

DOCUMENTOS DE TRABAJO

A Microstructure Approach to Gross Portfolio Inflows: The Case of Chile

Bárbara Ulloa
Carlos Saavedra
Carola Moreno

N.º 760 Julio 2015

BANCO CENTRAL DE CHILE



DOCUMENTOS DE TRABAJO

A Microstructure Approach to Gross Portfolio Inflows: The Case of Chile

Bárbara Ulloa
Carlos Saavedra
Carola Moreno

N.º 760 Julio 2015

BANCO CENTRAL DE CHILE





BANCO CENTRAL DE CHILE

CENTRAL BANK OF CHILE

La serie Documentos de Trabajo es una publicación del Banco Central de Chile que divulga los trabajos de investigación económica realizados por profesionales de esta institución o encargados por ella a terceros. El objetivo de la serie es aportar al debate temas relevantes y presentar nuevos enfoques en el análisis de los mismos. La difusión de los Documentos de Trabajo sólo intenta facilitar el intercambio de ideas y dar a conocer investigaciones, con carácter preliminar, para su discusión y comentarios.

La publicación de los Documentos de Trabajo no está sujeta a la aprobación previa de los miembros del Consejo del Banco Central de Chile. Tanto el contenido de los Documentos de Trabajo como también los análisis y conclusiones que de ellos se deriven, son de exclusiva responsabilidad de su o sus autores y no reflejan necesariamente la opinión del Banco Central de Chile o de sus Consejeros.

The Working Papers series of the Central Bank of Chile disseminates economic research conducted by Central Bank staff or third parties under the sponsorship of the Bank. The purpose of the series is to contribute to the discussion of relevant issues and develop new analytical or empirical approaches in their analyses. The only aim of the Working Papers is to disseminate preliminary research for its discussion and comments.

Publication of Working Papers is not subject to previous approval by the members of the Board of the Central Bank. The views and conclusions presented in the papers are exclusively those of the author(s) and do not necessarily reflect the position of the Central Bank of Chile or of the Board members.

Documentos de Trabajo del Banco Central de Chile
Working Papers of the Central Bank of Chile
Agustinas 1180, Santiago, Chile
Teléfono: (56-2) 3882475; Fax: (56-2) 3882231

A MICROSTRUCTURE APPROACH TO GROSS PORTFOLIO INFLOWS: THE CASE OF CHILE*

Bárbara Ulloa
Banco Central de Chile

Carlos Saavedra
Banco Central de Chile

Carola Moreno
Banco Central de Chile

Abstract

In this paper we explore the determinants of portfolio equity gross inflows (foreign liabilities) to the Chilean economy in dimensions that are novel to the literature. Using a unique dataset proprietary to the Central Bank of Chile that records each transaction of foreign investors on domestic portfolio equity instruments, we analyze aggregated and disaggregated flows, the latter identifying the type of foreign investor behind the flow. Our findings indicate that inward, and not outward, flows are those that respond to the traditional push/pull factors. Moreover, some pull factors that appear to be statistically non-significant for aggregate flows, become important to flows from specific investor types, and the economic relevance of these factors also varies among investors.

Resumen

En este artículo exploramos los factores determinantes de las entradas brutas de capital extranjero en cartera de renta variable (pasivos externos) a la economía chilena, en dimensiones que son nuevas para la literatura. Usando una base de datos única del Banco Central de Chile, que registra cada transacción realizada por inversionistas extranjeros en instrumentos de cartera de renta variable doméstica, analizamos flujos de capital agregados y desagregados, estos últimos identificando el tipo de inversionista extranjero detrás del flujo. Nuestros hallazgos indican que son los flujos de ingreso, y no egreso, de capitales los que responden a los factores push (factores externos) y pull (domésticos) tradicionales. Por otra parte, algunos factores pull que parecen ser estadísticamente no significativos para los flujos agregados, se vuelven importantes para los flujos desagregados por tipo de inversionista, y la importancia económica de estos factores también varía entre estos.

*The authors are thankful to the comments of the attendees of internal seminars of the Financial Policy Division of Central Bank of Chile, the participants at LACEA Conference, Sao Paulo 2014, and an anonymous referee. The opinions and remaining mistakes are of exclusive responsibility of the authors and do not necessarily represent the opinion of the Central Bank of Chile. Emails: bulloa@bcentral.cl, csaavedra@bcentral.cl, y cmoreno@bcentral.cl.

1 Introduction

In the past decade, capital flows into emerging market economies (EME) have become increasingly volatile. Despite the fact that the median of gross capital flows to EME reached around 15% of GDP in the early 2000s, a huge drop followed during the global financial crisis of 2007-2008. Strong capital fluctuations to EME were also observed before, for instance during the Asian crisis. However the characteristics of the rebound of flows after these two events have been different: partly due to the composition of previous gross inflows by type of investment, and partly due to its composition by type of investor. In this paper we exploit the latter dimension to argue that, depending on the type of investor's relative importance in a country's external (portfolio) liabilities, these might be more or less volatile as their link to global factors differs from one another.

Studying the behavior of different categories of foreign investors is also crucial for economic policy as their behavioral heterogeneity challenges the way that policy makers have so far understood what the destabilizing forces of local markets are. Taking advantage of a rich dataset confidential to the Central Bank of Chile, we explore whether the usual pull and push factors are equally relevant in explaining gross inflows, depending on who the underlying investor is.¹ We find that external risk and liquidity are usually relevant for all investor types, however each agent group responds differently to other external factors. Furthermore, the reaction to changes in idiosyncratic variables, such as expectations of domestic currency depreciation and reserve coverage ratio, as well as domestic growth surprises and domestic interest rate differential, also importantly differs among investors.

Compared to the 1990s, the world in the 2000s is one of much more globalized economies where international capital market structures have experienced major changes. As a result, both gross inflows and gross outflows of nearly all flow types showed remarkable growth until 2007-2008 (BIS, 2009). The increased share of bank credit flows was particularly important and symptomatic of what the drivers of EME inflows were in the first place, and of the sources of the financial crisis that hit in 2007. Their increasing importance also highlighted who the main foreign investors were, and why they lost relative importance when flows rebounded.²

The capital flow rebound to EME was related to the Fed's (and other major Central Banks') reaction to the crisis. The Fed took aggressive monetary policy measures, including unconventional ones such as massive long-term government bond purchases (QE). Low interest rates boosted capital

¹Push factors are related to unfavorable domestic conditions that push capital away from a country, whereas pull factors are those idiosyncratic features that attract foreign capital into a given economy. See Calvo, Leiderman, and Reinhart (1996); Fernandez-Arias (1996); Taylor and Sarno (1997); Agénor (1998); Chuhan, Claessens, and Mamingi (1998); Forbes and Chinn (2004); Griffin, Nardari, and Stulz (2004); Portes and Rey (2005); Goldstein, Razin, and Tong (2008); Hau and Rey (2008); Tong and Wei (2011); Forbes and Warnock (2012); and Fratzscher (2012).

²In the 1990s, governments' restructuring of old debts, combined with restored foreign agent's confidence, allowed governments to rely more on international markets to issue debt securities (Bacchetta and van Wincoop, 2000). During this period, domestic factors were key to attract foreign capital, and net inflows into EME were mainly explained by gross inflows on portfolio and foreign direct investment.

flows into fast-growing EME (Figure 1). A characteristic of this new wave of flows is that the aggressive search-for-yield strategy of international investors allowed even low credit-rating countries (and corporate) to borrow from international markets. Therefore, portfolio flows (rather than bank credit) gained importance. Even when foreign direct investment (FDI) still is the main component of total capital inflows for most EME, portfolio flows have been relevant for research since, according to the literature, they tend to be less stable than other forms of capital flows (Broner and Rigobon, 2005; Levchenko and Mauro, 2007; Felices and Orskaug, 2008; Broner, Didier, Erce, and Schmukler, 2013). The sources of this volatility could be related to the degree of development of the markets itself (Borio and Nelson, 2008), but as mentioned above, there is an important role for the composition of foreign investors (IMF, 2014), which leads to the second characteristic of the rebound.³

After 2008-2009, a change in the composition of foreign investors has been observed: investment, mutual and exchange traded funds – rather than leveraged institutions – started increasing their holding of foreign securities. The composition change could be related to the financial regulation imposed after the crisis to U.S. banks (the Volcker Rule), as well as the new liquidity recommendations of Basel III. These regulations had the unintended consequence of reducing the participation of investment banks in secondary market trading, which has diminished their role as market-makers. This is reflected in the huge decrease of the primary dealer’s inventories of corporate bonds and the implications for market liquidity are material (BIS, 2015).

The investors that have gained participation are much more prone to fire-sales. In fact, recent episodes of portfolio flow reversals have not been triggered by real crisis. It has been rather related to external factors such as sudden increases in global uncertainty and risk aversion. One recent example is the volatility event occurred in May 2013, when capital outflows from EME reached levels close to those observed during the global crisis, coinciding with the unexpected news about the timing with which the Fed would begin its QE tapering. Little differentiation was observed among EME, and so financial asset prices of almost all economies were negatively affected.⁴

According to the literature, investment strategies and behavior under different situations varies among investor types. Borensztein and Gelos (2003) explore the behavior of a representative group of emerging market funds, composed by different investor types, namely closed- and open-end funds; and global, regional and single-country funds. They argue that differences in investors behavior could be related to normative restrictions or information availability.⁵ The authors find that open-end and

³Particularly, idiosyncratic risk and market discipline play only a limited role in explaining portfolio flows during times of stress.

⁴These larger inflows put pressure on the value of many recipient countries’ currencies and also resulted in credit and asset prices growth above trend levels (BIS, 2013). A deterioration of the current account balance was also observed in a number of countries.

⁵Open-end funds, for example, are subject to redemptions by individual investors and might be forced to reduce exposure to certain countries before other fund types. Regional or country dedicated funds might have more information about the region or country they are dedicated to than those who focus on global funds.

single-country funds usually move before the others; and, during crisis, open-end reduce their exposure more strongly from vulnerable countries, though in general funds tend to reduce their exposures before crisis. Broner, Gelos, and Reinhart (2006), in order to study sources of financial crisis contagion, observe that mutual funds take an active risk approach (tracking error), leading to positive feedback investment strategies. Chan-Lau and Ong (2005) find that investment decisions of fund managers in the U.S. appear to be mainly driven by retail investors. In addition, retail investors' allocation decisions have a significant impact on emerging market returns. The authors also point out that retail investors have focused more on individual regions – rather than seeing emerging markets as a generic group – across time.

Foreign investors might not be equally sensitive to changes in initial conditions. Borensztein *et al.* (2003) note that, when open-end funds face redemptions as a result of losses due to crisis in one country, they are forced to liquidate positions in other countries with liquid markets which do not have fundamental links with the former. According to a survey by Forbes, Fratzscher, Kostka, and Straub (2012) to a diverse group of investors, when taxes to capital inflows were imposed in Brazil, mutual funds did not substantially change their exposures as they had limited ability to reduce their holdings; hedge funds in turn could reduce country exposure more quickly if, after taxes, the country no longer matched their expectations regarding returns.⁶ Raddatz, Schmukler, and Williams (2014) find that benchmark indices have a significant effect on international flows, because indexed funds tend to be more pro-cyclical than non-indexed funds.⁷ The pro-cyclicality diminishes as funds become more active in their strategies.⁸ While Jotikasthira, Lundblad, and Ramadorai (2012) observe no significant differences in re-allocating behavior between indexed and non-indexed funds, Raddatz and Schmukler (2012) find that underlying investors and fund managers react pro-cyclically during crisis, both studies suggesting that mutual funds might act as a destabilizing factor to domestic markets during crisis periods. In contrast, institutional investors have, according to IMF (2014), a more long-term strategy and do not face redemption risk. As such, in normal times, they contribute to stability of flows. Nevertheless, when faced to extreme shocks, they might pull back more strongly and persistently than mutual funds.

The information needed to study asset management and country allocations by type of investor is limited. In the literature, the most used private database on global asset managers is the one provided by the Emerging Portfolio Fund Research (EPFR). This database reports flows from surveys to funds that invest in EME. These data cover not only aggregate country levels but also data at investor type

⁶Mutual funds differ from hedge funds in the way they seek returns: the former might focus on relative returns, while the latter look for absolute returns above certain thresholds.

⁷Indexed funds are funds that are linked to an index, such as the Morgan Stanley Capital International (MSCI) or the Standard & Poor's 500 (S&P500). Benchmarking, and therefore, relative returns, matter increasingly more, as indexed funds gain participation.

⁸Funds that follow or are linked to an index have passive strategies.

level. Its disadvantage is that the range of investor types included in their survey is limited to mutual funds and institutional investors.

In an attempt to narrow this gap in the literature, this paper provides new evidence on capital flow microstructure literature through the examination of disaggregated portfolio flows into the Chilean economy, that contains each and every portfolio equity transaction by non-residents. To the best of our knowledge, this work is the first to exploit a complete dataset on actual capital accounts of a given economy. The advantage of this dataset is that it contains the universe of non-resident portfolio transactions in Chile. Therefore, the dataset enables us to analyze not only all investors according to their kind, but also to evaluate how much and why each investor type moves capital into and out of Chile.⁹ More specifically, in this paper we focus on the following research questions: (i) what is the composition of foreign investors into the Chilean markets of variable income, and how has this composition changed over time? (ii) what drives aggregated gross inflows, and inward/outward flows? (iii) does the reaction of individual investors to push and pull factors vary across investor type?

In order to address these research questions, we first classify each investor into one of the following five categories: institutional investors, investment banking, sovereign funds, non-indexed funds and indexed funds. Then, we estimate ordinary least square regressions to evaluate what push/pull factors drive the flows at aggregated and investor type level. We find that inward, and not outward, flows are those that respond to the traditional push/pull factors. Moreover, some pull factors that appear to be statistically non-significant for aggregate flows, become important to flows from specific investor types, and the economic relevance of these factors also varies among investors. More specifically, when examining the disaggregated flows, we note that institutional investors and non-indexed funds are relatively more sensitive to external factors such as the VIX¹⁰ and a global liquidity measure, compared to other investor types. In turn, sovereign funds are more responsive to pull factors than the other investors, given that changes to reserve coverage ratio and short-term interest rate differentials are only statistically significant to this investor type. Interestingly, depreciation expectations are relevant for institutional investors, in line with their longer term investment strategies.

