Chapter 1

Introduction

1.1 Background and motivation

Due to increased financial integration and capital market liberalization, the volume of international capital flows has increased significantly since the 1990s. They rose from less than 7% of world GDP in the 1990s to over 20% in 2007 (Milesi-Ferretti and Tille, 2011).\(^1\) According to Evans and Hnatkovska (2014), gross capital flows between industrialized countries expanded 300% between 1991 and 2000; portfolio equity flows even rose by roughly 600%. The volatility of capital flows also has increased dramatically since the 1990s (Forbes and Warnock, 2012). As shown in Figure 1.1, the growth rate of international capital flows exhibited large fluctuations. They declined in 2001 but quickly rebounded. Likewise, during the global financial crisis the volume of capital flows decreased but picked up again afterwards.

\(^1\) International capital flows are calculated as the sum of all capital inflows as a ratio of world GDP.
It is widely believed that huge and volatile capital flows tend to amplify economic cycles, increase financial system vulnerabilities, and aggravate macroeconomic instability (Bertaut et al., 2012; Forbes and Warnock, 2012; Fratzscher, 2012; Lane and Milesi-Ferretti, 2012). Exceptionally large capital inflows are generally correlated with asset price bubbles, credit booms, inflation, and financial fragility (Forbes and Warnock, 2012; Tillmann, 2013). Further, an abrupt and major reduction in capital inflows may result in currency depreciation, asset price collapses, sharp reduction in economic growth, and even banking and currency crises (Calvo et al., 2004; Calvo and Talvi, 2005). For example, in the 1990s, several Asian countries attracted large volumes of international capital flows due to their good economic prospects, which led to credit growth and asset price bubbles. In 1996, capital flew out of Thailand causing a currency crisis. The crisis spread to Malaysia, Singapore, Japan, South Korea, and China. Likewise, during the 2000s, large capital inflows and low interest rates in the US fueled a real estate boom. When the Federal Reserve increased policy interest rates in 2006, house prices dropped. The prices of asset-backed securities also fell and the panic spread to the whole financial system afterwards.

According to Sixth Edition of the IMF's Balance of Payments and International Investment Position Manual (BPM6), financial assets and liabilities can be classified into three categories: equity and investment fund shares, debt instruments, and other financial assets and liabilities, such as monetary gold and financial derivatives. In this thesis, we
concentrate on cross-border investments in domestic equity and bond instruments by global funds, including mutual funds, exchange traded funds (ETFs), closed-end funds, insurance-linked funds, and hedge funds. We define them as international fund flows. Also according to BPM6, international capital flows can be functionally categorized into five types: direct investment, portfolio investment, financial derivatives and employee stock options, other investment, and reserve assets. International fund flows are mainly portfolio investments in the IMF’s BPM6 classification. Our data comes from a novel database, Emerging Portfolio Fund Research (EPFR) Global, which tracks the asset allocation of more than 62,500 funds globally (as of September 15th, 2014). Based on data for 29 major emerging markets from 2005 to 2013, Moussavi (2014) concludes that trends in EPFR Global data largely coincide with trends in gross portfolio capital flows.

Depending on their investment targets, funds can be classified as equity funds, bond funds, money market funds, balanced funds and alternative funds. Equity funds account for more than 50% of the total net assets of funds (see Figure 1.2). Compared with long-term capital flows, fund flows are more volatile and more susceptible to reversal when investors get new information (Levchenko and Mauro, 2007; Sula and Willett, 2009; Gelos, 2013). They also play an increasingly important role in the transmission of shocks, such as exacerbating the international financial cycle due to asset fire sales during downturns (Jinjarak et al., 2011; Raddatz and Schmukler, 2012). Therefore, we deem it of high academic and policy relevance to investigate this particular type of international capital flows.

International fund flows have increased rapidly since the 1990s. During that time, industrial countries deregulated their financial markets. Emerging markets also increased their capital and trade openness, which have rendered them more attractive to international investors (Gelos, 2013). These reforms made it easier for foreign investors to access the

2 The database tracks around 98%-99% of emerging market equity funds, over 95% of ETF assets globally, around 90% of funds in US, 85%-90% of Canadian mutual funds and 70%-75% of funds in developed European markets. Some other studies also use this database (cf. Jinjarak et al., 2011; Fratzscher, 2012; Raddatz and Schmukler, 2012; Yeyati and Williams, 2012; and Puy, 2016).

