



Volume 40, Issue 1

Post-crisis changes in the pattern of capital flows - The case of Korea

Youngjin Yun
Bank of Korea

Abstract

This paper investigates pattern changes in international capital flows after the Global Financial Crisis using the Korean case. It follows different types of capital flows into Korea during the last couple of decades in relation with policy reforms, and documents three significant pattern changes. First, banks' external borrowing was curbed while external lending started an increasing trend after the introduction of currency-based macroprudential policies. Second, residents' outward portfolio investments increased significantly outpacing incoming foreign portfolio investments. The outflow is closely associated with return differentials between domestic and foreign assets. Third, reserve accumulation slowed down, and its precautionary role is supplemented by central bank swap lines. Current account surplus continued, but the surpluses were saved in various forms of public/private assets, not just in reserves alone. Regarding these findings, I implement a simple VAR analysis to confirm (1) the increased resilience of the bank foreign borrowing to the VIX shocks, (2) the increased association of outward portfolio investment with the interest rate differential, and (3) the increased negative response of outward portfolio investment to the VIX shocks.

The views expressed in this paper are those of the author and should not be interpreted as reflecting the views of the Bank of Korea. I thank anonymous referees for providing valuable suggestions which have improved the manuscript in many aspects. I also thank Jongho Park, Kwanghee Nam and seminar participants at the 2019 annual meeting of Korea Money and Finance Association for helpful comments. I am responsible for any remaining errors.

Citation: Youngjin Yun, (2020) "Post-crisis changes in the pattern of capital flows - The case of Korea", *Economics Bulletin*, Volume 40, Issue 1, pages 601-611

Contact: Youngjin Yun - prudentyun@gmail.com

Submitted: August 31, 2019. **Published:** February 23, 2020.

1 Introduction

The Global Financial Crisis (GFC) was an event that altered behavioral patterns of many economic variables. Among those, the pattern of capital flows went through a drastic change. The crisis became “*global*” only through the help of international capital flows, and hence post-crisis policy reforms were focused on them. Indeed, the literature documents the contraction in cross-border bank flows and compositional changes of global liquidity toward corporate bonds after the crisis. Due to the complexity of granular behaviors of different flows through every type of financial instruments, and of different policy reforms occurred in different countries, however, we are still in need of more research for a comprehensive understanding of the changes.

Focusing on an individual economy with an open capital account and a considerable size, this paper provides a detailed illustration of changed capital flow patterns in relation with policy reforms. Previous works that analyze the world data narrowed their scopes to one or two types of capital flows while discussing policy changes only in a broad sense. In contrast, the current paper provides a comprehensive view of capital flows in and out of one particular country, Korea. It closely follows the diminishing volatility of bank flows, the wide swing of portfolio flows, and also the slowdown of reserve flows. Analyzing the capital flows, it differentiates gross inflows with gross outflows¹, and relate the changes to policy reforms.

Korea provides a good testbed for the study of post-crisis capital flows and policy reforms. It had one of the most open capital account before the GFC. After experiencing large-scale capital inflows and outflows over the GFC, the country reworked capital management framework. The reforms altered the pattern of capital flows, and I find those changes to be representative of what happened globally. Focusing on Korea, I discuss the changes in relation to specific reforms in policy practices or regulations.

The purpose of this paper is twofold. First, it characterizes capital flows into Korea in the last two decades in relation with relevant policy reforms: introduction of currency-based macroprudential measures, autonomous monetary policy, and less reliance on FX intervention. Second, I deploy vector autoregression (VAR) analysis to confirm the changed temporal patterns of capital flows with external shocks, and with return differentials between domestic and foreign assets. Without aiming to evaluate a specific policy reform, the analysis tests whether the capital flow became resilient to external shocks, and whether it became more sensitive to return rates in the post-crisis period.

Gazing out the long time window and wide scope of flows, this paper documents three important pattern changes in the post-crisis capital flows of Korea. First, domestic banks’ overseas lending (gross bank outflow) increased significantly after the GFC, while both volatility and size of the bank foreign borrowing (gross bank inflow) decreased. These are regarded as the results of the currency-based macroprudential measures introduced after the crisis. Second, the net portfolio outflow increased rapidly after the crisis, and this is related with the changes in return differentials between domestic and foreign assets. Lastly, the pace of reserve accumulation slowed down, and instead, central bank currency swaps were arranged with many countries. The continued current account surpluses were saved as various forms of assets abroad while all of it was absorbed by FX reserves before the crisis.

The VAR exercises assess changes in temporal patterns of capital flows in relation with the above findings. The results indicate that the sensitivity of gross bank inflows to external shocks is muted after the crisis. It shows that gross portfolio outflows are systematically

¹ Gross inflow is net purchases of domestic assets by foreign investors, and gross outflow is the resident investor’s net purchases of foreign assets.

associated with interest rate differentials after the crisis, and also that the outflow works to the benefit of the local financial market stability since it returns home when global risk rises.

