LIVING WITH VOLATILITIES: CAPITAL FLOWS AND IMPLICATIONS FOR CENTRAL BANK POLICIES IN MONGOLIA

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ABSTRACT

This paper examines the capital flows in Mongolia and its macroeconomic policy implications, especially for the monetary policy during substantial fluctuations of the capital flows. We also determine main drivers of the capital flows using cointegration analysis in case of Mongolia. Our findings indicate that Mongolia implemented relatively counter cyclical monetary and macroprudential policies during the both periods of capital inflow surges, sudden stop and reversal. However, procyclical fiscal policy could not amortize volatilities of the capital flows, contribute to the sustainable economic growth, and encourage financial stability. The analysis of the determinants of the capital flows in Mongolia suggests that FDI inflows are the most important in Mongolia and the key determinants of the FDI are commodity prices (copper, coal and gold) and home country risk indicators (government external debt). Therefore, we recommend that comprehensive macroeconomic policies, countercyclical fiscal policy, domestic financial markets development, non-debt government external financing, and economic diversification are essential to smooth the negative effects of capital flow volatilities.

I. INTRODUCTION

Mongolia is a small open economy which is transited to a market economy in early 1990s. Over the last two decades, Mongolia privatized most of its public enterprises and assets, created a two-tier banking system, and liberalized its foreign trade and capital flows, opened the door to both residents and non-residents to make private investment and operate in FX market by creating basic regulations.

Although the residents are still limited to invest abroad due to their low level of capital accumulation, substantial growth of the non-residents investment inflows indicate deeper integration of Mongolia with the international markets. In Mongolia, the economic growth skyrocketed by reaching an all-time high of 17.3 percent, which was one of the highest across the region of the South-East Asia in 2011 due to a FDI inflow surge ensued from a mining boom after the global financial crisis of 2008/09.

However, the country has been facing a number of challenges such as unsustainable economic growth, high fiscal deficit and external imbalance, inflation and exchange rate pressures, and financial instability as a result of the recent capital inflows volatility. Therefore, Mongolia is currently paying more attention to implement appropriate macroeconomic policies that will contribute to sustainable growth and sound economic and financial developments while mitigating macroeconomic risks related to the capital volatility.

Thus, this paper aims to examine nature and characteristics of the recent capital flows in Mongolia and driving forces behind it. We mostly focus on the FDI flows because it is the most significant and persistent flows in Mongolia, and creates the largest volatility. We also review recent policy implications of the capital flows volatility in Mongolia. Finally, we provide some policy recommendations how to manage the volatile capital flows and to mitigate adverse effects induced from the volatilities.

The paper is structured as follows. Section 2 briefly discusses the capital flows by describing its compositions, volatilities, openness and determinants. Section 3 reviews macroeconomic policy responses to the recent capital flows volatility and its policy challenges in Mongolia. Then, the section 4 concludes and discusses some policy recommendations for Mongolia regarding the capital flows management.

II. NATURE AND CHARACTERISTICS OF THE CAPITAL FLOWS IN MONGOLIA

2.1. Recent Trends and Major Components

The gross capital flows[50] of Mongolia's balance of payments (BOP) were generally diversified with both non-resident inflows and resident outflows prior to the mining boom, which started in 2010. After transition to a market economy in early 1990s, Mongolia privatized most of its state assets, but residents have not accumulated enough capitals to invest abroad in large amounts. Therefore, the resident outflows in Mongolia have been relatively small until today.

Figure 1. Mongolia: Capital Flows52
percent of GDP
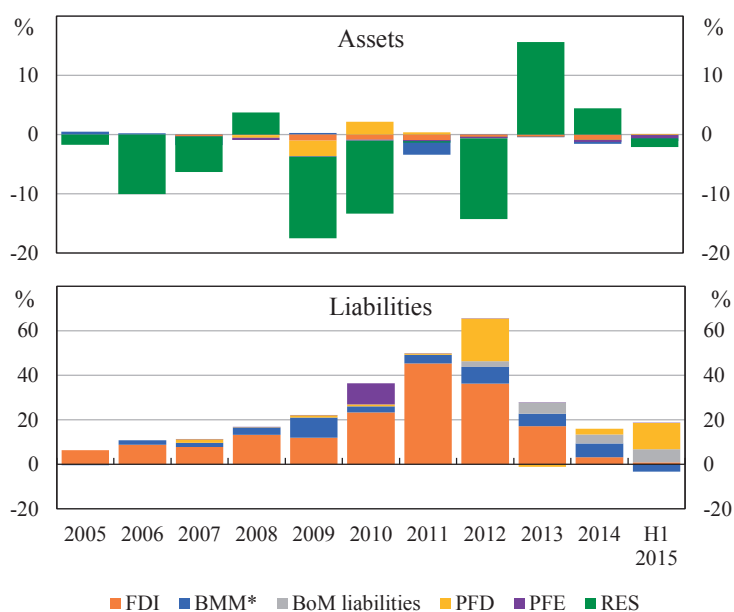
* The flows through the currency and deposit account (other than BoM liabilities) and BoM liabilities are excluded from the BMM.

Source: IMF-ICS database; Bank of Mongolia (BoM)

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[50] International standards specify that the 'financial' account is the main counterpart to the current account. However, since we are mainly discussing capital flows we prefer to use the term capital account to avoid confusion. The actual item in the official statistics that is called the capital account is usually very small and adds little to the analysis at hand.

[51] Here, FDI is foreign direct investment, PFE is portfolio equity investment, PFD is portfolio debt investment, BMM is bank and money market flows, RES is the change in official foreign exchange reserves.

In contrast, the public and private sector loans and foreign direct investment (FDI) into the domestic economy have been more persistent and large. Thus, the capital flows of Mongolia had been mainly driven by the FDI and bank and money market inflows (BMM)[52] prior to the global financial crisis of 2008/09, but size of the flows was relatively small compared to the recent flows.