The remainder of this paper is as follows. Section 2 explains the level of disaggregation of the flows we study within the financial account. Section 3 describes the dataset used and the investor classification proposed in this paper. Section 4 provides the descriptive statistics of the data, aggregated by flow and investor type, and Section 5 presents a study of volatility events. In Section 6 the push/pull determinants exercise is carried out. The conclusions are presented in the last section.

⁹These are what we later in this paper call the inward and outward flows (Figure 2, or *gross gross* flows, to distinguish from gross inflows, which are actually a net measure, defined as the sum between inward (positive values) and outward (negative values) flows of a given country.

¹⁰Chicago Board Options Exchange Market Volatility Index, a measure of the implied volatility of S&P 500 index options.

2 Understanding Capital Flows in the Financial Account

The financial account is the component of the balance of payments that records all investment flows of a country. While every amount that enters the country is considered a credit, any amount that flows out of a country is known as debit. As both foreign and local individuals can be responsible for these entries and exits of capital, the financial account can be also defined according to the agent's residency, i.e. the record of assets and liabilities that local investors have with foreign countries, or assets and liabilities that foreigners hold in the domestic country.

In the early years of the literature on capital flows, scholars focused on explaining capital inflows as the financial account balance, that is, the net of asset and liability flows. Later, it was noted that what motivates an investor to move capital into or out of its own country are not necessarily the same factors that motivate foreign investors to do the same. This idea challenged what researchers and policy makers viewed as the destabilizing factors of international flows. In fact, swings observed in net capital flows have not always been related to the foreigner investor behavior. Thus, scholars started to focus on what it was then called gross capital inflows (liabilities) and gross capital outflows (assets).

Following the illustration in Figure 2, in simple terms, net inflows correspond to the difference between gross inflows and gross outflows, where gross inflows are the difference between taken and undone positions of domestic assets by foreigner agents (non-residents) in the host country, and gross outflows are the difference between taken and undone positions of foreign assets by domestic agents (residents) in foreign countries. As noted by Forbes and Warnock (2012), these gross inflows and outflows are net accounts between inward and outward flows and could obey to very different motivations. In this sense, the well known *flight*, *retrenchment*, *stop* and *surge* phenomena are associated to different agent types and behaviors, and their behavior could even have opposite policy implications. In practice, large swings in capital flows in and out of a country will be predominantly associated to one of the phenomena mentioned above in order to indicate the strongest influence of certain agents.

It is important to notice that agents could be moving capital in and out of a country for very different reasons at the same time. For instance, foreign investment funds could be retrieving their capital from EME due to worsening in the economic conditions of this group of countries, while domestic institutional investors could be taking loans with foreign banks to take advantage of better conditions abroad, without it meaning that the domestic economy is not doing well. In this case, the strongest behavior rules: if non-resident outward flows are higher than what residents incur in debt, the concerns associated to the gross outflow observed are those of sudden stops.

3 Data and Classification

In this study, we focus on gross portfolio inflows (colored areas in Figure 2), that is, on the liability side of the Chilean financial account. In particular, we focus on variable income instruments, which we will be also calling equity flows interchangeably in this document.¹¹ One important advantage of this paper is that it employs a novel dataset that comprises all operations made by non-residents in Chile, registered by *Posición de Cambios* (POSCAM). The POSCAM is an electronic system in which all banks/financial institutions (that act as domestic intermediates or representatives of the non-resident investors) report transactions with the rest of the world on a daily basis.¹² Our data cover all transactions from January 2004 to June 2014. Each registered operation contains the name of the foreign investor, country of origin, direction of flows (inward or outward flows), and the amount of the transaction in U.S. dollars (USD).

In order to examine the microstructural properties of gross portfolio flows, we first classify each operation registered according to the agent behind each transaction. To do so, we go over each and every entry of our records, matching the investor's name with its description provided by Bloomberg.¹³ When the description is not available, we investigate the investor's websites or other online sources. The final classification comprises the following categories: *Non-indexed* funds, *Indexed* funds, *Sovereign* funds, *Institutional Investors*, and *Investment Banking*. *Non-indexed* funds are usually mutual funds. *Indexed* funds are those funds that follow an index, such as Exchange Tradable Funds (ETFs). *Sovereign* funds are those capital flows coming from other countries' governmental authorities. In this study, *Institutional Investors* are pension funds or insurance companies.¹⁴ There is a minor portion of our dataset that does not provide information on the foreign investor. These records remain tagged as *Unclassified*.

4 Descriptive Statistics

The summary of the basic statistics for gross portfolio equity flows are shown in Table 1. Considering the full sample, while the number of equity inward and outward flow observations is similar throughout the years, the average inward equity trades are higher than outward trades (0.51 and 0.33 billion USD, respectively). The level of non-residents activity has increased across time: the number of total inward yearly transactions has gone up from 2,217 in 2004 to 30,991 in 2013, and the outward transactions

¹¹We do not examine other types of flow, such as FDI and bank credit flows, because these flows are not registered through the same mechanism as portfolio flows, thus they are not available at a disaggregated level. It should be also noted that our data do not include fixed income instruments, also known as bond flows in the literature. More details that explain the exclusion of this part of portfolio flows is described in Appendix A.

¹²This system was created and is monitored by the Central Bank of Chile.

¹³<http://www.bloomberg.com/markets/symbolsearch/>

¹⁴It also includes a reduced number of real state, hedge funds, and other institutions such as charity institutions or endowment funds. Though classifying hedge funds as institutional investors is not an usual practice, their low share to our data is negligible.

have done so from 4,062 to 32,957.¹⁵

Complementing Table 1, Figure 3 shows the increase in cumulative portfolio inward and outward flows on a yearly basis. Note that the accumulated amount of equity inward flows in 2004 reached 588 million USD; in 2013, they reached almost 15,5 billion USD. Outwardly, the annually accumulated flows went from 634 million USD to almost 11 billion USD between 2004 and 2013. Exceptionally, in 2009 the balance was close to zero, as both inward and outward flows amounted to approximately 4 billion USD. Also note that the growth rate of both inward and outward flows has also changed over time. The average yearly accumulated amount in the post-crisis period (2010 to 2013) is around 6 times the average observed in the pre-crisis period (2004 to 2007) for inward and outward flows. The overall rapid growth has recently slowed down: the accumulated inward and outward flows in the first six months of 2014 correspond to 57% and 79%, respectively, of the total accumulated flows during the same period in 2013.

When these flows are analyzed at the investor type level, some features just described for the aggregated inflows are maintained.¹⁶ The most important similarity is that in 2009 all investor type transactions decreased both inward and outward. Monthly flows of each type of investor, illustrated in Figure 4, show that *Indexed* fund investments appear to be relatively less affected by the crisis merely because before 2009 the amount traded by these investor types were relatively less – they only increased in importance since 2011. A similar pattern is observed for *Investment Banking*, which appears to have a relatively stable inflows and outflows behavior prior to 2009, and increasing rapidly afterwards, surpassing 200 million USD in 2014. In 2009, *Sovereign* funds also showed an abrupt decline of their growing trend; since then, this type of investors has regained activity, particularly on the inward side, although more volatile. Among all investor types, *Non-indexed* funds appear to be the most affected by the crisis, as their increasing trend since 2004 was markedly interrupted in 2009. In contrast, this investor type showed the most prominent increase in 2013 compared to its peers.

Interestingly, the share of the different types of investors has not been the same throughout the years (Figure 5). While prior to the 2008-2009 crisis, *Non-indexed* funds accounted for above 40% of inward and outward flows, their relative importance declined since 2009, though recovering near the end of the sample. *Institutional Investors* also experienced a share reduction during the same period. Contrarily, *Sovereign* and *Indexed* funds, which accounted for less than 10% of total inward and outward flows, were much more active after the crisis, although their shares are now just close to 10%

¹⁵The literature on gross flows highlights how both external assets and liabilities have increased, a feature that is shadowed by looking at the net flows in the capital account balance. Recall that the underlying investor is different for gross inflows and gross outflows: while external assets are purchases done by residents, external liabilities – the focus of the our study – are by non-residents. In our case, the increased activity for inward and outward flows highlighted here has to do only with larger non-resident total transactions.

¹⁶The descriptive statistics provided in this section could have not been possible to obtained with public available data sources such as the EPFR, for these sources usually contain restricted or limited data on capital flows. For more details of the limitations of the EPFR compared to our data, see Appendix B.

each. Nevertheless, the total share of *Sovereign* and *Indexed* funds in 2013 was 26% of total inward flows and 16% of outward flows; summed to *Non-indexed* (in order to have a rough representation of investors with potentially short-term strategies), they account for 59% and 48% of total inward and outward flows, respectively. The decrease of the share of *Institutional Investors*, however, is a relevant issue since this type of investors tend to have a longer-term investment strategy, which is reflected in lower average volatility. As their relative importance decreases, and is replaced by investors with more active strategies, the volatility of total gross inflows increases.

Turning back to Table 1 and looking at the volatilities in more detail, we observe that, excepting outward flows in 2009, the coefficient of variation for the entire period analyzed is similar to the volatilities observed year in year out. As shown in Figure 6, volatility has varied over time. The volatility in early 2000s was higher than consecutive years for almost all inward and outward agent groups flows. Particularly, in almost all cases volatility increased immediately after the 2008-2009 crisis, followed by a more conservative flows' performance toward the end of the sample.

More importantly, volatility of flows differs among types of investors. Considering the full sample, *Non-indexed* funds are the most volatile both on the inward and outward side, followed by *Investment Banking*. The least volatile group throughout the whole period appear to be *Institutional Investors*, and contrary to what we expected, also *Indexed* funds, on both sides of gross inflows. There are at least two ways to explain this fact. One is that it might reflect that *Indexed* funds are mostly passive and have closed-end strategies. A somewhat complementary reason is that these funds are dedicated to Chile, which, combined with a passive strategy, might explain that even during episodes of higher global risk aversion, they behave as longer-term investors. An obvious implication is that the more active their strategies become, the more volatile they behave (i.e., more alike to *Non-indexed* funds).

5 Volatility Events: Case Study

In this section, we study the behavior of our five investor categories around volatility events occurred in the last decade: capital outflows until March 2009 due to the global crisis and its posterior recovery, and the May 2013 sell-off, known as the Taper Tantrum event. To investigate how disaggregated flows performed previous to and reacted since each event, we plot inward and outward flows of each investor type around each event in different panels. Total inward and outward flows are also displayed, for comparison purposes. Figures 7 and 8 combine these plots by event, and show that investors performed and reacted differently among them and throughout different periods, in aggregate terms and individually.

The output contraction that followed the 2008-09 financial crisis was observed worldwide. As explained in OECD (2009a), bank credit default swap rates reached high levels, in line with concerns about financial institutions solvency, while bond spreads in EME were ascending as their currencies

depreciate. Commodity prices fell significantly and world trade also kept decreasing up to the end of 2008. In that period and economic context, investment strategies were somewhat diverse. As shown in Figure 7, *Indexed* funds, *Institutional Investors* and *Investment Banking* inward and outward flows were relatively stable until March 2009. *Sovereign* funds were increasing net positions in Chile, inferred by the growing trend of inward flows and decreasing trend of outward flows. In contrast, *Non-indexed* funds were decreasing both inward and outward flows, with no clear pattern on their net positions. This is also true for the total inward and outward flows, but looking at the external liabilities of the Chilean financial account foreign net positions were actually decreasing over that period.¹⁷

According to OECD (2009b), the pace at which the world activity was falling since the global financial crisis decreased in March, thanks to inventory adjustments, non-OECD countries recovering, business confidence upturn and policy stimulus. Despite commodity prices had rebounded and some emerging economies showed signs of recovery, financial conditions were projected to remain tight as it was believed the recession had not reached its lower level. This probably impacted investment strategies: looking at the flows from non-residents in and out of Chile since March 2009 (in Figure 7), we observed a marked difference between *Indexed* funds and the other agent groups. While in most cases investors net positions decreased (inward flows diminishing more than outward flows), *Indexed* funds in fact increased inward flows and decreased outward flows, which means that there were more gross inflows to Chile from that particular investor type. *Sovereign* funds had the largest net decrease, explained by an important increase in outward flows, but most importantly by the largest relative decrease in inward flows which was observed immediately, to revert only in September 2009. *Investment Banks* maintained balanced gross flows immediately after the event, but since September 2009 they sharply increased outward flows. *Non-indexed* funds reacted more rapidly, decreasing their inward flows. *Institutional Investors* kept increasing their outward versus inward flows within the following two months after the event.

The sell-off event observed around May 2013 occurred during different economic conditions. Before that date, there was certain divergence in the recovery paths of several economies: some like the U.S. and China showed strong outlook, some others such as the Euro area were slacking. As shown in OECD (2013a), policy responses to the 2008-09 crisis had an effect on some EME, tightening their financial conditions. Capital inflows to EME began to moderate in a context of underperforming stocks and more appreciated currencies. The bond sell-off in May 2013 was triggered by a communication of the US Federal Reserve about the future tapering of its asset purchases program (OECD, 2013b). Some EME registered rapid credit growth, which combined with a higher reliance to short-term capital flows in some cases, led to even tighter financial conditions.

Figure 8 shows that prior to the March 2013 sell-off event, increases in both inward and outward flows were observed from all investors but *Investment Banking*. In aggregate terms, flows seemed

¹⁷See statistics database of the Central Bank of Chile, www.bcentral.cl.

somewhat stable. The reaction of investors to this event appeared to be more homogeneous compared to the 2009 event. In general, there was an immediate decrease of inward flows, which was also prolonged for more than a year. The reaction in terms of outward flows was less immediate, and also homogeneous across investor types: overall, outward flows increased, exacerbating the decrease in net positions by foreign investors in Chile during that period. In particular, *Indexed* funds not only reacted decreasing their inward flows like all other types of investors, but also showed the sharpest increase in outward flows. *Investment Banking* did not change their inward and outward flows trend.

