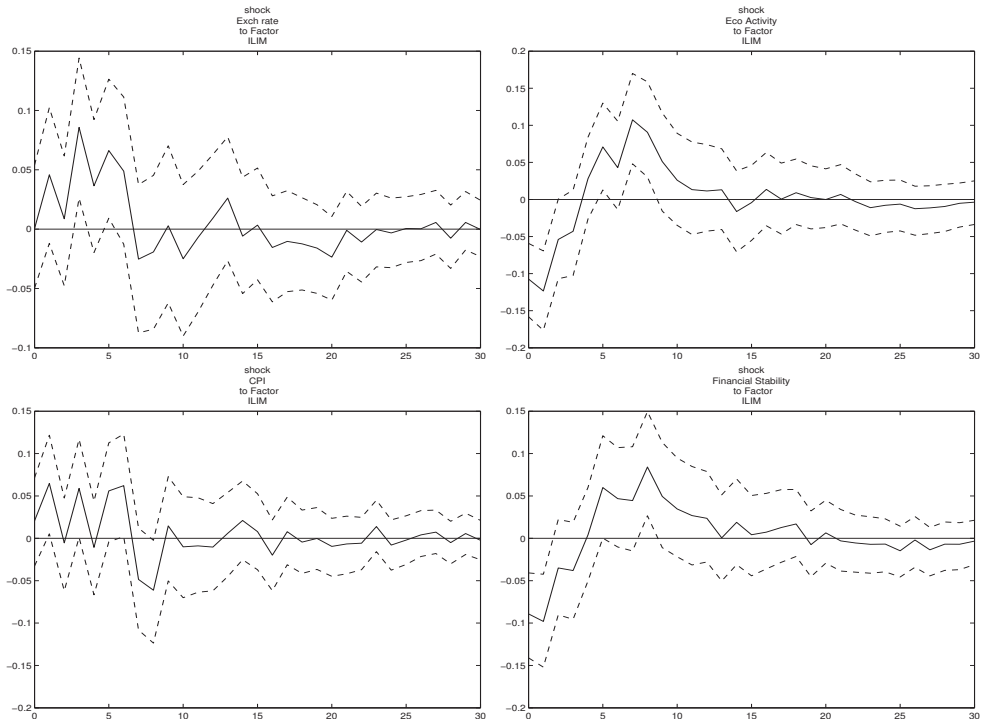


Figure 1.6: Impulse Response function before the crisis- Official liquidity

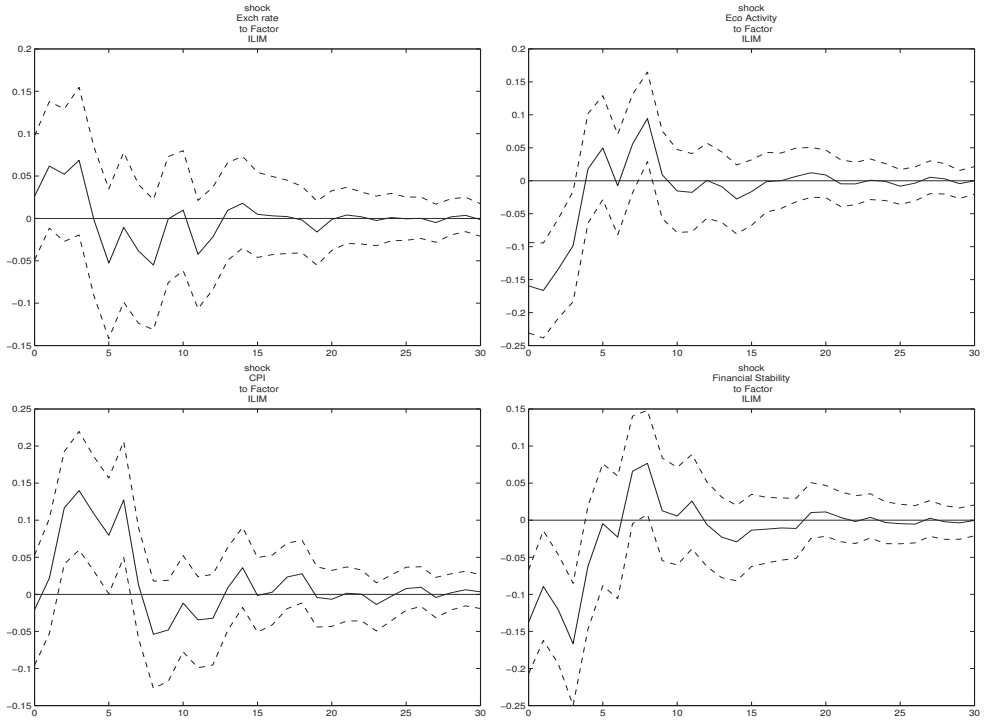


Figure 1.7: Impulse Response function - Private liquidity

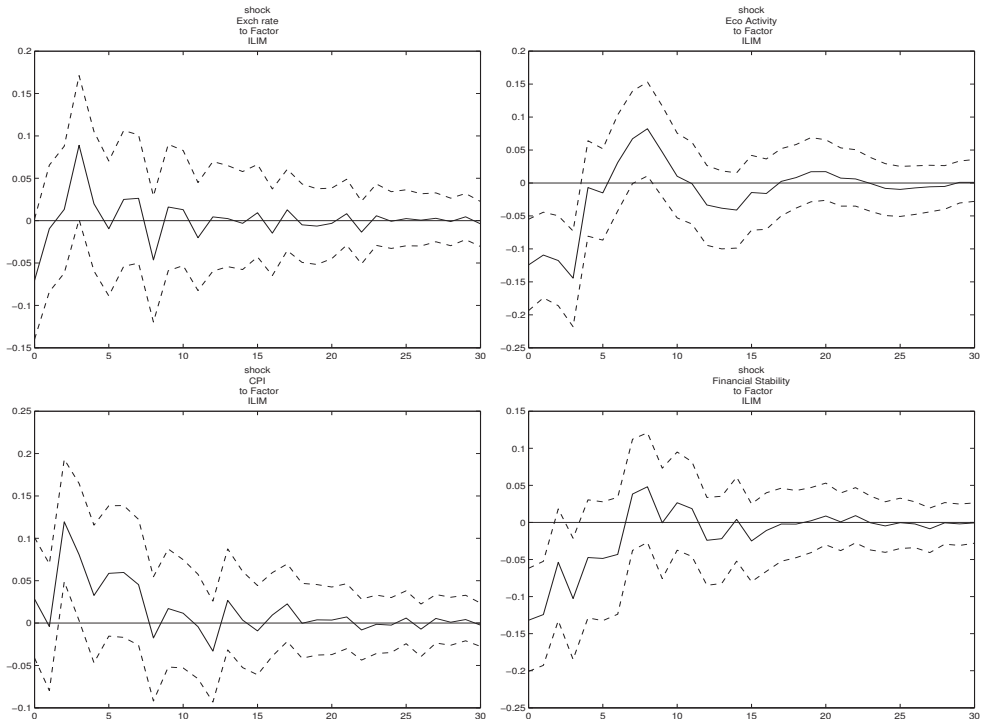


Figure 1.8: Impulse Response function before the crisis - Private liquidity

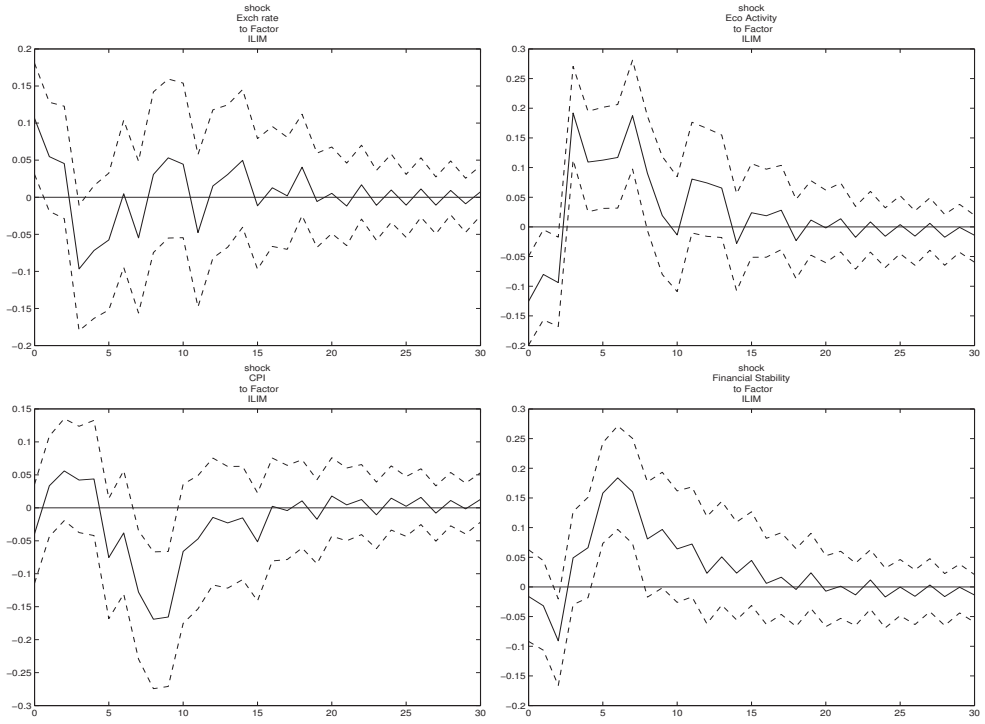


Figure 1.9: Impulse Response function - Credit

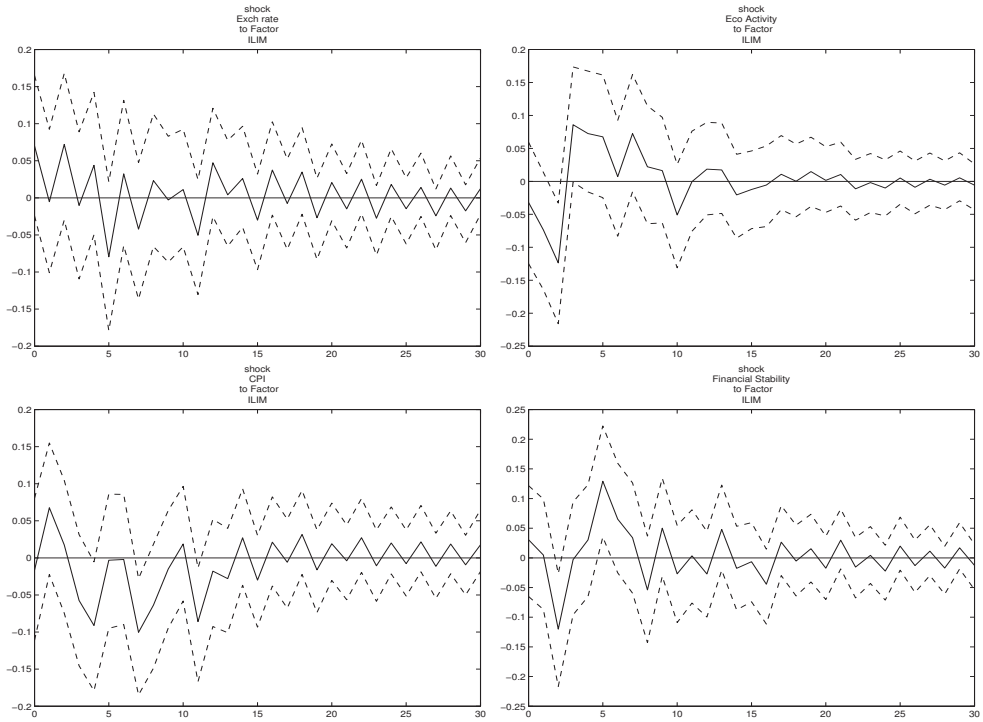


Figure 1.10: Impulse Response function before the crisis - Credit

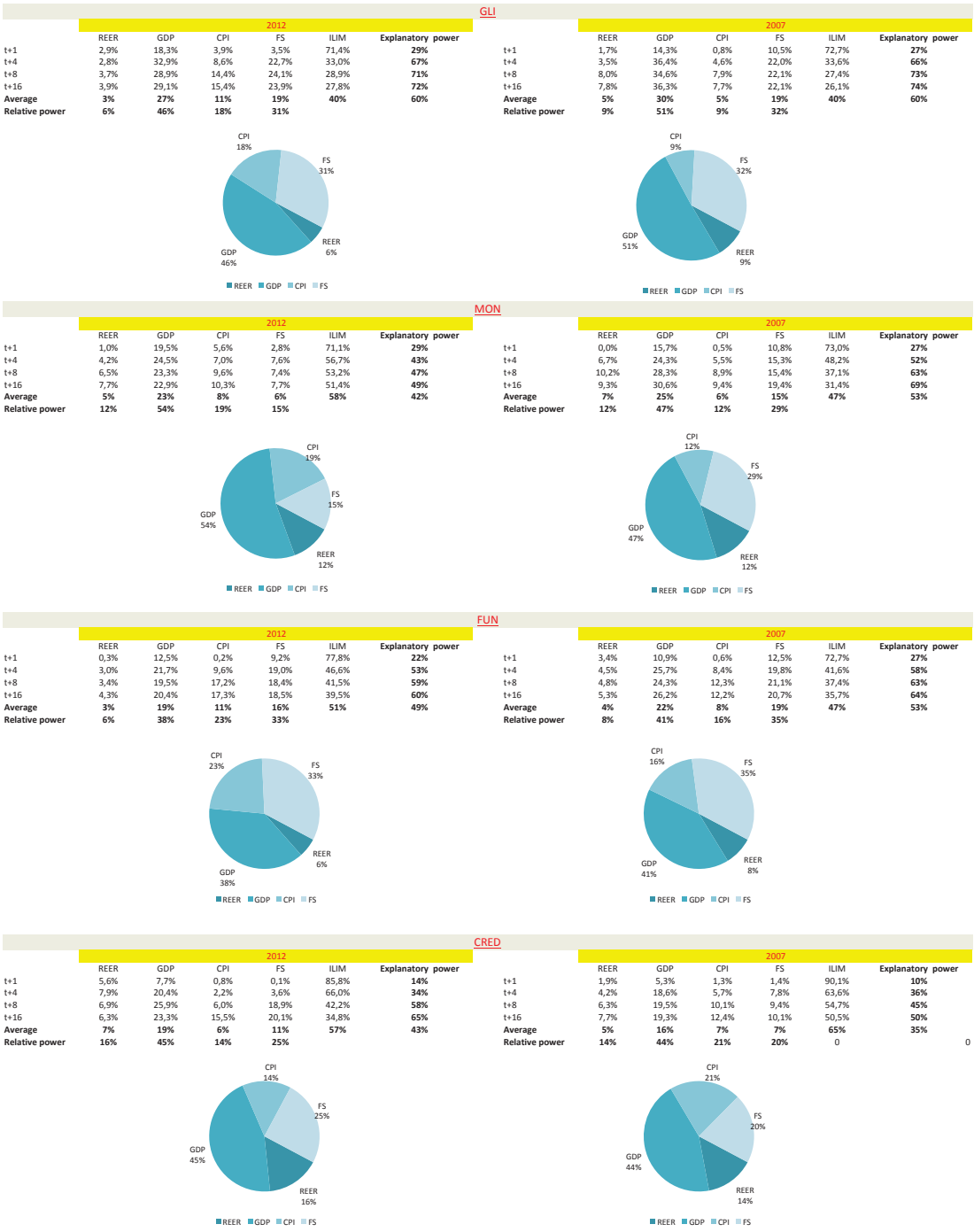


Figure 1.11: Decomposition of the Forecast Error Variance

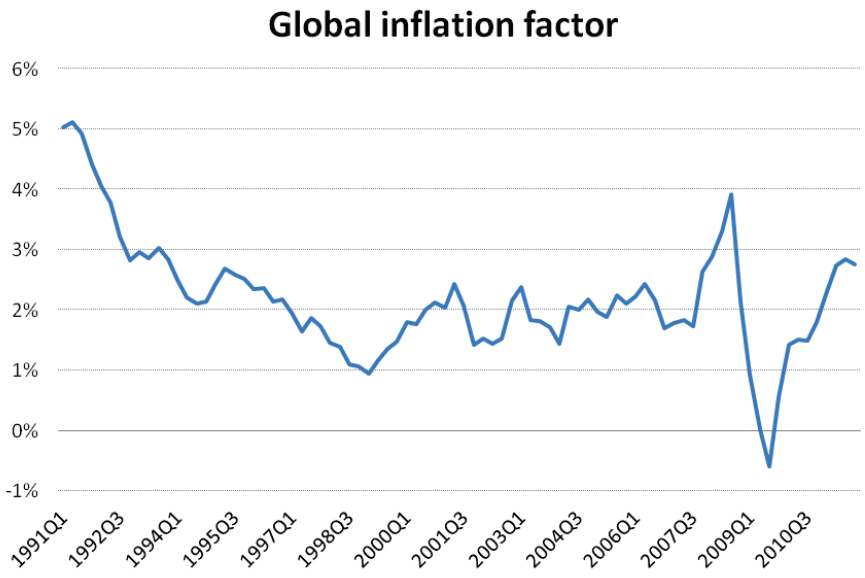


Figure 1.12: Global annual inflation factor

Chapter 2

Global shocks and Foreign asset repatriation

G. Adler[1], M-L. Djigbenou[2] and S. Sosa[3]

2.1 Introduction

Global financial markets have been a source of sizeable shocks over the last decade, with broad repercussions across the emerging market world. The crisis triggered by the bankruptcy of Lehman Brothers in 2008, and the quantitative easing (QE) program in advanced economies in the aftermath of that crisis, are stark examples. And looking forward, new shocks are likely to come, as the reduction in the scale of bond purchases by the U.S. Federal Reserve - i.e., "QE tapering" - marks only the start of the normalization of U.S. monetary conditions. Against this background, understanding the implications of global financial shocks in terms of their effect on capital flows to and from EMEs remains a key issue.

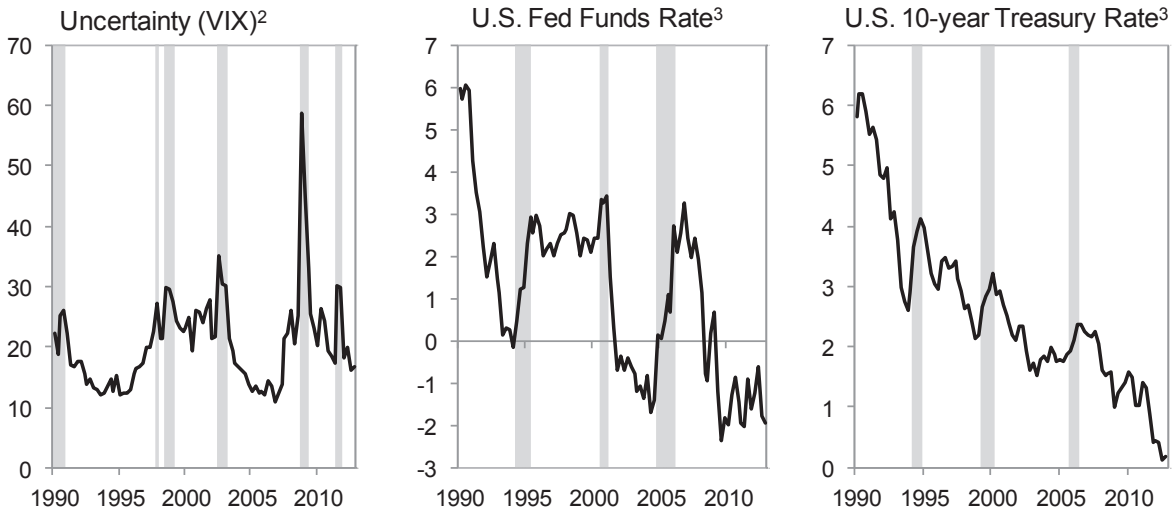
EMEs have become increasingly financially integrated with the rest of the world in the last two decades, raising their exposure to global financial shocks (i.e., shocks in core financial markets). However, a key feature of higher financial integration has been that both sides of EMEs balance sheets - that is, foreign liabilities as well as foreign asset holdings - have increased. As a result, emerging markets have had at their disposal increasing resources to offset balance of payment pressures arising during episodes of retrenchment of foreign investors, often occurring at times of financial distress in global markets. Larger stocks of public sector foreign assets (primarily international reserves) are undoubtedly a source of

[1]International Monetary Fund
[2]Banque de France, University of Bordeaux
[3]International Monetary Fund

resilience for these economies. But whether private foreign assets holdings are also a source of international liquidity, and the extent to which local investors play a stabilizing role following negative external shocks, remain open questions. Understanding the behavior of gross capital flows is, thus, critical, especially at the current juncture characterized by looming financial risks - including those stemming from uncertainty about the pace of U.S. monetary tightening.

A number of global financial shocks have taken place over the last two decades - some of them of sizeable magnitude - which are useful to assess the dynamics of gross capital flows to EMEs. These include global uncertainty shocks, as captured by the Chicago Board Options Exchange Market Volatility Index (VIX), sharp movements in the U.S. monetary policy (real) interest rates (the Federal Funds rate), as well as movements in the U.S. long-term (real) interest rates (e.g., the 10-year Treasury bond rate). Figure 2.1 illustrates the frequency and magnitude of some of these shocks.

Figure 1. Global Financial Shocks, 1990—2012[1]
(Percent, unless otherwise stated)



Sources: Haver Analytics; and Cleveland Federal Reserve.
[1] Large negative shocks are highlighted in gray.
[2] Chicago Board Options Exchange Market Volatility Index.
[3] Real interest rates based on forward-looking (1 and 10 year) inflation expectations.

Figure 2.1: Global financial shocks, 1990-2012

Global shocks have often had important effects on net capital flows to EMEs and, more

broadly, on economic activity in these economies. These aspects have been addressed extensively in previous studies [4] . However, attention to the dynamics of gross capital flows - and specially to the potential stabilizing role played by local investors - has remained limited, despite some recent evidence of domestic investors playing such an offsetting role by repatriating foreign assets (Figure 2.2).