The findings of this paper are in line with the previously documented post-crisis changes in global capital flows. Shin (2014) finds a sharp contraction of cross-border bank flows and a rise of corporate bond flows after the GFC, and name it as “*the second phase of global liquidity*”. Avdjiev et al. (2017) delve into the changes further, and find that the risk sensitivity of bank flows became weak while its sensitivity to the U.S. monetary policy became significant after the crisis. Ahmed and Zlate (2014) find that the interest rate differential became a more significant determinant of portfolio flows after the crisis. I document in this paper that Korea also experienced declines in volatility and size of gross bank inflows after the GFC, and that the portfolio flow became more associated with the return differential. As for the analysis on public flows, IMF (2019) notes that reserve accumulation of emerging economies have become far less significant while their current account surpluses have been continuing. This observation might come as puzzling to those who emphasized the mercantilist motive of reserve accumulation. I provide a decomposition of the balance of payment data for Korea to track how the current account surplus is supported by items other than international reserves. I relate the slowdown in reserve accumulation with increased central bank swap lines. While the above mentioned papers focus on a few types of capital flows to document stylized facts that are applicable to most countries, the current paper covers all types of capital flows and put together the previous findings using one country which is often regarded as a barometer of the world economy. Additional contribution of the current paper is that it highlights the recipient country’s policy reforms while the previous studies are mostly focused on the lender behavior.

The remainder of this paper is structured as follows. The next section overviews capital flows and related policies from 1999 to 2018 to document the three pattern changes. Section 3 deploys a simple VAR model to analyze capital flow responses to external shocks and return differentials. Section 4 summarizes and concludes.

2 Post-Crisis Policy Reforms and Capital Flows

After the 1997 Asian Financial Crisis, Korea moved to a new position in the impossible trinity, one which was becoming increasingly popular among emerging economies: it opened up its financial markets², let its exchange rate float freely, and introduced inflation targeting. The framework lasted 10 years before being reworked after the GFC. Macroprudential regulations were introduced to stabilize cross-border bank flows, and the country relied less on FX intervention while the monetary policy remained focused on domestic business cycles. This section documents three important changes in capital flow pattern after the crisis in relation with the policy reforms.

2.1 Cross-border bank flows and macroprudential policies

In the years preceding the crisis, global banks made a significant presence by funneling capital to many places around the world. The dramatic increase in cross-border bank flows was observed globally, and Korea was not an exception. Starting from 2006, capital inflows

² Bond market fully opened in December 1997; ceiling on foreign equity investment abolished in May 1998.

through banks increased significantly along with foreigners' domestic bond investment, each accumulating to nearly 100 billion dollars immediately before the GFC. The reasons behind the sudden surge of global bank flows are not fully understood yet. (Kaminsky, 2019) The bonanza, Korea experienced, however, is clearly fueled by a pull factor, a boom in local economic activities. The shipbuilding industry and asset management sectors were in a boom, and major firms in those industries sold forward dollars in large amounts through banks. Taking over forward dollars, the banks either borrow dollars or engage in buy-and-sell swaps to get dollar funds of the same amount as the forwards, and sell it in the spot market in order to avoid having FX position imbalances.³ This increased banks' short-term external borrowing and lowered the forward rate, which further increased capital inflows. The rapid increases in short-term external borrowing, FX forward transactions, and the inflows of foreigners' short-term bond investment all contributed to the FX-related instability during the GFC. Within the four months between the Lehman bankruptcy and the end of 2008, banks' external borrowing decreased by 50 billion dollars (Figure 1). The abrupt forced deleveraging in the banking sector triggered a combined currency and banking crisis.

After the crisis, a series of currency-based macroprudential policies are introduced to prevent recurrences of the increases in bank short-term external borrowing and FX forward transactions seen in the immediate pre-crisis period. Among those, three measures deserve close attention. First, banks' FX loan provision is restricted to those firms who use the fund overseas.⁴ The regulation affects both gross bank inflows and gross bank outflows. It reduces gross inflows because the banks now face a much smaller pool of FX borrowers so that there are less needs for them to borrow from abroad.⁵ On the other side, the regulation increases gross outflows by inducing banks to lend more to non-residents who are not regulated by the policy. The effect of this regulation can be seen from the left panel of Figure 1. It shows cumulative flows of cross-border bank lending and borrowing since 1999. The bank external lending (gross bank outflows) barely increased until 2007, but it started an increasing trend suddenly after the crisis. It reached 100 billion dollars, roughly a quarter of Korea's FX reserves by the end of 2018. On the contrary, bank foreign borrowing (gross bank inflows), which exhibited a large swing before the crisis, remains suppressed after the crisis.