During the global financial crisis of 2008/09, Mongolia experienced an excessive foreign exchange (FX) shortage due to significant decline in exports and the FDI inflows, which resulted a large exchange rate depreciation, substantial drop of international reserves, and economic and financial vulnerabilities. Therefore, Mongolia implemented 18-month SBA program of the International Monetary Fund (IMF) which was amounted US$229.2 million to stabilize the economy in 2009.

Due to this economic difficulty, the Government of Mongolia (GoM) highlighted the importance of having long-term sustainable sources of FX and paid more attention to attract foreign investment into the domestic economy after the crisis. During that period, a number of untapped and already explored mineral deposits were ready to be exploited in Mongolia. The GoM rushed to start exploiting those mines, considering them as a sustainable source of FX through both exports and FDI inflows. Then, the GoM accepted a number of exploiting licenses on mining sector from the owners of foreign-invested companies until 2012 when the license issuance was temporarily stopped. We call the period between 2010 and 2012 as a "mining boom" in Mongolia.

FDI in the mining sector significantly increased in years of 2010-2012 and became the biggest component of the capital inflows in Mongolia during the mining boom. It resides about 80 percent of total FDI inflows during the boom period while 70 percent between 2009 and 2014. The boom was mainly driven by a largest copper and gold project, Oyu Tolgoi (OT)[53] of which the total foreign investment was about US$6 billion (60 percent of

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[52] In the BOP these flows appear under the category of 'other investment'. As bank loans and money market transactions are the main components of this category, we refer to these flows as 'bank and money market' flows to lend them a more meaningful label.

[53] OT is one of the world's most advanced mines and is combined open pit and underground mining project in the south near the border with China. Oyu Tolgoi LLC is a strategic partnership between the Government of Mongolia (GoM) which owns 34 percent of the mine, Turquoise Hills Resources (Canada) and Rio Tinto (UK). The first phase or open pit investment and constructions are finished and second phase or underground mines investment is under negotiation between the GoM and Rio Tinto.

GDP) for its first phase. Therefore, we also call the period, 2010–12 as a capital inflow surge period in the following sections.

Although the second phase of the OT investment, amounted about US$4.5 billion, must have been started in 2013 according to investment agreement, it was postponed by undefined time due to the political disputes. In addition, public demonstrations against foreign ownerships of Mongolian strategic mines became a big social issue and the GoM temporarily stopped to issue licenses in the mining sector during 2012–15. A new law on the "Regulation of Foreign Investment in Business Entities Operating in Sectors of Strategic Importance" which was approved in 2012 also created an unpleasant environment for foreign investors. Therefore, the FDI has declined sharply because of the lack of favorable investment environment in domestic economy accompanied by weak global financial conditions, and drops in commodity demand and prices since the second half of 2012. Furthermore, the FDI inflows have become even negative because of the disinvestment or loss of those FDI related mining companies since the end of 2014. Thus, we call the period since 2013 as a capital stop or reversal in this paper.

Figure 2. Mongolia: FDI Inflows
percent of GDP
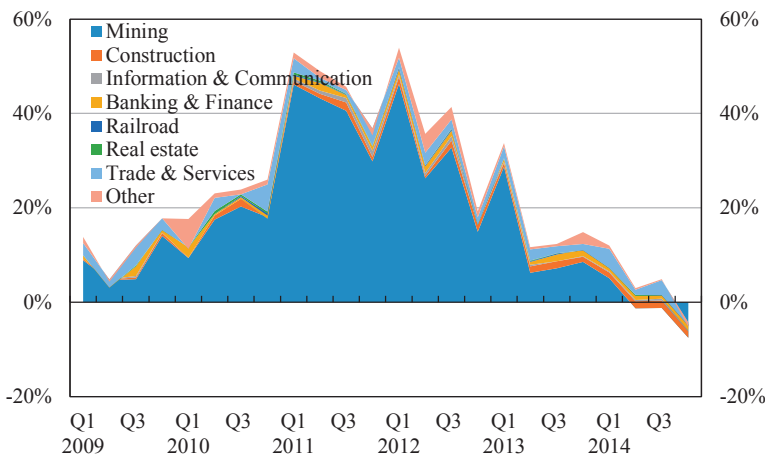
Note: When the foreign-invested companies operate with a net loss, it will be recorded in the FDI account of BOP as a disinvestment (negative FDI inflows).

Source: Bank of Mongolia

Mongolian foreign trade and financial accounts have been fully liberalized since 1990s, but the equity and bond investments had not been came into the economy until 2010. The non-banking sector is very small compared

to the banking sector which makes up 95 percent of the financial markets in Mongolia. The equity market is also unattractive because the market has a poor transparency and lack of efficiency, therefore any significant PFE inflows have not been came into Mongolia until today. Furthermore, Mongolian money market includes a few and limited instruments such as Central bank bills, Government notes and commercial certificates of deposit which are denominated in domestic currency and closed to foreign investors. However, after the foreign investors' optimism about the economic prospects since 2010, Mongolia became able to issue bonds in the international markets mainly owned and guaranteed by the GoM. For instance, the GoM, the state-owned Development Bank of Mongolia (DBM), some commercial banks and private companies raised a total of US$2.4 billion (25 percent of GDP) in 2012.

Initially, the bonds were issued to finance domestic infrastructure development and to provide short-term FX liquidity in the banking sector.[54] But, the bonds issuances and public sector external loan disbursements during the sudden stop of the FDI inflows tended to fill the balance of payments financing gap and short-term FX liquidity in the banking sector. Mongolia issued bonds amounted total of US$1.6 billion between 2013 and the first half of 2015 (see Table 1 for details). As a result, the PFE flows have become the second major source for the capital inflows in Mongolia.

Table 1. Mongolia: Successfully Issued Bonds and Equities
between 2007–15

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[54] In December 2012, the GoM issued US$1 billion and US$500 million sovereign bonds which have two different (10 and 5 years, respectively) maturity, and it reflects a large PFD increase in 2012.