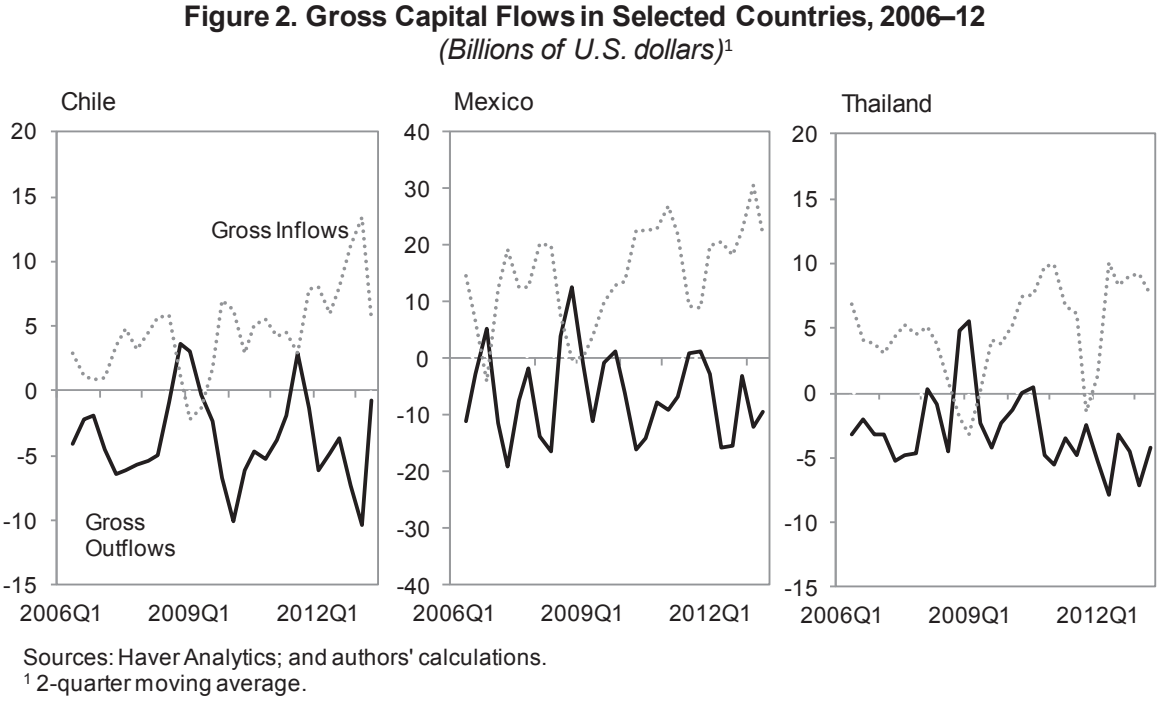


Figure 2.2: Gross Capital Flows in Selected Countries, 2006-2012

For example, this phenomenon has been observed in the aftermath of large global uncertainty shocks - like the one experienced during the 2008-09 global financial crisis - as well as after the "QE tapering" shock in May 2013 [5]. Whether this is a generalized

[4]The vast literature on Sudden Stops comes to mind (e.g., Calvo [1998]; Dornbush and Werner [1994]; Dornbush et al. [1995]; Calvo et al. [2004]; Calvo and Reinhart [2000]; Edwards [2004], etc.), although this strand of work has focused primarily on abrupt reversals in net capital inflows. More recently, Bluedorn, Duttagupta, Guajardo, and Topalova [Bluedorn et al.], and IMF [2013] have also studied the impact of global financial shocks on net flows to EMEs. Finally, Adler and Tovar [2013]) have studied the impact of global financial shocks on economic activity, and the role of financial integration in amplifying or mitigating such impact.

[5]On May 22, 2013, the U.S. Federal Reserve Chairman announced for the first time its intentions to

phenomenon across EMEs and types of financial shocks, however, remains unclear.

Some recent studies have focused on gross flows, examining whether episodes of net capital flow reversals were driven by declines in gross inflows (foreign investors retrenching from EMEs), surges in gross outflows (local investors accumulating external assets), or a combination of both (see, among others, Powell et al. [2002]; Cowan et al. [2008] ; Rothenberg and Warnock [2011] ; Forbes and Warnock [2012] ; Bruno and Shin [2012] ; Calderón and Kubota [2013] ; and Bluedorn, Duttagupta, Guajardo, and Topalova [Bluedorn et al.]). A few papers (for example, Cavallo et al., 2013) have also pointed to episodes of reversals of gross inflows that did not entail a reversal of net inflows (i.e., residents fully offsetting the behavior of non-resident investors). A common thread among these studies is the notion that the behavior of foreign and local investors may be driven by different factors and may respond differently to certain shocks. As a result, domestic investors could potentially play a stabilizing role, for example by repatriating foreign assets when foreign investors are liquidating positions in EMEs (i.e., during episodes of gross inflow reversals). For instance, a recent study (Broner et al. [2013]) finds a positive correlation between gross inflows and gross outflows, and that the behavior of domestic investors tends to offset that of foreigners during financial crises[6]. None of these studies, however, has explored the link between specific global shocks and gross flows, despite the fact that this is critical to assess EMEs vulnerabilities to (likely) changes in global financial conditions [7].

This paper contributes to this literature by examining the dynamic response of net and gross capital flows to key global financial shocks, including short and long-term U.S. interest rates. Specifically, we use a panel VAR setting, encompassing a group of 38 EMEs over the period 1990Q1-2012Q4, to study (i) the extent of the offsetting role played by

start a process of gradually reducing in the scale of bond purchases (i.e., "QE tapering"). The mere announcement was followed by a sharp rise in long-term U.S. interest rates, and important repercussions on capital flows to EMEs.

[6] Financial crises, however, are defined in an ad-hoc manner that makes it difficult to associate these events to specific external shocks.

[7] Forbes and Warnock [2012] and Calderón and Kubota [2013] study the impact of global financial shocks, but in probit settings that are not well-suited to grasp the impact on capital flows and their dynamic responses outside sudden stop events.

domestic investors in response to adverse foreign shocks, and (ii) whether this depends on the specific nature of the shock (in particular, uncertainty or short-term and long-term interest rate shocks). We also examine differences across EM regions, across countries with different characteristics (e.g., financial integration and capital account openness), and across types of capital flows. Finally, we use the estimated model to discuss also the impact of shocks to U.S. economic activity on capital flows to EMEs[8].

We follow the terminology used in recent papers, calling *gross inflows* the net movement in international liabilities of a country, and *gross outflows* the net movement in international assets[9]. While balance of payments accounting is based on doubly-entry, movements in the asset and liability sides of the financial account may differ as some operations involve an offsetting entry in the current account or a change in international reserves. As is standard in the literature, we base our analysis of gross flows on the notion that gross inflows (outflows) primarily reflect foreign (domestic) investors behavior. That is, shocks to gross flows are primarily supply driven[10].

We find that - after controlling for U.S. interest rates, U.S. GDP growth, and commodity prices - global uncertainty shocks lead to net capital outflows from EMEs, but the impact is, in general, short lived and relatively moderate. The response of net flows, however, hides sizeable dynamics in gross flows. In fact, we find evidence that while foreigners retrieve from EMEs during adverse shocks events, residents repatriate foreign assets, playing a meaningful offsetting role. In the case of (pure) U.S. interest rate shocks, we find important differences between the impact of short-term and long-term interest rate shocks. Domestic investors do not appear to play a mitigating role in the case of short-term interest

[8]The net effect of this type of shock is of particular interest at the current juncture and, a priori, ambiguous. Positive economic shocks to activity in the U.S. would normally lead to a tightening of monetary conditions in this country, pushing flows away from EMEs. At the same time, better economic prospects could attract flows to these economies, especially to U.S. trading partners.

[9]Specifically, a positive gross capital inflow is an accumulation of net foreign liabilities, while a positive gross capital outflow entails an accumulation of net foreign assets.

[10]While this could be controversial in the analysis of idiosyncratic shocks, it is less likely to be so in the context of global financial shocks studied in this paper. Results confirm that movements in gross inflows and outflows are not symmetric.

rate shocks. In fact, a positive shock to the Federal Funds rate is associated with statistically significant outflows by both foreign and local investors, although the magnitudes are relatively moderate. In the case of shocks to long-term U.S. interest rates, in contrast, we find evidence of asset repatriation, but this offsetting force falls short of balancing the retrenchment of non-residents (thus, implying non-trivial net capital outflows)[11]. Table 2.1 [12] summarizes the main results.

		U.S. interest rates	
	Uncertainty (VIX)	**Short-term rate**	**Long- term rate**
Net Flows	Limited net impact	Moderate net outflows	Larger net outflows
Gross Inflows	Sizeable retrenchment	Limited retrenchment	Sizeable retrenchment
Gross Outflows	Sizeable repatriation of foreign assets	Limited accumulation of foreign assets	Moderate repatriation of foreign assets

Table 2.1: Impact of Global Financial Shocks on Capital Flow to EME's

These results suggest that, while increased financial integration has raised EMEs exposure to global financial shocks, increased foreign asset holdings are likely to play an important - although not complete - stabilizing role. The results also shed light, in the current juncture, on how EMEs are likely to react to the U.S. Feds exit from QE, as the latter is likely to entail higher longer-term U.S. interest rates.

The rest of the paper is organized as follows: Section II discusses the empirical approach. Section III presents the main results, their robustness, and extensions. Section IV con-

[11] Although not the main focus of our analysis, we also find that positive growth disturbances in the U.S. lead to net capital inflows to EMEs, despite the associated rise in U.S. interest rates.

[12] General results for emerging markets economies. Magnitude vary somewhat for different analytical groups (as discussed below)

cludes with a summary of the key takeaways.

2.2 Empirical approach

Our objective is to examine the dynamic effect of global financial shocks on net and gross capital flows into EMEs. Since financial shocks are often accompanied by other shocks - for example, to U.S. output growth and commodity prices), and the latter may, by themselves, have important implications for capital flows to and from EMEs, a multivariate approach is critical to disentangle the pure effect of each of the shocks[13].

2.2.1 Panel VAR model

A panel vector autoregressive (PVAR) model is employed to quantify the dynamic impact of global financial shocks on both net and gross capital flows to EMEs. Specifically, we estimate a first-order PVAR model that treats all the variables in the system as endogenous and allows for unobserved country heterogeneity. Two versions of the model are estimated, focusing on net capital flows and gross capital flows separately[14]. In both cases the specification takes the following reduced form:

$$y_{i,t} = \alpha + \gamma_i + \beta' y_{i,t-1} + \varepsilon_{i,t} \tag{2.1}$$

with time index $t = 1, ..., T$; and country index $i = 1, ..., N$, where y_i is a vector of six variables for country i $\{G, VIX, INT, INT\_10Y, COMMP, NKF\}$ in the specification using net capital flows ($NFKi$) or a vector of seven variables $\{G, VIX, INT, INT_10Y, COMMP, GKIi, GKOi\}$ in the specification using gross capital

[13]In fact, a simple event analysis confirms that even in episodes of sizable global financial shocks, their impact on flows to EMEs is often not visible in a bivariate setting (see Appendix).

[14]We follow the recent literature in studying overall flows, excluding international reserve flows. A known shortcoming of this approach is that both private and public flows are included, because of data limitations, despite the fact that they may not behave in the same way in the face of global financial shocks. Bluedorn et al. (2013) show that official flows can play an important offsetting role in some cases - although this is a relevant feature for only a small number of countries in our sample that experienced crises (i.e., were impaired from borrowing in external financial markets).

flows (GKI_i and GKO_i); γ_i is a vector of country specific fixed effects, and $\varepsilon_{i,t}$ denotes a vector of reduced form errors. As mentioned before, we follow the terminology used in the recent literature, calling *gross capital inflows* (*outflows*) the (net) change in international liabilities (assets). Both net and gross flows are expressed in annualized terms and in percent of trend GDP (expressed in U.S. dollars) to properly normalize the flows while avoiding the measure to be contaminated by contemporaneous movements in GDP. Our measures of international financial conditions include global uncertainty (proxied by the Chicago Board Options Exchange Market Volatility Index, VIX), changes in the short-term U.S. real interest rate (the Federal Funds rate, INT), and changes in the long-term U.S. real interest rate (the 10-year Treasury bond rate, INT_10Y)[15]. Real interest rates are computed using forward-looking inflation expectations at 1 and 10-year horizons, and first differences are used to ensure series stationarity[16]. U.S. real output growth (G) and (the log difference of) a broad index of commodity prices ($COMMP$) are also included, mainly as control variables. Table 2.4 in Appendix 2 describes the variables used in the empirical exercise in detail.

Our main objective is to identify the dynamic response of capital flows to EMEs to global uncertainty and U.S. interest rate shocks. Two features of the selected specification are critical to estimate such effects. First, controlling for (as well as allowing feedback through) movements in U.S. real output and commodity prices is key to ensure that the estimated effects reflect those of pure global financial developments and not the response of financial variables to real shocks. Second, as there is significant cross-section heterogeneity in terms of the level of capital flows (especially with regard to gross flows), the model includes country fixed effects (γ_i) that capture the countries unobserved time-invariant idiosyncratic characteristics. However, to avoid the bias associated with the fact that

[15] The VIX index has recently been used as a measure of global uncertainty or financial stress. Bloom [2009] , for instance, shows that this volatility index is highly correlated with measures of micro- and macro-level uncertainty, including from financial variables. More recently, Carriere-Swallow and Céspedes [2011], Adler and Tovar [2013], and Adler and Sosa [2013] also used the VIX to measure global uncertainty shocks.

[16] Although we rely on real interest rates, shocks to them are primarily driven by nominal innovations, as inflations expectations tend to be highly stable for the sample period and countries under study.

fixed effects would be correlated with the regressors due to the lags of the dependent variables, we use forward mean-differencing, also referred to as the Helmert procedure, following Love and Zicchino [2006] and Arellano and Bover [1995]. [17]

Once the panel VAR is estimated, we compute impulse response functions to examine the effect of global financial shocks on capital flows. Since only the reduced from version of the model is estimated, imposing additional structure to the error variance-covariance matrix is required, so that the structural shocks can be identified. We use a standard Choleski decomposition to orthogonalize the reduced form errors. Our selected ordering (where the more exogenous variables of the model precede the endogenous ones), is as follows: $\{G, VIX, INT, INT\_10Y, COMMP, NKF\}$ and $\{G, VIX, INT, INT\_10Y, COMMP, GKI, GKO\}$ for the specifications using net flows and gross flows, respectively. Within the global variables, this order assumes, primarily, that financial conditions and commodity prices respond contemporaneously to U.S. output shocks but the latter only responds to these variables with a lag. This assumption is consistent with the notion that interest rates and prices are forward-looking variables[18].

Confidence intervals around the impulse responses are generated with Monte Carlo simulations, by randomly generating a draw of the coefficients of the model and re-calculating the impulse-responses. This procedure is repeated 700 times to compute the 5th and 95th percentiles of the impulse responses.

[17] This transformation is an orthogonal deviation, where each observation is expressed as a deviation from the mean of all the future observations. Each observation is weighted so the variance is standardized. The procedure preserves homoscedasticity and does not induce serial correlation (Arellano and Bover [1995]). Moreover, by preserving the orthogonality between transformed variables and lagged dependent variables, this technique allows the use of the lagged values of regressors as instruments, and to estimate the coefficients by the generalized method of moments (GMM).

[18] Nonetheless, the main results are robust to alternative orderings within the group of international variables, as discussed later.

2.2.2 Data

Our sample encompasses quarterly data for a group of 38 emerging market economies, over the period 1990Q1-2012Q4. Table presents the list of countries and the time coverage for each of them. The data sources are primarily the IMFs Balance of Payments Statistics (version BP6TS) and World Economic Outlook, Haver Analytics, and the Federal Reserve Bank of Cleveland database. Table 2.2 reports key summary statistics for the variables of the model.

Variables		Mean	Std. Dev.	Min	Max	Observations
NKF	**overall**	3,77	7,65	-62,24	62,96	N = 2639
	between		3,6	-5,43	9,53	n = 38
	within		6,87	-68,01	57,19	T-bar = 69.45
GKI	**overall**	6,84	8,96	-37,89	75,25	N = 2755
	between		3,79	1,05	15,62	n = 38
	within		8,15	-45,59	67,91	T-bar = 72.5
GKO	**overall**	3,02	6,65	-39,2	62,6	N = 2663
	between		2,99	-0,36	12,02	n = 38
	within		6,02	-42,81	58,99	T-bar = 70.08
VIX	**overall**	20,46	7,49	11,03	58,74	T= 92
INT	**overall**	-0,087	0,706	-1,932	2,017	T= 91
INT_10Y	**overall**	-0,062	0,271	-0,86	0,775	T= 91
COMMP	**overall**	0,012	0,09	-0,38	0,358	T= 91

Table 2.2: Descriptive Statistics

2.3 Results

2.3.1 Benchmark specification

Figures 2.3 and 2.4 illustrate the dynamic response of capital flows to EMEs to external shocks in our benchmark model, using net and gross flows respectively. The full set of responses of capital flows to global shocks, as well as a characterization of the magnitude

and persistence of the shocks, is presented in Figure 2.15 in Appendix 2.

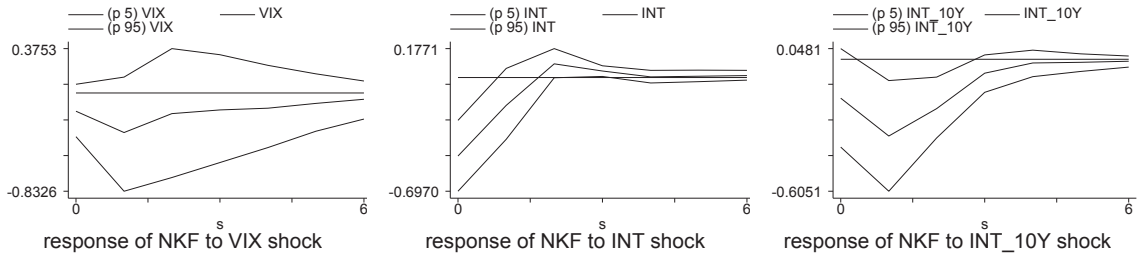
We find that increases in global uncertainty (first column in panels of Figures 2.3 and 2.4) have a very limited negative impact on net capital flows to EMEs. This result largely reflects the marked response of gross capital outflows. Indeed, while a VIX shock leads to a sizable and sustained reversal in gross inflows, such impact is largely offset by a decline in gross outflows (i.e., asset repatriation by local investors). Specifically, a one standard deviation shock to the VIX (about 5 points) leads to an average decline in gross inflows of about $1\frac{1}{2}$ percent of annual GDP over six quarters and to a decline in gross outflows of broadly similar magnitude.

A shock to the U.S. short-term (real) interest rate also leads to a decline in net flows to EMEs (second column in Figures 2.3 and 2.4), although the economic significance is relatively small. Indeed, a one standard deviation shock (about 0.7 percentage points) leads to a cumulative decline in net capital inflows of about 0.2 percent of annual GDP over two quarters. This fall in net inflows reflects both a decline in gross capital inflows and an increase in gross capital outflows. These results suggest that domestic investors do not play a meaningful stabilizing role in the context of short-term foreign interest rate shocks.

A shock to the 10-year Treasury bond rate, in turn, appears to have a significant - and distinct - impact on capital flows to EMEs (third column in Figures 2.3 and 2.4). This finding is especially relevant in the current juncture, since the main effect of the Feds exit from QE will be, at least in the short run, and upward drift in the longer-term interest rates in the U.S. Gross inflows decline markedly after an increase in the 10-year rate, with the impact being significantly larger than in response to short- term interest rate shocks. Furthermore, the estimated effect is economically meaningful, pointing to a cumulative decline of gross inflows of 1.8 percent of GDP over six quarters in response to an increase of 100 basis points in the 10-year Treasury bond rate. In contrast to the case of short-term rate shocks, we find that domestic residents play a stabilizing role by repatriating foreign assets. The extent of the latter, however, is substantially smaller than the fall

in gross inflows. Therefore, the impact on net capital inflows is negative, as in the case of the short-term rate shock[19]. These results appear broadly in line with the anecdotal evidence on capital flows following the "QE tapering" shock of May 2013, which showed that , in many EMEs, the retrenchment of foreign investors was partially offset by asset repatriation by residents.

Figure 3. Response of net capital flows to global financial shocks



Source: Authors' calculations.
[1] Response to a one standard deviation shock to a shock to the VIX (5 units), the Federal Fund interest rate (0.66 percentage points), and the 10-year Treasury bond interest rate (0.23 percentage points). Time horizon in quarters.

Figure 2.3: Response of net capital flows to global financial shocks

Controlling for U.S. GDP growth in the model ensures that the estimated effects discussed above reflect those of pure U.S. interest rate shocks, rather than the endogenous response of interest rates to U.S. output shocks. These can be interpreted as unexpected changes in markets expectations about the path of monetary policy rates, either because of surprises in inflation or changes in perceptions about the Feds reaction function. This is a key point,

[19] Interpreting this result is not straightforward and goes beyond the scope of this paper. The decline in gross inflows is as expected, as foreign investors pull off from EMEs in light of the change in interest rate differentials. Why local investors behave asymmetrically reducing their holdings of net foreign assets is less clear. While home bias or heterogeneity in investors assessments of asset valuations may be possible explanations, it is not obvious why they do not play a role in case of a short-term rate shock. A glance at the dynamics of the responses may shed some light. While the decline in gross outflows occurs with a lag (starting two quarters after the shock), the drop in gross inflows starts in the same quarter of the shock. This may be consistent with foreign investors reacting promptly to the change in interest rate differentials, typically associated with local currency depreciation and drops in the price of local assets, which may subsequently induce local investors - focused on the domestic purchasing power of their wealth - to repatriate foreign assets in order to lock-in valuation gains.

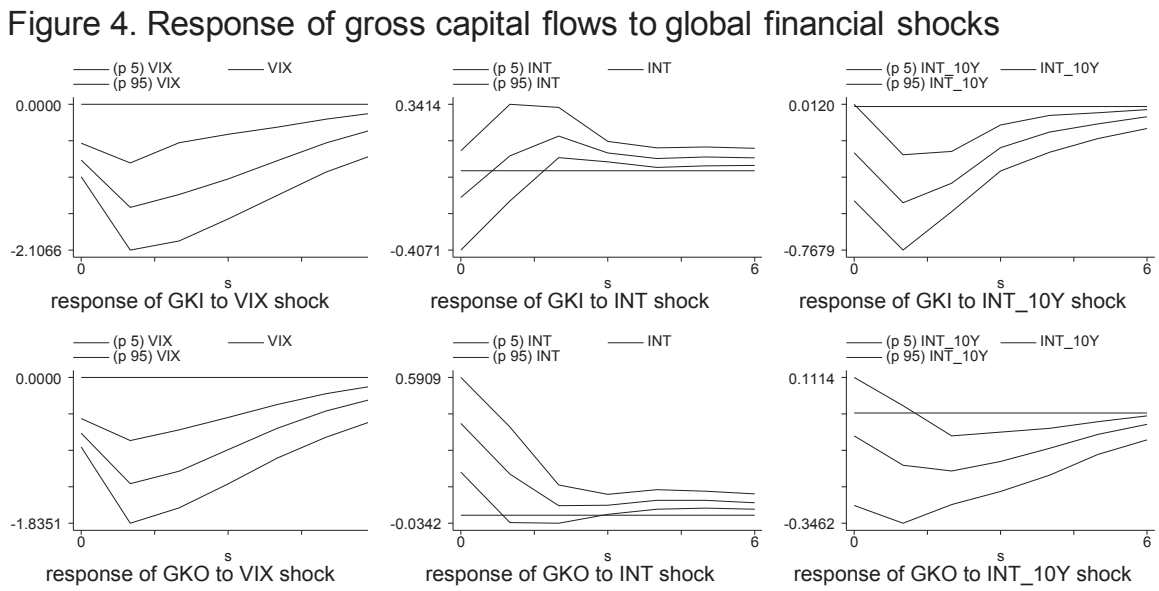


Figure 2.4: Response of gross capital flows to global financial shocks

especially in assessing the effect of QE tapering on capital flows in the current juncture. In this context, whether the rise in interest rates reflects improved economic conditions in the U.S. or a pure monetary policy shock could have very different implications in terms of the impact on capital flows to EMEs. In this regard, although not the main focus of the paper, an interesting result from the estimated PVAR model is that net capital inflows to EMEs respond positively to a positive disturbance to U.S. GDP growth. This occurs despite the associated increase in the U.S. interest rate (Figure 2.5), suggesting that the effect through real linkages outweight the impact through financial channels. Furthermore, a positive response of net flows reflects a repatriation of external assets by residents that is larger than the fall in non-resident capital inflows. This finding suggests that a normalization of U.S. monetary policy that occurs primarily as a result of an improving growth outlook would have only a moderate impact on EMEs.