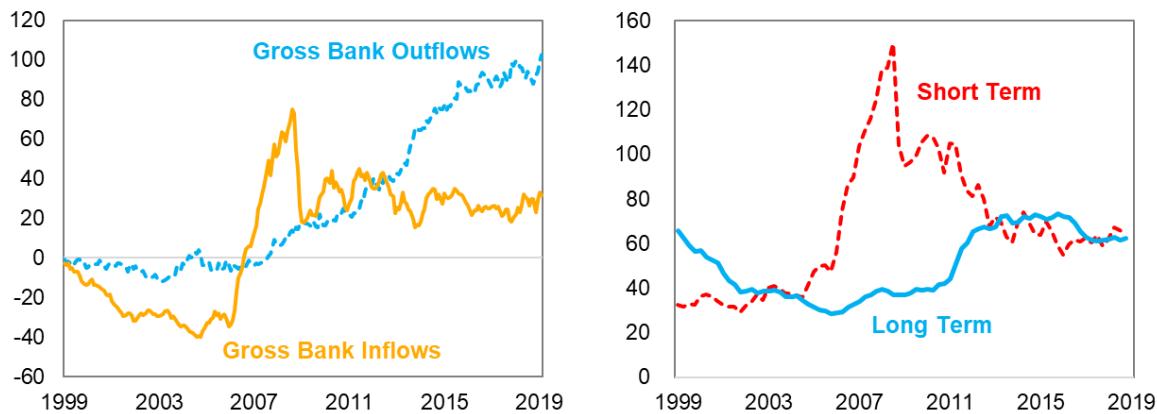


Figure 1. Effect of macroprudential policies. The left panel shows cross-border bank lending and borrowing. Cumulative flows from January 1999. The unit is billion USD. The right panel divides the stock of bank external debt into short-term and long-term. The unit is billion USD.

³ Chung, Park and Shin (2014) explain this process in detail.

⁴ This regulation was first introduced in August 2007, and strengthened later in July 2010.

⁵ Local banks borrow from global banks in U.S. dollars to lend to corporate borrowers. The "double-decker" model of Bruno and Shin (2014b) incorporates this intermediation process.

Second, ceilings are introduced on the FX derivatives positions of banks (October 2010). It limits the positions to be some multiples of capital. This measure has an effect of curbing banks' external borrowing, since the borrowed funds typically go through the swap market. It also encourages more capitalization of banks, and more long-term borrowing of foreign bank branches since the ceilings are proportional to capital and long-term funding (for the foreign branches). Third, a bank levy is introduced for banks' short-term external borrowing (September 2011). The levy made short-term borrowing more expensive relative to long-term borrowing. The policy is aiming to lengthen the maturity of banks' foreign borrowing and to reduce volatility of bank borrowing. The right panel of Figure 1 hints at the effect of bank levy and the FX derivative regulation. After the crisis, banks' short-term borrowing decreased significantly, while long-term borrowing increased. The reduced volatility of gross bank inflows in the left panel could also be a combined result of these policies.

The early assessments of the macroprudential policies are that it enhanced external resilience by reducing the maturity mismatch of banks and the currency mismatch of firms (Bruno and Shin, 2014a; Kim, 2014).⁶ Later in Section 3, I analyze the resilience of gross bank inflows to VIX shocks comparing the periods before and after the GFC. By reducing the bank flow volatility the macroprudential policies also helped monetary policy be more autonomous. The monetary policy focused more on domestic business cycles, but then it affected the portfolio flow which is discussed in the following subsection.

2.2 Portfolio flows and return differentials

Previous studies document that interest rates are important determinants of portfolio flows. The traditional push and pull factor literature of capital flows includes advanced countries' interest rates as push factors, and domestic return rates as pull factors. Recent studies reconfirm the significance of interest rates in determining capital flows and some find that the sensitivity of flows to interest rate differentials increased after the GFC.⁷

Portfolio flows into Korea are also closely related with interest rate differentials. The left panel of Figure 2 plots cumulative net portfolio outflows along with the interest rate differential as calculated as Korean policy rate less Federal funds rate target. After the crisis, the negative correlation between them became more apparent. Although the central bank was newly mandated with financial stability after the crisis⁸, monetary policy was kept focused on domestic business cycles which was desynchronized with the U.S. cycle. The policy rate differential had a large swing during the last 10 years, and the cumulative portfolio flows followed the swing in the opposite direction. The right panel decomposes the net flow into gross outflows and gross inflows. Immediately after the crisis portfolio inflows increased rapidly, pushed by abundant global liquidity generated from quantitative easing of advanced economies. The gross inflows later slow down especially after 2015 when the U.S. interest rate normalization begins.

⁶ There are, however, more recent studies documenting unintended consequences of the policies. Ahn et al. (2019) finds that the bank levy made regulatory arbitrage possible. Yun (2019) finds that the increases in foreign banks' long-term borrowing are mostly tag-changes of previous short-term borrowing from parent banks.