Note: GoM = Government of Mongolia, DBM[56] = Development Bank of Mongolia, TDB =
Trade and Development Bank, MMC[57] = Mongolian Mining Corporation

Source: Bank of Mongolia

For the BMM, public sector concessional loans from international financial institutions such as World Bank, ADB, EBRD and banking sector commercial loans composed the significant part of the BMM and total capital inflows prior to the mining boom. However, these inflows became less significant after the mining boom. In addition, the specific foreign ownership structure of the biggest mining projects have been one of the main sources of the BMM outflows in the recent years. The foreign-invested mining companies started to export their products, however, Mongolia has not received its export income in full amount as the investors have not intend to save their income in domestic banks. Instead, they kept their export receipt in their bank accounts abroad and its balance of payments entry in the 'currency and deposits account' suggests that there have been large capital outflows for the past three years. Therefore, it should be noted that large part of the BMM outflows are the BOP entries mentioned above.

2.2. Volatility in the Capital Flows

In this section, we calculate the volatility of gross and net capital flows in Mongolia by types as a simple standard deviation. We consider three timeframes: 2005–07, 2008–09, and 2010–15.Q2 in order to show the variations of capital flows as illustrated in Table 2.

According to the calculation, volatilities of all types of the flows were relatively low prior to the global financial crisis, however, it increased during the turmoil of the crisis during 2008–09. After the crisis, volatility of non-resident capital inflows (liabilities) increased substantially because of the capital flows surge and sudden stop. We also found that non-resident flows are more volatile than the resident flows due to the small international investment position of the residents as discussed in the previous section.

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[55] In 2011, the government established the state-owned DBM in order to finance large mining and infrastructure projects and show great impact to the current development of Mongolia.

[56] MMC is the largest privately owned coal mining company in Mongolia. Established in 2005, it listed on the Hong Kong Stock Exchange in October 2010.

As we mentioned before, the FDI inflow is the most volatile capital flow among the different types of capital flows in Mongolia due to the strong dependence on the mining sector and commodity cycles. The fact that a few mining projects (OT and others) started and completed their investment stages almost at the same time was another factor that increased the volatility of the FDI inflows. Furthermore, the portfolio debt (PFD) and portfolio equity (PFE) inflows had a significant fluctuations during 2010–15. Q2 due to the bond and equity issuances that is represented in Table 1.

Table 2. Mongolia: Volatility of Capital Flows by Type
percent of GDP*

	Assets							Liabilities							Net						
	FDI	PFE	PFD	BMM	RES	DER	KAB	FDI	PFE	PFD	BMM	RES	DER	KAB	FDI	PFE	PFD	BMM	RES	DER	KAB
2005-07	0.2	0.0	0.0	4.7	7.5	0.0	7.6	4.2	0.0	2.8	2.0	0.0	0.0	5.3	4.1	0.0	2.8	4.7	7.5	0.0	7.8
2008-09	1.5	0.4	3.3	4.0	11.4	0.0	14.5	4.5	0.2	2.1	6.8	0.0	0.0	6.9	5.4	0.4	4.9	7.4	11.4	0.0	11.7
2010-15.Q2	0.7	0.2	2.1	8.8	14.6	0.0	17.9	18.1	6.4	11.8	8.0	0.0	0.0	25.7	18.2	6.4	12.1	12.1	14.6	0.0	15.3
Total	0.8	0.2	2.1	9.0	12.4	0.0	14.9	15.0	4.6	8.9	6.8	0.0	0.0	22.0	15.0	4.6	9.5	10.8	12.4	0.0	15.8

1	2	3	4	5	6	7

Lower ⟵ ⟶ Higher

* Volatility is measured as the standard deviation of the quarterly
flows as a percent of GDP.

Source: authors' calculations

The bank and money market (BMM) flow has been fluctuated significantly over time for both asset and liability sides, which is a reflection of the two sided flow in Mongolia. On the outflow side, the reserve flow was the most volatile. The reason is that the BoM intervened a lot in domestic FX market through its international reserves creating the high volatility in the reserve outflows in periods of 2013–15. It showed that the BoM has a fear of floating like many other emerging market economies (EMEs).

2.3. Openness to Capital Flows

Another measure that helps to understand characteristics of the capital flows and its volatility is a measure of openness to capital flows. As discussed by Becker and Noone (2009), openness to capital flows is one of the important factors that encourages volatility of capital flows and we calculate a very simple measure of degree of openness to capital movements in Mongolia. The index is defined as a ratio of absolute value of gross flows to absolute value of sum of gross and net flows as follows:

$$Flow\ Openness_{it} = \left[\frac{|Resident\ Flows_{it}| + |Nonresident\ Flows_{it}|}{|Resident\ Flows_{it}| + |Nonresident\ Flows_{it}| + |Net\ Flows_{it}|} - \frac{1}{2}\right] \times 200$$

According to the formula, we expect the sum of absolute gross flows to be large relative to the net flows when the capital flows of particular country freely in both directions. In this case, the index tends towards 100. In contrast, we expect the gross flows to be small relative to the net flows when the capital flows are very one-sided. The most extreme case would be where the gross flows (either assets or liabilities) are the same size as the net flows. This would occur if either resident or non-resident flows were completely restricted. In this case, the value of the index would be zero.

Figure 3. Mongolia: Openness to Capital Flows index
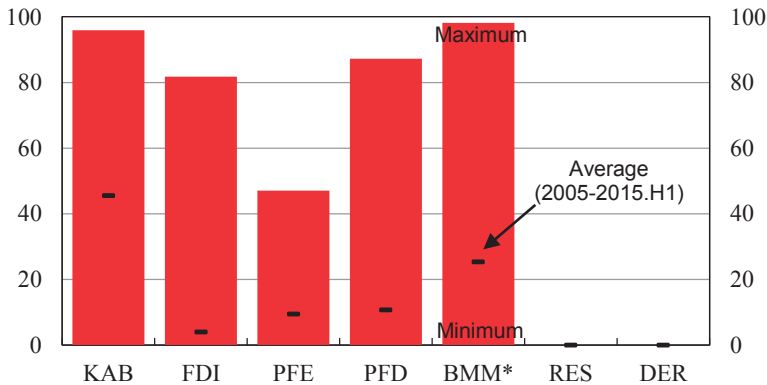
* BMM includes all the inflows and outflows of the 'other investment' account.