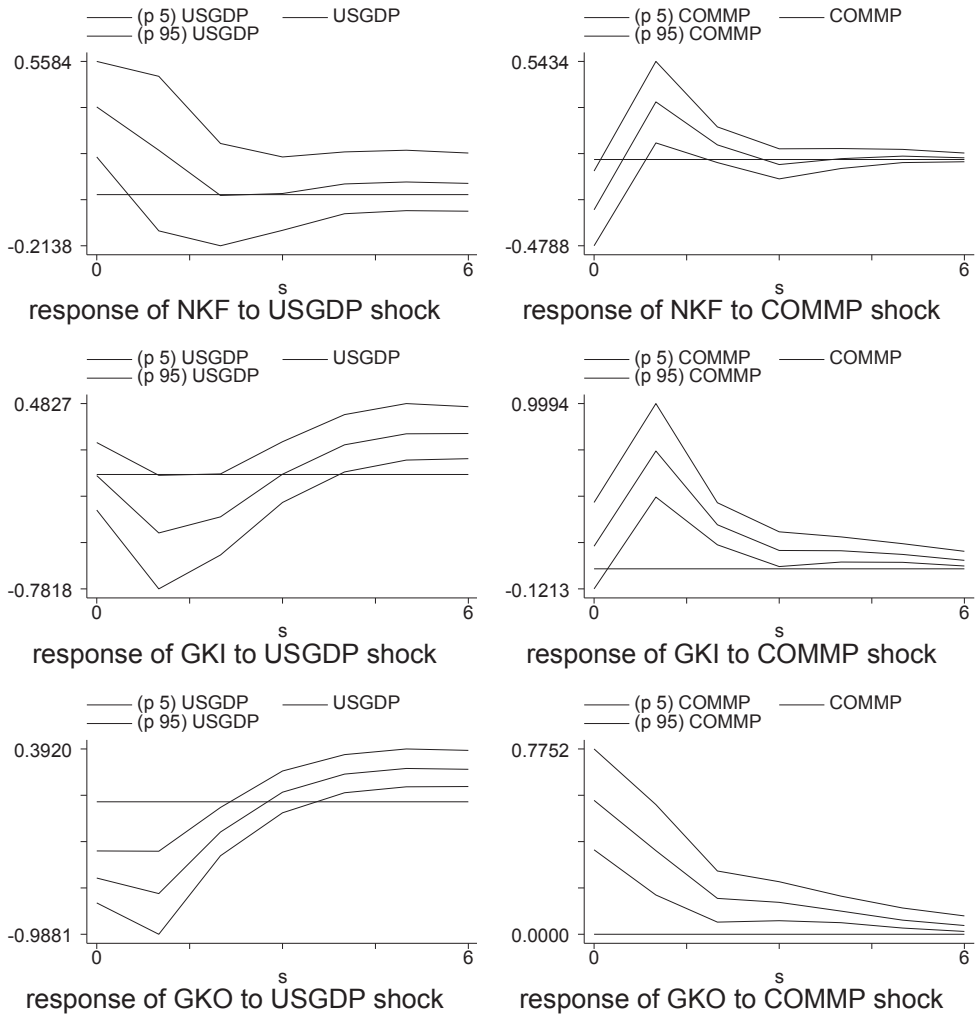


Figure 2.5: Response of gross capital flows to other foreign shocks

2.3.2 Extensions

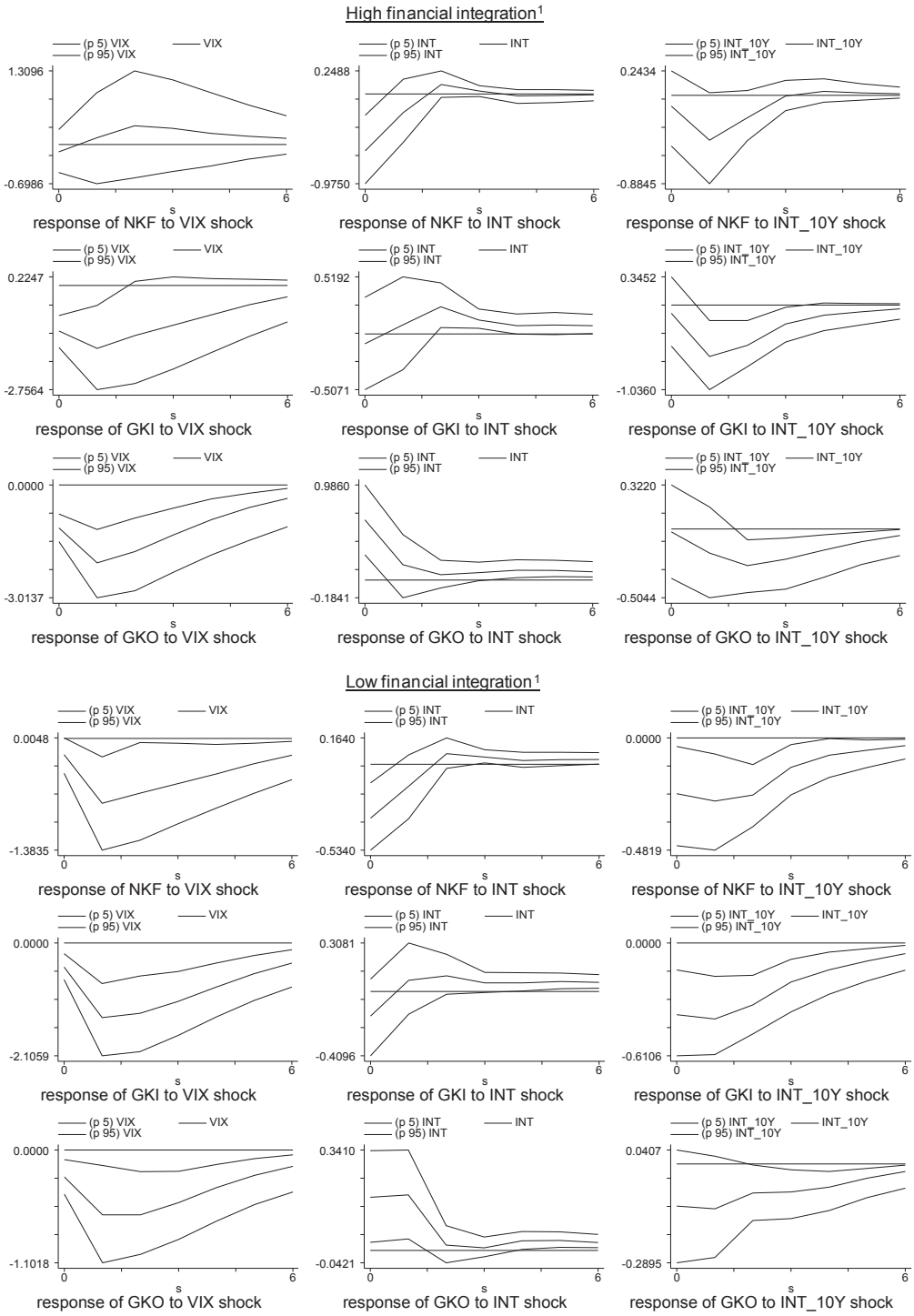
2.3.2.1 Financial Integration

We study whether results depend on the countrys degree of financial integration with the rest of the world. To this end, we split the sample in two groups based on each countrys average degree of financial integration during the sample period, distinguishing those

that were above or below the median value for the whole sample. Financial integration is measured as the sum of total foreign assets and foreign liabilities, in percent of GDP, using the updated version of the dataset created by Lane and Milesi-Ferretti [2007].

We find interesting differences between the more integrated and less-integrated economies (Figure 2.6). While global uncertainty shocks do not appear to have a statistically significant effect on net capital inflows to financial integrated EMEs, they do have a sizeable impact on the less-integrated economies. Although both groups are subject to a sharp drop in gross capital inflows, the extent of asset repatriation by local investors is much larger in the more financially-integrated economies (fully offsetting the drop in gross inflows). Short-term interest rate shocks, in turn, have a negative impact on net inflows to both groups of countries, yet the impact is larger in financially integrated economies. This mainly reflects that the increase in gross outflows tends to be larger in the more financially-integrated economies, where domestic investors appear to be highly sensitive to this type of shock. Finally, foreign investors reduce their accumulation of local assets (i.e., gross inflows decline) and local investors reduce their holdings of foreign assets (i.e., gross outflows fall) in response to a shock to the 10-year Treasury rate in both groups of countries. Gross flows appear to be, at least on impact, more sensitive in the case of the more financially-integrated economies. The offsetting effect of asset repatriation is relatively small, so net capital inflows decline in both groups of countries.

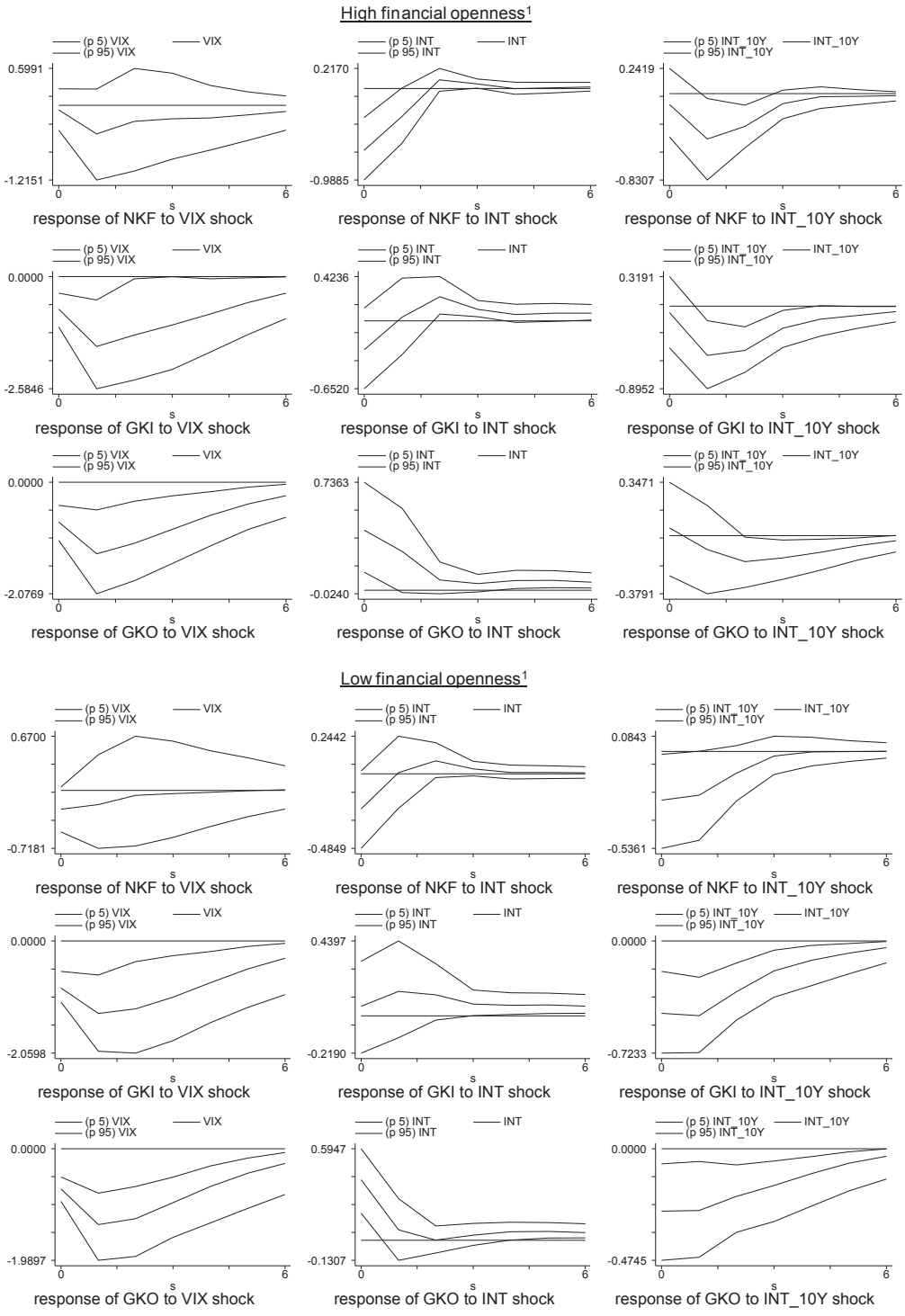
Figure 6. Response of capital flows to global financial shocks: the role of financial integration



Source: Authors' calculations.
[1] Based on measures of foreign assets and liabilities, in percent of GDP, from Lane and Milessi-Ferretti (2007) updated dataset.

Figure 2.6: Response of capital flows to global financial shocks: the role of financial integration

Figure 7. Response of capital flows to global financial shocks: the role of capital account openness



Source: Authors' calculations.
[1] Based on overall index of capital account openness, as measured by Quinn et al (2011).

Figure 2.7: Response of capital flows to global financial shocks: the role of capital openness

Alternatively, we split the sample using a measure of financial integration based on the degree of capital account openness, as measured by Quinn et al. [2011]. The results are roughly similar (Figure 2.7). Uncertainty shocks do not have a significant impact on net capital flows to EMEs with more open capital accounts, as asset repatriation by residents fully offsets the drop in gross capital inflows. After short-term interest rate shocks, in contrast, there is no asset repatriation by residents, as they actually increase their purchase of foreign assets. A shock to the 10-year Treasury bond rate has a negative impact on net capital inflows, as the decline in gross outflows is not large enough to completely offset the fall in gross inflows. In economies with more capital account restrictions, we find that results are qualitatively similar but entailing much smaller magnitudes in the response of both gross inflows and outflows, as expected given the partial restrictions on capital mobility.

2.3.2.2 Types of Flows

Next, we examine the response of different types of capital flows to global shocks. With this aim, we break up the series of net and gross flows into their FDI and non-FDI components. We find qualitatively similar responses for both types of flows to global uncertainty shocks (Figure 2.8), but - as expected - much larger sensitivities in the case of non-FDI flows (mainly portfolio and other debt flows)[20]. The response of non-FDI (gross and net) flows to a U.S. short-term interest rate shock is similar to that of total flows, with declines in gross inflows and increases in gross outflows. However, the impact of such shocks on FDI (gross and net) inflows appears to be insignificant. The impact of a shock to the U.S. 10-year interest rate on non-FDI (gross and net) flows is similar to that on total flows. Both net and gross inflows decline, while gross outflows also fall - although the magnitude of asset repatriation is relatively small. The sensitivity of FDI gross flows to a shock to the 10-year rate is much lower, with the impact on net flows being insignificant. The responses of the two types of flows to U.S. growth shocks are also different (Figure 2.16 in Appendix 2). While improvements in economic activity in

[20] A breakdown of non-FDI flows into portfolio and other debt creating flows is not possible given data inconsistencies in some countries in the earlier part of our sample.

the U.S. appear to induce non-FDI net inflows to EMEs, the response of net inflows of FDI is negative. Finally, both FDI and non-FDI net and gross inflows react positively to increases in commodity prices.

2.3.2.3 Regional Perspective

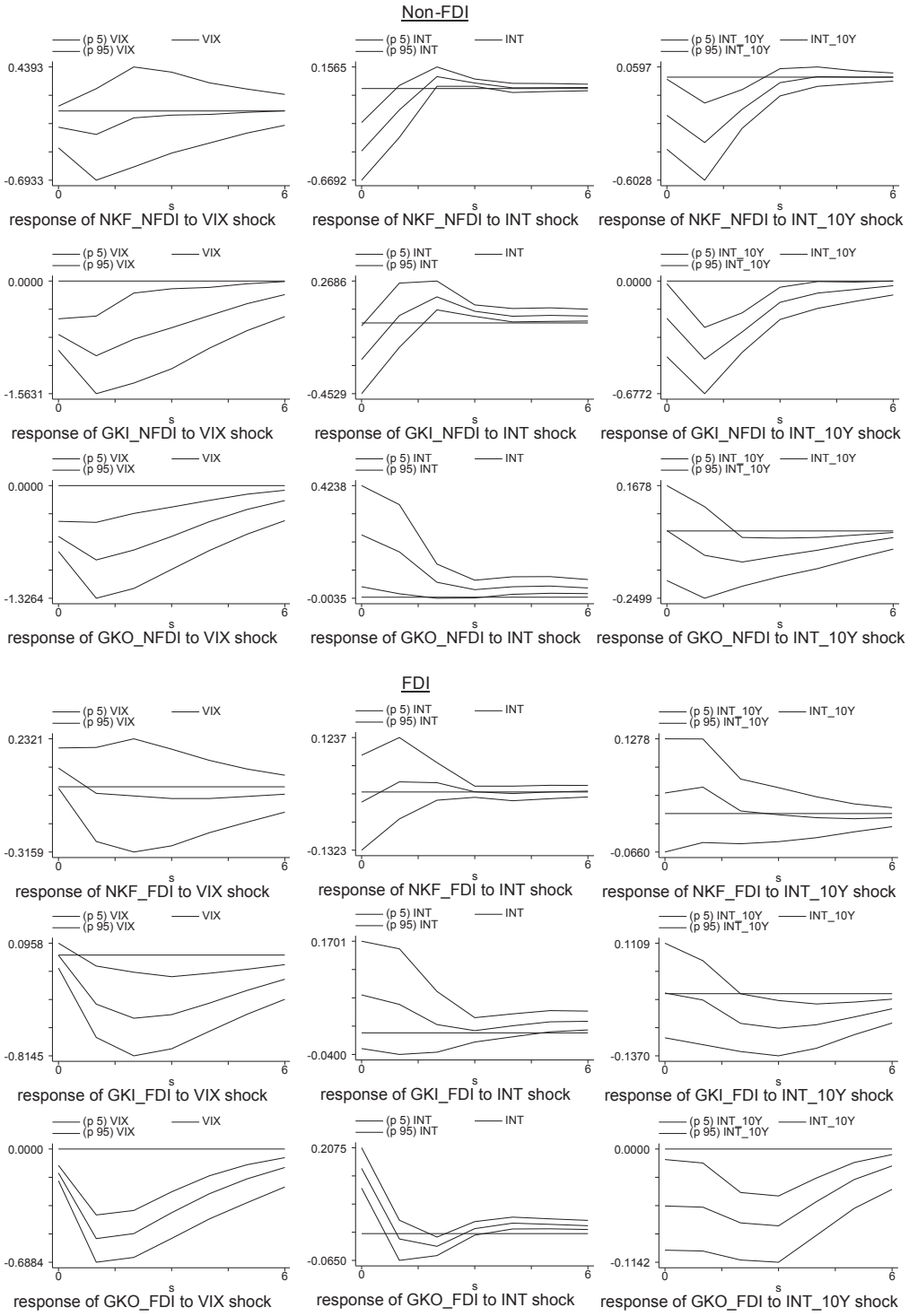
We also explore potential differences across regions by splitting the sample into four EM regions: Asia, Europe, Latin America, and others. Qualitatively, the main results of the benchmark specification hold for the most part for all regions. There are, however, differences across them in terms of the magnitude of the impact of the shocks analyzed (Figure 2.9). Most interesting to note is:

i. Global uncertainty shocks appear to have a particularly large impact on net inflows to Latin American (and to a lesser extent Asian) EMEs. This reflects a sizable decline of gross inflows (twice as large as in the benchmark specification), only partially compensated by asset repatriation by residents. In emerging Europe, in contrast, the effect on both gross and net inflows is not significant.

ii. The negative impact of U.S. short-term interest rate shocks on net flows appears to be (qualitatively) more uniform across regions, although it is considerably larger in emerging Europe. In this region, the sharp decline is mostly driven by the large fall in gross inflows (the increase in gross outflows by local investors also contributes but to a much lesser extent). On the other hand, in Asia and Latin America the decline in net inflows is largely explained by increases in foreign asset accumulation by residents.

iii. A shock to the U.S. 10-year interest rate has a negative impact on net capital inflows in all EM regions, except in Emerging Europe. The fall in net flows is especially large in Latin America, reflecting a substantial decline in gross inflows that is not offset by the decline in gross outflows. Interestingly, only in this region (and to a lesser extent in Asia) local investors respond to shocks to the U.S. 10-year rate by repatriating foreign assets.

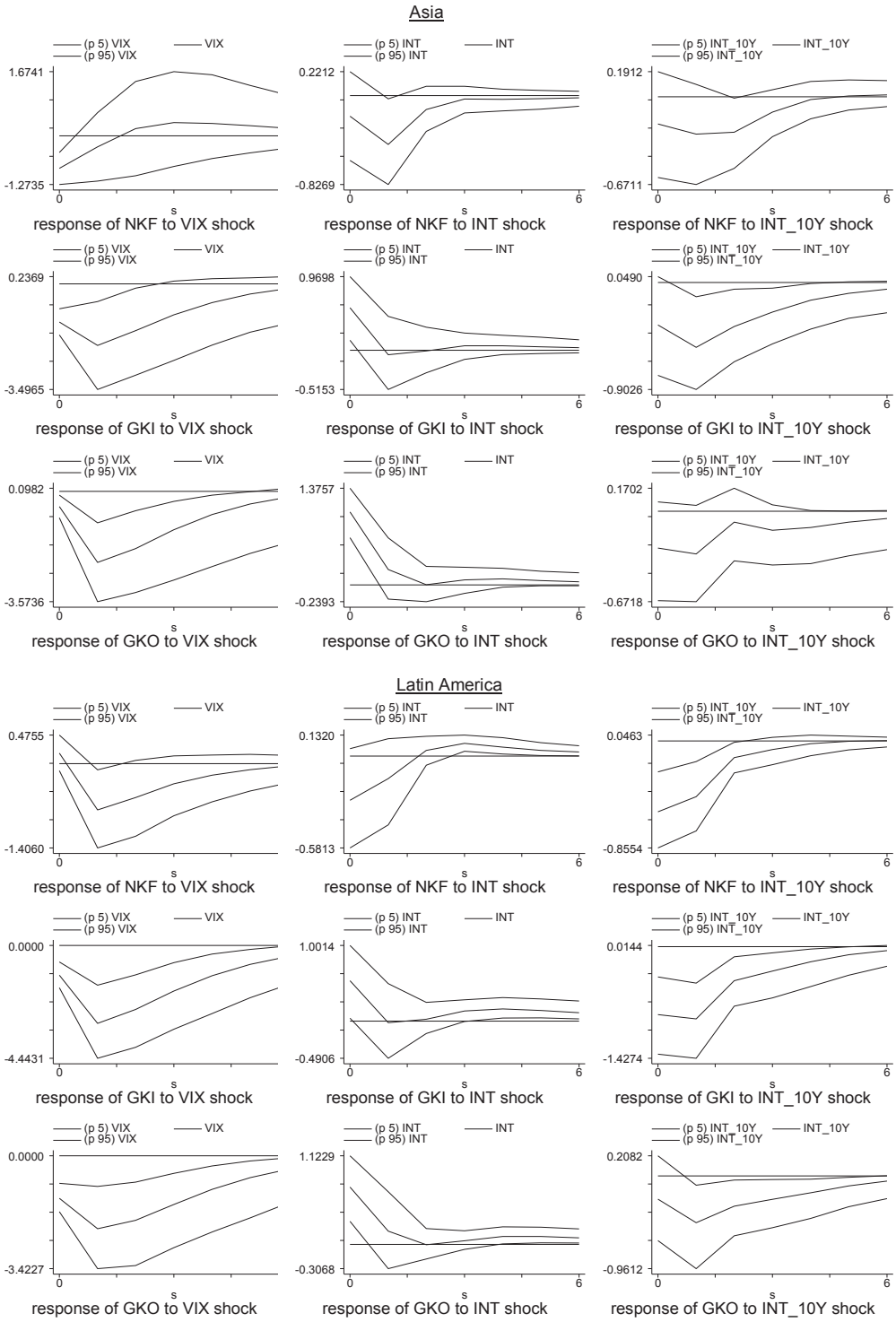
Figure 8. Response of capital flows to global financial shocks: type of flows



Source: Authors' calculations.