⁷ Ammer et al. (2019) find that lower home interest rates induce investors from other countries to increase U.S. corporate bond investment. Ahmed and Zlate (2014) find that interest rate differentials are important determinants of capital inflows into EMEs, and that the sensitivity of the flows to interest rate differentials increased during post-crisis period.

⁸ Korea began discussing the financial stability mandate of the central bank after the crisis, and in 2011, it required the central bank to pay attention to financial stability as it carries out monetary policy.

A more notable change happened to gross portfolio outflows. It increases sharply from around 2012 as the return differential begins downward trend. Population ageing is related with the increased sensitivity of gross portfolio outflows to interest rate differentials. The share of elderly population aged 65 and above in total population recorded 15.6 percent in 2010, but it is forecasted to rise above 60 percent by 2040. Due to the demographic change, saving demand is rising quickly. Pension funds, insurance companies and mutual funds are collecting large funds which are sensitive to small differences in yields. The institutional investors are increasing foreign assets in their portfolio seeking for additional yields while return rates in the local financial markets remain at low.⁹

The sizable gross portfolio outflow boosts foreign exchange demand both in spot and derivative markets, and by doing so, it helps keep foreign capital inflows continue even when local interest rates are lower than the U.S. rates. Also, when foreign capital leaves the country due to rising global risk aversion, the gross portfolio outflow ceases and returns home supporting the local market stability. In Section 3, I examine how gross portfolio outflows respond to both VIX shocks and interest rates differentials in the pre- and post-crisis periods.

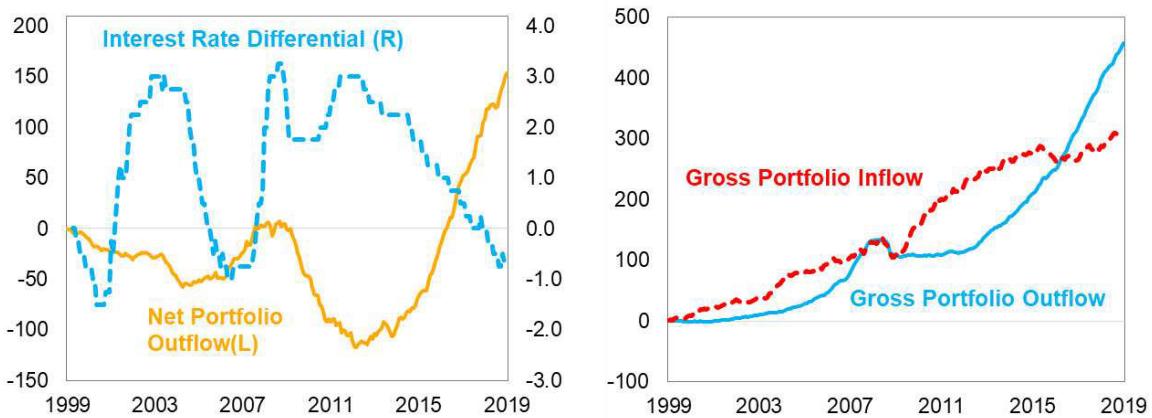


Figure 2. Portfolio flows and the interest rate differential. The flows are cumulative from January 1999. The unit is billion USD. The rate differential is the BOK base rate less the Federal funds rate target upper limit. The unit is in percentage.

2.3 Public and private saving abroad

International reserves proved to be useful during the GFC, but they were also found to have limitations. During the second half of 2008, Korea unloaded roughly a quarter of its accumulated reserves, but it was only after the currency swap arrangement with the Fed that the market calmed down. The pace of reserve accumulation apparently slowed down after the crisis. The left panels of Figure 3 shows the cumulative reserve accumulation (as it appeared in the balance of payment) since January 1999. After 2010, the slope of reserve flows declined compared to the pre-crisis period. The average monthly accumulation is 1.7 billion dollars during 1999-2007, but it is 1.0 billion during 2011-2018. Given that the flow includes interest accrued on the accumulated stock of reserves, one can infer that FX intervention has been minimal in the later period. The change is more apparent in the dotted line which plots reserve-to-GDP ratio using the second axis.

⁹ Insurance companies' investment abroad is, in part, affected by the change in accounting standard (IFRS 17, scheduled for 2022). It induces the companies to hold more long-term assets which are scarce in local markets.