Despite the heterogeneity in investors' behavior, total gross inflows remained negative for at least a year in both events.¹⁸ However, when decomposing gross inflows by inward and outward flows, the events of March 2009 and May 2013 were different. First, after March 2009 total inward flows decrease was observed for a much shorter period than after the 2013 sell-off. Second, total outward flows kept increasing almost a year ahead in the 2009 event, whereas in 2013 they reverted its growing trend approximately six months after the occurrence of the event. In sum, these case studies suggest that, when foreign capital outflows are observed, they can be either due to investor decisions to invest less (decrease inward flows), to repatriate their investment (increase outward flows), or both.

6 Determinants of Portfolio Inflows to Chile

6.1 Specification and Expected Elasticity Signs

The objective of this section is to characterize how different types of portfolio flows respond to different factors. In order to accomplish this target, we estimate linear regressions of these flows ($f_{j,t}$) on a set of variables that are usually considered in the literature as push and pull factors, using monthly data. The general model estimated using robust Ordinary Least Square (OLS) methods¹⁹ follows:

$$f_{j,t} = g(y_t^{CH}, y_t^{US}, (i_t^{CH} - i_t^{US})^{SR}, (i_t^{CH} - i_t^{US})^{LR}, E(\Delta e_t), rcr_t, vix_t, \Delta M2_t^{US}, QE_t, f_{j,t-1}) \quad (1)$$

where the exogenous variables are:

- y_t^{CH} is the 12 month moving average of the surprise on the Chilean economic activity growth data released on a given month, relative to the median expected value, standardized by an estimate of the standard deviation around the median;²⁰

¹⁸The total gross inflows are not explicitly shown in Figures 7 and 8, but we infer that they remained negative as the movements of outward flows more than compensated inward flow changes.

¹⁹Robust OLS implies standard errors estimated with Newey and West (1987) procedure. We include the lagged dependent variable as it is often used in the literature to evaluate the degree of inertia or persistence of each flow (see, e.g., Arbatli, 2011; Fratzscher, 2012; Arias, Garrido, Parra, and Rincon, 2013; among others). the estimated coefficients resulting from the estimation of a specification that excludes the lagged dependent variable do show minor changes in terms their magnitudes, although they also lose significance.

²⁰The monthly data on the Chilean economic activity corresponds to the economic activity index IMACEC (*Índice Men-*

- y_t^{US} is the 12 month moving average of the surprise on the annual change of seasonally adjusted U.S. Industrial Production data released on a given month, relative to the median expected value, standardized by an estimate of the standard deviation around the median;²¹
- $(i_t^{CH} - i_t^{US})^{SR}$ is the short run interest rate differentials (difference between 90 days domestic rate and the U.S. Treasury 3 months rates);²²
- $(i_t^{CH} - i_t^{US})^{LR}$ is the long run interest rate differentials (difference between the 10 years domestic rate and the U.S. Treasury 10 years rates);²³
- $E(\Delta e_t)$ is the expected depreciation of nominal exchange rate 1 year ahead;²⁴
- rcr_t is the logarithm of the reserve coverage ratio, which is calculated as the international reserves divided by the residual short term external debt ratio;
- vix_t is the logarithm of the VIX index;
- $\Delta M2_t^{US}$ is the annual change of U.S. aggregate money M2;
- QE_t is a dummy variable that equals 1 during U.S. quantitative easing period, i.e., from November 2008 to April 2013.

These data are gathered from different sources. For instance, y_t^{CH} and its expected value, short and long run i_t^{CH} , $E(\Delta e_t)$, and the series on international reserves and residual short term external debt used to calculate $solv_t$, are retrieved from the Central Bank of Chile’s website. The y_t^{US} , short and long run i_t^{US} and $\Delta M2_t^{US}$ are downloaded from the Federal Reserve’s website. Finally, vix_t and the expectations for U.S. industrial production are extracted from Bloomberg. Note that the reason we consider surprises in economic activity, and not their respective growth rates, is that previous unpublished and internal research has indicated that portfolio flows into Chile are less responsive to economic growth than other types of flows (like FDI). Instead, portfolio flows usually react to news and macrofinancial shocks. Moreover, in the particular case of the surprises for the Chilean economic

sual de Actividad Económica for its name in Spanish). The expected value is obtained from the survey *Encuesta de Expectativas Económicas* of the Central Bank of Chile. As in Morales, Moreno, and Vio (2014), the estimated standard deviation is computed as the difference between the maximum and minimum expected value (90th percentile and 10th percentile, respectively), divided by 2.56, as we assume that the distribution of the expected values is close to a Normal one such that the length between the percentiles is covered by 2.56 standard deviations.

²¹As in Morales *et al.* (2014), the estimated standard deviation is computed as the difference between the maximum and minimum expected value (99.9th percentile and 0.1th percentile, respectively), divided by 6, as we assume that the distribution of the expected values is close to a Normal one such that the length between the percentiles is covered by 6 standard deviations.

²²The domestic short run Chilean rate corresponds to the prime rate of Chilean banks.

²³The long run Chilean rate corresponds to the BCP, which is the domestic 10 year interest rate of risk free bonds (issued by the Central Bank of Chile) in Chilean pesos.

²⁴The nominal exchange rate is defined as local currency per U.S. dollars. Its expected value is obtained from the survey *Encuesta de Expectativas Económicas* of the Central Bank of Chile.

activity surprises, the monthly indicator of economic activity IMACEC is released with a lag of 2 months.

According to the literature, the U.S. Treasury bill is a push factor that has been frequently found to be statistically significant: a lower interest rate in the U.S. leads to higher capital inflows to emerging economies. Another relevant push factor is market volatility (measured by VIX), which is significant mainly for portfolio inflows, and more so for equity. Domestic economic growth, in turn, is a significant pull factor for all types of inflows – but mostly so for cross-border loans and FDI – while the domestic interest rate is usually more relevant for portfolio flows. With regards to the flows response to its drivers, increases in the relative economic activity performance, interest rates differentials, reserve coverage ratio, and international liquidity (measured as changes in M2 and complemented by the QE dummy) are expected to be positively correlated with capital flows into the host economy. Lastly, increases in depreciation expectations and the VIX would be associated with outflows from the host economy.

To test whether these associations hold for our data, we first estimate Equation (1) for aggregated total gross inflows, total inward flows, and total outward flows. Then, we estimate the same specification for the disaggregated flows according to investor type, that is, total gross inflows by *Non-indexed* funds, *Indexed* funds, *Sovereign* funds, *Institutional Investors*, and *Investment Banking*, as well as their respective total inward and total outward flows.²⁵

6.2 Empirical Results

Table 2 shows the results for the estimations of Equation (1) for aggregate flows. The first column indicates that, on the push factors' side, the external volatility (proxied by the VIX) is the relevant driver of gross portfolio inflows to Chile. On the pull factors' side, the long run interest rate differential and domestic growth surprises are statistically significant. When total gross inflows are decomposed into inward and outward flows, we note they respond very differently to the same determinants.

Inward flows are sensitive to the factors that affect total gross inflows, and additionally, to the U.S. industrial production surprises, the short term interest rate differentials, and global liquidity (proxied by changes in M2). Regardless of significance levels, overall the signs of all regressor coefficients have the expected signs, with the exception of the surprises in foreign economic activity. There are two possible interpretations for its ambiguous correlation with capital flows when taking U.S. investors as the representative foreign investors for the Chilean case. On the one hand, positive surprises in the U.S. being a pull factor for the U.S. would result in more home investment in the U.S., hence less investment in other countries (in this case, less inflows coming from the U.S. to Chile). On the other hand, positive surprises could have wealth effects for U.S. investors that would allow them to increase

²⁵In this version of the paper, we only report the results for inward flows and outward flows. Results for total gross flows disaggregated by investor type are available upon request.

their positions in both the U.S. and foreign financial markets.

With regards to outward flows, the estimated coefficients show counterintuitive signs. This behavior is not surprising given that their performance seem to be a “mirror” of inward flows (recall Figure 4). In order to test whether outward flows are actually explained by the factors included in Equation (1) (and not merely $AR(1)$ processes), we perform an F-test of joint significance to all explanatory variables but the lagged flow for each of the aggregated flows. Results indicate that the hypothesis that push and pull factors are jointly statistically equal to zero cannot be rejected for outward flows, thus the lagged factor might be the main factor explaining the flow dynamics in our model. In this sense, outward flows could be closer to a random walk.

Table 3 shows the results for estimating Equation (1) for inward flows disaggregated according to investor type.²⁶ First and as expected, the VIX is significant for all investor types, showing the strong influence of external (rather than idiosyncratic) factors on capital inflows to EME that is also found in the literature. With the exception of *Sovereign* funds, this is also the case for changes in M2 – also an external factor that could be a proxy for global liquidity. Second, and more surprising, note that not all remaining factors are significant for all investor types. Moreover, some that are not significant for total gross inflows or total inward flows now gain importance. Likewise, some which are significant at aggregate levels, do not appear to affect some of the individual flows.

More specifically, among the variables that are significant for total inward flows, domestic growth surprises remain so for *Indexed*, *Investment Banking* and *Sovereign* funds, while external growth surprises are relevant only for *Investment Banking* and *Sovereign* funds. The short term rate differential appears to affect only *Sovereign* funds, while the long term rate differential impacts *Indexed* funds and *Institutional Investors*.

With regards to the non significant variables for total inward flows, we find that two pull factors now become significant at the investor type level: the exchange rate depreciation expectations and the reserve coverage ratio. In particular, *Indexed* funds and *Institutional Investors* would decrease inward flows as depreciation expectations increase, while only *Sovereign* funds would respond positively (negatively) to better (worse) reserve coverage ratio.²⁷

The heterogeneity of investors’ behavior found in our results is intuitive. *Institutional Investors* tend to have long term strategies, hence it is plausible that they would respond more strongly to long interest rate differentials and exchange rate expectations one year ahead. Not surprisingly, *Indexed* funds, which have passive strategies, seem to mimic this behavior. *Non-indexed* funds are more representative of the usual behavior according to the literature, and respond more to push factors

²⁶The first column in Table 3 is the same as the second column in Table 2.

²⁷Reserve coverage ratio improves when there are increases in international reserves, decreases in short term external debt, or both. Albeit this evidence that no other investor type seems to be responsive to reserves coverage ratio, this measure to evaluate EME vulnerability is often used to warn about capital flow sudden stop and reversal risks.

rather than pull factors.²⁸ *Sovereign* funds appear to have the most “atypical” behavior when compared to the other type of investors: they are less sensitive to global factors, and more sensitive to domestic conditions of the host country. In addition, they are the only ones whose flows result significantly related to short term rate differentials, which is also true for total inward flows, implying that they drive the aggregate response to changes in short term rates.

6.3 Responses to Shocks

In this section, we examine the economic significance of changes in push and pull factors on disaggregated inward flows. That is, we evaluate the impact of marginal shocks in all the explanatory variables of Equation (1). The size of the shock we consider for each variable is the difference between the maximum value registered in the sample, and the sample average of each push and pull factor. Note that, by following this criterion, the size of each shock corresponds to 2 or 3 standard deviations. We evaluate in Equation (1) only one shock at a time.

Figure 11 summarizes the results. The shock to the VIX appears to have the strongest impact on inward flows compared to shocks to other drivers.²⁹ The main reason is that it significantly affects all investor types, and in relatively high magnitudes each (between 50 and 100 million USD). Following the impact of the VIX, there is the positive effect of increases in global liquidity, which involves all investor types but *Sovereign* funds, again fluctuating around 50 and 100 million USD.

In terms of the individual behavior, to understand which investor type reacts more severely compared to its own trend, we re-scale the effects of the shocks shown in Figure 11 by the average inward flows observed during 2013 and 2014 for each investor type. The results are shown in Figure 12, and suggest that *Institutional Investors* and *Indexed* funds react more to a shock to the VIX. The decrease in their inward flows would represent between 40 and 45% of their 2013-14 average inward flow. This proportion is much larger than that estimated for *Non-indexed* funds (just above 20%). This result is somehow coherent with IMF (2014) findings that *Institutional Investors* do not always react to every news, but in extreme cases when they do react, they might retrench large portions of their investments abroad. In terms of the reaction of the investors to positive changes in external factors, such as it is the case of increases in global liquidity, we observe that the proportions to which inward flows expand fluctuates between 10 and 30% of its 2013-14 trend, showing certain asymmetry in how positive and negative external shocks are perceived that are common to most agent groups.

As for the rest of the factors, effects are less predominant as the drivers become more investor-specific. In the case when we consider a deviation of the surprise in domestic growth from its sample

²⁸In particular, according to the IMF (2014), *Institutional Investors* and *Non-indexed* funds are more sensitive to external factors such as the VIX, although the latter – mostly mutual funds – react relatively less.

²⁹In our sample, the highest levels for the VIX are observed in November 2008, just after Lehman Brother’s collapse, reaching 60 (three times the sample mean). The shock to the VIX implies a movement of 3 standard deviations above the sample mean.

mean towards the largest level observed in the sample, we observe that *Sovereign* funds, followed by *Investment Banking* and *Indexed*, are the ones who would increase their inward flows the most. A similar behavior could be observed for the case of surprises in the U.S. growth, only that *Indexed* become less sensitive to this surprises, probably because this would not be highly associated with changes in region or country specific stock indexes. The effects of short and long term interest rate differentials are related to even more specific cases. Note for instance that *Sovereign* funds would react more strongly to short term rates (above 40% of its usual flows), compared to their reaction to a shock to the reserve coverage ratio, which would account for only 25% of the flows. Lastly, note that investors would probably not stop their inward flows to Chile even with large increases on expected currency depreciation, compared to the changes in investment strategy related to worsening of external conditions.