Figure 2.8: Response of capital flows to global financial shocks: type of flows

Figure 9. Response of capital flows to global financial shocks: A regional perspective[1]



Source: Authors' calculations.
[1] See list of countries in Appendix table A1.

Figure 2.9: Response of capital flows to global financial shocks: A regional perspective

2.4 Conclusions

The paper studied the dynamic response of gross capital flows in EMEs to different global financial shocks, with a focus on the possible stabilizing role played by domestic investors in offsetting the behavior of foreign investors. We find evidence of such role, but its existence and magnitude depend on the type of shock.

Local investors appear to offset the behavior of non-residents in the face of global uncertainty shocks, as well as shocks to long-term U.S. interest rates. In the former case, sizeable asset repatriations largely offset the retrenchment of non-residents, except in Latin America. In this region, global uncertainty shocks appear to have a particularly large negative impact on net inflows, reflecting a sizable decline of gross inflows (twice as large as in the other EMEs) which is only partially offset by residents asset repatriation. In the case of long-term U.S. interest rates shocks, the offsetting effect is much more limited (with shocks causing net outflows from EMEs). In the case of short-term U.S. interest rate shocks, on the other hand, residents and non-resident appear to behave alike (shifting capital towards higher interest rates), although magnitudes appear to be economically moderate.

These results suggest that, while increased financial integration over the last two decades may have raised EMEs exposure to global financial shocks, increased foreign asset holdings are likely to play an important - although not complete - stabilizing role. Our findings also have important implications for assessing the possible impact of the Feds exit from QE going forward. In particular, we find that a rise in long-term U.S. interest rates would have only moderate effects on capital flows to EMEs if it is mainly driven by positive developments in U.S. economic activity. If, in contrast, the rise largely reflects a pure U.S. interest rate shock, the impact would be more sizable, as asset repatriation would only play a partial stabilizing role.

2.5 Appendices

2.5.1 Appendix 1. A simple Event Analysis

As a first attempt to explore the potential impact of these shocks on capital flows to EMEs, a simple event analysis is performed. We study net and gross capital flows for a sample of 38 EMEs, centering them at the quarter of the largest variation of the VIX, the U.S. Federal Fund rate, and the U..S. 10-year Treasury bond interest rate within the shock episodes depicted in Figure 2.1 (Table 2.3 presents the details about the episodes) [21]. Our focus is primarily on adverse shocks (i.e., sharp increases in each of these variables). Flows are demeaned to exclude possible country-specific level effects.

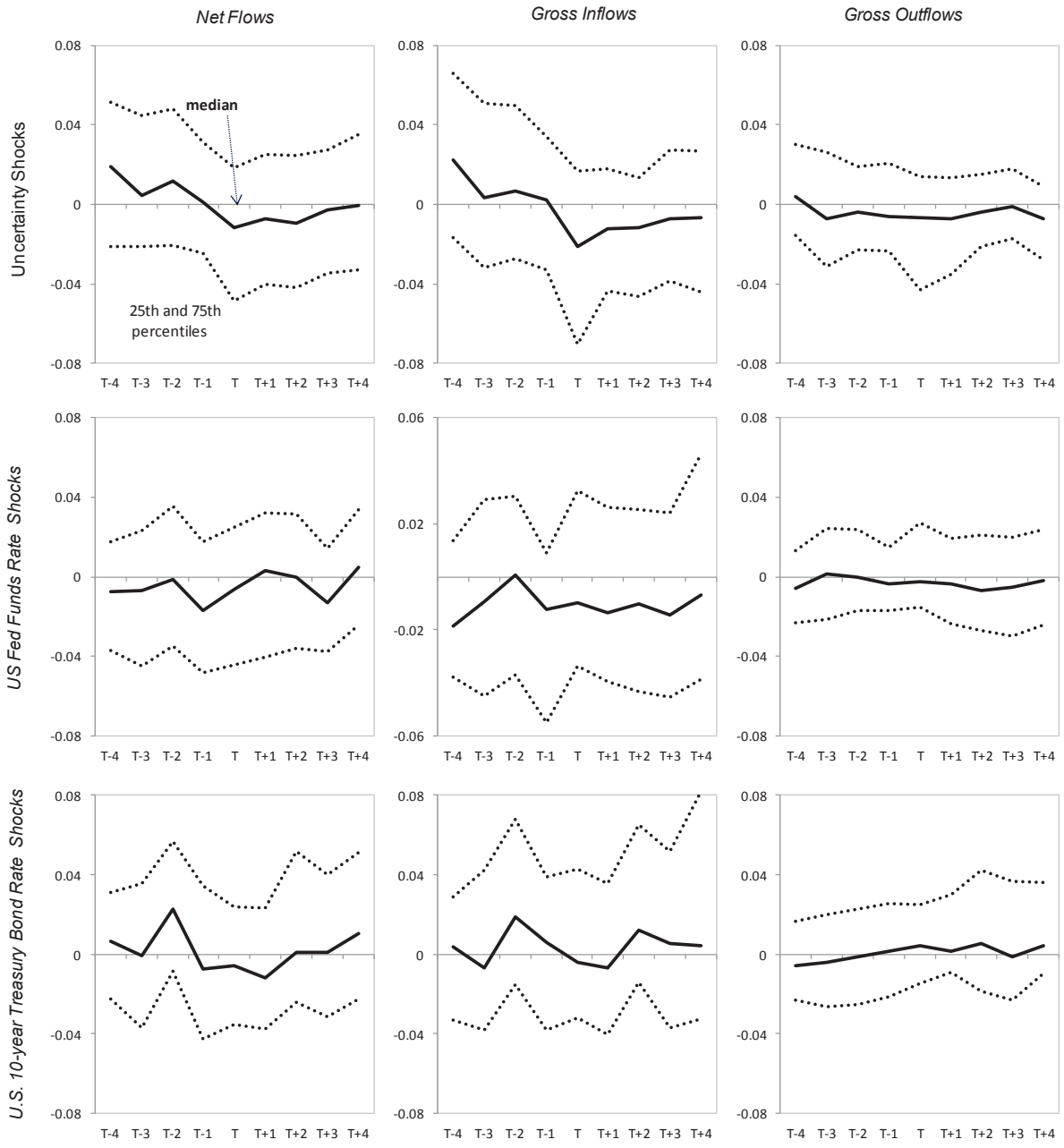
VIX shocks						**U.S. Fed Funds interest rate shocks**						**10Y U.S. Treasury bond Interest rate shocks**					
Episode		**VIX level**				**Episode**		**Fed Fund rate level**				**Episode**		**10-year rate level**			
start	end	start-1	avg.	peak	end+1	start	end	start-1	avg.	peak	end+1	start	end	start-1	avg.	peak	end+1
1990q1	1990q4	9.6	23.0	26.0	22.3	1994q2	1995q2	-0.1	1.6	2.9	2.5	1994q2	1994q4	2.9	3.9	4.1	4.0
1997q4	1997q4	22.5	27.4	27.4	21.3	2000q3	2001q1	2.4	3.3	3.4	1.5	1999q2	2000q1	2.2	2.9	3.2	2.9
1998q3	1999q1	21.5	28.9	29.9	24.4	2004q4	2006q1	-1.4	0.9	2.7	2.1	2005q4	2006q2	1.9	2.1	2.4	2.4
2002q3	2003q1	21.8	31.9	35.1	21.5												
2008q4	2009q2	25.1	45.6	58.7	25.5												
2011q3	2011q4	17.4	30.1	30.3	18.3												

Table 2.3: Episodes of Global Financial Shocks

This simple exercise fails to unveil any discernible pattern (Figure 2.10), except in the case of uncertainty shocks. Spikes in global uncertainty appear to affect capital flows to EMEs significantly, with a marked deceleration in net inflows (upper left chart). The decline in net inflows is largely driven by the behavior of gross inflows, which display a sizeable reversal during these episodes. Gross outflows, on the other hand, appear to play a meaningful offsetting role only in some cases (as illustrated by the drop in the line corresponding to the 25th percentile). Furthermore, there is no evidence of acceleration in gross outflows, pointing to an asymmetric behavior of residents, who do not exacerbate reversals in gross capital inflows, and in some cases help to offset them.

[21] See the list of countries in Table 2.4 in Appendix 2.

Figure A1.1. Capital Flows to Emerging Markets around Negative Global Financial Shock Episodes[1]
(Percent of GDP)



Sources: IMF's Balance of Payments Statistics and authors' calculations.
[1] Negative episodes refers to *increases* in global uncertainty or interest rates. Demeaned series. Gross outflows (inflows) refer to asset (liability) side flows—i.e., positive numbers denote outflows (inflows).

Figure 2.10: Capital Flows to Emerging Markets around Negative Global Financial Shocks Episodes

In the case of (U.S.) interest rate shocks (both short- and long-term rates), interestingly,

we find no clear pattern for the response of capital flows. [22] This is likely to reflect the joint occurrence of shocks, as global financial conditions are typically highly correlated with economic activity and commodity prices (Figure 2.14). The latter stresses the importance of disentangling the effect of financial shocks from other (real) external shocks in a multivariate setting. It should be noted that such correlation is also relevant in the case of uncertainty (VIX) shocks. However, while in the latter cases the effect of economic activity and financial shocks on EMEs flows are likely to be of the same sign (with weaker economic activity as well as distress in global financial markets affecting flows to EMEs negatively), this is unlikely to be the case for U.S. interest rate shocks.

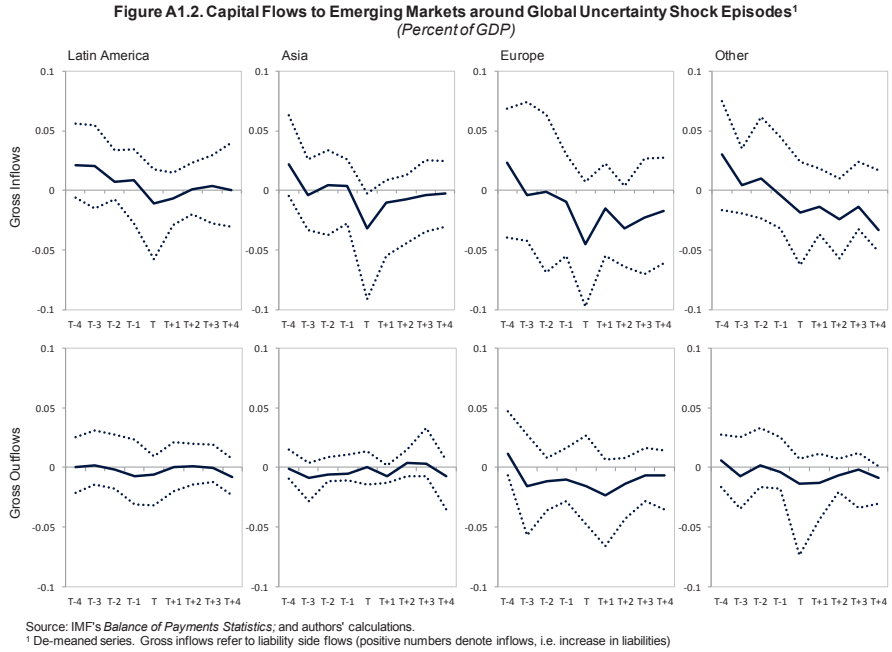


Figure 2.11: Capital Flows to Emerging Markets around Global Uncertainty Shocks Episodes

[22] These results hold, broadly, across different EM regions (Figures 2.11 - 2.13).

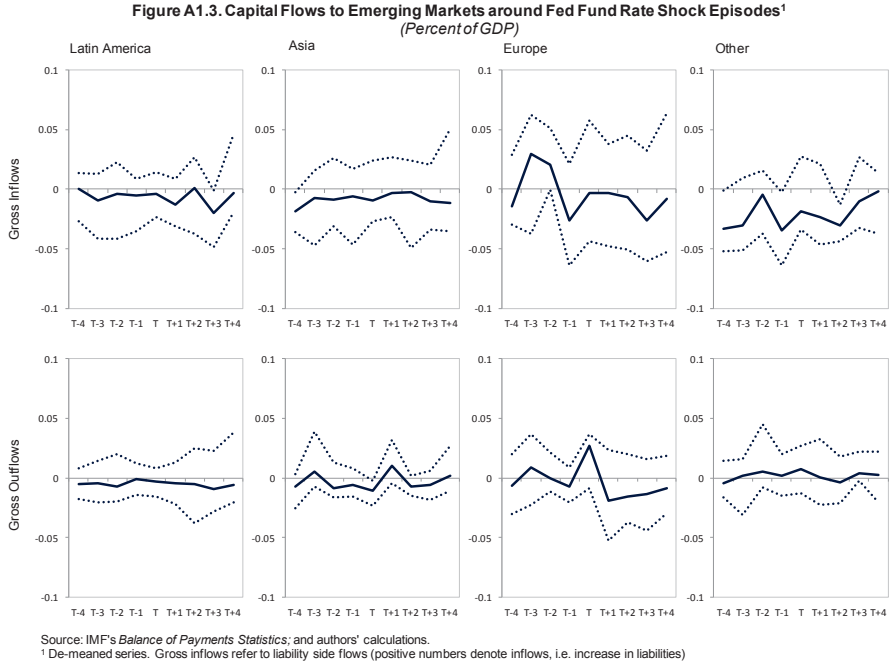


Figure 2.12: Capital Flows to Emerging Markets around Fed Fund Rate Shocks Episodes

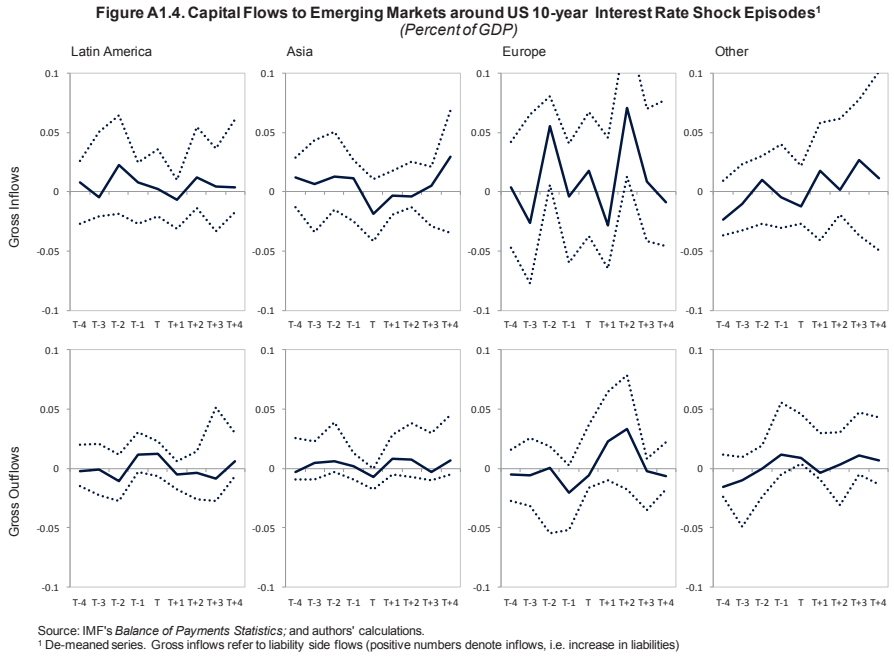
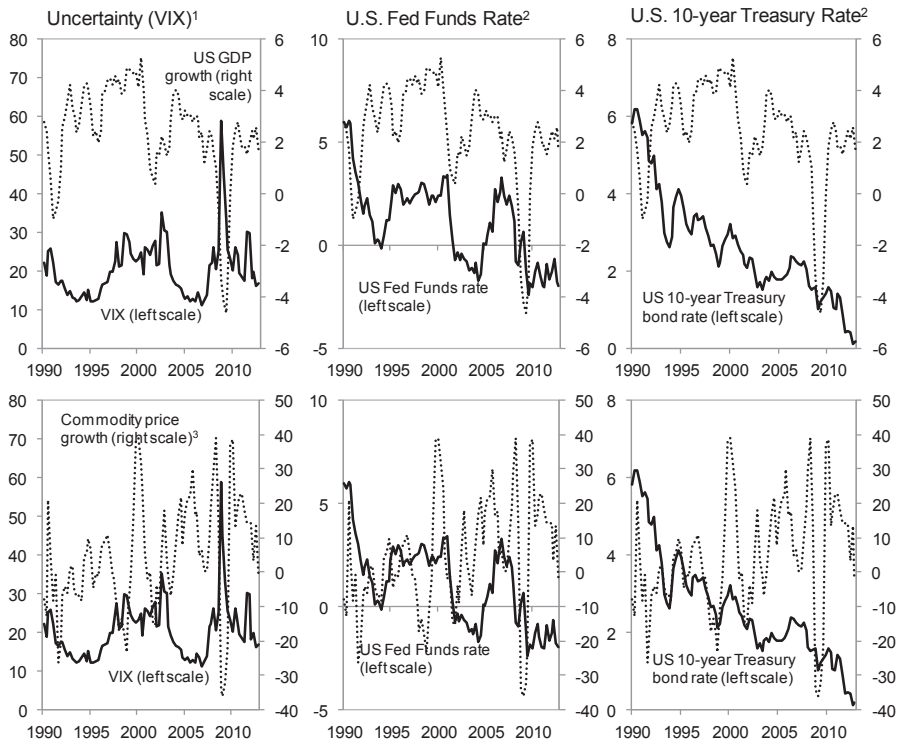


Figure 2.13: Capital Flows to Emerging Markets around US 10-year Interest Rate Shocks Episodes

Figure A1.5. Global Financial Conditions, U.S. Output, and Commodity Prices, 1990–2012
(Percent, unless otherwise stated)



Sources: Haver Analytics; and Cleveland Federal Reserve.
[1] Chicago Board Options Exchange Market Volatility Index.
[2] Real interest rates based on forward-looking (1 and 10 year) inflation expectations.
[3] IMF broad commodity price index. Annual percentage change.

Figure 2.14: Global Financial Conditions, U.S. Output, and Commodity Prices, 1990-2012

2.5.2 Appendix 2. Additional Tables and Figures

Abbrev.	Definitions	Details	Sources
GKI	Gross capital inflows	Total liabilities in terms of trend nominal GDP in dollar: (FDI_Liab + PI_Liab + OI_Liab)/GDP; Forward demeaned (Helmert transformation).	IMF's Balance of Payment BP6TS, and authors' calculations.
GKO	Gross capital outflows	Total Assets in terms of trend nominal GDP in dollar: (FDI_Assets + PI_Assets + OI_Assets)/GDP; Forward demeaned (Helmert transformation).	IMF's Balance of Payment BP6TS, and authors' calculations.
NKF	Net capital Flows	Net liabilities flows in terms of trend nominal GDP in dollar : GKI - GKO; Forward demeaned (Helmert transformation).	IMF's Balance of Payment BP6TS, and authors' calculations.
GKO_FDI	Direct investment abroad	Net acquisition of financial assets : FDI, in terms of trend nominal GDP in dollar; Forward demeaned (Helmert transformation).	IMF's Balance of Payment BP6TS, and authors' calculations.
GKI_FDI	Direct invetment in reporting countries	Net incurrence of financial liabilities: FDI, in terms of trend nominal GDP in dollar; Forward demeaned (Helmert transformation).	IMF's Balance of Payment BP6TS, and authors' calculations.
NKF_FDI	Net Foreign Direct Investment	Net FDI in terms of trend nominal GDP in dollar: GKI_FDI - GKO_FDI ; Forward demeaned (Helmert transformation).	IMF's Balance of Payment BP6TS, and authors' calculations.
GKO_FDI	Non Foreign Direct Investment assets	Net acquisition of financial assets portfolio investment and other investment, in terms of trend nominal GDP in dollar. Forward demeaned (Helmert transformation).	IMF's Balance of Payment BP6TS, and authors' calculations.
GKI_FDI	Non Foreign Direct Investment liabilities	Net incurrence of financial liabilities: portfolio investment and other investment, in terms of trend nominal GDP in dollar; Forward demeaned (Helmert transformation).	IMF's Balance of Payment BP6TS, and authors' calculations.
NKF_FDI	Net Non Foreign Direct Investment	Net Non-FDI, in terms of trend nominal GDP in dollar : GKI_NFDI - GKO_NFDI; Forward demeaned (Helmert transformation).	IMF's Balance of Payment BP6TS, and authors' calculations.
GDP	Nominal detrend GDP, in USD	HodrickPrescott filter.	IMF WEO
VIX	VIX	Forward demeaned by Helmert transformation.	WSJ
INT	Real Federal Fund rate	Federal Fund rate deflated by expected inflation.	IFTS, Cleveland FED
INT_10Y	Real 10 year US government bonds	10-year US Treasury bond interest rate deflated by 10-year inflation expectations	IFTS, Cleveland FED
COMMP	Real Commodities prices	Forward demeaned by Helmert transformation.	WEO
USGDP	Real US GDP Growth	Forward demeaned by Helmert transformation.	WEO
Dum_IIP	Degree of financial integration based on International investment position (IIP)	Take value 1 if IIP in terms of GDP of the country is greater than or egal to the median of the sample.	Lane and Milesi-Ferretti updated database
Dum_kapoen	Net degree of openness on net capital account	Take value 1 if the degree of openness is greater than or egal to the median of the sample, if more open.	Chinn-Ito Index
Dum_kao	Degree of openness on capital outflows	Take value 1 if the degree of openness is greater than or egal to the median of the sample, if more open.	Chinn-Ito Index
Dum_kai	Degree of openness on capital inflows	Take value 1 if the degree of openness is greater than or egal to the median of the sample, if more open.	Chinn-Ito Index

Table 2.4: List of Variables

IFS_code	Name	IFS_code	Name
213	Argentina	273	Mexico
911	Armenia	686	Morocco
913	Belarus	728	Namibia
223	Brazil	564	Pakistan
918	Bulgaria	283	Panama
228	Chile	288	Paraguay
924	China, P.R.: Mainland	293	Peru
233	Colombia	566	Philippines
238	Costa Rica	964	Poland
960	Croatia	968	Romania
258	Guatemala	922	Russian Federation
944	Hungary	456	Saudi Arabia
534	India	199	South Africa
536	Indonesia	578	Thailand
439	Jordan	186	Turkey
916	Kazakhstan	926	Ukraine
941	Latvia	298	Uruguay
946	Lithuania	299	Venezuela, R.B.
962	Macedonia	582	Vietnam
548	Malaysia		