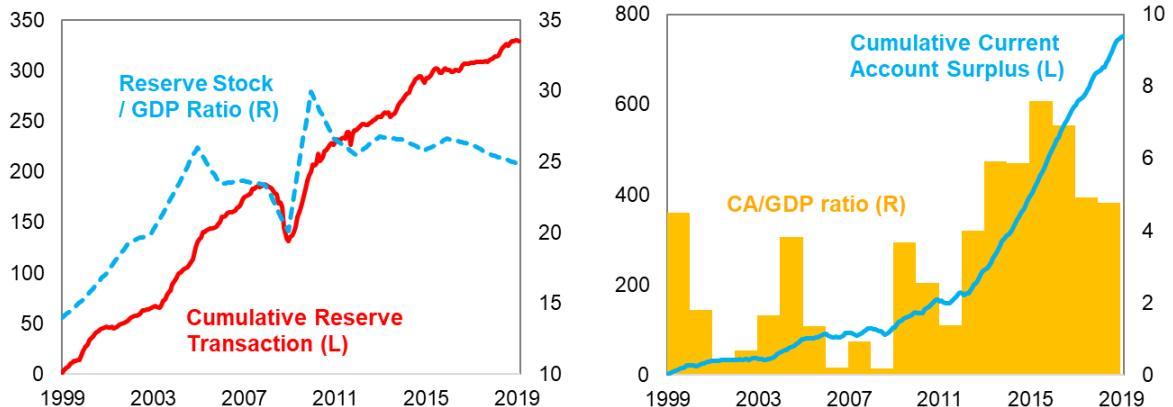


Figure 3. Reserve accumulation and current account surplus. The solid lines in both panels show cumulative flows since January 1999. The unit is billion USD. The dotted line in the left panel and bar chart in the right panel use the right axes, and the unit is in percentage.

The precautionary role of FX reserves is complemented by currency swap arrangements with major countries. While keeping international reserves at a level commensurate with the size of the economy, the central bank has sought to enter into currency swap arrangements. Before the crisis, it had swap lines only with some neighboring countries: China (2002), Malaysia (2002) and Indonesia (2003). After the crisis, the list expanded to include more countries that can offer global safe-haven currencies: UAE (2013), Australia (2014), Canada (2017), and Switzerland (2018).

Although the pace of reserve accumulation slowed down, the current account surplus has not only continued onward but increased significantly in size (the right panel of Figure 3). When the current account surplus was accompanied by heavy reserve accumulation before the crisis, many suspected that the surplus was driven by FX intervention. But now, the country is recording even larger surpluses without significant reserve accumulation. Current account equals financial account (net capital outflows), and hence this means the current account surplus has been saved as financial assets other than FX reserves after the crisis.

Balance of payment identity can be re-organised as follows:

$$\begin{aligned}
 \text{current account} &= \text{financial account} \\
 &= \text{net public outflows} + \text{net private outflows} \\
 &= (\text{reserve flows} + \text{government flows}) \\
 &\quad + (\text{net outward direct investment} + \text{net portfolio outflows} \\
 &\quad + \text{net bank outflows}) + \text{etc.}
 \end{aligned}$$

Table 1 shows the cumulative sum of each item in the last equation above during the periods of pre-crisis (1999-2007), crisis (2008-2009) and post-crisis (2010-2018).

Before the crisis, the rapid growth of reserves absorbed both current account surpluses and private capital inflows (the negative figures in the private outflows). After the crisis, however, the role of reserve accumulation shrank and instead, other types of capital outflow increased significantly. First, outward direct investment increased a lot surpassing incoming FDI. The net direct investment recorded 171.9 billion dollars outflows. Second, net private portfolio outflows (64.9 billion dollars) and net bank outflows (82.3 billion dollars) increased significantly as discussed in the previous subsections. They recorded net inflows before the crisis. Third, the public outflow in the form of the national pension (NPS) became significant

(131.0 billion dollars). Reserve accumulation covers only 21 percent of the current account surplus in this period (129.9 billion dollars). In contrast, it was 181 percent of the surplus during the pre-crisis period. To sum up, current account surpluses were saved abroad as FX reserves before, but those are saved as various forms of public/private foreign assets after.

Period	Current Account	Financial Account				
		Net Public Outflows		Net Private Outflows		
		Reserve Flows	Gov't (NPS)	Direct Investment	Portfolio Outflows	Bank Outflows
1999-2007	103.6	187.8	17.6	-16.2	-15.9	-44.5
2008-2009	34.8	12.2	-6	16.7	-48.0	29.1
2010-2018	608.4	129.9	131.0	171.9	64.9	82.3

Table 1. Rearranged balance of payment. summed over each of the three periods, in billion USD.

Reserve hoarding is now substituted with accumulation of various types of assets abroad and currency swaps. This change has an important implication for financial stability. Forbes and Warnock (2012) observe from international data that sudden stops (sudden outflows by foreigners) and retrenchments (sudden inflows by residents) tend to come together. Broner et al. (2013) also find that gross capital inflows and outflows are positively correlated and that both are procyclical. The accumulated foreign assets might be redeemed and help the economy when it is hit by sudden outflows of foreign capital. Indeed, Hansen and Krogstrup (2019) argue that capital flows into Korea became resilient to global risk-off shocks after around 2014 due to strengthened local institutional investor base. They provide a few recent events as anecdotal evidence. In the next section, I analyze responses of gross portfolio outflows to global risk shocks. The result is in line with the findings of the above studies.