Source: authors' calculation

According to the calculation for Mongolia, the indices are relatively small for all types of flows reflecting that the capital flows of Mongolia are one-sided as mentioned in previous sections. In details, the portfolio equity, portfolio debt and FDI flows are mainly driven by non-resident inflows. The change in foreign exchange reserves is by definition always one-sided[57] and Mongolia has no derivative investments. But, the openness index for the total capital flows (KAB) is higher due to the asset flows of reserves and liability flows of other accounts. We also consider the flows might have a low openness because either resident or non-resident flows are inhibited due to a lack of domestic financial markets development.

2.4. Determinants of Capital Flows: Push and Pull Factors

The clear understanding of behavior of the capital flows is beneficial for

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[57] Foreign exchange reserves are resident assets and have no corresponding non-resident liability. Hence the gross flows are always entirely due to changes in resident assets and equal to net reserve movements. The index is anchored at zero by definition.
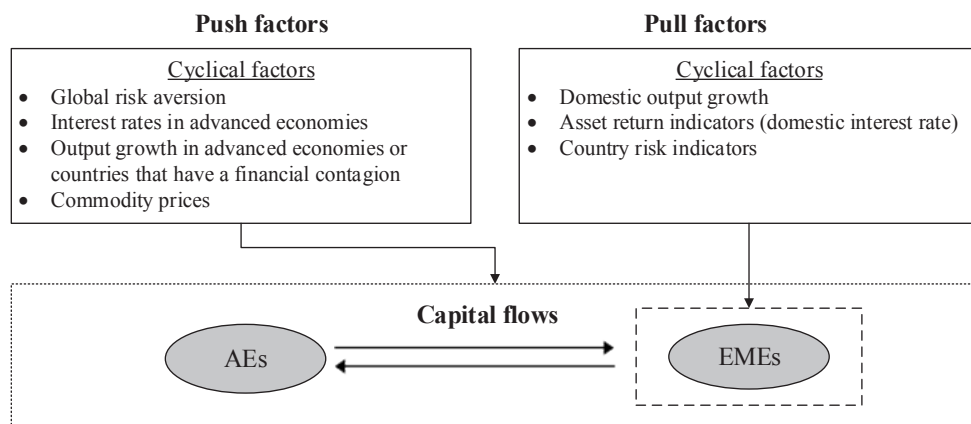
policy makers to implement appropriate policy responses to changes of them. Investigating main drivers of the capital flows is thus an important policy issue, which is reflected in significant academic interest since the early 1990s (Koepke, 2015). The reason is that appropriate policy response to the capital flows depends on the driving forces behind them.

The seminal work by Calvo, Leiderman and Reinhart (1992) and Fernandez-Arias (1996) introduced distinction between country-specific "pull" factors and external "push" factors and provided a theoretical framework. Fernandez-Arias (1996) and Taylor and Sarno (1997) found that capital inflows are generally driven by external factors, however, Ghosh and Ostry (1993) and Förster et al. (2014) argued that domestic economic fundamentals were the major driver of capital flows for a large group of emerging market economies (EMEs). The push-pull framework provides a simple and intuitive classification of capital flows drivers. Although the framework certainly has limitations (for example, international investors behavior and contagion effects are not included in this framework), it continues to be a useful analytical perspective for structuring the discussion on determinants of the EMEs capital flows.

Another corresponding dimension in the discussion of country–specific and global factors is distinction between cyclical and structural forces that affect to capital flows. The cyclical factors are naturally shorter–term and often vary across different phases of business cycle. On the contrary, the structural factors are more long-term and related to the macroeconomic fundamentals, institutions, and policy and regulatory frameworks (Koepke, 2015).

The characteristics of capital flows also differ between *net* and *gross* flows. The net capital flows are the mirror illustration of the current account balance. In contrast, the gross capital flows consider resident outflows and non–resident inflows separately (i.e., the changes in assets and liabilities in the financial account). For the purpose of understanding capital flow movements, the gross capital flows are more relevant. When explaining the gross capital flows movement, there has been much more focus on the cyclical factors, especially in the most recent period since the global financial crisis of 2008/09.

Figure 4. Determinants of Capital Flows

Push factors   **Pull factors**

Cyclical factors
- Global risk aversion
- Interest rates in advanced economies
- Output growth in advanced economies or countries that have a financial contagion
- Commodity prices

Cyclical factors
- Domestic output growth
- Asset return indicators (domestic interest rate)
- Country risk indicators

Capital flows

AEs   EMEs

Source: Koepke (2015); authors' view

In addition, Cerutti, Claessens and Puy (2015) concludes that global push factors in the advanced economies mostly explain the dynamics of aggregate inflows to the EMEs by conducting a systematic analysis of the sensitivity of 34 EMEs to global push factors for periods of 2001–13 and also using the factor model of Kose, Otrok and Whiteman (2003).

Koepke (2015) suggested that driving factors of capital flows differed across types of capital flows. For example, global risk aversion, mature economy interest rates and country risk have a clear negative relationships with the PFE, PFD and BMM flows while advanced and domestic economy growth, and domestic asset return have some positive relationships with these flows. Only domestic output growth and country risk have a clear relationships with the FDI flow in EMEs.

The panel estimation,[58] factor model[59] and the SVAR model[60] are widely used in the pull-push framework. However, simple methods such as a residual-based cointegration approach, proposed by Engle and Granger (1987) and Johansen VECM method are applied in this paper to determine push-pull factors of the capital flows of Mongolia.

Since the capital flows in Mongolia is largely one-sided and the FDI inflow is the most significant and sustained in Mongolia, we concentrate more on

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[58] See Alleyne and Mecagni (2014), Brana and Lahet (2008) to study further in this direction.

[59] The readers who want to study further, please see Cerutti, Claessens and Puy (2015), Förster et al. (2014), and Fratzscher (2012).