7 Conclusions

The examination of the microstructure properties of foreign capital flows into Chile is relevant for it reveals new evidence on the dynamics of different types of investors, both in terms of individual behavior and as part of an interactive market. In this paper we find that gross portfolio inflows are subject to how different types of investors behave and respond to external and idiosyncratic factors. Their relative importance in a country's external liabilities becomes relevant as a larger share of more pro-cyclical type of investors could make gross inflows more volatile.

Such topic has not yet been comprehensively researched, partly due to data availability. In an attempt to narrow this gap in the literature, and taking advantage of a rich dataset confidential to the Central Bank of Chile and available to us for research purposes only, we study the behavior of disaggregated portfolio flows into the Chilean economy. This data contains each and every equity portfolio transaction by non-residents in the Chilean financial system during the last decade. Therefore, it enables us to analyze not only all investors according to their kind, but also to evaluate how much and why each investor type moves capital into and out of Chile. To the best of our knowledge, this work is the first to exploit a complete dataset on actual capital accounts of a given economy.

The aim of this study is to find answers for three questions: (i) What is the composition of foreign investors into the Chilean markets of variable income, and how has this composition changed over time? (ii) What drives aggregated gross inflows, and inward/outward flows? (iii) Does the reaction of individual investors to push and pull factors vary across investor type. Then, we estimate ordinary least square regressions to evaluate what push/pull factors drive the flows at aggregated and investor type level.

We classify each and every foreign investor into five groups – *Institutional Investors*, *Investment Banking*, *Sovereign* funds, *Non-indexed* funds and *Indexed* funds –, in a way that is broadly consistent

with aggregations employed by other data providers. Prior to the 2008-2009 crisis, *Non-indexed* funds accounted for above 40% of inward and outward flows. Since then, their relative importance declined, though recovering by the end of the sample period. *Institutional Investors* also experienced a share reduction during the crisis years. The decrease of the share of *Institutional Investors* is a relevant issue since this type of investors tends to have a longer-term investment strategy, which is reflected in lower average volatility. The decrease of their relative share has been replaced by investors with more active strategies, which pushes the volatility of total gross inflows upwards. In fact, *Sovereign* and *Indexed* funds, which accounted for less than 10% of total inward and outward flows, were much more active after the crisis. The total share of the potentially short-term investors (*Sovereign*, *Indexed* and *Non-indexed* funds) in 2013 was 59% and 48% of total inward and outward flows, respectively.

In exploring whether pull and push factors are equally relevant for gross inward and outward flows from different investor type, we find interesting results. First, inward – and not outward – flows are those that respond to the traditional push/pull factors. Second, some pull factors that appear to be statistically non-significant for aggregate flows, become important to flows from specific investor types. Third, the economic relevance of these factors also varies among investors.

More specifically, external risk and liquidity are usually relevant for all investor types, however each agent group responds differently to other external factors such as interest rate differentials and economic growth surprises. Particularly, when examining the disaggregated flows, we note that *Institutional Investors* and *Non-indexed* funds are relatively more sensitive to external factors such as the VIX and a global liquidity measure, compared to other investor types.

Furthermore, the reaction to changes in idiosyncratic variables, such as expectations of domestic currency depreciation and the level of the reserve coverage ratio, as well as domestic growth surprises and domestic interest rate differential, also importantly differs among investors. For instance, *Sovereign* funds are more responsive to pull factors than the other investors, given that changes to reserve coverage ratio and short-term interest rate differentials are only statistically significant to this investor type. Interestingly, depreciation expectations are relevant for institutional investors, in line with their longer term investment strategies.

Our findings suggest that there are certain issues and implications for financial stability worth further exploring. First, it is possible that herding behavior could be adding to the overall volatility of portfolio flows. Borensztein and Gelos (2003) study who the leaders and followers are during tranquil and turbulent times, using the EPFR data, finding that close-end funds follow open-end funds, and global funds follow dedicated funds. In a preliminary exercise, we find evidence that non-indexed funds lead other type of investors. Second, changes in investors composition might have relevant impact on domestic markets. Chan-Lau and Lian Ong (2005) find that allocation decisions from retail investors has a significant impact on emerging markets equity return (crossover fund). In the case of Chile, given that market capitalization is small, even a small portion of inflows accounts for a large proportion of

market capitalization. Nevertheless, the sensitivity of equity returns is relatively low compared to other emerging economies (Chile FSR, 2010). This sensitivity might change as market conditions change (for instance, as foreign participation increases), and also if estimations differentiate between normal and stress times. Lastly, from a methodological viewpoint, future research could consider refining the classification to identify group within each class, exploiting the fact that such information on characteristics, such as target region, are also present in this dataset.

References

- AGÉNOR, P.-R. (1998): “The Surge in Capital Flows: Analysis of ‘Pull’ and ‘Push’ Factors,” *International Journal of Finance & Economics*, 3(1), 39–57.
- ARBATLI, E. (2011): “Economic Policies and FDI Inflows to Emerging Market Economies,” IMF Working Papers 11/192, International Monetary Fund.
- ARIAS, F., D. GARRIDO, D. PARRA, AND H. RINCON (2013): “Do the different types of capital flows respond to the same fundamentals and in the same degree? Recent evidence for emerging markets,” mimeo, Fourth BIS CCA Research Conference.
- BACCHETTA, P., AND E. VAN WINCOOP (2000): “Capital Flows to Emerging Markets: Liberalization, Overshooting, and Volatility,” in *Capital Flows and the Emerging Economies: Theory, Evidence, and Controversies*, NBER Chapters, pp. 61–98. National Bureau of Economic Research, Inc.
- BIS (2009): “Capital flows and emerging market economies,” Discussion Paper 33, Committee on the Global Financial System.
- (2013): “BIS Quarterly Review - Markets under the spell of monetary easing,” Discussion Paper June 2013, Bank for International Settlements.
- (2015): “BIS Quarterly Review - A wave of further easing,” Discussion Paper March 2015, Bank for International Settlements.
- BORENSZTEIN, E. R., AND R. G. GELOS (2003): “Leaders and followers: emerging market fund behavior during tranquil and turbulent times,” *Emerging Markets Review*, 4(1), 25–38.
- BORIO, C., AND W. NELSON (2008): “Monetary operations and the financial turmoil,” *BIS Quarterly Review*.
- BRONER, F., T. DIDIER, A. ERCE, AND S. L. SCHMUKLER (2013): “Gross capital flows: Dynamics and crises,” *Journal of Monetary Economics*, 60(1), 113–133.
- BRONER, F. A., G. R. GELOS, AND C. M. REINHART (2006): “When in peril, retrench: Testing the portfolio channel of contagion,” *Journal of International Economics*, 69(1), 203–230.
- BRONER, F. A., AND R. RIGOBON (2005): “Why are Capital Flows so Much More Volatile in Emerging Than in Developed Countries?,” Working Papers Central Bank of Chile 328, Central Bank of Chile.
- CALVO, G. A., L. LEIDERMAN, AND C. M. REINHART (1996): “Inflows of Capital to Developing Countries in the 1990s,” *Journal of Economic Perspectives*, 10(2), 123–139.

- CHAN-LAU, J. A., AND L. L. ONG (2005): “U.S. Mutual Fund Retail Investors in International Equity Markets; Is the Tail Wagging the Dog?,” IMF Working Papers 05/162, International Monetary Fund.
- CHUHAN, P., S. CLAESSENS, AND N. MAMINGI (1998): “Equity and Bond Flows to Latin America and Asia: The Role of Global and Country Factors,” *Journal of Development Economics*, 55(2), 439–463.
- CLARO, S., AND C. MORENO (2015): “Long term rates and the term premium: evidence from Chile,” Discussion paper.
- FELICES, G., AND B.-E. ORSKAUG (2008): “Estimating the determinants of capital flows to emerging market economies: a maximum likelihood disequilibrium approach,” Bank of England working papers 354, Bank of England.
- FERNANDEZ-ARIAS, E. (1996): “The New Wave of Private Capital Inflows: Push or Pull?,” *Journal of Development Economics*, 48(2), 389–418.
- FORBES, K., M. FRATZSCHER, T. KOSTKA, AND R. STRAUB (2012): “Bubble thy neighbor: portfolio effects and externalities from capital controls,” Working Paper Series 1456, European Central Bank.
- FORBES, K. J., AND M. D. CHINN (2004): “A Decomposition of Global Linkages in Financial Markets Over Time,” *The Review of Economics and Statistics*, 86(3), 705–722.
- FORBES, K. J., AND F. E. WARNOCK (2012): “Capital flow waves: Surges, stops, flight, and retrenchment,” *Journal of International Economics*, 88(2), 235–251.
- FRATZSCHER, M. (2012): “Capital Flows, Push versus Pull Factors and the Global Financial Crisis,” *Journal of International Economics*, 88(2), 341–356.
- GOLDSTEIN, I., A. RAZIN, AND H. TONG (2008): “Liquidity, Institutional Quality and the Composition of International Equity Outflows,” NBER Working Papers 13723, National Bureau of Economic Research, Inc.
- GRIFFIN, J. M., F. NARDARI, AND R. M. STULZ (2004): “Are Daily Cross-Border Equity Flows Pushed or Pulled?,” *The Review of Economics and Statistics*, 86(3), 641–657.
- HAU, H., AND H. REY (2008): “Global Portfolio Rebalancing Under the Microscope,” NBER Working Papers 14165, National Bureau of Economic Research, Inc.
- IMF (2014): “Global Financial Stability Report: Moving from Liquidity- to Growth-Driven Markets,” Report Abril, International Monetary Fund.
- JOTIKASTHIRA, C., C. LUNDBLAD, AND T. RAMADORAI (2012): “Asset Fire Sales and Purchases and the International Transmission of Funding Shocks,” *Journal of Finance*, 67(6), 2015–2050.

- LEVCHENKO, A. A., AND P. MAURO (2007): “Do Some Forms of Financial Flows Help Protect Against “Sudden Stops”?”, *The World Bank Economic Review*, 21(3), 389–411.
- MORALES, M., C. MORENO, AND C. VIO (2014): “Foreign Shocks on Chilean Financial Markets: Spillovers and Comovements Between Bond and Equity Markets,” *Emerging Markets Finance and Trade*, 50(sup5), 35–50.
- NEWBY, W. K., AND K. D. WEST (1987): “A Simple, Positive Semi-definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix,” *Econometrica*, 55(3), 703–08.
- OECD (2009a): “OECD Economic Outlook Interim Report,” *OECD Publishing*.
- (2009b): “OECD Economic Outlook, Volume 2009 Issue 1,” *OECD Publishing*.
- (2013a): “OECD Economic Outlook, Volume 2013 Issue 1,” .
- (2013b): “OECD Economic Outlook, Volume 2013 Issue 2,” .
- PORTES, R., AND H. REY (2005): “The Determinants of Cross-Border Equity Flows,” *Journal of International Economics*, 65(2), 269–296.
- RADDATZ, C., AND S. L. SCHMUKLER (2012): “On the international transmission of shocks: Micro-evidence from mutual fund portfolios,” *Journal of International Economics*, 88(2), 357–374.
- RADDATZ, C., S. L. SCHMUKLER, AND T. WILLIAMS (2014): “International asset allocations and capital flows : the benchmark effect,” Policy Research Working Paper Series 6866, The World Bank.
- TAYLOR, M. P., AND L. SARNO (1997): “Capital Flows to Developing Countries: Long- and Short-Term Determinants,” *World Bank Economic Review*, 11(3), 451–70.
- TONG, H., AND S.-J. WEI (2011): “The Composition Matters: Capital Inflows and Liquidity Crunch During a Global Economic Crisis,” *Review of Financial Studies*, 24(6), 2023–2052.

Appendix A Fixed Income Data of Chilean Financial Accounts

As mentioned in Section 3, our data do not contain information on fixed income instruments traded by non-residents. The main reason for its exclusion is that, unlike variable income, the investors behind these flows are much more difficult to track. This difficulty arises from the very unique nature of the behavior of these types of flows into the Chilean economy, as well as the reporting procedure of such transactions.

To understand the uniqueness of the Chilean portfolio fixed income flows, it is important to examine the decomposition of such flows in terms of issuance location. Fixed income Chilean liabilities with the rest of the world can be separated into those securities issued domestically and those issued abroad. Bonds and other fixed income instruments issued in Chile that are purchased by non-residents are registered through the same system used for variable income records (the POSCAM), thus individual investors could be identified. However, usually these flows do not represent more than 10% of the total fixed income liabilities registered in the Chilean financial accounts. Furthermore, our internal analysis on the aggregates of foreign inward and outward inflows show that the equity flows we examined in this study account for about 80% of total traded amounts when including the fixed income flows that are registered by POSCAM. The greater number of transactions are in short term instruments, whose average amount is much smaller than the average traded in long term bonds issued in Chile, pattern that would not correctly represent the foreign demand for Chilean fixed income instruments.³⁰

The majority of fixed income instruments that are sold to foreign investors are issued abroad. This is a unique feature of the Chilean economy compared to other EME. These transactions are not recorded using POSCAM, because although these bonds are acquired by foreigners, it is the issuer, not the foreign investor, who finally brings the foreign currency into the country, thus requiring additional information that can only be recovered through other systems available for this particular item. The fact that the resident is in charge of reporting this portion of the foreign currency inflows makes it difficult to track the foreign investors that bought the asset.

³⁰Using public data on tenancy of outstanding Chilean bonds issued abroad, Claro and Moreno (2015) offer preliminary evidence of a significant decrease in the share held by investors that have filing obligations with the U.S. Securities and Exchange Commission. These investors are presumed to have less opaque investment strategies compared to, for instance, hedge funds. However, the average tenancy is about 30% of the total outstanding.

Appendix B Comparison of Chilean MicroData with EPFR Data

When it comes to analyze the microstructural characteristics of capital flows, the common practice amongst researchers is to examine the properties of investment funds provided by the EPFR. The main advantage of the EPFR data is that it gathers information at very high frequency on portfolio flows for an ample set of countries through a survey oriented to the most representative mutual funds and institutional investors existing. The EPFR also allows the user to identify whether flows into a specific country are dedicated to the country itself or is a flow that targets a geographic region or particular group (for example, “Latin America” or “Emerging Markets”).