Table 2.5: Sample of Countries

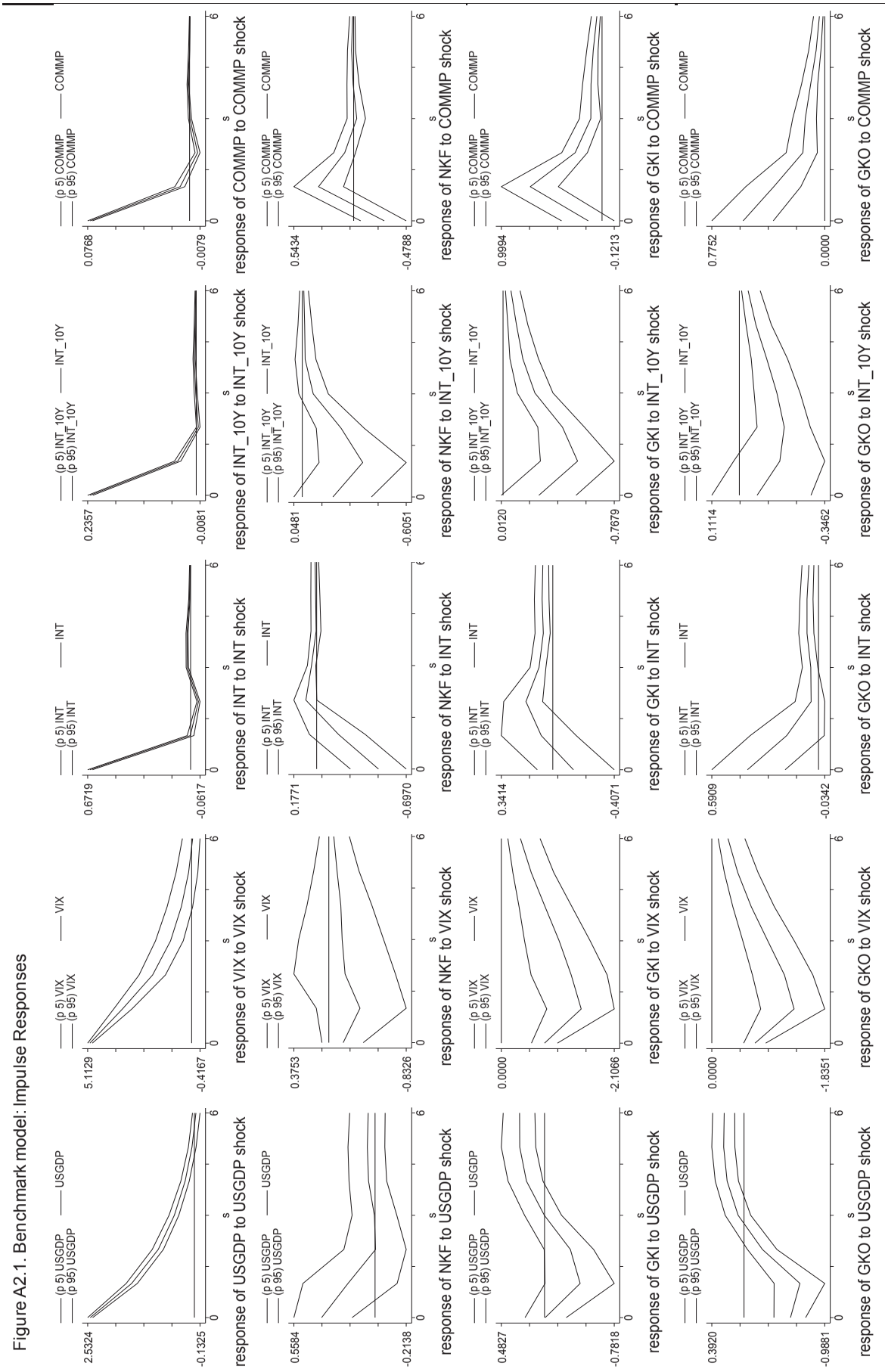
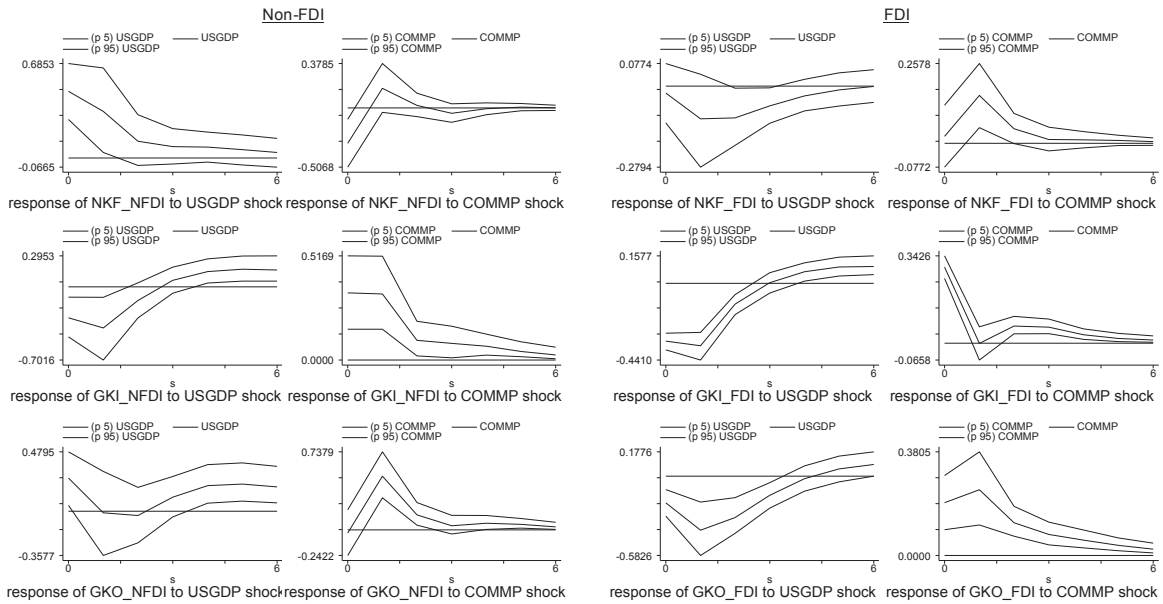


Figure 2.15: Benchmark model : Impulse Responses

Figure A2.2. Response of gross capital flows to other foreign shocks: Types of flows



Source: Authors' calculations.
[1] Response to a one standard deviation shock to U.S. real GDP growth (0.6 percentage points) and commodity prices (7.5 percentage points). Time horizon in quarters.

Figure 2.16: Response of gross capital flows to other foreign shocks: Types of flows

Part II

Spillover effects of Global Liquidity on emerging economies

Part 2

As mentioned in the previous part, global liquidity in a traditional view is still growing due to the crisis and the private liquidity dry-up on some markets. Monetary authorities, especially in advanced countries, have implemented different measures for providing liquidity. Traditional and Non conventional measures have been adopted. But increasingly concerns are raised on the effects of these measures especially on emerging economies.

Historically, the emerging countries have already been exposed to immediate large outflows, especially at the end of 1990. These massive outward capital flows cause financial and economic crisis in these countries, leading them to build up more foreign reserves and by the way contribute to increase global imbalances.

The object of this second part is to analyze what are the spillover effects of global liquidity on the real activity and asset prices in emerging countries (chapter 3) and its effects on global imbalances (chapter 4).

Chapter 3

Global excess liquidity and asset prices in emerging countries, a PVAR approach

S. Brana[1], M-L. Djigbenou[2], and S. Prat[3]

3.1 Introduction

Over recent years, the concept of global liquidity has become a matter of concern. If traditionally, analyses focused on the impact of growing liquidity deriving from the ease of monetary conditions on aggregate demand, others studies have been interested in the impact of global liquidity on asset prices, essentially at country-levels. Given the increasing degree of financial integration including financial innovations during the last fifteen years, coupled with the high degree of capital mobility, monetary expansion in advanced economies, resulting in an environment of generally low interest rates, gives rise to an increase in global liquidity encouraging international investors to favor carry-trades opportunities. These strategies coming from investors seeking for higher yields promote strong capital flows from those markets to emerging markets exhibiting higher interest rates and stronger economic development prospects. Non-resident investors may also benefit from exposure to appreciating foreign currencies.

However, the surge of capital inflows to emerging markets may have some harmful consequences for financial stability. A related strand of literature has pointed out the strong implications of global liquidity on financial stability, in particular in relation to investors

[1]Bordeaux University
[2]Banque de France, Bordeaux University
[3]NATXIS, Bordeaux University

risk appetite and the high level of volatility that characterizes cross-border capital flows (European Central Bank, 2011). In a context of abundant global liquidity and the accompanying decline in risk aversion, strong capital inflows from international investors searching higher yield would likely have an impact on domestic financing conditions and exert upward pressures on exchange rates and asset prices in emerging markets receiving those flows. Indeed, to prevent their currencies from an excessive appreciation and a deterioration of cost-competitiveness, central banks in emerging markets economies have been incited to pursue or reinforce foreign exchange accumulation. These foreign exchange interventions have forced monetary authorities to create additional money to absorb those dollar inflows. The result was an increase in the monetary base of these countries which was sometimes transferred to the real economy through an increase in domestic credit supply.

The strong volatility of these capital flows, essentially in the form of portfolio investments, raises also concerns about sudden-stop episodes or capital outflows which may threaten financial stability in several different ways. First, during episodes of inflows, emerging markets face upward pressures on asset and real estate prices, sometimes well-above fundamental values, and on exchange rates leading to undesired real exchange rate appreciation which undermines competitive gains. Second, those inflows bring funding costs lower which encourage the financial and non-financial private sector in emerging market economies to increase its debt leverage fueling balance sheet mismatches (i.e. a deterioration of the debt/equity ratio). It raises the issue of financial instability in the event of a wave of risk aversion leading to a dramatic withdrawal of capital and a sudden hike in funding costs. Third, a large part of bond issues and cross-border banking credits appear to be denominated in dollars, also with a short maturity, causing foreign currency and maturity mismatches on balance sheets of the private sector. They expose non-exporting companies (whose revenue flows are likely to be denominated in local currency) to the risk of depreciation in the local currency but also to the risk of funding liquidity. Finally, other than the potential risks of capital inflows on financial instability, they also curb monetary policy management in emerging markets countries. Authorities

are hesitant to continue tightening the monetary conditions even if inflationary pressure persists. Central Bank interventions to limit an appreciation of their currencies are also accompanied by an expansion of the monetary base (because interventions are not fully sterilized), encouraging the distribution of credit and thus feeding inflationary pressures.

Conversely, episodes of sudden stops of inflows (in worst case episodes of sudden withdrawal) are also a factor of financial instability by their negative impacts on funding costs and on the path of exchange rates. Countries that rely heavily on external funding to finance their economic activity are the most exposed to sudden stops with higher risks of economic contraction. Generally speaking, the volatility of capital flows indirectly influences economic activity by increasing uncertainty that weighs heavily on choices on investment and consumption of both businesses and households.

Global liquidity grew steadily from the beginning of the last decade and accelerated from mid- 2007 when financial crisis started with subprime mortgage losses and liquidity shortage among financial institutions in the United States. The crises intensified with Lehman collapse, spreading across markets and countries and turning into a full-blown global financial crisis. In order to mitigate the effect of the crisis, monetary authorities, starting with the FED, responded aggressively by taking unprecedented measures, using traditional monetary policy tools as well as unconventional monetary policy actions, to counter disruptions in the supply of liquidity. In the same way, between 2003 and 2007, net private capital flows to emerging markets increased from roughly 280 bns USD to more than 1200 bns USD before dramatically falling in 2008 and 2009 by almost 50% to $622 bns and $602 bns respectively (according to the IIF estimates). Capital inflows in emerging markets revived sharply in 2010, reaching almost $910 bns on the back of strong economic fundamentals, and hence positive global risk perception in an environment of global excess liquidity. The surged of inflows have thus prompted several countries to implement macro-prudential framework (South Korea, Indonesia for example) or to take explicit measures of capital controls (like in Brazil) in an effort to curb financial assets appreciation, preventing them from rising too much. Thereby, global excess liquidity seems to have been strongly associated with capital flows from advanced countries to

emerging markets ones for more than a decade.

Set again this backdrop, this study empirically investigates the relative impact of global excess liquidity on financial stability for a set of emerging countries. For this purpose, in a first step, we collect measures of monetary bases for industrialized and emerging countries, and then compute a global indicator of global excess liquidity. In a second time, we estimate a panel VAR model in order to identify the impact of a shock of excess global liquidity[4] on emerging assets and real estate prices for a set of 16 emerging countries. The contribution of this paper is threefold. First, we focus on emerging countries as few studies have investigated the link between excess global liquidity and asset prices in those countries. Second, to our knowledge, the econometric panel var (pvar) approach used in this paper has not been yet investigated in previous studies on this topic (a shock of global liquidity on financial stability has been until yet estimated only with aggregate data). Third, we compute an original global liquidity indicator which represents roughly the monetary base at the world level, compared to others measures of global liquidity proxied by monetary aggregates in the G5 countries[5].

The reminder of the paper is organized as follows. Section 2 provides an overview and some stylized facts about global liquidity and several measures to assess periods of excess global liquidity. Section 3 presents a review of existing literature on the impact of global liquidity in terms of financial instability. Section 4 presents our data set as well as our empirical model, including details on methodology to construct our global liquidity indicator. Results on econometric tests are detailed on section 5. Section 6 concludes.

3.2 Measures of global excess liquidity

The concept of global liquidity could be defined as the aggregate of domestic liquidity that can be used for payments and transfers for current international transactions. Set against this background, the concept of external convertibility of the currency is important as it

[4]Global liquidity in the spillover analysis excludes the 16 countries under investigation.

[5]**?** use aggregates data for eleven developed countries

can influence the liquidity at the domestic level of others countries.

During the last global financial crisis, the excess of global liquidity combined with liquidity shortfalls on financial markets fuelled a liquidity paradox This points out the (twofold) multiple dimensions of liquidity: the monetary versus market and funding concepts. Monetary liquidity traditionally refers to the *official* liquidity and can be defined according to the BIS as the funding that is unconditionally available to settle claims through central banks In this sense monetary liquidity represents overall funding conditions in the whole economy. Conversely market and funding liquidity broadly refers to the *private* liquidity, i.e. created by the financial and non-financial sectors through cross-border operations More precisely, market liquidity can be defined as the ease to trade financial assets (i.e. without created disruptions on these prices) whereas funding liquidity generally represents the ease for financial institutions to obtain funding. For our purpose, we will focus particularly on monetary liquidity.

Contributions to the literature provide several indicators to assess this concept of global liquidity. In particular, two categories of indicators can be identified: quantitative measures and price measures.

The main quantitative measures include monetary aggregates and credit aggregates. The former can be viewed as an extension of liquidity measures at the domestic level. Baks and Kramer [1999] proposed several aggregate indicators for the G-7 countries, based on narrow and broad money, using three different methods (GDP-weighted and unweighted growth rate of both narrow and broad money and lastly Divisia indices of global money growth).

Domestic credit (scaled by GDP) was also used as quantitative measure of global liquidity as it can be considered as the major counterpart of money supply (Gouteron and Szpiro [2005])

In addition, global liquidity can be proxied by reserve money and/or foreign exchange reserves. define global liquidity as "the money created by central banks around the world", i.e. all monetary bases. Another strand of literature focuses on foreign exchange

reserves to assess global liquidity[6], where they could sometimes be associated with reserve money of advanced economies (Darius and Radde [2010] and DeNicolò and Wiegand [2007]). Indeed, these measures take into account the increasing role of liquidity created by emerging market economies.

Based on these various indicators, norms have been established to distinguish periods of global excess liquidity to shortage liquidity periods. The leading works on this topic are largely based on those of Baks and Kramer [1999]. They consider as a norm for global liquidity the rate of GDP growth in the economy. This threshold relies on the quantitative theory of money expressed by

$$M.V = P.Y$$

with M the total amount of money in circulation in a country during a defined period, V the turnover in the money supply, i.e. the transactions velocity of money, Y the real output and P the corresponding price level.

$$\frac{M}{PY} = \frac{1}{V} = k \tag{3.1}$$

Following the hypothesis of a relatively stable velocity of money related to the quantity theory of money, we get after linearization and differentiation of the last equation:

$$\tilde{m}_t = m_t - g_t \tag{3.2}$$

With $\tilde{m}_t$ the excess money growth observed, m_t the growth rate of money in the economy and g_t the growth rate of GDP. Thereby, the threshold of excess liquidity may be defined when the growth in money supply exceeds the growth rate of GDP.

As underlined by Gouteron and Szpiro [2005], this threshold represents the one required for the "normal" economic development of the economy without creating a situation of overheating. In other words, it is the level of liquidity compatible with the objective of price stability.

[6]Foreign exchange reserves can be considered as the main counterpart of reserve money.

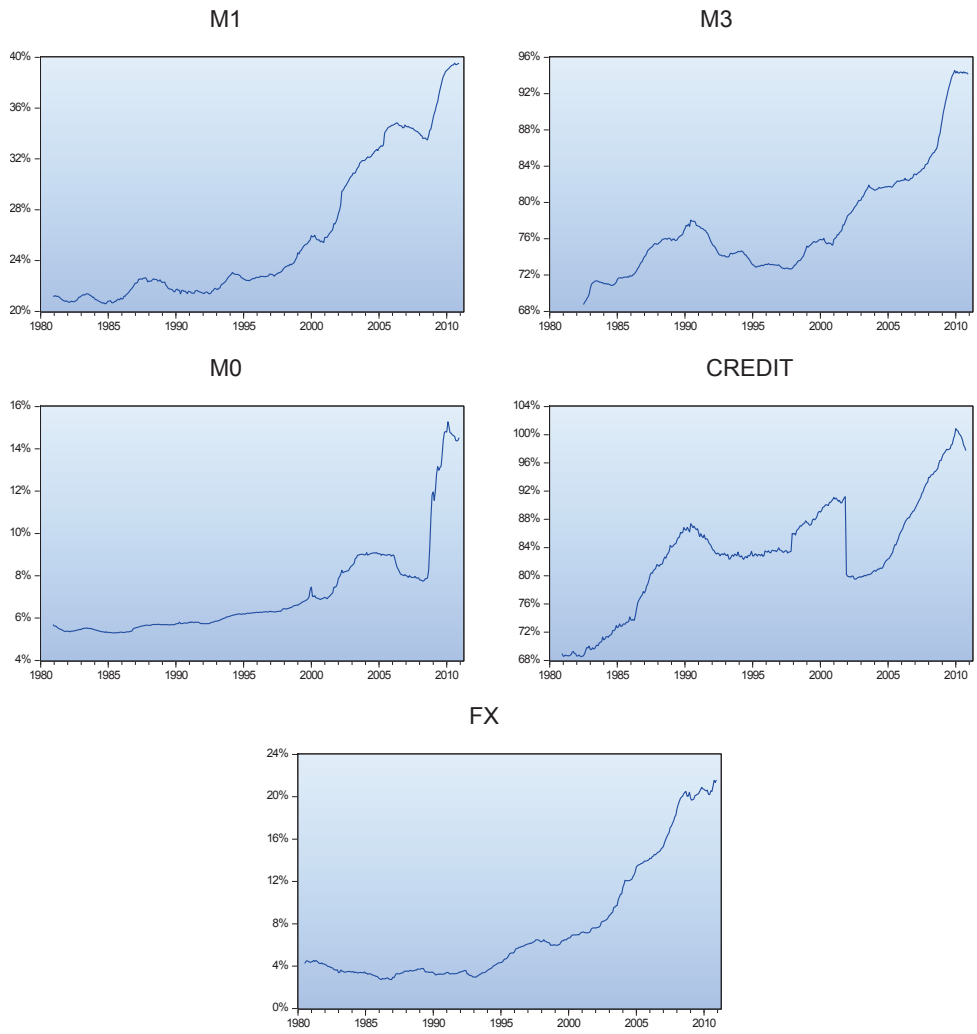
Other measures of excess liquidity have been used such as the money overhang, which represents the deviation between the actual level of money supply expressed in nominal terms with an equilibrium value being a function of long-term demand for money. A combination of this indicator and that of Baks and Kramer [1999] is the real money gap. It represents the deviation of the actual quantity of money in real terms. This is based on the quantitative theory of money and incorporates a specification of the velocity of circulation of money (Berger and Harjes [2009]). Other indicators are based on credit, featuring notably *the differential in the rate of growth of credit and that of GDP*. Another measure, the credit gap, is proposed by Borio and Lowe [2002]. A credit gap is defined when "*the ratio of credit to GDP deviates from its tendency towards a specific value*". According to these authors, the deviation (measured by the variance of the ratio) must exceed four percentage points from its trend to be described as excessive. The method used to determine the threshold is drawn from the works of Kaminsky and Reinhart [1999].

Besides these quantitative indicators, price indicators can be considered. There is a fairly close relationship between prices and quantities. DeNicolò and Wiegand [2007] propose an indicator of global excess liquidity based on the deviation of short-term nominal interest rate from the Taylor rate. The Taylor rate results from reactions of monetary authorities to output gap and inflation differential and reveals the preference of central banks underlying the conduct of monetary policy. Therefore, the gap between this threshold (Taylor rate) and the short run nominal interest rate could reflect an excess of money supply, if the current rate is below the Taylor rate. A second approach is presented by Gouteron and Szpiro [2005]. According to them, excess of monetary liquidity would be assessed by the difference between the short term real interest rate and the natural interest rate deriving from the long run growth.

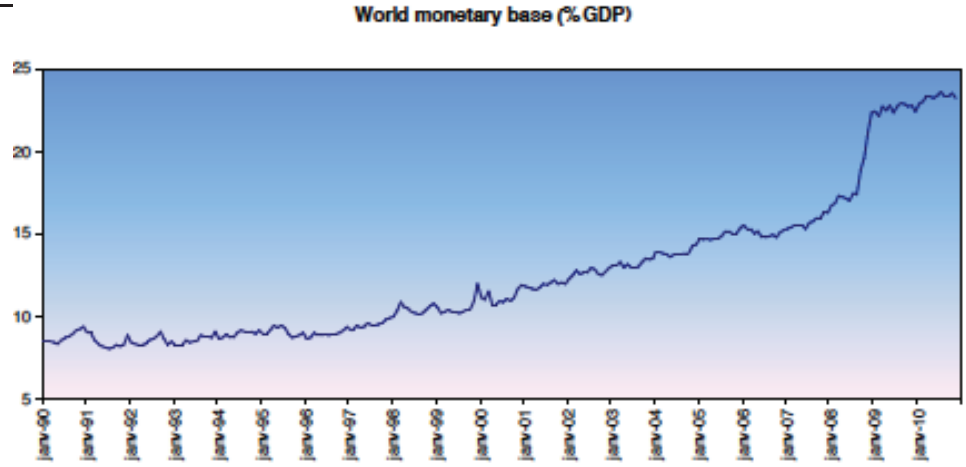
We have constructed several indicators in order to assess the possible excess of global liquidity. The first ones define the excess liquidity as a ratio of a monetary aggregate to nominal GDP (Figure 3.1). M0, M1 and M3 are based on the monetary supply of industrialized countries only. Foreign currency reserves (FX) are those of OPEC countries, China, India and Japan. The world monetary base aggregate represents the global

monetary base coming from the IMF data translated at the current exchange rate. It includes the US, the euro zone, Japan, the UK, Australia, Canada, eight Asian emerging countries, China, OPEC countries, Central and Eastern European countries, Russia and seven Latin American emerging countries. These aggregates are expressed as percentage of GDP.