[60] For the papers in which the SVAR model is used to investigate the push-pull framework, see Çulha (2006), Korap (2010), and Boschi (2012).

the determinants of the FDI inflows. The recent sudden stop of the capital inflows in Mongolia is related to the decline of the FDI, thus investigating the driving forces is crucial for policy analysis.

Table 3. Data Definition

	Indicators	Choice of variable	Notation	Source
	Capital Inflows			
1.	Foreign direct investment	FDI (share of GDP)	FDI	IMF-ICS; BoM; NSO
2.	Bank and money market investment	BMM (share of GDP)	BMM	IMF-ICS; BoM, NSO
3.	Portfolio debt investment	PFD (share of GDP)	PFD	IMF-ICS; BoM, NSO
4.	Portfolio equity investment	PFE (share of GDP)	PFE	IMF-ICS; BoM, NSO
	Push Factors			
1.	Global risk aversion	VIX index	VIX	IMF
2.	Advanced economy output growth	U.S. GDP growth	GDP_US	BEA
3.	Output growth of a country that has a financial contagion	China GDP growth	GDP_CHN	Bloomberg
4.	Commodity prices	Copper price	COPPER	IMF
		Coal price	COAL	Bloomberg
		Gold price	GOLD	Bloomberg
	Pull Factors			
1.	Domestic output growth	GDP growth	GDP_MNG	NSO
2.	Interest rate differential (domestic rate minus advanced economy rate)	*Domestic interest rate:* Interbank weighted average rate minus CPI inflation *Advanced economy interest rate:* 3 month Libor minus U.S. CPI inflation	RATE_DIF	Bloomberg; BoM; authors' calculation
3.	Country risk indicators	Government external debt-to-GDP ratio	DEBT_GOV	BoM; NSO

Notes: BoM = Bank of Mongolia, NSO = National Statistical Office,
BEA = Bureau of Economic Analysis

Figure 4 presents all possible factors that might have affected to the FDI inflows of Mongolia and the data used in empirical analysis is defined in Table 3. Our data sample covers the period between 2006:Q1–2015:Q2.

Table 4. Drivers of Mongolia's Capital Flows

Type	Driver	FDI	BMM	PFD	PFE
Push	Global risk aversion (VIX index)				
	Advanced economy output growth (U.S.)				
	Outpu growth of the country that has financial contagion (China)				
	Copper price	(green)			
	Coal price				
	Gold price	(green)			
Pull	Domestic output growth				
	Interest rate differential (domestic rate minus foreign rate)	(green)			
	Country risk indicator	(red)			

(green)	Positive relationship
(gray)	No relationship
(red)	Negative relationship

Source: authors' illustration

According to unit root test, only FDI inflow is non-stationary among the types of capital inflows in Mongolia, thus, we do not apply the cointegration methodologies for the other types of flows. For the determinants, all the variables were non-stationary or $I(1)$ processes except the U.S. GDP growth. The integration orders of the variables estimated by the ADF test are illustrated in Table 6.

Table 5. OLS and VECM Estimation Results
Dependent variable: FDI inflows-to-GDP ratio

(a) Vector Error Correction Estimates		
Cointegrating Eq: CointEq1		
FDI(-1)	1.00	
DEBT_GOV(-1)	89.64	
	-9.45	
	[9.48]	
Error Correction:	D(FDI)	D(DEBT_GOV)
CointEq1	-0.75	0.00
	-0.17	0.00
	[-4.31]	[-1.05]
COPPER	23.69	-0.02
	-5.81	-0.04
	[4.07]	[-0.35]
COAL	12.95	-0.02
	-4.76	-0.04
	[2.72]	[-0.50]
GOLD	2.84	0.13
	-7.76	-0.06
	[0.36]	[2.30]
RATE_DIF*	0.47	0.00
	-0.18	0.00
	[2.59]	[0.49]
Adj. R-squared	0.36	0.06
Number of observations	37 after adjustment	

(b) OLS Estimates		
	Coefficient value	t-statistics
DEBT_GOV	-75.28	-9.10
COPPER	15.95	3.22
COAL	19.71	4.04
GOLD	15.57	2.44
D1*	-16.56	-2.78
Adj. R-squared	0.87	
Number of observations	38 after adjustment	

** D1 is the crisis dummy that takes a value of
1 in the third quarter of 2008.*

*Note: The residual of the above equation is
stationary process, thus these variables have
long-run relationship or cointegration with
the FDI inflows.*

** The real interest rate differential was I(1)
process, thus we include it in the equation as
an exogenous variable.*

*Note: ¹ Standard errors in ( ) & t-statistics
in [ ]*

*² According to the Trace test of Johansen
cointegration, it has 1 cointegrating eqn(s)
at the 0.05 level.*

Table 4 shows brief results of the estimations that we executed and some estimation outputs are shown in Table 5. As a small economy, Mongolia is unable to influence in the international commodity prices and mature economy interest rates, thus, those indicators are illustrated as an exogenous variables in the VECM. The Johansen cointegration technique is used to determine the number of cointegrating vectors in a VECM framework. The trace test is used in this respect and the trace test indicates presence of one cointegrating equation at the 5 percent significance level. On the other hand, residual of the OLS estimation was stationary from which we can conclude there is cointegration. The results of two model estimates are consistent with each other and the estimates satisfy the summary statistics and diagnostic tests. The residual tests show that there is no significant serial correlation and heteroscedasticity in the residuals. Recursive estimation (CUSUM test and CUSUM of Squares test) of the OLS model also suggests that the regression coefficients are stable over the sample period. This implies that the OLS estimation is stable.

The result approves that the FDI inflows in Mongolia is only one source of the sustainable and volatile flows. Furthermore, Granger causality test shows that the commodity prices affects the domestic GDP growth, and we remove the indicator of domestic GDP growth from the pool of determinant variables in order to avoid multicollinearity. In this paper, we also propose to analyze the importance of the commodity prices for capital flows volatility in Mongolia. In below, we mention about all the push and pull factors in detail and separately.