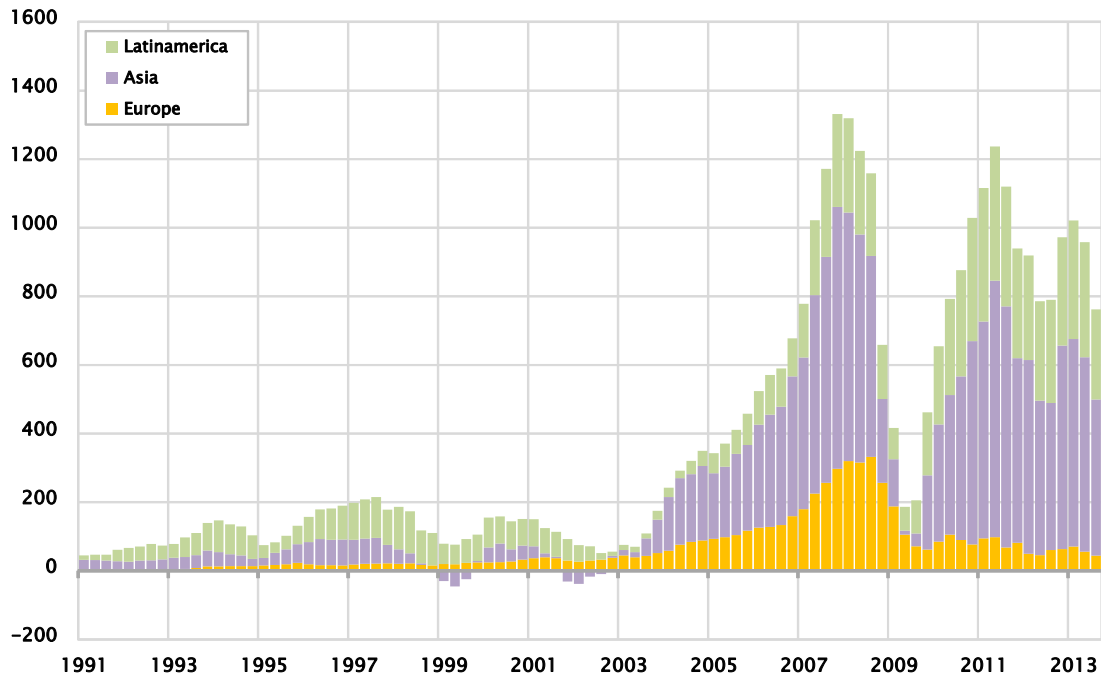
However, the EPFR surveys a particular type of agents; therefore it does not necessarily reflect what is actually happening with total portfolio flows into certain economies. Particularly, the EPFR does not account for institutional funds as understood in our study. According to the IMF (2011), the empirical importance of institutional investors, such as pension funds or insurance companies, has grown considerably. This is a relevant issue since the share each agent type represents of the total can vary from one country to the other, possibly related to the degree of financial markets development. For instance, it could be the case that, in EME, institutional investors are the major players, and in developed countries, investment funds are the ones who move higher levels of capital cross borders.

In this sense, the EPFR has been losing its potential to represent appropriately the financial accounts of EME considered in their sample.³¹ Chile is not an exception. A comparison between EPFR data of capital flows into Chile and the aggregated data on equity flows coming from the Chilean financial account is shown in Figure 9. This comparison corroborates that agents other than investment funds are a relevant piece of the puzzle for understanding non-resident net inflows into a country. This does not imply by any means that EPFR is not a reliable source. Rather, it opens the question of whether it is representative as researchers so far have thought it to be. We also compare the aggregate flow from investment funds arising from our classification to data of EPFR decomposed into ETF and non-ETF flows. The results, shown in Figure 10, indicate that the ETF flows from the EPFR represent relatively well the *Indexed* funds of our classification, however its lack of representativeness when looking at *Non-indexed* funds confirms the importance of examining more comprehensive data.

In conclusion, the first clear advantage of our data and proposed classification is its representativeness compared to the other source available. A comparison with the EPFR indicates that our classification is apparently going to the right direction, at least for *Indexed* funds.

³¹In fact, the Institute of International Finance (IIF) recently began reporting estimated flows to emerging countries aiming to provide a better approximation to these flows. However, as they base their estimations on the current accounts of the countries in their sample, they are unable to provide disaggregated data at investor type level.

Figure 1: Capital Flows into Emerging Market Economies



This figure illustrates quarterly data on total gross inflows to a representative group of EME. *Asia* includes China, India, Indonesia, Jordan, Kazakhstan, Malaysia, Pakistan, Philippines, Russian Federation, Thailand, and Turkey. *Europe* includes Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Lithuania, Poland, Romania, Slovenia, and Ukraine. *Latin America* includes Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Panama, Peru, and Venezuela. Flows are measured in billions of U.S. dollars. The sample ranges from 1991.Q1 to 2013.Q3.

Source: International Monetary Fund.

Figure 2: Capital Flows in the Financial Account

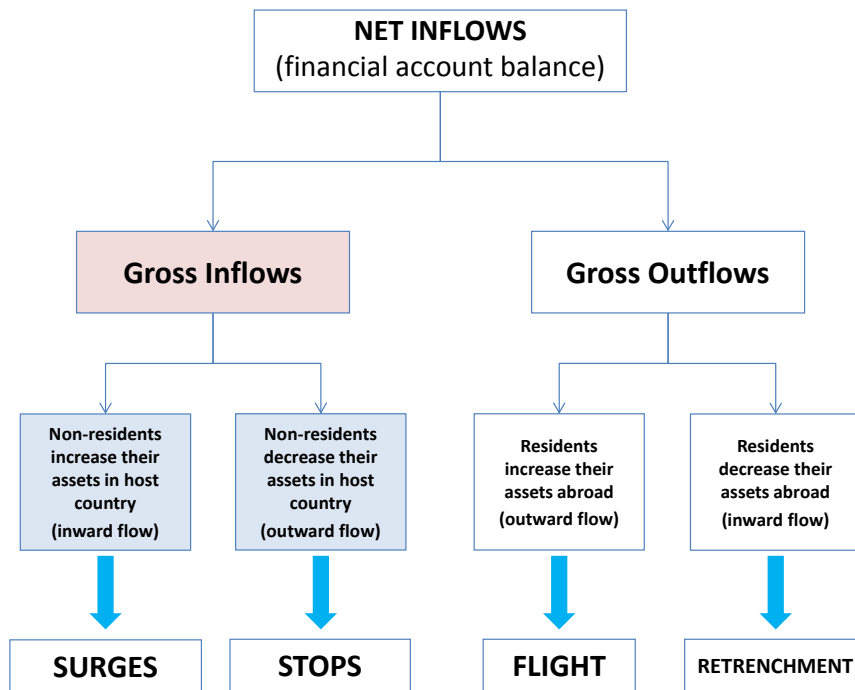
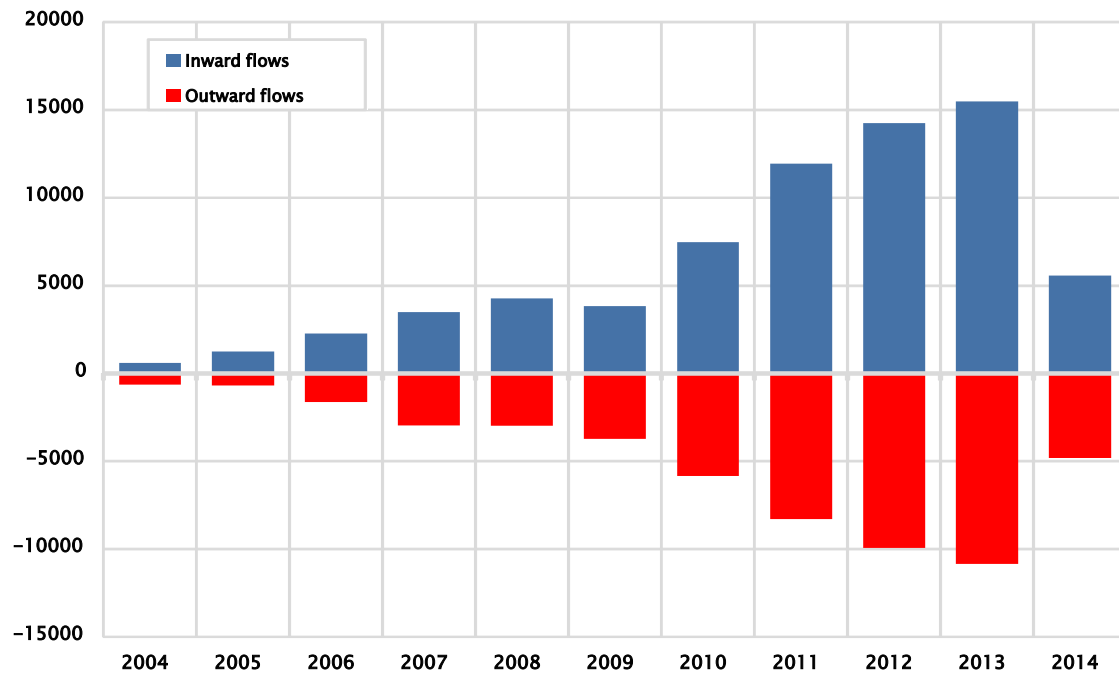
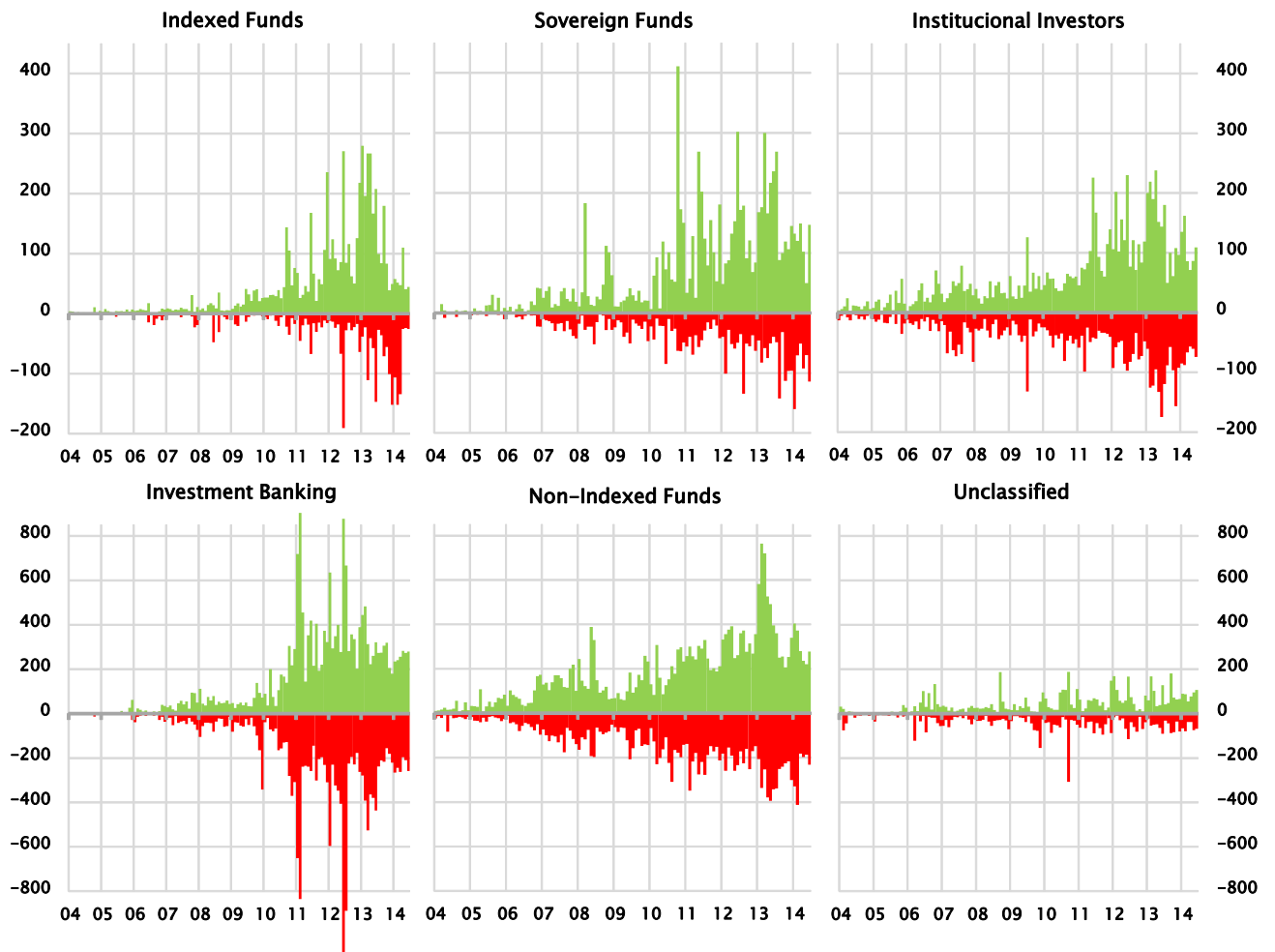


Figure 3: Total Inward and Outward Equity Flows into Chile



This figure shows yearly accumulated total inward and outward flows into Chile. Flows are measured in million U.S. dollars. The sample ranges from January 2004 to June 2014, daily irregularly spaced data.
Source: Central Bank of Chile.