3 Evidence from VARs

In this section, I implement a simple recursive VAR analysis on capital flows. The analysis focuses on the three observations from the previous section, and sees whether gross bank inflows became more resilient to the VIX shocks, whether portfolio outflows became more sensitive to interest rates, and whether the retrenchment (i.e. negative responses of gross outflows to risk shocks) became stronger.¹⁰

First, I test how resilient bank foreign borrowing is to external shocks, and how it is different before and after the GFC. The macroprudential policies introduced after the crisis were focused on curtailing the volatility of gross bank inflows. Hence, I am interested to know whether the gross bank inflow became less sensitive to external shocks after the crisis. I do not attempt to causally evaluate individual policy reforms, but rather, I intend to see how responses of the flow to external shocks became different after the GFC as a result of many

¹⁰ Hence, I study bank flows and portfolio flows only in this section. I do not try to analyze the other types of flows because the determinants of the flows are very different. For example, direct investment is determined by non-financial firms which consider labor costs or accessibility to markets in their decision on where to establish new factories. The reserve flow is governed by the central bank which considers all macroeconomic conditions.

changes including all those policy reforms.

Second, I check how the gross portfolio outflow is associated with the return differential between domestic and foreign assets. After the crisis, gross portfolio outflows increased significantly, and it happened together with a continued decrease in interest rate advantage of domestic assets over foreign assets. I argued in subsection 2.2 that the sensitivity of portfolio flows to interest rates increased. Therefore, I want to assess the change in temporal pattern of return differentials and gross portfolio outflows through the VAR framework.

Third, in subsection 2.3, I found that the large current account surpluses were saved in various forms of public/private assets other than FX reserves. I drew an important policy implication from the previous literature that gross capital outflows tend to move in the opposite direction to gross inflows thereby making local financial markets more resilient. I test this by checking the response of gross portfolio outflows to external shocks.

Monthly balance of payment data is used. The focus is on gross bank inflows and gross portfolio outflows. The monthly flows are made real by the U.S. CPI (=100 in Dec. 2015). The sample period is from January 1999 to December 2018, but I exclude the crisis period (Jul. 2008 - Jun. 2009). I divide the sample into before-crisis (Jan. 1999 - Jun. 2008) and after-crisis (Jul. 2009 - Dec. 2018), and hence both of them have 114 observations equally.

I try to stay in the most parsimonious possible model to avoid overfitting and to keep a clear grasp of the results. For the external shock, I consider the VIX index. It measures the option volatility of the S&P 200 index, but it has many other interpretations in the literature. It is a measure of uncertainty, global risk appetite, and also the Global Financial Cycle (Rey, 2015). Hence, it is suitable as a representative index of external risk shocks. For the proxy of the return differentials of domestic and foreign assets, I use the policy rate differential between Korea and the U.S. The policy rates affect return rates of all the other assets, and therefore the gap would serve as a good proxy for return differentials in various kinds of assets. With these variables, I construct a VAR model as follows:

$$A(L)y_t = \varepsilon_t$$

$$y_t = [Flows_t, ID_t, VIX_t, REXR_t]'$$

A is a lower triangular matrix, and ε is a vector of orthogonal shocks. $Flows$ is one of the two types of capital flows, ID is the policy rate gap, and $REXR$ is the real exchange rate.

The ordering of the variables follows the VAR convention. Slow moving variables come first and fast changing market variables come later. The monthly capital flow is a quantity variable cumulated over 30 days, and hence I place it before the other price variables. The policy rate gap evolves through periodic decision making by the central banks, thus it is ordered before the VIX index which changes instantaneously by news. The real exchange rate comes next. The resulting order of variables is similar with Bruno and Shin (2015) or Rey (2015) who find strong influences of the U.S. monetary policy and VIX on global capital flows. I estimate four different VARs for the two different flows (gross bank inflows, and gross portfolio outflows) and two different periods (before and after the crisis). Lag order is one following suggestion of the formal test by SBIC.

Figure 4 shows the responses of capital flows to VIX shocks. Graphs in the first column show responses of before-crisis, and the second column is for after-crisis. The first and second rows show gross bank inflows and gross portfolio outflows, respectively. It is very clear that the sensitivity of bank gross inflows to external shocks is muted after the GFC. Before the crisis the external borrowing of banks decreased significantly after external shocks. After the crisis, however, no effect is found. This is likely showing the effectiveness of the macroprudential policies which focused mainly on gross bank inflows.