Push Factors of the FDI

Since the U.S. GDP growth rate is usually used as an indicator of the advanced economy output growth (Hernández, 2015) and the VIX[61] is used as an indicator of global risk aversion, we applied these indicators to our estimation as push factors to the FDI. However, we find no clear relationships of the global risk aversion and advanced economy growth with Mongolian FDI inflows, which is similar result with the illustration of Koepke (2015) obtained by over 40 empirical studies of the EMEs. In addition, our estimation suggests that China's GDP growth affects negatively to the FDI, which is theoretically insignificant, thus we eliminated this variable from the equation.

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[61]   See Forbes and Warnock (2012), Byrne and Fiess (2011), etc.

We find that prices of copper, coal, and gold which are main export commodities of Mongolia are the most important determinants of the FDI inflows, and impact positively. Ghosh and Qureshi (2012) also considers commodity price as a global factor for capital flow surges and concludes that a positive shock to the commodity price index raises the surge probability by about seven percent, however, commodity price booms have statistically insignificant effect. The surge in commodity price support the large FDI inflows to the extractive sector in many African countries (Rangasamy & Mihaljek, 2011). Additionally, Bastourre et al. (2012) suggests that increase in commodity price has an effect on the availability of external financing in EMEs that rely strongly on commodities.

Mongolia is highly dependent on exports revenue[62] in which the mining exports (copper, coal, gold, crude oil, iron ore, zinc, etc.) constantly make up about 90 percent of its total exports. The mining commodities of Mongolia are also comparatively competitive due to low costs, high quality and short distance to the Chinese markets, which attracts massive foreign investments into the sector. Furthermore, high growth performance of Mongolia fueled by strong commodity prices increases the investment even further. The GDP growth was on average 12.0 percent in the periods of commodity price surge in between 2010–12, but it decreased to 9.7 percent during 2013–14 when the prices declined significantly.

Figure 5. FDI Inflows and Commodity Prices
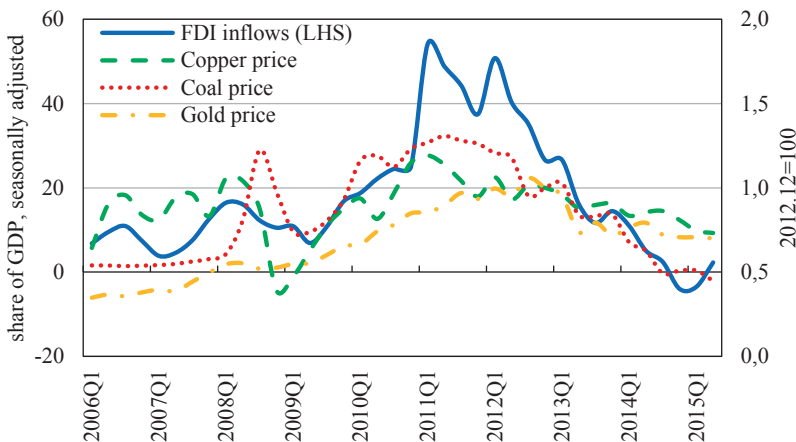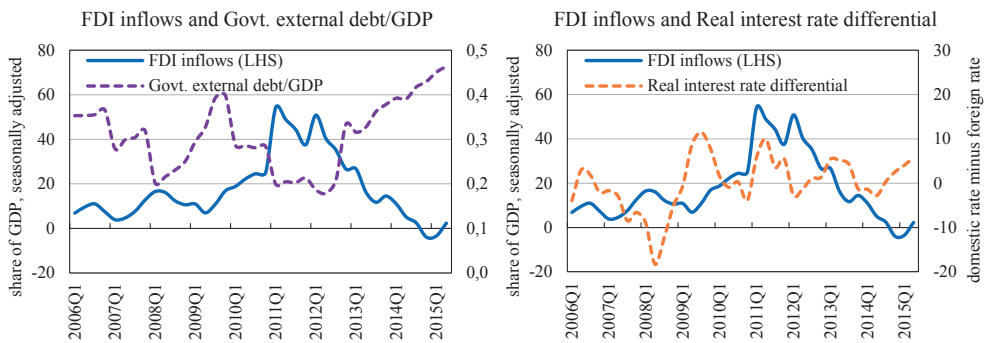

Source: authors' illustration

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[62] In Mongolia, the average share of exports of goods in GDP was about 40 percent for the last decade.

In contrast, sharp declines in the commodity prices resulted by weak demand for commodities in the world economy following China's economic slowdown since the second half of 2012 also led to decrease the capital inflows of Mongolia. Between mid–2012 and mid–2015, the refined copper price at the London Metal Exchange and Mongolian border price of coking coal fell by over 26 and 57 percent, respectively, when the copper and coal exports make up 50 percent of Mongolia's total exports. Combined with the lack of export diversification that China accounts alone for 90 percent of Mongolia's total export, the drop of the prices also reflected to the significant decline in GDP growth. Thus, we suggest that the main push factors of the FDI inflow were the copper, coking coal and gold prices.

Pull Factors of the FDI

As a result of the econometric estimation, a measure of country risk (government external debt-to-GDP ratio)[63] and real interest rate differential (domestic rates minus foreign rates) found to be statistically significant for the FDI changes in Mongolia, affecting the debt to GDP ratio negatively while the interest rate differential positively. Ahmed and Zlate (2013), Suttle, Huefner and Koepke (2013), Kabadayi et al. (2012) and Fratzscher (2012) suggest similar results for EMEs. IMF (2015b) points out that the expected interest rate hike in the U.S. economy might attract more capital flows from EMEs.

Figure 6. Mongolia: FDI Inflows and Pull Factors

Source: authors' illustration

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[63] For the papers that consider government external debt-to-GDP ratio as a country risk pull factor, see Brana and Lahet (2008), etc.