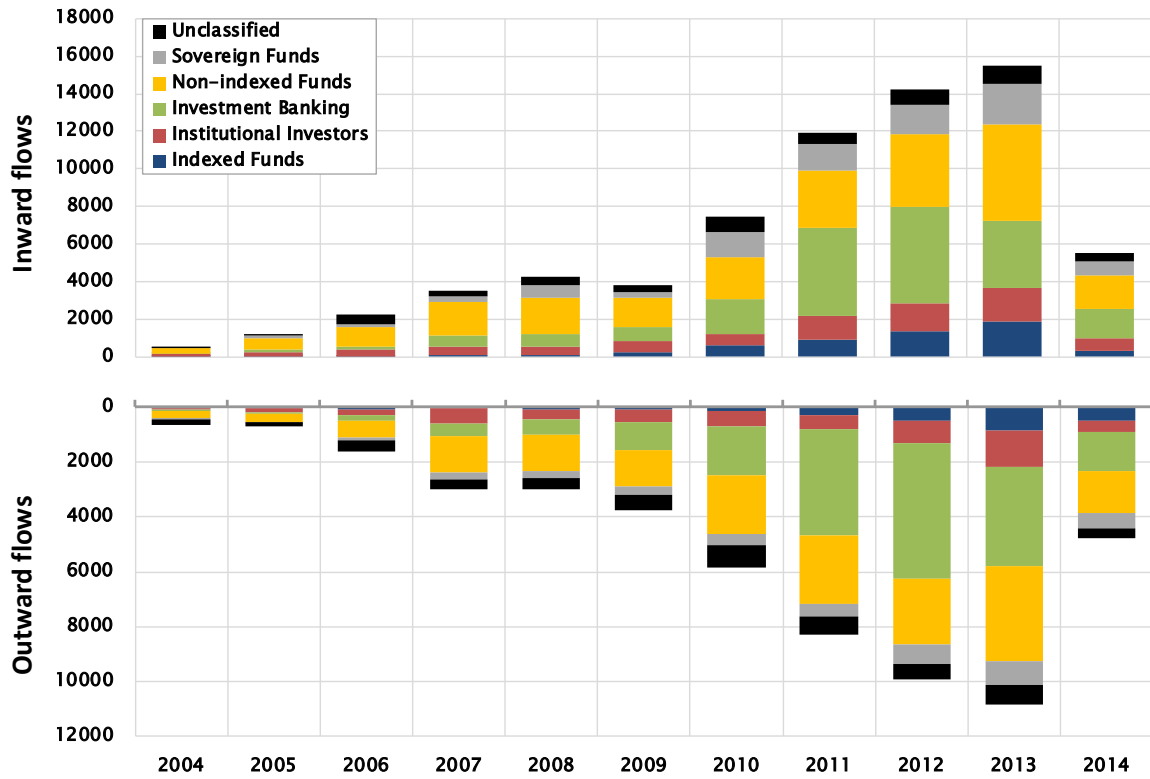
Figure 4: Inward and Outward Equity Flows into Chile, by Investor Type



This figure shows monthly accumulated inward and outward flows into Chile, by investor type. Flows are measured in million U.S. dollars. The sample ranges from January 2004 to June 2014, daily irregularly spaced data. Investor grouping based on classification proposed in Section 3 of this paper.

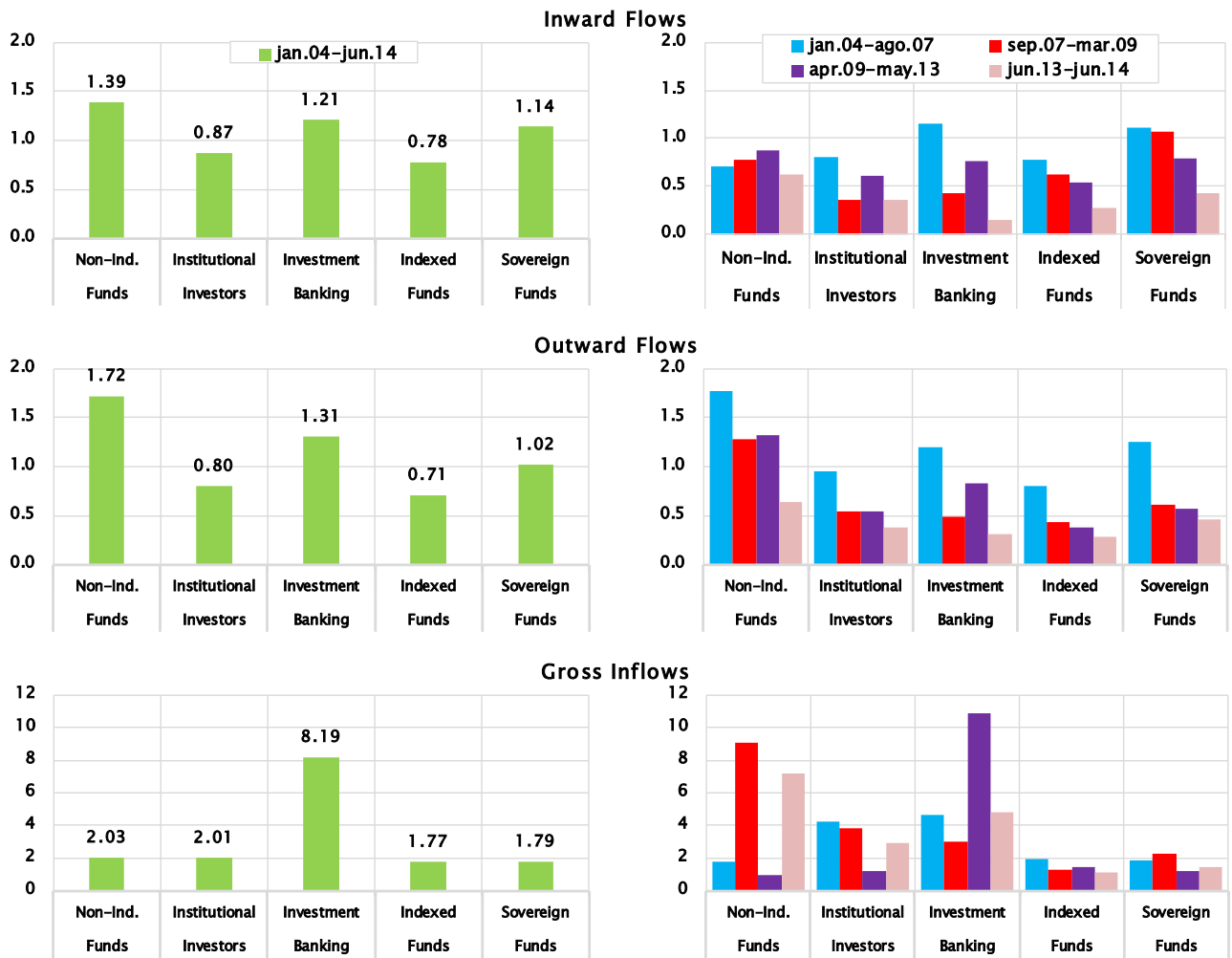
Source: Central Bank of Chile.

Figure 5: Total Inward and Outward Equity Flows into Chile, Investor Type Shares



This figure shows yearly accumulated total inward and outward flows into Chile, stack by investor type. Flows are measured in million U.S. dollars. The sample ranges from January 2004 to June 2014, daily irregularly spaced data. Investor grouping based on classification proposed in Section 3 of this paper.
 Source: Central Bank of Chile.

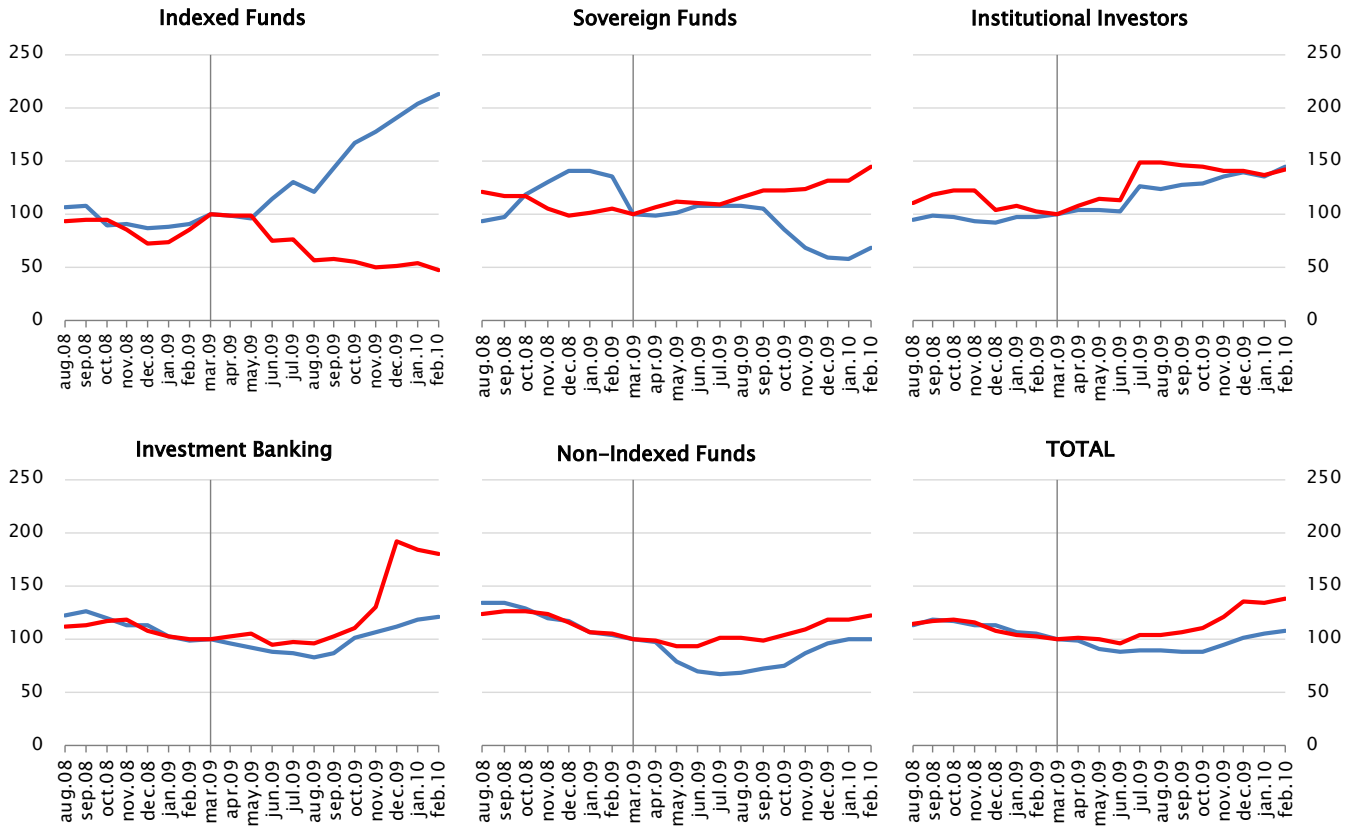
Figure 6: Equity Inflows Volatility



This figure shows the variation coefficient (standard deviation over the mean) of inward flows, outward flows, and total gross inflows, by investor type, over different periods. The sample ranges from January 2004 to June 2014, daily irregularly spaced data. Investor grouping based on classification proposed in Section 3 of this paper.

Source: Central Bank of Chile.

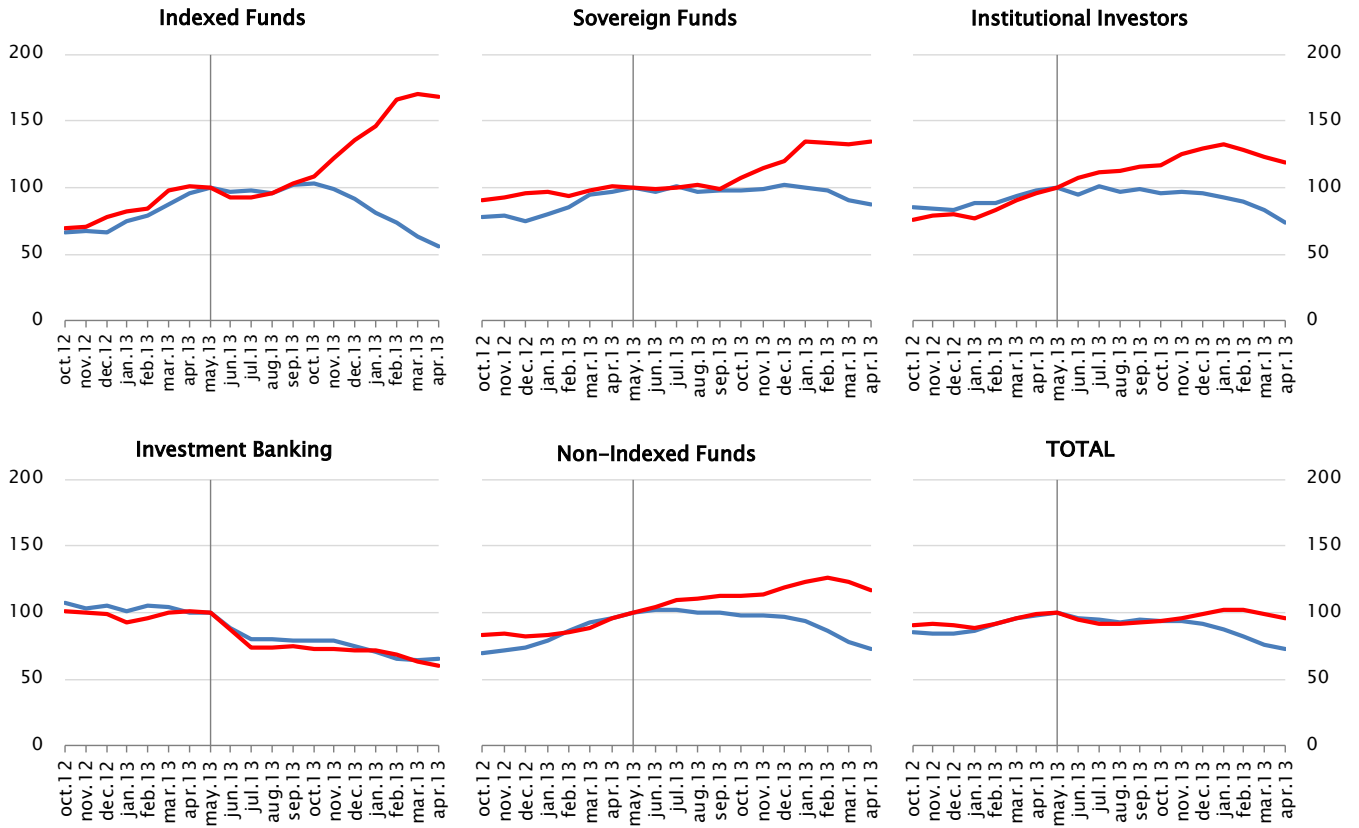
Figure 7: March 2009: Global Financial Crisis, sudden stop and flight to safety?