Figure 3.1: Global liquidity indicators, (% GDP)



Regardless of the measurement (global monetary base ($M0$), broad ($M3$) and narrow ($M1$) monetary aggregates or foreign currency reserves as percentage of GDP), it seems that global liquidity stayed fairly stable up to 1995 and has increased sharply from this date. This is confirmed with the indicators based on the growth differential between

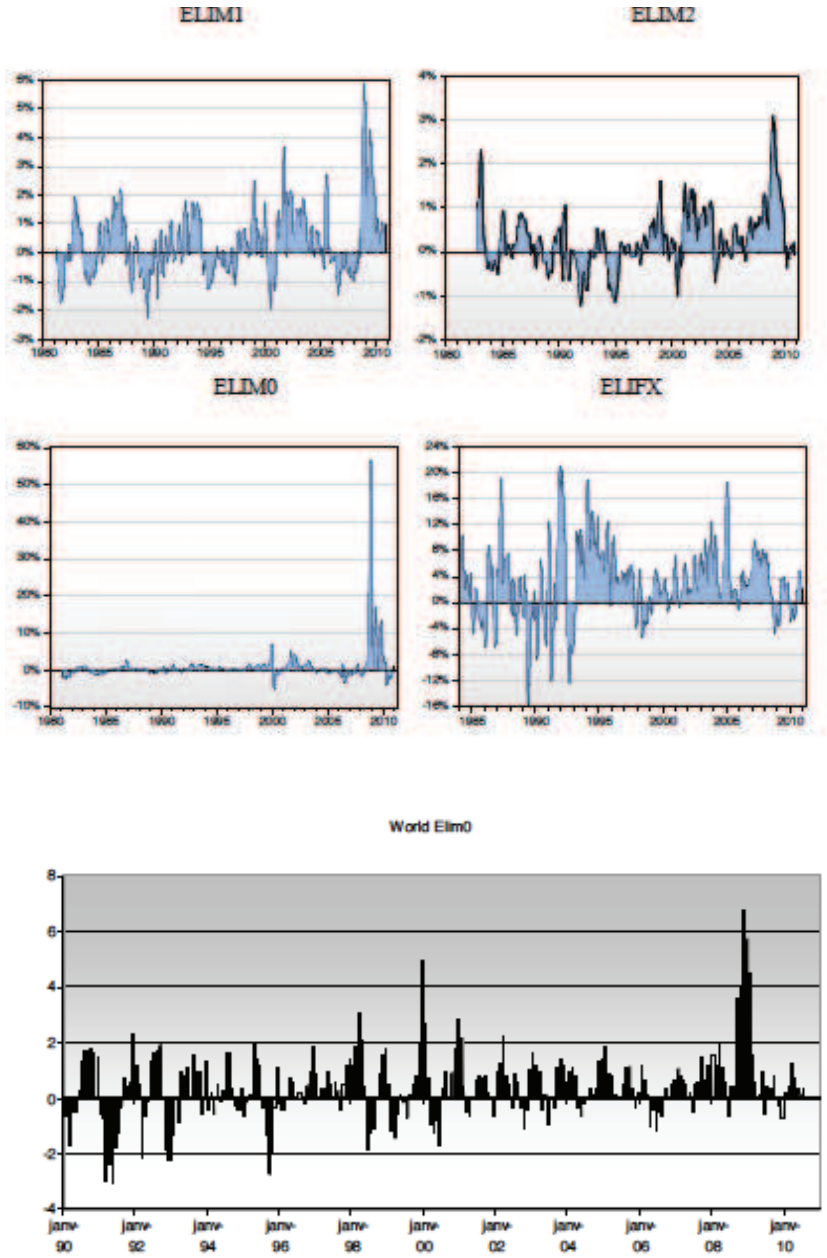


money supply and GDP (figure 3.2). We use several indicators named $ELIM0$, $ELIM1$ and $ELIM3$ (respectively the differences between the growth rates of $M0$, $M1$ and $M3$ aggregates and the growth rate of GDP in industrialized countries), and the growth rate of foreign currency reserves ($ELIFX$). In the same way, we calculate the differential between the growth rate of the "world" monetary base and the growth rate of the "world" nominal GDP ($Worldelim0$).

Indicators of excess liquidity provide overall confirmation of this breaking point in the trend. Prior to 1995, excess liquidity was relatively low and only for rather brief periods. These surpluses were accompanied by, fairly cyclically, declines in liquidity or even deficits. As regards indicators based on $M1$ or $M3$ aggregate, surplus liquidity followed a path around 0 and fluctuations appears to be relatively weaker than those observed few years later. The same pattern is evident in terms of foreign exchange reserves. Before 1995, the growth rate in foreign exchange reserves increased slowly and even decreased for oil-exporting countries. The decline in oil prices as from 1980 had been followed by a slowdown of foreign currency reserves.

It is thus as from 1995 that global excess liquidity really became an issue. All indicators point out the global liquidity growth exceeding the growth rate of GDP. Phases of surplus liquidity become increasingly of importance in terms of amount and also for longer period. From 1995, global liquidity, based for example on M1 aggregate and, to a lesser extent, on M3 started to grow on the back of several interest rate cuts, leading by the Japanese

Figure 3.2: Global excess liquidity indicators



monetary authorities, prompted by the banking and financial crisis that hit the economy. The low interest rate environment in Japan coupled with the introduction of the Euro in 1999, which has been accompanied by an increase of money supply above the target established by the ECB (+ 4.5%)[7], could also have played a major role.

[7]This argument must be viewed carefully in the context of exogenous factors linked to institutional and statistics changing.

The domestic credit, although held back during the 2000 Internet crisis, started to climb again on the back of large expansionist monetary policies pursued by central banks in advanced countries (Federal Reserve, ECB, etc.) after the dot.com crisis. The excess liquidity reflected in $ELIM1$ during the first part of the 2000s is also obvious, except between 2005 and 2006 where major Central Banks in advanced countries tightened monetary conditions. Finally the current financial crisis and measures adopted by monetary authorities have boosted liquidity once more.

Since 1995, foreign currency reserves have risen exponentially with the development of Brazil, India and China and the huge oil revenues generated by OPEC countries. These countries with current account surpluses along with Japan have thus considerable available resources that can earn a return on the capital markets.

Lastly, turning to monetary bases, once again the charts indicate that the phases of surplus liquidity are becoming more frequent and wider than the phases of a liquidity deficit, and also that imbalances are growing over time.

3.3 The impact of global excess liquidity on emerging economies

In a global environment characterized by excess liquidity, which can be attributed in large part to monetary easing in advanced countries, international investors increase their demand for higher-return assets to optimize the risk-return ratio of their portfolio. This excess liquidity encouraged capital flows to emerging markets, leading upward pressures, sometimes excessive on both asset prices and exchange rates in these countries.

To what extent excess liquidity can encourage international investors to search for higher yields, driving asset prices up, especially in emerging markets? Few studies have tackled this question. Most of them focused on the impact of global liquidity on output, inflation and asset prices using VAR models, though only for advanced economies. Sousa and Zaghini [2007] showed that a shock on global liquidity in the G5 countries has a positive

impact on real GDP, but only in the short run. The impact on aggregate prices is positive only with a lag. These results are confirmed by those obtained in a single country framework. Baks and Kramer [1999] find for the G7 countries that global excess liquidity has a negative impact on real interest rates but a positive impact on equity prices. They also emphasize cross-country spillover effects on stock returns and interest rates of a shock on liquidity in a given country. Rüffer and Stracca [2006] also examine the cross-border transmission effects of global excess liquidity, which they find to be significant and positive on production and on broad money in the euro zone and in Japan, though not in the US. They suggest, as did Grilli and Roubini [1995] that the US could be a leader internationally as the economy seems to be insulated from a global monetary shock. Belke et al. [2010] studied the interaction between global liquidity and the level of goods and asset prices for eleven OECD countries. Whereas monetary aggregates provide leading information on property prices, gold prices and global GDP deflator, equity prices do not react to liquidity shocks. These results are in line with Giese and Tuxen [2007] who showed that global liquidity has an impact on property prices but not on stock prices. Darius and Radde [2010], also find for the G7 countries that global liquidity provide useful information on property prices although domestic variables play a more significant role than global variables though not on equity prices (based on the MSCI world index). All these analyses were conducting by using VAR models and impulse functions.

Studies concerning the impact of liquidity on emerging countries are rather scarce and more recent. Chudik and Fratzscher [2011] compare the role of the tightening of monetary conditions (estimated by the change in the 3-month money market interest rate) and the collapse in risk appetite (evidenced by a shock on the VIX index or the TED spread) in the global transmission of financial crises measured by the change in the stock market index. They show that liquidity shocks are felt more by leading countries, while emerging economies are affected more by changes in risk appetite. Lastly, the IMF (2010) examines the link between growth in global liquidity and asset prices (equity returns) in "receiving" emerging countries. The regression (panel data) indicates that global liquidity is positively associated with equity investments between 2003 and 2009, which may explain the rise in

returns.

3.4 Empirical analysis

We investigate the impact of surplus global liquidity on a set of prices for a sample group of 16 emerging economies in Latin America and Asia (Argentina, Brazil, Chile, Colombia, Mexico, Peru, Venezuela, India, Indonesia, Malaysia, Philippines, Taiwan, South Korea, Thailand, Hong Kong and Singapore) over a period from 1990 to 2010 with a monthly frequency[8].

We collect data on monetary bases (i.e. $M0$) for a large sample including both advanced and emerging market countries[9]. All data are drawing from the IMFs International Financial Statistics. As monetary bases are expressed in local currencies, we convert all time series in the same unit by using nominal exchange rates against dollar measured at the end of each month. Finally we create a series called the "world" monetary base by simply summing monetary bases for all countries of our sample for each period. The "world" monetary base is expressed in billion dollars. We also create a series called "world" GDP by summing nominal GDPs for our set of countries expressed in dollar terms for each period. In order to study the spillover effects of the global monetary base, we do not include the contribution of the 16 emerging countries to the world monetary base.

Then we construct two indicators of excess global liquidity at the aggregate level. The first one is calculated as the differential between the growth rate of the "world" monetary base and the growth rate of the "world" nominal GDP. The second one is calculated as the ratio of "world" monetary base to "world" nominal GDP expressed in percentage.

In order to identify international transmission of monetary shocks, we used a panel vector autoregression (PVAR) model, developed by Love and Zicchino [2006]. This model

[8]But data for some countries are available only on a shorter sample.

[9]The sample includes United States, United Kingdom, Japan, Australia, New Zealand, Sweden, Denmark, and the euro zone for advanced countries. For emerging countries, we include China, South Africa and ten countries from Central and Eastern Europe including Russia and Turkey. The sample comprises also three oil exporting countries, i.e. Qatar, Kuwait and Saudi Arabia.

allow for individual heterogeneity in the levels of the variables by introducing fixed effects (μ_i). It can be written as:

$$X_{i,t} = \mu_i + \Theta(L)X_{i,t} + \chi_t + \varepsilon_{i,t} \tag{3.3}$$

With $i = 1, , N(N = 16)$, $t = 1, , T$ (T=252)

$\Theta(L)$ is the lag operator. $X_{i,t}$ is a vector of 6 macroeconomic variables (*moy*, *gdp*, *cpi*, *crb*, *stock*, *house*). *Moy* is the world monetary base on the world GDP. This global variable excludes the 16 emerging countries under investigation. We order the monetary variable first because it is expected to be more exogenous with respect to the other variables in the short run. In a spillover analysis it is assumed that domestic factors lag behind global factors (Darius and Radde [2010]). The increase of global liquidity is likely to be associated with a rise in aggregate demand and will thus increase the prices of several assets: housing, equity, commodities and consumer goods. For each of the 16 emerging countries, we collect data on real GDP (GDP), a consumer price index (cpi), a house price index (house)[10] and a asset price index (stock). Moreover we include the CRB commodity index (crb), which is a basket of internationally traded commodities, including oil. The Cholesky ordering of our variables follows the literature and the relative sluggishness of variables response to shocks. In particular, it is standard to order output and prices before equity and property prices (Belke et al. [2010] ; Sousa and Zaghini [2007]).

Helmert transformation is used in order to remove the individual effects (μ_i) (ie the difference between each variable and its forward mean)[11]. It preserves the orthogonality between transformed variables and lagged regressors. We have also removed the country time dummy variables (χ_t) by subtracting the means of each variable calculated for each country year[12]. Coefficients are estimated by GMM, lagged regressors being used as instruments.

A quarter order PVAR has been estimated using monthly data from January 1990 until

[10] The data on residential property price are not always comparable across countries.

[11] Arellano and Bover [1995]

[12] Countries specific time dummies capture country specific macro shocks.

December 2010. In order to compute impulse respond function, we identify the shocks using Choleski decomposition (confidence intervals are generated with Monte Carlo simulations). Results are presented in the following figures.

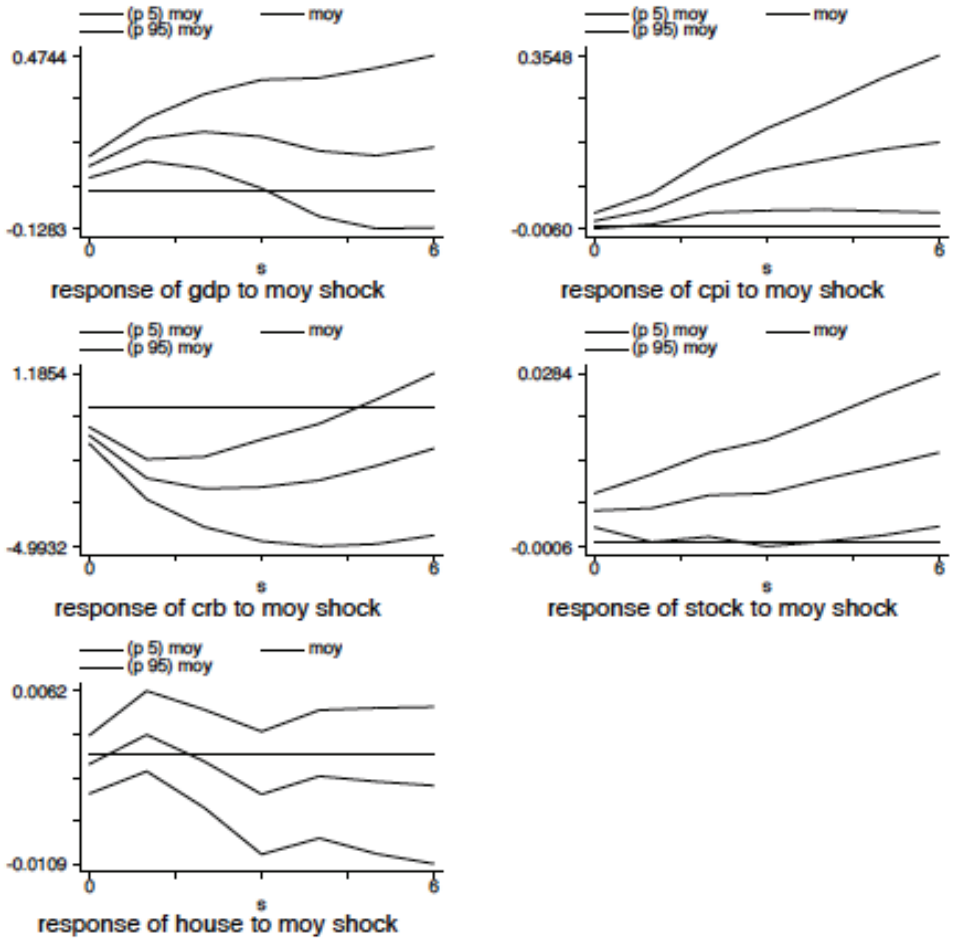


Figure 3.3: Impulse responses to a liquidity shock (moy)

Figure 3.3 shows that an increase in the global excess liquidity has a positive impact on real GDP in the short run, but this impact disappears in the medium to long run. The effect of monetary shock on prices is quite low in the first months but becomes significantly positive and permanent. These results are consistent with what one expects from a monetary policy shock: it increases output temporarily and the price level persistently. Excess global liquidity has an impact on emerging economies, as if it were a domestic monetary shock. The impact on asset prices is less significant. As seen in the figure, asset prices index doesnt appear very sensitive to changes in global liquidity. Moreover,

	10 months	20 months	30 months
GDP	2	6.5	11.9
CPI	2.5	3.8	5.3
CRB	2.7	7.2	18.4
Stock	2.4	9.9	18
House	0.3	0.3	0

Table 3.1: Variance decompositions : percent of variation of the row variable explained by the excess liquidity variable

asset prices do not show a clearly positive response to a monetary impulse. This weak relationship between global liquidity shocks and share prices is very similar to results obtain for industrialized countries (Rüffer and Stracca [2006], Giese and Tuxen [2007]). However, the negative response of the CRB index is rather surprising. As expected, as the supply of house is inelastic relative to other assets, its price reacts more strongly, at least in the short term (Darius and Radde [2010]). This contrasts with the relationship between global excess liquidity and consumer goods prices, which are more supply elastic. The short term cpi response is weaker.

Finally, we present the variance decomposition analysis up to 30 months, using the same choleski ordering. Table 3.1 indicates the percent of the variation of one variable that is explained by a (one standard deviation) shock in another variable, the excess global liquidity here, accumulated over time.

The forecast error variance decomposition shows that the contribution of unexpected monetary shocks is rather limited in the short run, but increases over time. Global excess liquidity explains almost 20% of total variation of commodities prices and stock prices 30 periods ahead (2.5 years). The response of real estate prices is significantly lower.

Our main findings are robust to some alternative specifications of the VAR model, such as in the ordering of the variables or the number of lags (we estimated the same equation with 2 and 3 lags). Another test of robustness was to replace the indicator of excess global liquidity moy (world monetary base on the world GDP) by $elim0$ (the differential between

the growth rate of the world monetary base and the growth rate of the world nominal GDP) (Figure 3.3). Results are very similar from a qualitative point of view (except for stock prices) although with less statistical significance (in the pvar estimation, as in the variance decompositions, not reported here).

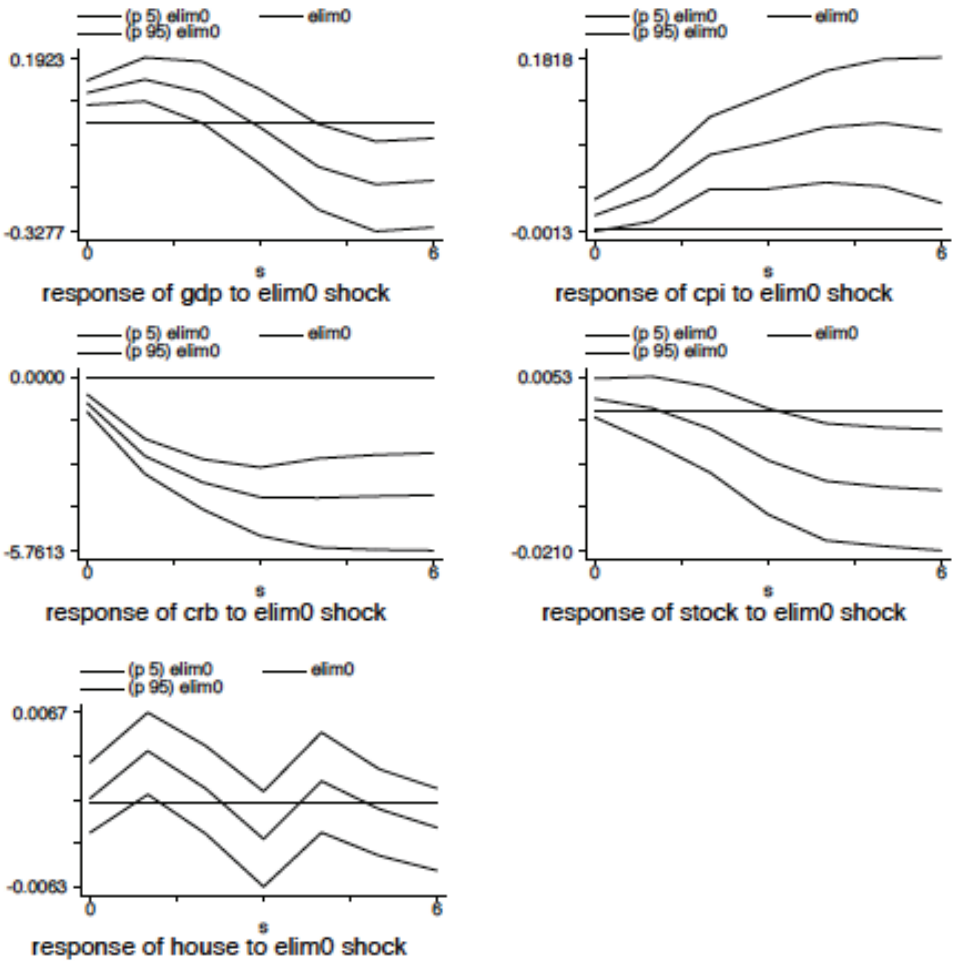


Figure 3.4: Impulse responses to a liquidity shock (elim0)

Finally, our results are broadly in line with previous studies. We found evidence of spillover from excess global liquidity to economic conditions in emerging countries. Global liquidity shocks matter for price and output fluctuations. However, the relationship with asset prices (which includes commodity, property and equity) appears weaker.

3.5 Conclusion

The global excess liquidity, regardless of the indicators used, increased from the mid-ninety, before accelerating again in early 2000 with the easing of monetary policies of industrialized countries, following the collapse of the Internet bubble in the U.S., then in 2008-2009 to the subprime crisis. So far, the relationship between money growth, asset and good prices has been little studied in an international context, and only of industrialized countries. In this paper, we analyze the effects of global monetary shocks on emerging countries. By focusing on spillovers effects of global liquidity and on emerging countries, this paper contributes to the debate. Moreover, our broad liquidity measure allows us to consider the role of international reserves. We find support that excess of global liquidity generates significant spillovers to the emerging countries. It contributes to the increase in GDP and in consumer prices in these countries. However the relationship between global liquidity shocks and share prices or real estate prices is weaker. The findings of this paper are broadly in line with previous studies applied to industrialized countries.

The mixed results on asset prices may have several explanations. First, the monthly frequency of our panel is maybe too short to adequately take into account spillovers. Then it might be useful to distinguish spillovers according to country size. Some authors showed that large-sized countries are more insulated from global liquidity shocks. Finally, as suggested by Darius and Radde [2010], between boom and bust phases of the business cycle, the impact of liquidity may not be symmetric. Especially in periods of global crisis, we would expect a negative rather than positive relationship between liquidity and asset prices. Again, it might be profitable to distinguish sub-periods for the econometric analysis

Chapter 4

Destabilizing effects of global liquidity and global imbalances spillover

M-L. Djigbenou[1], V. Fourel[2], and H. Park[3]

4.1 Introduction

Global liquidity in a monetary view has increased significantly over the recent period. Private agents, economists and researchers as well as central banks and international institutions are increasingly interested by this concept. This increase in the interest of global liquidity is first of all guided by the period of excess liquidity prior to the beginning of the financial crisis. And this excess was shown by both the liquidity provided by official authorities and the liquidity from financial institutions and markets. More recently, the interest is essentially motivated by the different accommodative policies adopted by the monetary authorities with a rise in unconventional measure. At the same time, the liquidity issued by banks and some markets keep slow downing. This ambivalence or this dynamic of global liquidity continues to intrigue especially because the impact on the economy or the international financial system are not well known.