III. CONSEQUENCES AND POLICY CHALLENGES OF CAPITAL FLOWS VOLATILITY IN MONGOLIA

Poorly managed large capital inflows can expose three main risks to capital-recipient countries. firstly, macroeconomic risk where the capital inflows can accelerate domestic credit growth, overheat domestic economy, increase inflation pressure and cause real exchange rate appreciation, affecting the macroeconomic performances in a way not consistent or compatible with domestic policy objectives, such as, sustainable economic growth with price stability. The second risk is financial instability. The capital inflows can create maturity and currency mismatches in the balance sheets of commercial banks and private corporations. In addition, massive capital inflows push up equity and other asset prices and able to reduce the quality of the assets, thereby establishing a greater financial fragility. The third risk is related to the capital flow of sudden stops and reversals. Capital inflows can stop suddenly or even reverse within a short period, resulting in depleted reserves or sharp currency depreciation (Kawai & Takagi, 2010).

There are also common impacts of the capital surges in EMEs, such as, deterioration of the current account, widening of fiscal deficits, appreciation of real exchange rate, and inflationary pressure (Claessens & Ghosh, 2013). Thus, the volatile capital flows encourage domestic cycles and contributes to macroeconomic vulnerabilities through overheating pressures. However, composition and size of the capital inflows and their impacts on the domestic economy and financial systems are influenced by financial market development (Rangasamy & Mihaljek, 2011).

Mongolia is a country which has less developed financial markets. Therefore, the capital inflows come to Mongolia, mainly in the form of FDI which affects the economy directly through investment and increases output and hardly transfers through financial system. In addition, macroeconomic consequences of the recent capital inflows in Mongolia have been highly affected by the macroeconomic policies implemented in the recent years.

3.1. Monetary and Exchange Rate Policy Challenges

According to the Law of Mongolia, on the Central Bank (Bank of Mongolia–BoM), the main objective of monetary policy is to ensure the stability of the national currency. At the same time, the law also states that the exchange rate policy to follow the principles of keeping the exchange rate to be floating. However, maintaining the price stability requires the BoM to intervene in the

domestic FX market in order to soften the pass-through effects of exchange rates on inflation which is relatively high in Mongolia. Also it prevents from high exchange rate fluctuations that can weaken the financial and real sectors.

The inflation rate is also highly vulnerable from supply shocks of several consumer goods in Mongolia. Sudden shortfalls of domestic productions of wheat and meat due to harsh weather or harmful disease and trade limits of gasoline in main supplier countries creates high inflationary pressure in some periods. Therefore, Mongolia has been experiencing high inflation rate in the past years. It was about 9.6% on average between 2001 and 2008 reaching to the highest level of 23.2%. Although the inflation dropped to 2.0 percent in 2009, it has increased back to 14.3% in the following year and reached 12.0% on average between the periods of 2010–14. For the exchange rate, the nominal exchange rate tends to depreciate over the time since foreign exchange demand has been continuously increasing for residents. However, the real exchange rate is likely to appreciate due to the high domestic inflation rate. The real effective exchange rate (REER) appreciated by 7 percent annually during 2001–08 while it has dropped to 2 percent during 2010-14 because of the high nominal depreciation.

The recent volatile capital flows have been having a number of implications on the monetary policies. During the capital inflow surges, the BoM decided to buy the foreign exchanges in order to prevent large nominal appreciations which could be harmful for domestic industries at its early stages and build-up foreign reserves by the excess foreign exchanges in the FX market. However, the BoM faced a challenge to ensure low and stable inflation when the excess liquidities in domestic and foreign currencies accumulated in the banking sector. Therefore, the BOM conducted offsetting open market operations to sterilize the interventions in the period. As a result, the reserves increased from 8.0 months of goods imports to 9.8 months of goods imports and the nominal exchange rate appreciated by 26 percent between 2009 and 2012.

However, the FX interventions and sterilizations highly affects to balance sheets of the Central bank and at the same time, it allows the build-up of large excess liquidity in the banking sector in light of concerns about the large sterilization costs and/or weak capital positions of the BOM. The expansionary fiscal policies in this period weakened the condition even further. Therefore, the BoM tightened its policy by increasing its policy rate by 2.25 percentage point to 13.25 and reserve requirement from 5 percent to 12 percent in the period between 2010 and 2012.

Furthermore, the BOM faced more challenges during the sudden stops and reversals of the capital inflows regarding high BOP deficits, large nominal depreciation, inflationary pressure, significant decline of international reserves, worsening financial stability induced from asset price drops and liquidity shortage in banking sector. Since the banking sector liquidity shortage causes the financial instability and real economy to lead to economic slowdown and unemployment, the Mongolia's authority needed to promote the real economy, keep the employment, mitigate the sudden impacts of declining FDI and boost the credit growth. Thus, the BoM softened its policy in 2013 by cutting its policy rate three times by a total of 2.75 basis points to 10.5 percent; and also provided substantial loans to commercial banks at below-market rates through the "Price Stabilization Program (PSP)" and "Mortgage Lending Program".