3 An equity fund is a fund that invests mainly in stocks/equity securities. A bond fund is a fund that invests mainly in bonds or other debt securities. A money market fund is an open-ended mutual fund that invests in short-term debt securities such as US Treasury bills and commercial paper. A balanced fund is a fund that holds a combination of equities and bonds. An alternative fund is a fund that invests in asset classes other than stocks, bonds, and cash.
local market and for domestic investors to allocate their assets globally (Bekaert and Harvey, 1998; Gelos, 2013). Consequently, the volume of international fund flows surged over the last two decades. As shown in Figure 1.2, assets under management by international funds (covered by the EPFR Global database) increased more than 150 times, expanding from 150 billion US dollars in 2000 to 25000 billion US dollars in 2015. Notably the volume of equity flows increased from less than one billion US dollars in 2000 to 77.4 billion US dollars in 2013. Meanwhile, the volatility of international fund flows increased as well.

![Figure 1.2: Total net asset of funds covered by EPFR Global (USD billion)](chart.png)

Data source: EPFR Global

For example, Figure 1.3 shows equity fund flows going into/out of China and the MSCI price index in China. After the opening of China’s financial markets, fund flows increased dramatically. International equity fund flows increased from 20.56 million US dollars in 2000 to 4,631 million US dollars in 2006. The significant increase of fund flows can be attributed to China’s relatively high GDP growth rate (average GDP growth was 9.5% between 2000-2006) and the performance of its stock markets. After the US subprime mortgage crisis had begun in 2007, financial risks aggravated. International investors swiftly withdrew money out of emerging markets like China in 2007 and 2008. At the time, the Chinese stock market also experienced a sharp decline. During 2009-2010, China again attracted large volumes of equity flows, but equity flows have become more
volatile since 2011. During this period, China’s economic future became more uncertain, as reflected in lower growth rates and turbulence on Chinese stock and foreign exchange markets. In 2015, equity flows moved out of China.

Figure 1.3 Equity fund flows in China

![Equity Fund Flows in China](image)

Data source: EPFR Global, datastream

The increased volume of international fund flows over the last decade has attracted the attention of researchers (Jinjarak et al., 2011; Fratzscher, 2012; Raddatz and Schmukler, 2012; Yeyati and Williams, 2012; Brandao et al., 2015; Puy, 2016; Cenedese and Mallucci, 2016). For example, based on weekly fund flow data for 50 countries from October 2005 to November 2010, Fratzscher (2012) finds that global shocks have a stronger impact than domestic factors in determining fund flows. Jinjarak et al. (2011) analyze the relationship between international fund flows and returns on equity and bond funds and conclude that international fund investments are positively associated with contemporaneous and past market returns. Raddatz and Schmukler (2012) investigate the behavior of global funds. They conclude that the volatility of mutual fund investments is driven by both the underlying investors and fund managers through (i) injections into/redemptions out of each fund and (ii) managerial changes in country weights and cash. These studies concentrate on the behavior of fund flows at the fund- or country-level. However, they fail to figure out the risks stemming from fund flow volatilities. In this thesis, we examine the drivers of large changes in fund flows (surges and sudden

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4 Fund-level studies focus on the money flowing into/out of each fund, whereas country-level studies concentrate on money flowing into/out of one country aggregated by all related funds.
stops) and the dynamic relationship between (changes in) fund flows and equity returns, the exchange rate and the business cycle of the receiving country. A surge refers to exceptionally large capital inflows (Ghosh et al., 2014); a sudden stop is defined as “an abrupt and major reduction in capital inflows to a country that has been receiving large volumes of foreign capital” (Edwards, 2004, p.59). The extreme volatility of fund flows tends to bring risks for receiving countries, such as increasing financial system vulnerabilities and aggravating macroeconomic instabilities. Furthermore, we investigate the influence of fund flows on the receiving countries. In particular, we focus on the cyclical behavior of fund flows and the interaction between fund flows, equity returns and exchange rates.

1.2 Research questions

This thesis aims to contribute to the literature by extending the analysis of the risks stemming from international fund flows, namely, the surges and the sudden stops of fund flows, the cyclical behavior of fund flows, and the interaction between fund flows and financial markets in receiving countries. Specifically, four research questions are addressed:

1. How to identify surges of fund flows? How many waves of fund flow surges occurred during the last two decades? Are global (push) factors or domestic (pull) factors driving the occurrence of fund flow surges? Are these factors also the drivers of the magnitude of the surges?

2. How have fund flow sudden stops evolved over time and across countries? Are they mostly determined by global (push) factors or by domestic (pull) factors? What are the determinants of the magnitude of sudden stops?

3. Are international fund flows pro-cyclical or counter-cyclical from the perspective of the receiving country? Following Kaminsky et al. (2005), we consider capital flows into a country to be procyclical when the correlation between the cyclical components of net capital inflows and output is positive. Likewise, capital flows are regarded as countercyclical when the correlation between the cyclical components of net capital inflows and output is negative.