At this purpose, the IMF (2013) has the will to make a surveillance of the dynamics. The BIS also belongs in this logic and provides already some indicators. One main indicator which is highlighted by both institutions in this purpose is the interbank flows as it's a channel used by financial agents to transfer the liquidity from a monetary area to

[1]Banque de France, University of Bordeaux
[2]Banque de France
[3]Bank of Korea

another. But this liquidity and the management of the funds are highly dependent on the monetary policy defined by the local monetary authorities. By considering for instance the key policy interest rates of central banks, a global downward trend is observed as highlighted by the Figure 4.4. These decisions are without any doubts justified by the objectives of monetary authorities especially. In reference to the work of Djigbenou [2013], the global liquidity is essentially guided by the real economic situation and financial stability. And the recent experience with the implementation of the US Federal Reserve with the implementation of the different quantitative easing (QE) policy illustrates this purpose. The decrease of 25 bp in the key policy rate by the European Central Bank, in a context of deflation risk, could also be explained by these economic motivations. But even if these accommodative policies are justified, a domestic policy could significantly affects the dynamics of liquidity in the world and could be destabilizing for the world system.

In this paper, we will essentially focus on a monetary definition of global liquidity, especially on those issued by the monetary authorities. In fact, these official agents define the first conditions by which the other agents (private) especially the banks will define their own liquidity. In this view, global liquidity can be defined as the whole of liquidity provided by domestic agents (in this case, mainly by the monetary authorities), which can be used outside its own monetary area for buying a good, a service or an asset. Therefore, the dynamics of global liquidity are strongly linked to the liquidity provided by the monetary liquidity of advanced countries. The liquidity issued by the US Federal Reserve, European Central Bank, Bank of England or by the Bank of Japan can directly be used outside their monetary area in international trade and on financial markets. So they directly contribute to the growing or the decline of global liquidity, particularly by a reallocation of their domestic liquidity all over the world and thus increasing the liquidity in different economies and markets. Monetary policies adopted by these central banks from advanced countries with the recent crisis are in favor of the increase of global liquidity. But the dynamics of global liquidity are not based only on the liquidity provided by advanced countries, it takes also into account the liquidity from emerging countries. For

the main big emerging countries, the issue of the capability of local liquidity to be used outside its monetary area has to be nuanced currently. For instance, some regional exchanges in Latin American countries or in Asia are in local currencies. But the currencies of main advanced countries stay the most used and the most liquid.

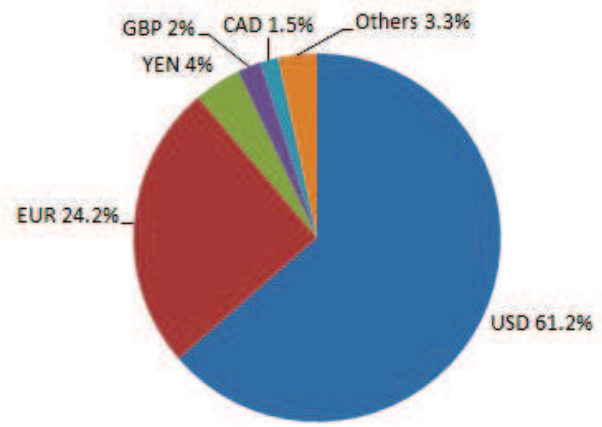


Figure 4.1: Currency composition of foreign reserves - 2012

The data provided by IMF in its Currency Composition of Official Foreign Reserves database shows that the emerging and developing countries holds 67% of the total of foreign exchange reserves at the second quarter of 2013. According to this database, these reserves are denominated mainly in USD (61.2%), EUR (24.2%), YEN(4%) and CAD(1.5%) at the end of 2012 (Figure 4.1). For being sure that the issued liquidity would be quickly exchanged without a loss in the value of the currency, the contribution of emerging countries to global liquidity will be defined on the asset side of the balance sheet of the monetary authorities via the foreign exchange reserves. Via the foreign reserves, monetary authorities creates domestic liquidity if the build-up of foreign reserves is not followed by a sterilization process. But these agents can also directly impact the global liquidity by buying assets on a foreign markets. By doing this, they increase the demand on this market for a given supply. That permits to increase the liquidity on this market. Thus global liquidity can be issued by advanced and emerging countries.

On the whole, the liquidity issued by monetary authorities is increasing. Basically, each monetary authority defines each own monetary policy according to its objectives

and its economic background. Considering the evolution of interest rates presented in the Figure 4.2, the dynamics of global liquidity seem to follow a self-sustaining process. For instance, the restrictive policy adopted by the US Federal reserve in 2004 by itself slowdown the global liquidity as a whole. But few quarters later, the other central banks adopt also restrictive policies, which in turn contribute to the slowdown of global liquidity. A similar mechanism could be also observed in 2007 in an accommodative framework. As in the previous case, the accommodative policy of the Federal reserve is followed by accommodative policies of the other central banks. This strong correlation between the liquidity issued by the FED and the other central banks could lead to question about the spillover of a domestic liquidity policy on the global liquidity dynamics, especially after a modification of the US monetary policy. What are the spillover effects of this change in US monetary policy on global liquidity? Is it a stabilizing or a self-sustaining dynamics?

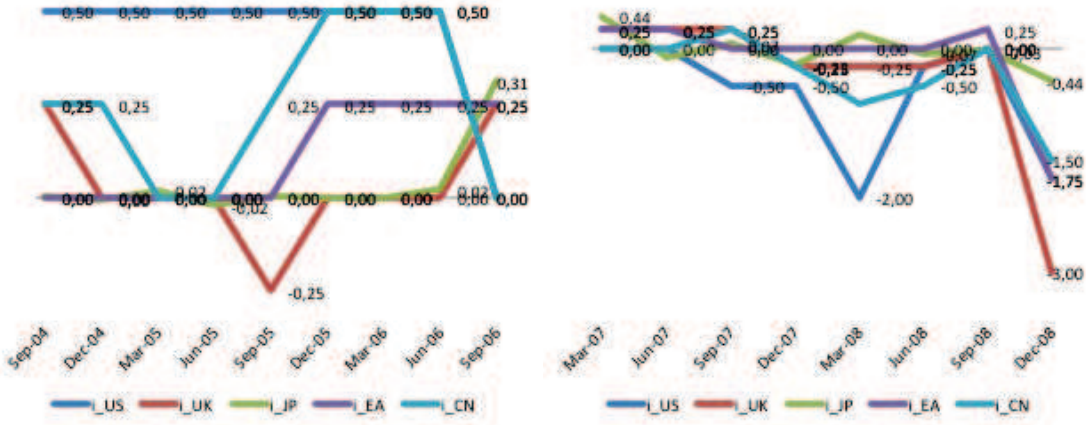


Figure 4.2: Quarterly variation of key policy rates

Moreover, the comparison between global imbalances and global liquidity dynamics seems to be very close. In regard to Figure 4.3, it's to note that periods of slowdowns of global liquidity are followed by a decrease in global imbalances calculated on the basis of absolute value of national current account[4]. According to Figure 4.3, the raise of global

[4]As in IMF(2010), this measure of global imbalances is calculated as the sum of absolute current account positions.

interest rate, ILIRATE, [5] in 1994 is directly followed by a decrease of global imbalances. Similarly, between 1999 and 2000 or just after the increase of interest rates in 2005, we observe also a decrease in global imbalance. It's also the case when we focus on liquidity issued by emerging countries. The periods of acceleration of foreign reserves are directly linked to growth of global imbalances. This last relation has been highlighted by Blanchard and Milesi-Ferretti [2009] and Fund [2010]. And Blanchard and Milesi-Ferretti [2009] mention that "*imbalances reflected primarily distortions both at the domestic and international level*" .

The causes of the global imbalances have been raised in various ways. These include: the global saving glut (Bernanke [2005], Bernanke [2007]); foreign exchange market intervention in emerging economies (Dooley et al. [2004]); preference for safe assets of advanced countries (Caballero [2006]; Caballero et al. [2008]) and capital flows from emerging economies to developed countries dubbed "the uphill flow of capital " (Gagnon [2012]). Cooper [2006] and Feldstein [2008] consider negative saving-investment gap and over-consumption in advanced countries due to the persistent easing monetary policy. Even though the global imbalances are to be attributed to multifaceted factors, we here focus on the effects of global liquidity on the global imbalances. Barnett and Straub [2008] show that monetary policy shocks played a crucial role in current account deteriorations in the US from 1970 to 2006 through structural VAR model including output, inflation, interest rate, oil price inflation, current account, the sum of consumption and investment and the real effective exchange rate. In terms of the forecast error variance decomposition, monetary policy shocks account for over 60 percent at a one year forecast.

The main purpose of this paper is to study in a first part how global liquidity responds to a monetary policy shock especially to a US monetary policy shock and in a second part the spillover effect on global imbalances. For answering to this question, we make different kind of regressions, especially Panel and Panel-VAR. Our study concerns 5 countries: 5 advanced (United States, United Kingdom, Euro area, Japan and Canada) and 5 emerging

[5]The global interest rate is the weighted average of key policy rates in US, UK, EA, JP and CN. The weight are calculated according to the weight of each country in GDP expressed in PPP. And Expon(ILIRATE) represents the exponential trend curb of ILIRATE

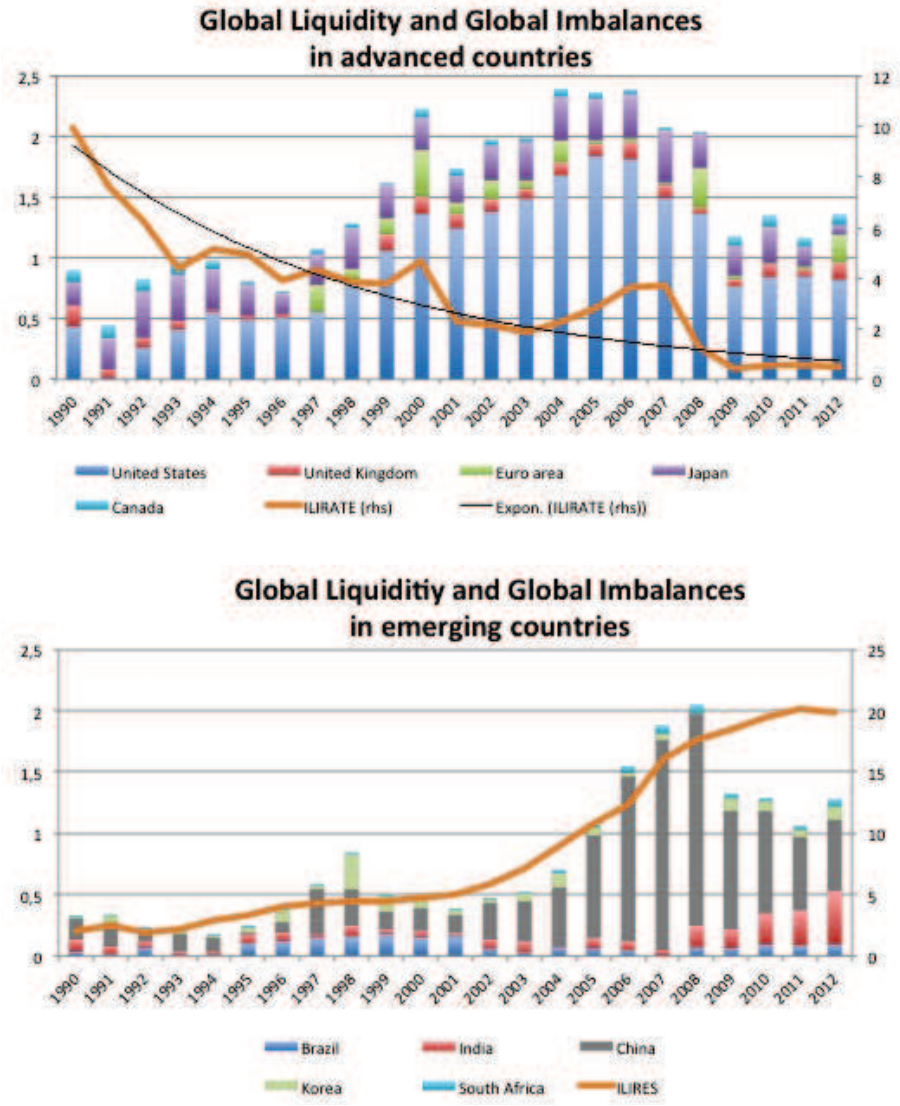


Figure 4.3: Global liquidity and Global Imbalances

countries (Brazil, India, China, Korea and South Africa) from 1990 to 2011.

The results of this study suggest a risk of destabilizing dynamics of global liquidity after a US monetary shock and significant spillover effects on global imbalances. In fact, global liquidity tends to display proportionally greater than the initial US monetary shock and impacts considerably the global imbalances in emerging and advanced countries.

We organize this paper as following: the first part studies the dynamics of global liquidity du to domestic monetary policies. In a second part, we will studies if there are destabilizing effects of global liquidity on global imbalances.

4.2 US Monetary shocks and amplified dynamics of global liquidity

In this paper, global liquidity is defined as the whole of relevant official liquidity. In other words, it represents the sum of domestic liquidity provided by the countries which are able to export their local currency outside their monetary area. Thus, global liquidity depends on the policies adopted by the monetary authorities. It would be interesting to understand the relationship between an individual monetary policy shock, especially a US monetary shock and the dynamics of global liquidity. Interest rates parity with the framework of Mundell's trilemma permits to justify a self sustaining dynamics, which is validated by the empirical data.

4.2.1 Global liquidity in the interest rate parity

The trilemma of Mundell or incompatibility triangle of Mundell describes a constrained relationship between exchange rates, monetary policy and capital flows. It refers to an impossibility to deal with a perfect mobility of capital flows, an autonomous monetary policy and a fix exchange rate at the same time. The interest rate cannot served both an external and an internal objectives in an environment of perfect mobility of capital flows. It's in this context that monetary authorities make their decisions. The dynamics of global liquidity therefore depend also on these relationships.

Considering an accommodative monetary shock via for instance a decrease in key interest rate for two economies. This policy shock increases the interest rate differential de facto and thus increases the attractiveness in capital flows, other things remaining equal. This fosters the appreciation of the currency of the second country and then decline its price competitiveness. For limiting the negative impact on its real activity, bubbles on local financial markets and avoiding sudden and massive outward capital flows, the monetary authorities in the second country are incited to decrease the key interest rate. The differential of interest rates goes back therefore to the initial equilibrium.

It's also the case when the monetary policy adopted by the central bank is non-

conventional. In this framework, the shock impulsed by the first country impacts price on market and decreases the returns on the market concerned by the monetary decision. Then, for rebalancing their portfolio, investors redefine the components for keeping their risk-return ratio. Considering that agents diversify their portfolio in local and foreign assets, the rebalancing of their portfolio brings about capital outflows in direction of the second country. The second country faces to appreciation of its own currency and more capital on its financial market. At this stage, the monetary authority in the second country can let the market correct in a long run by itself given the progressive decline in returns on markets and the effect of currency appreciation, or react in a short run with also an accommodative policy. So the liquidity shock impulsed by one country can therefore induce a reaction from other countries, and by the way causes an increase in global liquidity higher than the initial shock.

These mechanisms between domestic monetary policies and the dynamics of global liquidity are illustrated by the Figure 4.4 where three groups of countries are considered. The group 1 is composed by the United States (US) alone. In this model, US monetary policy is considered as the initial shock because of its key role in international financial system. Ehrmann and Fratzscher [2009] show indeed a key role of US monetary policy shock in global financial markets and Kazyi et al. [2013] study its significant impact on GDP growth in different country. Moreover, as mentioned in the introduction, the US monetary shock is firstly observed before the others over the recent period. The second group is the group of other advanced countries with United Kingdom (UK), Euro area (EA), Japan (JP) and Canada (CN). And the third group is the emerging group composed by Brazil (BR), India (IN), China (CH), Korea (KO) and South Africa (SA).

A US monetary shock can therefore induce lower key interest rate or unconventional measure in order to limit the effect of the US shock in terms of the appreciation of the exchange rates and thus on the economy. Over the recent period, this consideration of the exchange rate in the monetary policy could be observed with for instance the direct intervention in 2012 of the Bank of Japan on foreign exchange market in order to reduce the appreciation of the yen against USD. More recently, Draghi and Constâncio [2013]

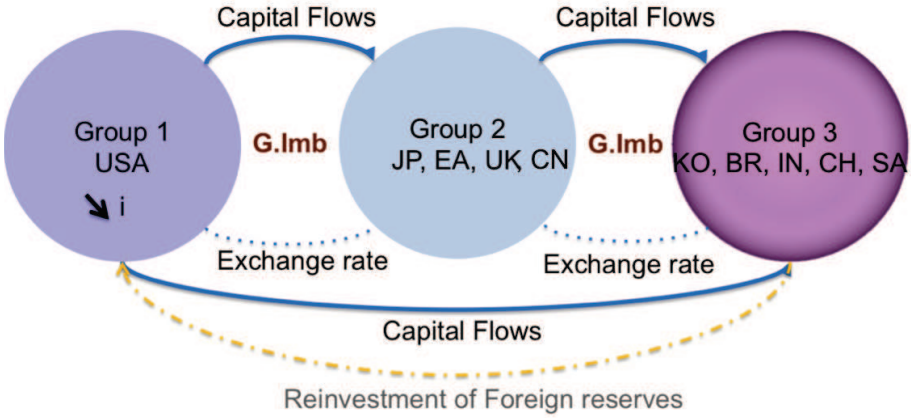


Figure 4.4: US monetary shock and Global liquidity spillovers

said: "*the exchange rate is not a policy target for the ECB. The target for the ECB is medium-term price stability. However, the exchange rate is important for growth and for price stability and we certainly pay close attention to these developments.*". Taking into account the exchange rates movements could thus contribute to justify reports in accommodative monetary policies through different countries and therefore increase more global liquidity. Considering the group 3, the influence of US monetary shock passes through the accumulation of foreign exchange reserves. In fact, the appreciation of USD against the other currencies due to the US accommodative policy impact foreign reserves by different channels. First of all, by the effect of this appreciation on current account. The USD appreciation tends to increase the price of imports in the emerging countries and decrease the price of export. Thus exports are encouraged at the expense of imports. So emerging countries receive more foreign currencies. The effects of USD appreciation on foreign reserves can also pass by financial channel or by intra-bank system (Bruno and Shin [2012]). According to carry trade operations, the US easing monetary shock could be used to acquire more foreign assets or to fund projects with more attractive interest rates via the better condition of branch office. These different channels can drive USD into emerging countries and increase the foreign reserves that can be sterilized or not. If the country does not sterilize, then the entry of foreign currencies correspond directly on an increase in local liquidity. But whatever be the case, the build up of foreign reserves can be reinvested on different markets and therefore provides more liquidity on

this markets. And this reinvestments raise the liquidity on this market and decrease returns. This increases the global liquidity as mechanisms of propagation of liquidity in an unconventional monetary policy.

So global liquidity can face to a snowball dynamics to the extent that one accommodative monetary shock can caused chain reactions which could also raise global liquidity. An empirical study could permit to have a better understanding of the dynamics of global liquidity.

4.2.2 Sustained dynamics

As explained previously, global liquidity is amplified dynamics if other country react to a monetary policy shock. According to the main objectives of monetary authorities, the monetary policy responds basically to real activity and price stability. Thus as for the Taylor rule, liquidity of country i, $ILIM_i$, is here defined as a linear function of real activity GDP_i and inflation CPI_i expressed in terms of quarterly growth rates (eq.4.1) and global liquidity (GLI) as a simple sum of the liquidity of the n countries (eq.4.2).

$$ILIM_{i,t} = \alpha_0 + \alpha_1 ILIM_{i,t-1} + \alpha_2 GDP_{i,t-1} + \alpha_3 CPI_{i,t-1} + \varepsilon_{i,t-1} \tag{4.1}$$

$$GLI_t = \sum_{i=1}^{n} ILIM_{i,t} \tag{4.2}$$

For studying the dynamics of global liquidity after a monetary shock, especially a US shock, we extend the basic domestic monetary rule by including the US monetary shock inside the decision rule. For testing empirically this relationship and for simplification reasons, only one representative country is chosen by group: UK for the group 2 and CH for the group 3.

$$ILIM_{US,t} = \alpha_{US,0} + \alpha_{US,1} ILIM_{US,t-1} + \alpha_{US,2} GDP_{US,t-1} + \alpha_{US,3} CPI_{US,t-1} + \varepsilon_{US,t-1} \quad (4.3)$$

$$ILIM_{UK,t} = \alpha_{UK,0} + \alpha_{UK,1} ILIM_{UK,t-1} + \alpha_{UK,2} GDP_{UK,t-1} + \alpha_{UK,3} CPI_{UK,t-1} + \beta_{UK,1} ILIM_{US,t-1} + \beta_{UK,2} ILIM_{US,t-2} + \varepsilon_{UK,t-1} \quad (4.4)$$

$$ILIM_{CH,t} = \alpha_{CH,0} + \alpha_{CH,1} ILIM_{CH,t-1} + \alpha_{CH,2} GDP_{CH,t-1} + \alpha_{CH,3} CPI_{CH,t-1} + \beta_{CH,1} ILIM_{US,t-1} + \beta_{CH,2} ILIM_{US,t-2} + \varepsilon_{CH,t-1} \quad (4.5)$$

$$\begin{aligned} GLI &= ILIM_{US} + ILIM_{UK} + ILIM_{CH} \\ \triangle GLI &= \triangle ILIM_{US} + \triangle ILIM_{UK} + \triangle ILIM_{CH} \\ \triangle GLI &= \triangle ILIM_{US} + \beta_{UK} \triangle ILIM_{US} + \beta_{CH} \triangle ILIM_{US} \\ \triangle GLI &= (1 + \beta_{UK} + \beta_{CH}) \triangle ILIM_{US} \end{aligned}$$

With $\beta_{UK} = \beta_{UK,1} + \beta_{UK,2}$ and $\beta_{CH} = \beta_{CH,1} + \beta_{CH,2}$

If one local monetary authorities of one group react significantly to the US monetary shock, that is to say, if in this case β_{UK} and β_{CH} are significant, then we consider that other central banks integrate the US monetary shock in their monetary decisions. If in addition, these coefficients are strictly positve therefore global liquidity is a self sustaining dynamics.

$$\frac{\triangle GLI}{\triangle ILIM_{US}} = 1 + \beta_{UK} + \beta_{CH} \quad (4.6)$$

For estimating this regression, we consider the quarterly growth rates of variables from 1990 to 2013. Data are extracted from national sources, OECD and IMF databases. We consider only one representative country by group. If the results for these countries to a US monetary shock indicate a significant and positive response, then we consider that the dynamic of global liquidity can be amplified after a US monetary shock due to advanced and emerging countries responses. The results of these regressions are summarized in the Table 4.1.