This figure shows monthly accumulated inward (blue lines) and outward (red lines) flows into Chile, by investor type, around the sell-off event occurred in March 2009. Flows are re-scaled to 100 in the exact month of the event. The daily data is irregularly spaced. Investor grouping based on classification proposed in Section 3 of this paper.

Source: Central Bank of Chile.

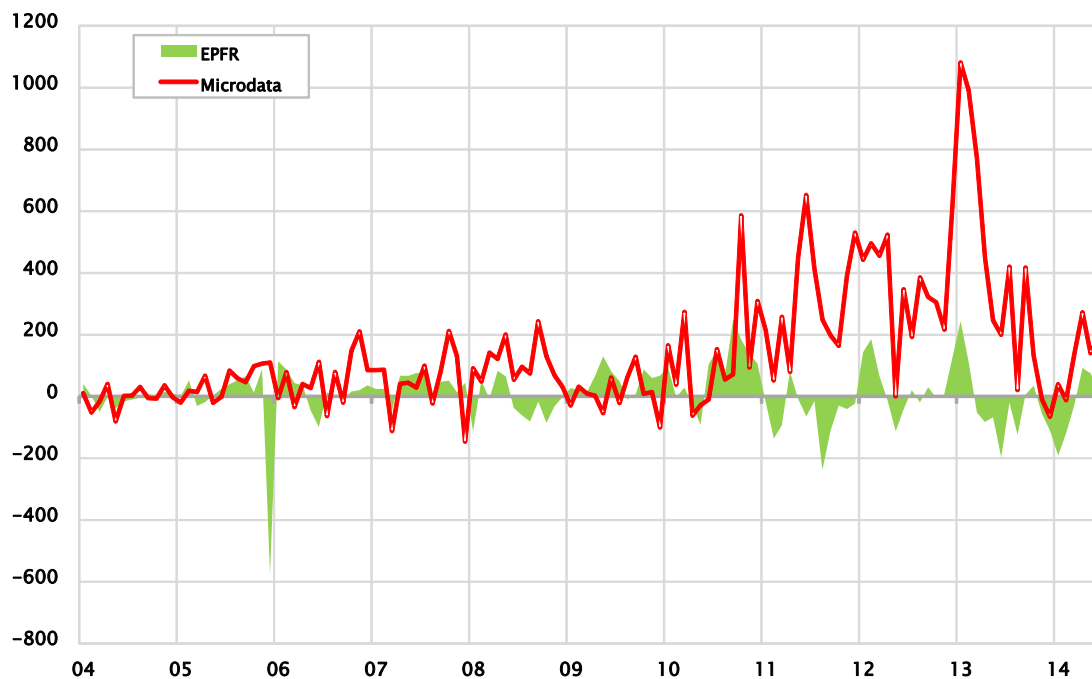
Figure 8: May 2013: Tapering Talk, co-movements across investor types



This figure shows monthly accumulated inward (blue lines) and outward (red lines) flows into Chile, by investor type, around the sell-off event occurred in May 2013. Flows are re-scaled to 100 in the exact month of the event. The daily data is irregularly spaced. Investor grouping based on classification proposed in Section 3 of this paper.

Source: Central Bank of Chile.

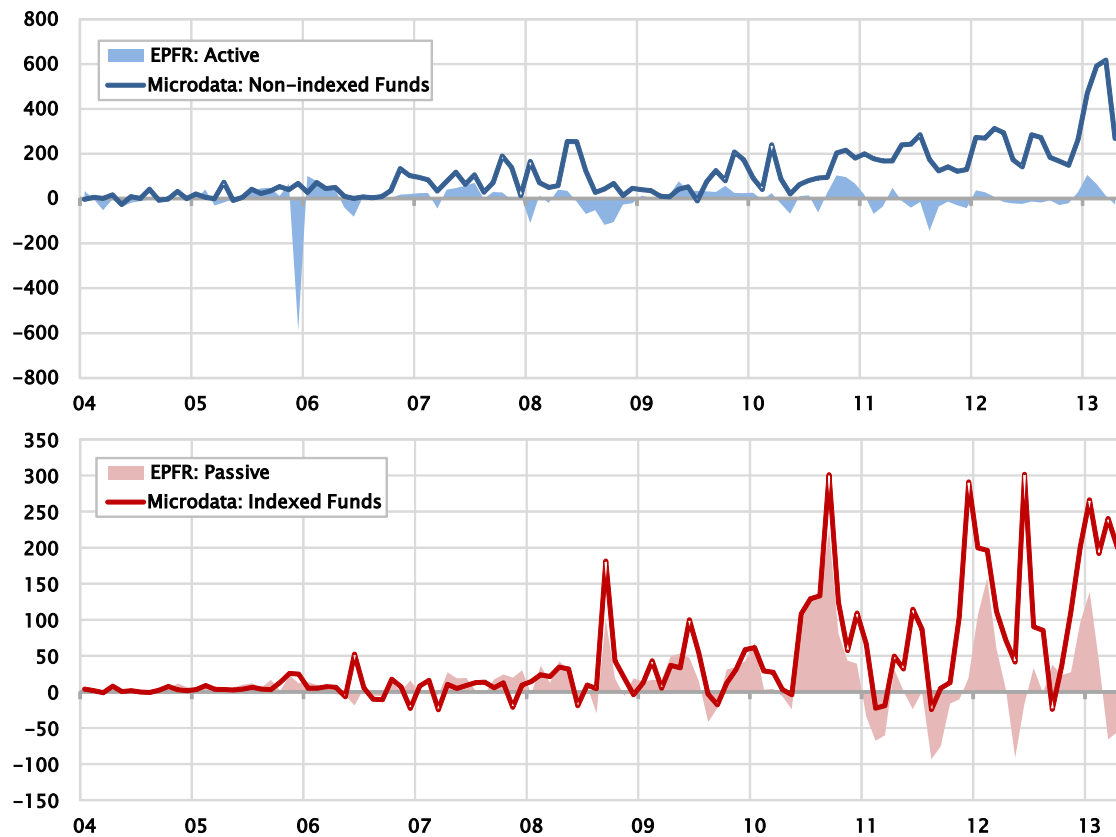
Figure 9: Total Gross Equity Inflows into Chile, All Investors



This figure shows monthly accumulated total gross flows of all investors into Chile, according to different data sources. Flows are measured in million U.S. dollars. The sample ranges from January 2004 to June 2014, using daily irregularly spaced data.

Source: Central Bank of Chile and Emerging Portfolio Fund Research.

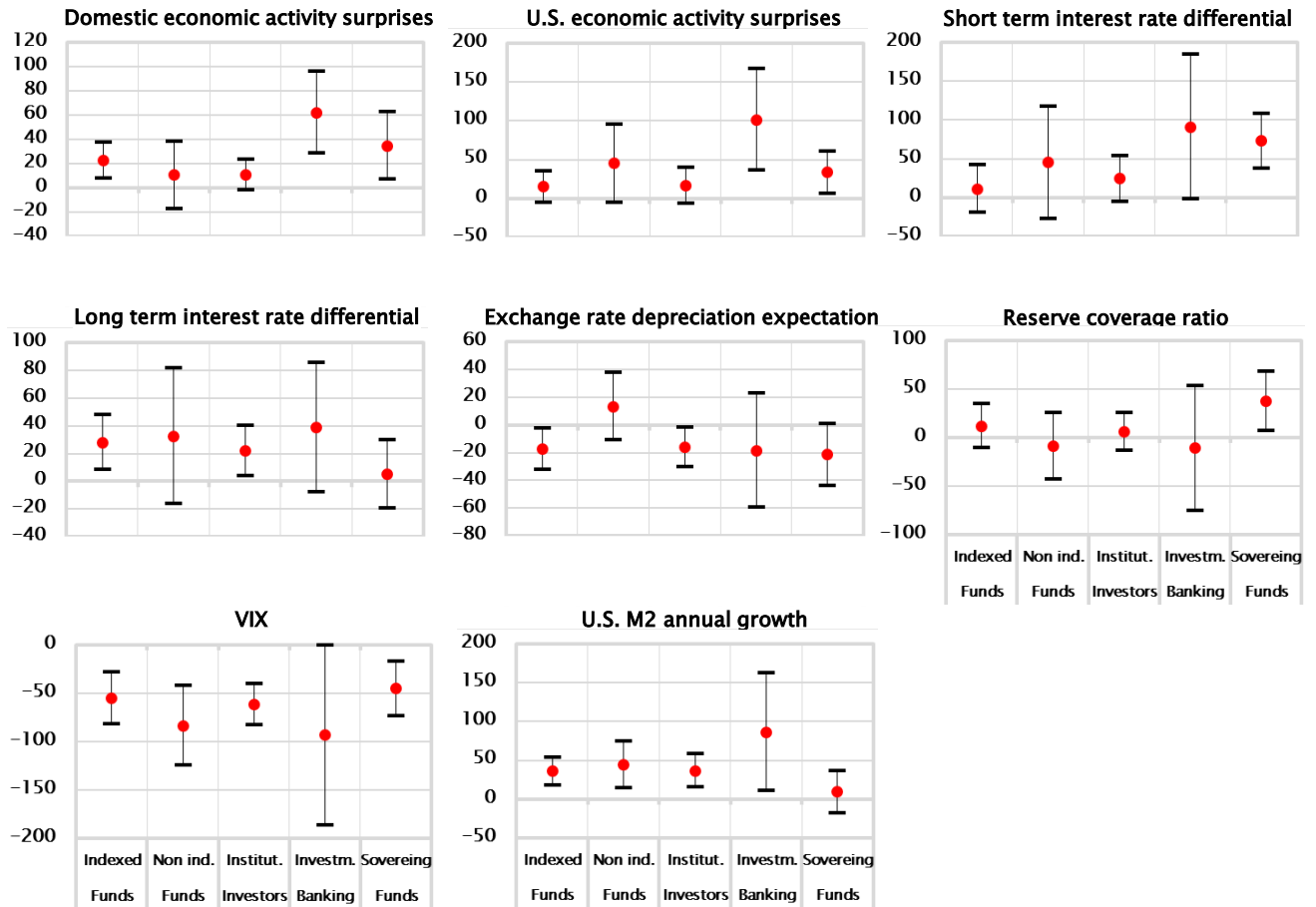
Figure 10: Total Gross Equity Inflows into Chile, Indexed and Non-indexed Funds



This figure shows monthly accumulated total gross flows of Indexed and Non-indexed funds into Chile, according to different data sources. Flows are measured in million U.S. dollars. The sample ranges from January 2004 to June 2014, using daily irregularly spaced data.

Source: Central Bank of Chile and Emerging Portfolio Fund Research.

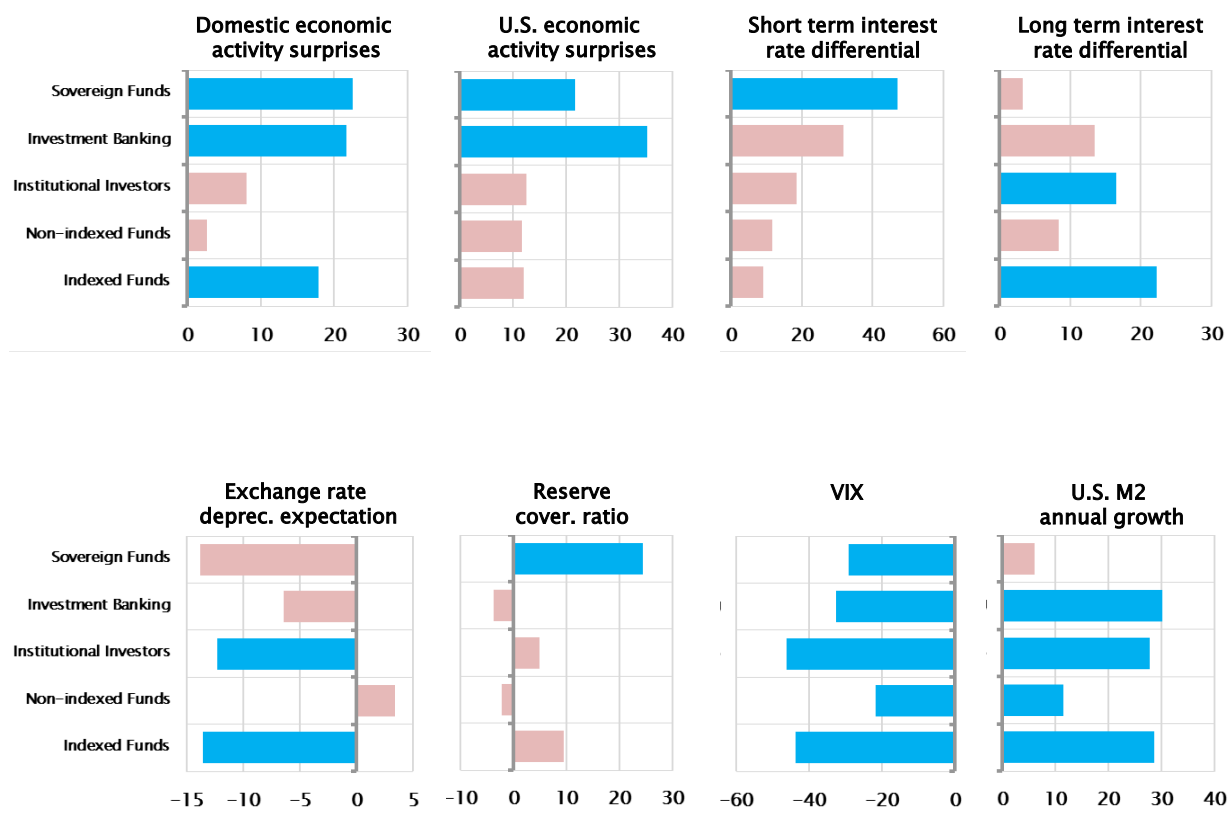
Figure 11: Effects of Factors Changes on Disaggregated Inward Flows



This figure shows the effect of movements of push or pull factors, from their sample mean to their maximum point observed in-sample, on inward flows disaggregated by investor type, according to estimated coefficients of Equation (1). The red dot indicates the average effect ($\beta * \Delta x_j$ where x_j are the exogenous variables in Equation (1)), and the black ranges indicate 90% confidence intervals. Therefore, the vertical axis corresponds to the change in flows resulting from a change in a push or pull factor, and it is measured in million U.S. dollars.