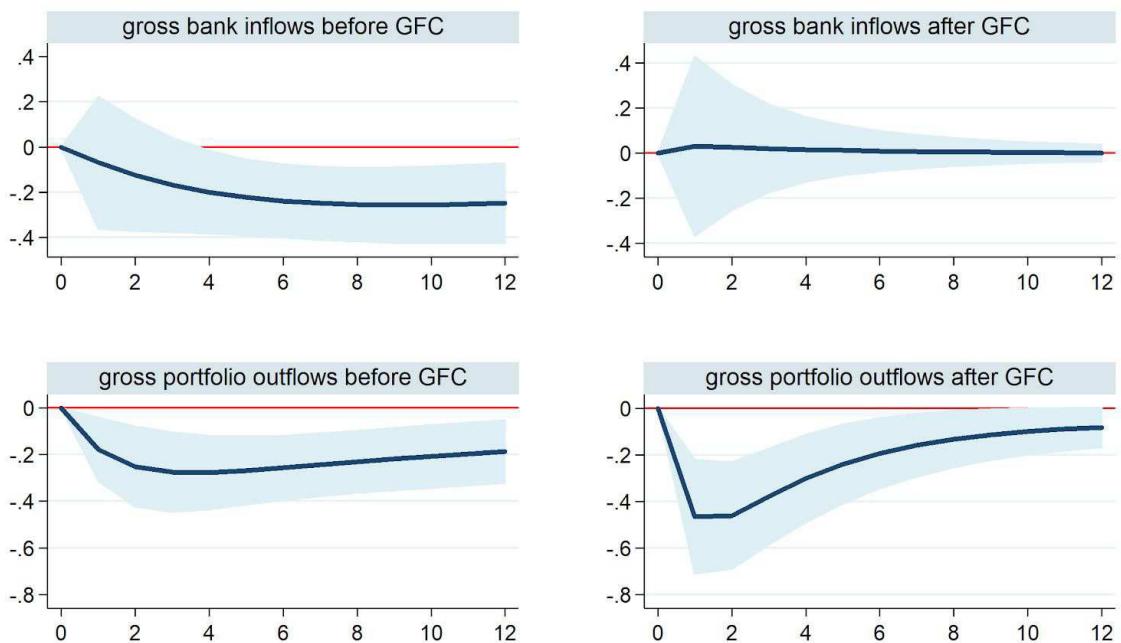


Figure 4. Responses of capital flows to one standard deviation shock in VIX. 90% confidence bands are shown. The standard deviation is 6.3 before GFC (Jan. 1999 - Jun. 2008), and 5.8 after GFC (Jul. 2009 - Dec. 2018). The vertical axis unit is billion USD.

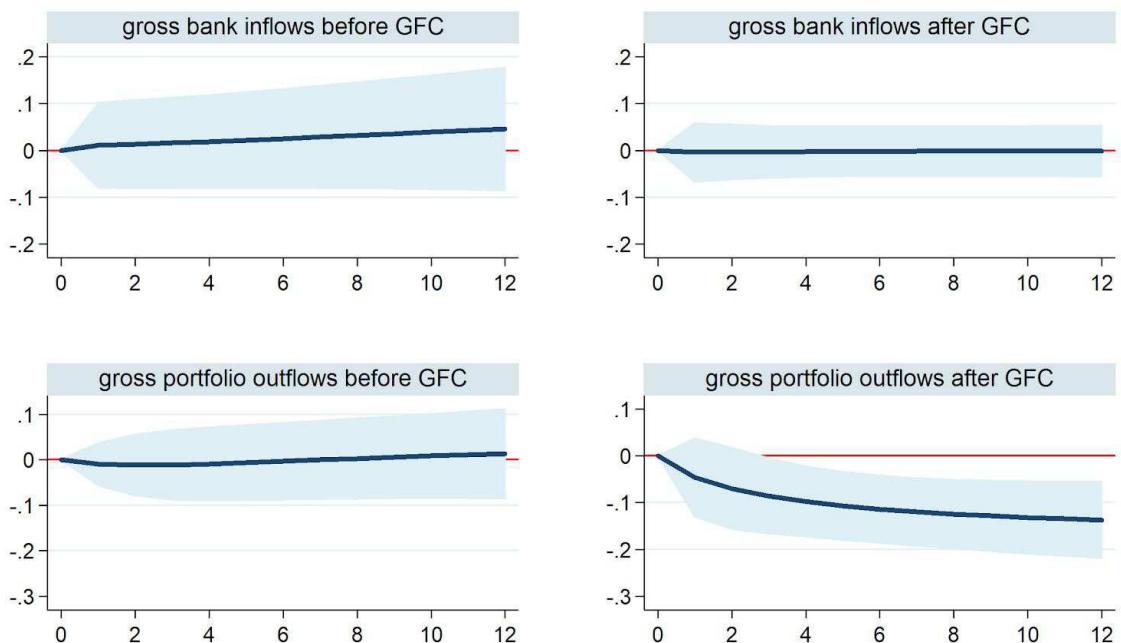


Figure 5. Responses of capital flows to one standard deviation shock in the interest rate differential. 90% confidence bands are shown. The standard deviation is 1.5 before GFC (Jan. 1999 - Jun. 2008), and 1.1 after GFC (Jul. 2009 - Dec. 2018). The vertical axis unit is billion USD.