	(1)	(2)	(3)
VARIABLES	ILIM_US	ILIM_UK	ILIM_CH
ILIM_US(-1)	0.4181***	0.0358**	-0.0883
	[0.102]	[0.018]	[0.053]
ILIM_US(-2)		0.0215	0.0998*
		[0.016]	[0.052]
GDP_US(-1)	0.5017		
	[0.818]		
CPI_US(-1)	1.3820		
	[1.035]		
ILIM_UK(-1)		0.4753***	
		[0.103]	
GDP_UK(-1)		0.5952***	
		[0.161]	
CPI_UK(-1)		0.2024	
		[0.186]	
ILIM_CH(-1)			0.4980***
			[0.133]
GDP_CH(-1)			1.2671***
			[0.429]
CPI_CH(-1)			0.2353
			[0.452]
Observations	97	96	49
R-squared	0.154	0.625	0.834

Note: Standard errors in brackets.*** p ¡0.01, ** p¡0.05, * p¡0.1

Table 4.1: Regression results

The results of these regressions in Table 4.1 point out a response of UK and CH to the US monetary shock. Both β_{UK} and β_{CH} are significants and positive. That means that the additional liquidity provided initially by the US monetary authority have a greater impact on global liquidity according to Equation (4.6). This simple regression allows us to consider the dynamics of global liquidity as driven by local factors and also by US monetary decisions. Therefore these dynamics are more than proportional to the initial shock, which impulses more liquidity on the whole and can be destabilizing in terms of global imbalances.

4.3 Global liquidity and global imbalances

4.3.1 Which linkages?

Faced with global liquidity inflows, emerging economies accumulated foreign exchange reserves in order to counter large capital inflows and appreciation pressures, and then reinvest these reserves in safe assets like U.S. Treasuries. With regards to this, Caballero [2006] argues that asset supply shortages in emerging economies lead to high demand for the US assets and, accordingly, asset shortage perspective could explain low real interest rates and global imbalances.

Since the crisis, the advanced countries' accommodative policy renders capital-recipient countries concerned about export competitiveness and abrupt capital outflows, strengthening the incentive for accumulating foreign exchange reserves. As a result, the global imbalances before the crisis are still with us. As argued by Choongsoo [2013], although the primary purpose of the quantitative easing policy lies in revitalizing their domestic economies, it also affects other countries through capital flows and exchange rates. He also mentioned that although it may shrink emerging economies' current account surpluses to some extent, this would not necessarily resolve global imbalances if emerging economies increase their foreign exchange reserves to offset appreciation pressures of their currencies. In this context, Choi and Lee [2010] demonstrate that there is a feedback mechanism between the global money expansion and global imbalances. First, global excess liquidity partly account for the large current account surplus in emerging economies due to the negative relation between the global liquidity and net saving rates in emerging economies. Next, if emerging economies increase sterilized intervention in their foreign exchange markets, the capital inflows could end up as foreign exchange reserves instead of leading to domestic investment. This accumulation of foreign exchange reserves finally causes low interest rates in the US. In this process, global imbalances would not be reduced.

Global liquidity expansion constrains the implementation of monetary policy, creating asset price bubbles and strengthening a pro-cyclical credit cycle (Eickmeier et al. [2013]).

In particular, we experienced volatilities in pro-cyclical global liquidity created endogenously by the private sector. As we already witnessed, heightened risk-appetite boosted private credit creation before the crisis and stronger risk-aversion reduced aggregate credit volume during the crisis even after central banks increased their liquidity injections (Matsumoto [2011]). Regional banks play a pivotal role in the endogenous creation of global liquidity through non-core funding involving global banks (Bruno and Shin [2012]; Shin [2012]). They construct a model of cross-border capital flows through the interaction between regional and global banks and empirically show that the leverage cycle of the global banks accounts for capital flows in banking sector. Unlike previous studies, Gourinchas [2011] focuses on 'global liquidity imbalances', rather than 'global imbalances'. Liquidity imbalances denote the mismatch between maturing external liabilities and pledgeable external assets. He points out that gross external positions describes funding conditions more accurately than current account balances do; therefore, global liquidity imbalances seem to be more essential in terms of global financial stability.

4.3.2 Global liquidity: a destabilizing factor on global imbalances

In order to investigate the effect of liquidity on current account, the following regression model is considered:

$$BCA_{it} = \alpha + \beta_1 BCA_{it-1} + \beta_2 GDP_{it} + \beta_3 CPI_{it} + \beta_4 ILIM_{it} + \beta_5 REER_{it} + f_i + \varepsilon_{it} \quad (4.7)$$

where BCA_{it} is the balance of current account to nominal GDP of individual country i in t, GDP_{it} the real GDP growth rate, CPI_{it} the CPI growth rate, $ILIM_{it}$ the global liquidity indicator, $REER_{it}$ the real effective exchange rate, f_i is an individual fixed effect, and ε_{it} the error term.

More precisely, dynamic panel models are estimated because the current account might be affected by its own lagged values. Related, we use both the difference GMM and the system GMM methods, as proposed by Blundell and Bond [1998]. Both the difference GMM and system GMM methods can mitigate the endogeneity issue by employing the

lagged dependent variables as instrumental variables. The individual fixed effect in equation (4.7) is eliminated by a first differenced method. The sample period ranges from the first quarter of 1990 to the fourth quarter of 2011 using quarterly data.

We report the estimation results in Table 4.2. Columns 2 and 3 correspond to results of total 10 countries, Columns 4 and 5 to those of only advanced countries and the other two columns to those of only emerging countries. In case of the total 10 countries, the coefficients of the liquidity are similar across two different methods, in the range of 1.4953 to 1.4988, with significance at the 5% levels, respectively. The values in parentheses are the robust standard errors adjusted for heteroskedasticity.

Similarly, the current account is also associated with and explained by the liquidity in emerging countries. The significantly positive coefficient of the liquidity is robust across both dynamic models. The coefficients of the liquidity are in a range between 1.7443 and 1.8071 in the case of only emerging countries. However, for only advanced countries, they are not significant with lower coefficients of the liquidity. It suggests that the effects of the liquidity on the current account are significantly stronger in emerging countries than those in advanced countries. Among control variables, the GDP growth rate has a significantly negative effect on the current account both in total countries and in only emerging countries. From the results of the 1st and 2nd order auto-correlation test of residuals in Table 4.2, there exist no second-order serial correlations in residual terms in the difference equations across all specifications.

In line with the estimation results shown in Table 4.2, it is argued that the liquidity is positively related to the current account especially in emerging countries. This indicates that current account surplus could be increased in accordance with the rise of the liquidity.

Additionally, a Panel-VAR is considered to investigate the effects of liquidity shocks on current account, real GDP growth, inflation and real effective exchange rate. A Panel-VAR model is specified as follows:

$$Z_{it} = \Phi(L)Z_{it} + f_i + \varepsilon_{it} \tag{4.8}$$

	Total countries		Advanced countries		Emerging countries	
	difference GMM	system GMM	difference GMM	system GMM	difference GMM	system GMM
BCA(-1)	-0.2467***	-0.2488***	-0.3373***	-0.3366***	-0.2256***	-0.2263***
	[0.0604]	[0.0592]	[0.1044]	[0.1112]	[0.0712]	[0.0657]
GDP	-0.291**	-0.0300**	0.0013	-0.0008	-0.0287**	-0.0301***
	[0.0135]	[0.0116]	[0.0207]	[0.0244]	[0.0132]	[0.0116]
CPI	0.0003	0.0002	0.0924	0.0898**	0.0002	0.0001
	[0.0003]	[0.0003]	[0.0633]	[0.0453]	[0.0003]	[0.0003]
ILIM	1.4988**	1.4953**	0.5866	0.4543	1.8071***	1.7443**
	[0.6003]	[0.6901]	[0.4486]	[0.4302]	[0.6914]	[0.8813]
REER	-3.8047	-4.3190	-0.5623	-1.1383	-5.1228	-5.7059
	[2.9078]	[3.0759]	[1.9804]	[2.3415]	[4.2008]	[4.3038]
Constant	0.0832	0.0886	-0.0124	-0.0058	0.1281	0.1447
	[0.0704]	[0.0595]	[0.0349]	[0.0420]	[0.1088]	[0.0920]
Observations	817	827	410	415	407	412
No. of Countries	10	10	5	5	5	5
AR(1) p-value	0.0085	0.0082	0.0444	0.0501	0.0355	0.0336
AR(2) p-value	0.3190	0.2590	0.5278	0.4598	0.6926	0.6080

Note: Robust standard errors in brackets.*** p¡0.01, ** p¡0.05, * p¡0.1

Table 4.2: Regression results of dynamic panel models - Sample period: 1990Q1-2011Q4

where Z_{it} is the five-variable vector $(GDP_{it}, CPI_{it}, ILIM_{it}, REER_{it}, BCA_{it})$, $\Phi(L)$ the lag operator, f_i the individual fixed effect, and ε_{it} the error term.

We order the variables with GDP placed first, and then followed by CPI, ILIM, REER and BCA. The Helmert procedure is employed to remove the individual fixed effects as in Arellano and Bover [1995] and Love and Zicchino [2006]. By Helmert's transformation, the explanatory variables and the error term can be orthogonal. We estimate the dynamics of the vector as a first order VAR, by GMM; thus, lagged regressors are used as instrumental variables in the VAR system. Our quarterly data covers the period from the first quarter of 1990 to the fourth quarter of 2011.

Figures 4.5 and 4.6 present the orthogonal impulse responses to shocks using Cholesky decomposition and the 5% standard error bands generated by Monte Carlo simulations with 700 repetitions. We focus on the response of the current account to a liquidity shock. As expected, a shock to liquidity has a positive effect on the current account in the short run, and it gradually dies off. For both total countries and emerging countries, the responses of the current account to liquidity shocks instantly show positive, but they become negative and then disappear. In the case of advanced countries, this impact peaks

after one quarter and then gradually disappears.

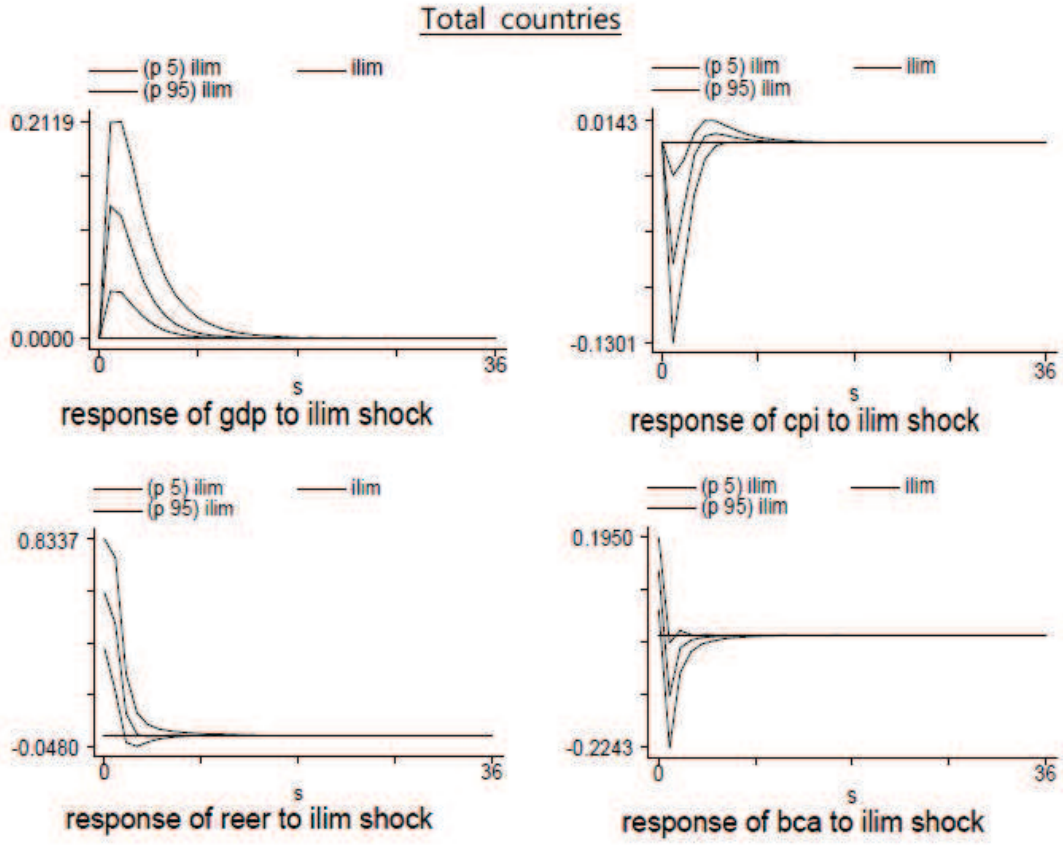


Figure 4.5: Impulse responses to a liquidity shock (ILIM): Total

Finally, Table 4.3 shows the results of forecast error variance decomposition both at 10 quarter and at 20 quarter horizons. In regard to total countries, results show that 2.3 percent of change in the current account is explained by the ILIM and 3.8 percent by the REER, and 2.7 percent by the GDP, respectively. The results for emerging countries are similar in that the ILIM accounts for the change in the current account at 3.4 percent, in the REER at 5.4 percent and in the GDP at 3.3 percent. In contrast, only 0.5 percent of change in the current account is account for by the ILIM and 0.5 percent by the REER, and 1.0 percent by the GDP in advanced countries, indicating that the contribution of the liquidity is relatively lower than that in emerging countries.

In summary, the orthogonal impulse responses and forecast error variance decomposition show that an increase in liquidity has a positive effect on the current account

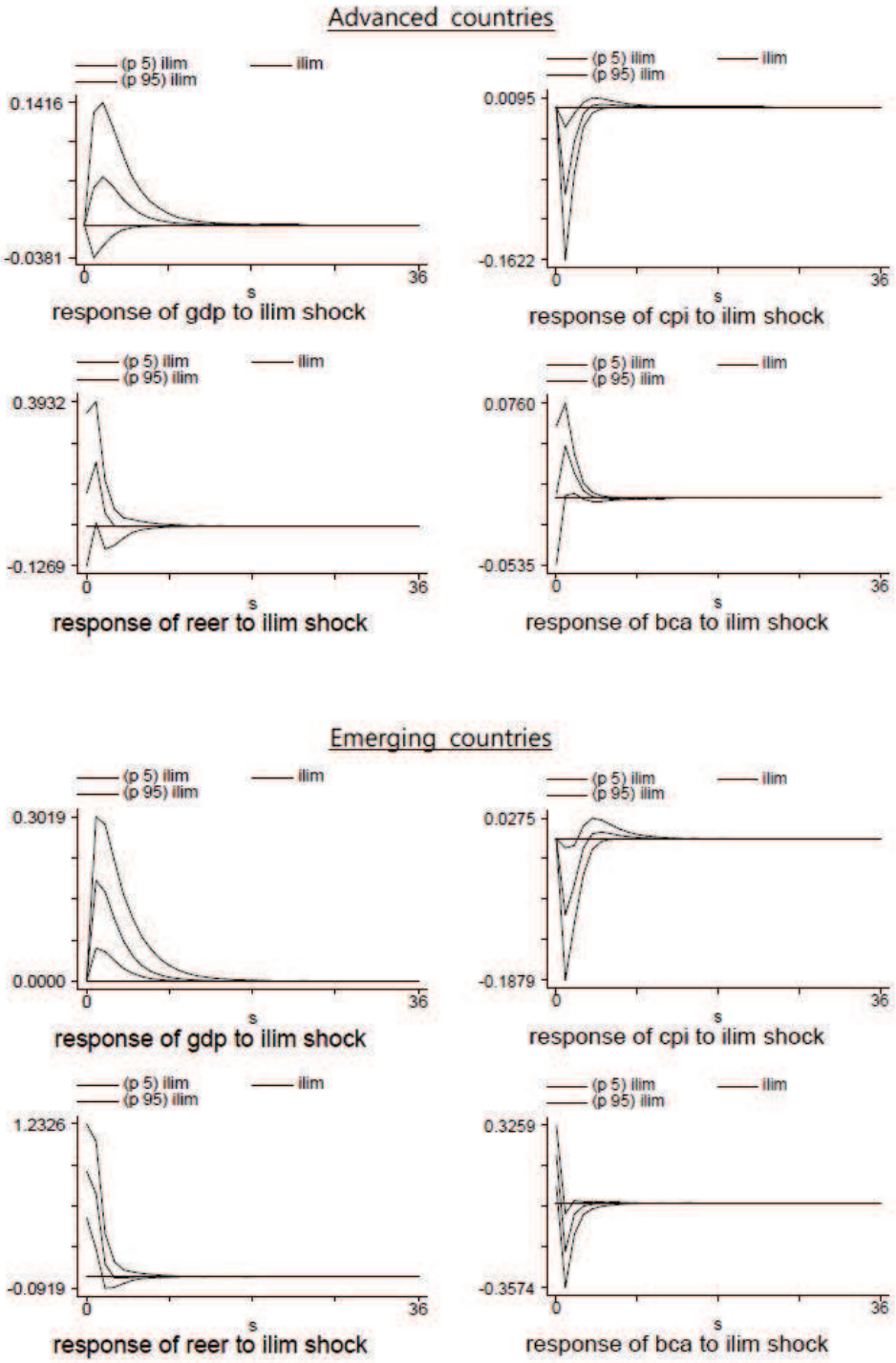


Figure 4.6: Impulse responses to a liquidity shock (ILIM): Advanced and Emerging

temporarily, and the impact is more significant in emerging countries.

	Total countries		Advanced countries		Emerging countries	
	Horizon: 10Q	Horizon: 20Q	Horizon: 10Q	Horizon: 20Q	Horizon: 10Q	Horizon: 20Q
GDP	2.6838	2.6845	1.0057	1.0063	3.3028	3.3036
CPI	0.6715	0.6715	2.1009	2.1010	0.6861	0.6862
ILIM	97.4002	97.3996	96.6003	96.5998	96.0417	96.0409
REER	3.8341	3.8341	0.5190	0.5190	5.4034	5.4034
BCA	2.3042	2.3042	0.4883	0.4883	3.4378	3.4378

Table 4.3: Variance decomposition: Percentage of variation explained by the liquidity

4.4 Conclusion

Global liquidity, defined in this paper as the aggregate monetary policies, follows dynamics which are not just the reflect of specific local situations. It takes also into account the responses of other central banks to the US monetary policy. These central banks react in order to stabilize their exchange rates against dollar and maintain their price competitiveness. Moreover, the synchronization of the economic cycles, or the real and financial interlinkages between the US and the countries also contributes to justifying the reactions of central banks when the US monetary policy changes. In this regard, US monetary policy can be considered as a leading indicator of future global liquidity dynamics. And this global dynamics have a significant impact on global imbalances. This result is applied for both advanced and emerging economies, and points out the spillover effects on global liquidity on global imbalances. This empirical result is consistent with the works of Gourinchas (2011) which suggests a greater focus on global liquidity dynamics instead of global imbalances.

Conclusion

Cette thèse contribue à la littérature économique sur la liquidité mondiale en abordant trois thématiques majeures. Tout d'abord, elle permet de mieux comprendre le concept de liquidité mondiale, de chiffrer et visualiser différentes composantes de la liquidité mondiale depuis 1990. La liquidité mondiale mise à disposition par les autorités monétaires est en quasi hausse depuis 1990, mais s'est fortement accrue ces dernières années avec la crise. Concernant la liquidité issue du secteur privé, elle continue de croitre jusqu'en 2008, puis baisse fortement avec la montée de l'incertitude et des perspectives économiques de moins en moins performantes. Il est donc très important de considérer les différentes dimensions de la liquidité mondiale pour en apprécier réellement sa dynamique. Les travaux proposés considèrent une batterie d'indicateurs permettant de suivre cette dynamique mais également d'en identifier les facteurs à l'origine de son évolution dans le temps et de l'affectation internationale de cette liquidité. En effet, les autorités publiques et les agents privés n'adoptent pas le même comportement selon les configurations économiques et financières. Conformément au caractère procyclique des investisseurs du secteur privé, ils suréagissent en période de stress financier et, de ce fait, freinent davantage leur contribution à la liquidité mondiale qu'ils n'accroissent la liquidité en période de boom. Cette asymétrie est aussi observée dans le comportement des autorités monétaires, mais de manière modérée en cas de crise économique et financière. L'action des autorités monétaires est donc à analyser en prenant également en considération celle du secteur privé. Ainsi de manière générale, ce sont essentiellement l'activité économique et la stabilité financière qui définissent l'accroissement ou la baisse de la liquidité mondiale.

Les facteurs influençant l'orientation des flux de liquidité sont quant à eux dépendants de la nature des chocs mondiaux. Et à ce sujet, il peut être très utile de distinguer le comportement des investisseurs locaux de celui des investisseurs étrangers dans la mesure où ils n'adoptent pas nécessairement la même réaction. A titre illustratif, en cas de hausse de l'incertitude globale, l'étude menée met en évidence une rapatriation des capitaux des deux catégories d'investisseurs, ce qui conduit à un effet global nuancé. A contrario, si

l'on considère une hausse du Fed Fund rate, comme il est envisageable avec le FED's QE tapering, la liquidité se dirigerait plutôt en direction des Etats-Unis quelque soit l'origine de l'investisseur. La dynamique de la liquidité mondiale dépend donc de facteurs locaux et de chocs globaux.

L'effet de cette liquidité mondiale est ensuite étudié dans la seconde partie de cette thèse. La liquidité mondiale a un effet considérable sur les économies émergentes en affectant l'activité économique et le niveau général des prix. Toutefois l'effet sur les prix des actifs financiers ou immobiliers reste assez indéterminé ou peu stable selon l'indicateur retenu. Ce résultat peut aussi s'expliquer par les sens opposés de flux qui s'observent lors de certains chocs globaux. Étant donné qu'une part non négligeable des flux en direction de ces pays est investie sur les marchés financiers, les sorties de capitaux peuvent très-bien être compensées par des entrées concomitantes de capitaux; et ainsi nuancer l'effet final sur les prix des actifs. Il n'est donc pas exclu que ces flux de liquidité déstabilisent à très court terme ces marchés.
De plus, la liquidité mondiale a un impact sur les déséquilibres mondiaux. Si l'on considère que certains pays suivent d'une manière ou d'une autre, la politique monétaire adoptée par les Etats-Unis, avec un certain retard, la dynamique de la liquidité mondiale ne cesserait de croitre après une politique monétaire accommodante des Etats-Unis. Ce qui est susceptible d'être déstabilisant notamment en termes d'allocation de la liquidité entre les pays. Ces flux peuvent converger vers un même groupe de pays qui, de ce fait, voit ses comptes extérieurs impactés. Ainsi l'évolution de la liquidité mondiale pourrait être un facteur explicatif des déséquilibres mondiaux. Il serait donc très intéressant de suivre la dynamique de la liquidité mondiale et de considérer la politique monétaire des Etats-Unis comme un indicateur avancé.

La liquidité mondiale est donc un concept très vaste, dont l'étude approfondie nécessite encore beaucoup de travaux. Elle concerne tous les groupes de pays des plus riches aux plus pauvres et gagnerait à être surveillée.

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