Source: Central Bank of Chile.

Figure 12: Individual Changes on Disaggregated Inward Flows due to Push and Pull Factor Shocks



This figure shows the proportion to which individual inward flows would respond to movements of push or pull factor, from their sample mean to their maximum point observed in-sample, according to estimated coefficients of Equation (1) and the 2013-14 average disaggregated inward flows. The bars correspond to the average effect divided by the average of each flow (i.e., $\frac{\beta \Delta x_j}{\bar{f}_i^{2013-14}}$ where x_j are the exogenous variables in Equation (1), and $\bar{f}_i^{2013-14}$ is the average flows of investor i between January 2013 and June 2014). Shaded red bars are those to which the coefficients are not statistically significant at 90% confidence level. Therefore, the horizontal axis is measured in percentages.

Source: Central Bank of Chile.

Table 1: Descriptive statistics: Aggregated Data

	Variable Income Instruments											
	<i>2004</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>Full Sample</i>	
Gross Inward Flows												
<i>Obs</i>	2,217	4,581	6,525	6,554	8,256	9,385	11,536	17,910	25,950	30,991	139,182	
<i>Volatility</i>	2.78	6.18	4.71	2.30	4.20	3.97	4.61	3.93	4.07	4.60	4.25	
<i>Average</i>	0.27	0.27	0.35	0.53	0.52	0.41	0.65	0.67	0.55	0.50	0.51	
Gross Outward Flows												
<i>Obs</i>	4,062	5,464	5,555	9,669	9,910	12,782	15,069	19,965	27,447	32,957	160,994	
<i>Volatility</i>	6.55	4.27	6.25	3.17	4.28	9.30	5.23	4.86	6.47	4.53	5.62	
<i>Average</i>	0.16	0.13	0.29	0.31	0.30	0.29	0.39	0.42	0.36	0.33	0.33	

The table reports basic descriptive statistics of yearly accumulated total inward and outward equity flows. *Obs* are the number of transactions recorded in the dataset. *Volatility* corresponds to the coefficient of variation in every period using monthly aggregated data. *Average* corresponds to the mean in every period using monthly aggregated data. Flows are measured in billions of U.S. dollars. The sample ranges from January 2004 to June 2014. Daily irregularly spaced data. Source: Central Bank of Chile.

Table 2: OLS Estimations: Aggregated Gross Flows

	Total Gross Inflows	Inward Flows	Outward Flows
y_t^{CH}	70.67** (28.06)	104.73** (48.99)	40.87 (29.96)
y_t^{US}	-15.15 (86.21)	261.04** (128.36)	242.66** (97.45)
$(i_t^{CH} - i_t^{US})^{SR}$	8.12 (14.32)	34.48** (17.07)	20.76 (12.55)
$(i_t^{CH} - i_t^{US})^{LR}$	69.78** (34.69)	87.25** (41.88)	32.24 (32.57)
$E(\Delta e_t)$	488.90 (431.55)	-830.69 (862.01)	-1,342.94* (801.47)
r_{cr_t}	152.72 (170.43)	178.88 (225.68)	-53.73 (174.19)
$vi x_t$	-146.43*** (43.89)	-270.12*** (88.55)	-126.45** (52.69)
$\Delta M2_t^{US}$	730.48 (675.06)	2,421.70** (1,167.39)	1,935.56* (1,008.37)
QE_t	-26.13 (51.46)	2.92 (56.36)	31.83 (41.51)
f_{t-1}	0.35** (0.14)	0.51*** (0.11)	0.60*** (0.08)
<i>constant</i>	334.10** (145.67)	727.04*** (258.50)	342.83** (159.51)
Adj. R^2	0.57	0.84	0.80
Obs.	114	114	114
F test p-value	0%	1%	22%

The table reports robust OLS estimated coefficients and respective standard deviations (in parentheses) for the regressions of total gross inflows, and inward and outward flows, on a set of push and pull factors. $Adj.R^2$ is the adjusted determination coefficient. *Obs* indicates the number of events considered. *** indicates statistical significance at 1% level, ** at 5%, and * at 10%. The sample ranges from January 2004 to June 2014, monthly frequency.

Source: Central Bank of Chile.

Table 3: OLS Estimations: Disaggregated Inward Flows

	Inward Flows	Indexed Funds	Non-Indexed Funds	Institutional Investors	Investment Banking	Sovereign Funds
y_t^{CH}	104.73** (48.99)	20.22** (8.00)	9.52 (14.99)	9.61 (6.73)	55.68*** (18.26)	31.28** (14.88)
y_t^{US}	261.04** (128.36)	22.76 (18.26)	68.23 (45.91)	24.98 (21.13)	152.74** (59.05)	50.51** (25.07)
$(i_t^{CH} - i_t^{US})^{SR}$	34.48** (17.07)	1.90 (3.05)	7.46 (7.22)	4.07 (2.94)	15.03 (9.28)	12.07*** (3.52)
$(i_t^{CH} - i_t^{US})^{LR}$	87.25** (41.88)	18.54** (7.90)	21.48 (19.51)	14.42** (7.14)	25.61 (18.59)	3.39 (9.80)
$E(\Delta e_t)$	-830.69 (862.01)	-281.12* (147.65)	216.12 (239.65)	-266.68* (141.87)	-302.08 (404.69)	-351.34 (221.33)
rcr_t	178.88 (225.68)	39.24 (44.19)	-27.69 (66.82)	21.32 (38.10)	-35.39 (126.55)	123.33** (59.64)
$vi x_t$	-270.12*** (88.55)	-46.86*** (13.71)	-70.64*** (21.18)	-51.92*** (10.93)	-78.88* (47.48)	-38.19*** (14.47)
$\Delta M2_t^{US}$	2.421.70** (1167.39)	514.92*** (152.13)	629.07** (256.74)	525.57*** (186.75)	1,232.91* (649.22)	136.15 (235.01)
QE_t	2.92 (56.36)	-2.43 (13.42)	15.11 (18.31)	2.64 (9.50)	10.59 (40.61)	-14.29 (19.08)
f_{t-1}	0.51*** (0.11)	0.37*** (0.13)	0.63*** (0.09)	0.30** (0.14)	0.43*** (0.12)	0.20*** (0.08)
<i>constant</i>	727.04*** (258.50)	113.18*** (42.65)	165.58*** (58.79)	140.25*** (36.19)	165.33 (135.31)	159.22*** (41.35)
Adj. R^2	0.84	0.67	0.78	0.66	0.69	0.53
Obs.	114	114	114	114	114	114
F test p-value	1%	0%	1%	0%	0%	0%

The table reports robust OLS estimated coefficients and respective standard deviations (in parentheses) for the regressions of inward flows, aggregated and by investor type, on a set of push and pull factors. $Adj.R^2$ is the adjusted determination coefficient. Obs indicates the number of events considered. *** indicates statistical significance at 1% level, ** at 5%, and * at 10%. The sample ranges from January 2004 to June 2014, monthly frequency.

Source: Central Bank of Chile.

Table 4: OLS Estimations: Disaggregated Outward Flows

	Outward Flows	Indexed Funds	Non-Indexed Funds	Institutional Investors	Investment Banking	Sovereign Funds
y_t^{CH}	40.87 (29.96)	-0.76 (4.47)	13.10 (12.33)	4.59 (5.03)	34.57* (20.37)	-0.13 (5.11)
y_t^{US}	242.66** (97.45)	22.15* (12.99)	52.21 (32.77)	29.08** (14.02)	163.85** (68.31)	47.11*** (17.60)
$(i_t^{CH} - i_t^{US})^{SR}$	20.76 (12.55)	6.32** (2.62)	7.71* (3.90)	3.89* (2.10)	9.84 (8.37)	9.03*** (3.02)
$(i_t^{CH} - i_t^{US})^{LR}$	32.24 (32.57)	-5.37 (6.90)	6.73 (11.67)	-2.41 (5.06)	33.89 (21.38)	-7.69 (6.46)
$E(\Delta e_t)$	-1,342.94* (801.47)	-308.53* (158.70)	-236.48 (179.34)	-175.82** (71.18)	-664.39 (568.08)	-60.55 (77.20)
rcr_t	-53.73 (174.19)	15.13 (33.28)	77.56 (57.23)	0.84 (23.77)	-99.18 (140.71)	28.87 (25.68)
vix_t	-126.45** (52.69)	-28.32** (11.29)	-35.49*** (12.88)	-17.49*** (6.42)	-79.27* (42.27)	-22.34*** (8.33)
$\Delta M2_t^{US}$	1,935.56* (1008.37)	129.66 (151.25)	112.31 (203.39)	265.29** (102.04)	1,607.97* (806.98)	93.32 (106.12)
QE_t	31.83 (41.51)	6.33 (7.25)	12.77 (12.28)	7.00 (5.89)	0.08 (40.37)	10.17 (6.70)
f_{t-1}	0.60*** (0.08)	0.31** (0.15)	0.48*** (0.09)	0.35*** (0.12)	0.48*** (0.09)	0.08 (0.12)
<i>constant</i>	342.83** (159.51)	94.23** (36.22)	151.51*** (46.58)	66.91*** (21.37)	133.01 (116.84)	86.93*** (27.73)
Adj. R^2	0.80	0.48	0.68	0.52	0.65	0.49
Obs.	114	114	114	114	114	114
F test p-value	22%	0%	0%	1%	1%	0%

The table reports robust OLS estimated coefficients and respective standard deviations (in parentheses) for the regressions of outward flows, aggregated and by investor type, on a set of push and pull factors. $Adj.R^2$ is the adjusted determination coefficient. *Obs* indicates the number of events considered. *** indicates statistical significance at 1% level, ** at 5%, and * at 10%. The sample ranges from January 2004 to June 2014, monthly frequency.

Source: Central Bank of Chile.

<p>Documentos de Trabajo Banco Central de Chile</p> <p>NÚMEROS ANTERIORES</p> <p>La serie de Documentos de Trabajo en versión PDF puede obtenerse gratis en la dirección electrónica:</p> <p>www.bcentral.cl/esp/estpub/estudios/dtbc.</p> <p>Existe la posibilidad de solicitar una copia impresa con un costo de Ch\$500 si es dentro de Chile y US\$12 si es fuera de Chile. Las solicitudes se pueden hacer por fax: +56 2 26702231 o a través del correo electrónico: bcch@bcentral.cl.</p>	<p>Working Papers Central Bank of Chile</p> <p>PAST ISSUES</p> <p>Working Papers in PDF format can be downloaded free of charge from:</p> <p>www.bcentral.cl/eng/stdpub/studies/workingpaper.</p> <p>Printed versions can be ordered individually for US\$12 per copy (for order inside Chile the charge is Ch\$500.) Orders can be placed by fax: +56 2 26702231 or by email: bcch@bcentral.cl.</p>
--	---

DTBC – 759

Efectos Reales de Cambios en el Precio de la Energía Eléctrica

Lucas Bertinato, Javier García-Cicco, Santiago Justel y Diego Saravia

DTBC – 758

The Labor Wedge and Business Cycles in Chile

David Coble y Sebastián Faúndez

DTBC – 757

Accounting for Labor Gaps

François Langot y Alessandra Pizzo

DTBC – 756

Can a Non-Binding Minimum Wage Reduce Wages and Employment?

Sofía Bauducco y Alexandre Janiak

DTBC – 755

The Impact of the Minimum Wage on Capital Accumulation and Employment in a Large-Firm Framework

Sofía Bauducco y Alexandre Janiak

DTBC – 754

Identification of Earnings Dynamics using Rotating Samples over Short Periods: The Case of Chile

Carlos Madeira

DTBC – 753

The Impact of Commodity Price Shocks in a Major Producing Economy. The Case of Copper and Chile

Michael Pedersen

DTBC – 752

Nominal Term Structure and Term Premia: Evidence from Chile

Luis Ceballos, Alberto Naudon y Damián Romero

DTBC – 751

The Labor Wedge: New Facts Based on US Microdata

David Coble

DTBC – 750

El Rol de las Asimetrías en el Pass-Through: Evidencia para Chile

Lucas Bertinatto y Diego Saravia

DTBC – 749

Dissent in FOMC Meetings and the Announcement Drift

Carlos Madeira y Joao Madeira

DTBC – 748

Post-crisis Financiera y Expansión de las Exportaciones: Micro-Evidencia para Chile

Roberto Álvarez y Camila Sáez

DTBC – 747

Exchange Rate Pass-Through to Prices: VAR Evidence for Chile

Santiago Justel y Andrés Sansone

DTBC – 746

A New Liquidity Risk Measure for the Chilean Banking Sector

Sebastián Becerra, Gregory Claeys y Juan Francisco Martínez

DTBC – 745

Sensibilidad de las Exportaciones al TCR: Un Análisis Sectorial y por Destino

Samuel Carrasco, Diego Gianelli y Carolina Godoy



BANCO CENTRAL
DE CHILE

DOCUMENTOS DE TRABAJO • Julio 2015