In the second row, gross portfolio outflows show significant decreases after a VIX shock, and the response is more significant after the crisis. This provides evidence for the “retrenchment” meaning that the resident’s overseas investment decreases in the time of high global risk aversion. The larger response in the post-crisis period may be a result of much larger stock of overseas investment by domestic institutional investors. Hence, the result is consistent with the conjecture of Hansen and Krogstrup (2019).

Figure 5 shows the responses of capital flows to a shock in the interest rate differential. For the gross portfolio outflow during the post-crisis period, I find a clear sign of inflows (decreases of outflows) after a rise in the interest rate gap. The effect is not found in the pre-crisis period. These results confirm the increased sensitivity of domestic investors’ overseas investment to yields.

The VAR results are robust to various changes. I tested increasing the lag order to two, and also different ordering of the variables. The results qualitatively stay the same.

4 Conclusion

This paper is an effort to better understand the post-crisis capital flow in relation to policy reforms. After the crisis, Korea reworked its capital flow management policies: it introduced new macroprudential measures; financial stability objective was added to monetary policy which in practice focused on domestic business cycles; it relied less on FX intervention while expanding central bank swap lines. The renovated framework changed the landscape of post-crisis capital flows. The cross-border bank borrowing was curbed and became less sensitive to external shocks, while the bank’s external lending started an increasing trend. The declining merit of domestic assets in terms of yields fueled a surge in portfolio outflows. The outflows are found to be of help in the time of high global risk aversion, because they return home when foreign investors retreat. The proceeds of trade surplus were entirely absorbed by FX reserves before the crisis, but it is saved abroad in various forms of assets after the crisis. Overall, the findings suggest that capital flows into Korea evolved in ways that are more stable and sustainable, and that the post-crisis policy reforms managed to mitigate the volatility of capital flows at least to some extent.

References

- Ahmed, S., and Zlate, A. (2014). “Capital flows to emerging market economies: A brave new world?” *Journal of International Money and Finance*, 48, 221-248.
- Ahn, J., Kim, Y., Lim, H., and Schnabl, P., (2019). “For whom the levy tolls: The case of a macroprudential stability levy in South Korea” mimeo.
- Ammer, J., Claessens, S., Tabova, A., and Wroblewski, C. (2019). “Home country interest rates and international investment in U.S. bonds” *Journal of International Money and Finance*, 95, 212-227.
- Avdjiev, S., Gambacorta, L., Goldberg, L. S., and Schiaffi, S. (2017). “The shifting drivers of global liquidity” NBER working paper number 23565
- Broner, F., Didier, T., Erce, A., and Schmukler, S. L. (2013). “Gross capital flows: Dynamics and crises” *Journal of Monetary Economics*, 60, 113-133.
- Bruno, V., and Shin, H., (2014a). “Assessing macroprudential policies: case of South Korea” *The Scandinavian Journal of Economics*, 116(1), 128-157.
- _____, (2014b). “Cross-border banking and global liquidity” *The Review of Economic Studies*, 82(2), 535-564.
- _____, (2015). “Capital flows and the risk-taking channel of monetary policy” *Journal of Monetary Economics*, 71, 119-132.
- Chung, K., Park, H., and Shin, H. S. (2014). “Mitigating systemic spillovers from currency hedging” in *Volatile Capital Flows in Korea* (pp. 217-244). Palgrave Macmillan, New York.
- Forbes, K. J., and Warnock, F. E. (2012). “Capital flow waves: Surges, stops, flight, and retrenchment” *Journal of International Economics*, 88(2), 235-251.
- Hansen, N. J. H., and Krogstrup, S. (2019). “Recent shifts in capital flow patterns in Korea: An investor base perspective” IMF working paper number 19/262
- IMF (2019). “Global imbalances” Report for the Group of Twenty.
- Kaminsky, G. L. (2019). “Boom-Bust Capital Flow Cycles” NBER working paper number 25890
- Kim, C., (2014). “Macroprudential policies in Korea – Key measures and experiences” *Financial Stability Review*, Banque de France, No.18, 121-130.
- Rey, H. (2015). “Dilemma not trilemma: the global financial cycle and monetary policy independence” NBER working paper number 21162
- Shin, H. S. (2014). “The second phase of global liquidity and its impact on emerging economies”. in *Volatile capital flows in Korea*, pp 247-257. Palgrave Macmillan, New York.
- Yun, Y., (2019). “Cross-Border Bank Flows through Foreign Branches and the Effect of a Macroprudential Policy” mimeo.