4. What is the dynamic interaction between fund flows, equity returns, and exchange rates?
1.3 Outline of the thesis

The rest of the thesis is organized as follows. Chapters 2 and 3 investigate surges and sudden stops of international fund flows, respectively. Chapter 4 examines whether international fund flows are pro-cyclical or counter-cyclical from the perspective of the receiving country. Chapter 5 investigates the interaction between fund flows, equity returns and exchange rates. Chapter 6 summarizes our findings.

Chapter 2 addresses the first research question and investigates the surges of international fund flows, which are defined as exceptionally large fund inflows. Surges appear to contribute to asset price bubbles, credit booms and more volatile economic cycles. Based on monthly data for 55 countries from January 1996 to June 2013, we first build a database of surge episodes for equity flows and bond flows separately. We conclude that similar to net capital flows (Cardarelli et al., 2010; Ghosh et al., 2014), surges of fund flows tend to be synchronized globally. Equity flows experience three waves of surge episodes: one in the 1990s (which ended before the East Asia financial crisis), one in the early 2000s (which ended with the global financial crisis in 2008), and one in the late 2000s. Bond flows experience two surge waves between 2004 and 2013, which coincide with waves of equity flow surges. Then, we examine the determinants of surges. We use probit models to identify the determinants of the occurrence of surges and OLS models to investigate the drivers of the magnitude of these surges. Our results suggest that global factors and contagion factors are the main drivers of the occurrence of the surges. However, the magnitude of surges mainly depends on domestic factors. We also conduct several sensitivity analyses, e.g. changing the estimation method and employing alternative specifications of surge episodes as well as some explanatory variables.

Chapter 3 concentrates on another risk related to fund flows: sudden stops, i.e. an abrupt and major reduction in capital inflows to a country that has been receiving large volumes of foreign capital (Edwards, 2004, p. 59). Sudden stops are associated with exchange rate depreciation, higher costs of external finance, economic decline and even banking and currency crises. In Chapter 3, we use data for fund flows into 65 countries from January 2000 to June 2015. Given data limitations on bond fund flows, we focus on equity fund flows. We identify four waves of sudden stops. The first wave was in 2000-2001, while the second wave occurred in 2007-2009 when the world was hit by the global financial crisis. The third and fourth waves were in 2011-2012 and in 2014-2015. High-
income countries frequently experience sudden stops, while lower-middle-income countries are least likely to witness sudden stops. Then, probit models and OLS models are employed to investigate the determinants of the occurrence as well as the magnitude of fund flow sudden stops. Our results suggest that global, contagion and domestic factors are all important in determining the likelihood of sudden stops. Sudden stops in developed countries are strongly driven by global factors, while domestic factors play a more important role in developing countries. We also find that the magnitude of sudden stops is primarily determined by global factors. Abundant foreign reserves, moderate credit growth and a high-degree of trade openness are helpful to reduce the risk of a sudden stop.

Chapter 4 addresses the third research question and focuses on the cyclical behavior of international fund flows. The cyclical components of international fund flows and industrial production are employed to test for cyclicity. The data covers 68 countries for the period from January 1996 to June 2013 for equity flows and January 2004 to June 2013 for bond flows. To examine the cyclicity of fund flows, three methods are employed: a correlation-based method, a panel data regression method and the concordance index method. All these methods come to the same conclusion, namely that international fund flows tend to be counter-cyclical contemporaneously, i.e. fund flows are above trend when industrial production is below trend. The cyclicity of bond flows is more significant than that of equity flows. Furthermore, the counter-cyclical behavior of fund flows has become more significant after the global financial crisis. In line with previous studies, we also conclude that global factors dominate the behavior of international fund flows.

Chapter 5 addresses the final research question. We analyze the behavior of international fund flows and investigate the dynamic interaction between international fund flows, equity returns and exchange rates in this chapter. Employing equity flow data for 55 countries from January 1996 to December 2015, we first examine the correlation of fund flows among countries and find that international equity flows are positively correlated across countries and even more so within regions. In other words, a country appears to attract more equity flows if its neighbors also attract equity flows. Then, we employ the correlation method and panel-VARX models to investigate the interaction between international fund flows, equity returns and exchange rates. We find that (i) larger equity inflows are associated with a currency appreciation and higher equity returns in the following one to five months; (ii) higher domestic equity returns are associated with
ensuing domestic currency appreciation; and (iii) higher equity returns will result in equity inflows in first month after the shock and lead to equity outflows in the following three to five months. In addition, the interaction between international fund flows, equity returns and exchange rates is more significant in developing countries than in developed countries, suggesting that financial volatility stemming from international fund flows are more substantial in developing countries.

Chapter 6 summarizes the main findings and policy implications. In addition, we highlight some limitations of the research.