Figure 7. Mongolia: Monetary and Exchange Rate Policy
at the end of Aug, 2015
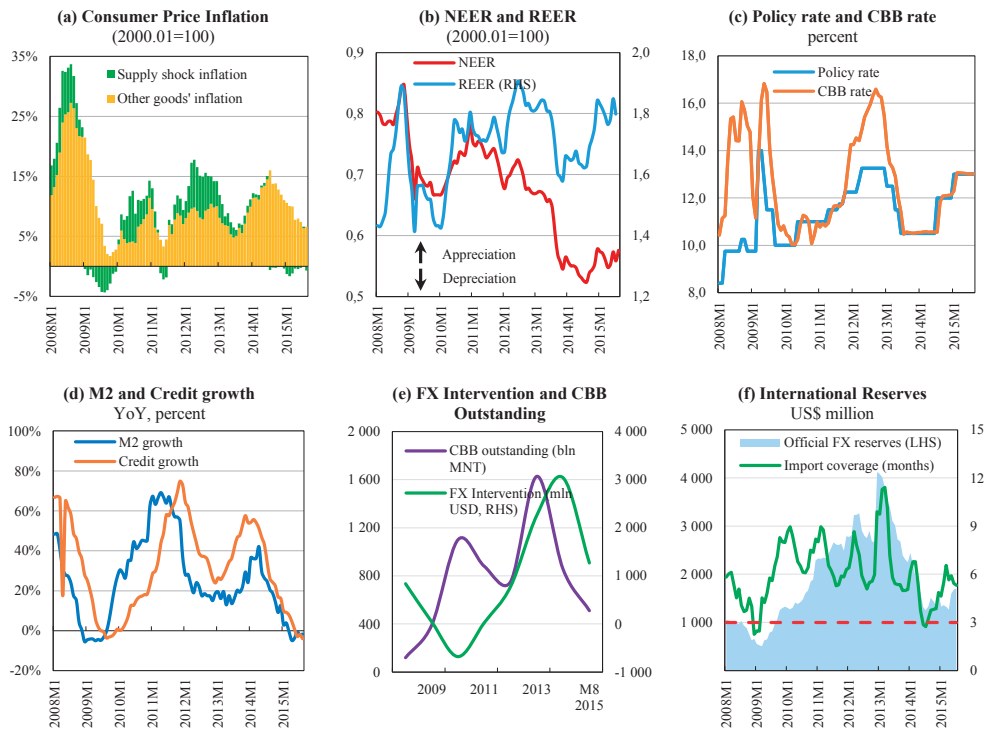
Note: [1] Supply shock inflation includes the prices of meat, petroleum and cement
(Figure 7(a)).
[2] Both foreign currency injections through auction and non-auction instruments are
included in the FX intervention in Figure 7(e).
Source: Bank of Mongolia

In addition, the negative shocks to both FDI and commodity prices have weakened the balance of payments of Mongolia substantially, thus, the exchange rate depreciated significantly since the second half of 2012. The balance of payments pressure also compounded with the expansionary monetary and fiscal policies of the period that encouraged the imports into economy and worsened the conditions. As a result, the exchange rate depreciated by 12 percent and 19 percent against U.S. dollar in 2013 and 2014, respectively.

The exchange rate depreciation created further challenges regarding inflation pressure through the exchange rate pass-through effects since early 2013. Although the inflation fell down to a two-year low level of 7 percent in July 2013 due to moderate food and gasoline prices as a result of the PSP, the exchange rate depreciation started to push up the inflation again. Therefore, the BoM sold foreign exchanges in the domestic FX market in order to smooth the speed of exchange rate depreciation, prevent short-term imbalances of supply and demand of foreign exchanges in the domestic FX market, and correct market expectations about the exchange rate. As a result of continuous intervention in the FX market, the gross international reserves subsequently fell down by $2.5 billion between 2012 and the first half of 2015.

When the economy had the substantial negative external shocks, the sufficient international reserve was crucial to mitigate negative risks of the shocks in the economy. Thus, BOM built-up the official foreign reserves in the recent years in several ways. Besides, the interventions, the foreign exchange sources of Sovereign bonds and Samurai bonds were managed by the Central bank in its functions of reserve management. Additionally, in order to provide short-term liquidity in the domestic FX market and to promote the bilateral trade with China, the BoM signed "Bilateral Currency Swap Arrangement between the People's Bank of China and the Bank of Mongolia" in May 2011. The maximum amount of it was RMB5 billion, but it has increased to RMB15 billion during 2011–14.

3.2. Macroprudential Policy Challenges

The volatile capital flows also weakened financial stability of Mongolia. Procyclical systemic risks through financial linkages has been rising through the fiscal, export, credit and housing channels, given the strong cross-border capital inflows in the form of the FDI and the rapid increase in the domestic intermediation of the capital flows (Maino, Imam, & Ojima, 2013). Fueled by the loose fiscal policy alongside rising capital inflows has given a rise to overheating pressures in Mongolia. Furthermore, the buoyant mineral exports

triggered to achieve a high record of real GDP growth and contributes to a positive output gap. Then, the general optimism in the market has led banking sector to lend more freely during the surging period. When it combined with easy access to foreign financing, it also created an upsurge in the private sector loans that amplified the boom even further. Therefore, the credit growth tended to be high as complacency regarding risk itself. Some standard precautionary measures are no longer observed or are loosened.

Housing has been playing a special role for macroeconomic policies in Mongolia and it has been a major component of the credit channel risk. During the good times, commercial banks competed by their loans with each other and it led to generous mortgage borrowing in housing market of Mongolia. Furthermore, Mongolia's authorities were always eager to stimulate housing market development over time due to the high pollution problems in the capital city area. During the period of 2007–11, the volume of mortgage lending and construction finance in the context of four programs by the Government—"40,000 units", "100,000 units", "4,000 units" and "Housing for Veterans"—accounted for 25 percent of total loan origination and 30 percent of the unit construction in Mongolia (Milyutin, 2012). Because of easy lending during the capital inflow surges period and the promotional programs, housing demand increased significantly which also led to boom in housing price. On the other side, banking liquidity shortage during the capital inflow stop and reversal caused to decrease mortgage loans which led the price to decrease because of surplus in housing markets. Therefore, housing price in Mongolia has tended to be strongly correlated with the capital inflows. We can state that the recent volatile capital flow had a similar effect through the asset price volatility on the banking system which led to further increase in the systemic risk.

In conclusion, the procyclical fiscal policy, rising credit growth, asset price boom, and heightened risk appetite of the banking sector during the capital inflow surge have been posing the significant risks to financial stability of Mongolia.

Therefore, the BoM introduced several macro-prudential measures that prevent from both procyclical and market risks in order to manage the excessive short-term liquidity and mitigate its negative impacts on domestic banking system. Some of them are listed below:

- Increase in the liquidity ratio (18 to 25 percent in 2011)
- Increase in the capital adequacy ratio (12 to 14 percent for 5 systemic banks)

- Limits on exposure concentration (not exceed 20 percent of the capital of the bank)
- Limits on net open currency positions (not exceed 15 percent of the bank's equity capital)
- Limits on maturity mismatches
- Setting a reserve requirement on all deposits
- Reducing provisioning at the time of crisis

In addition to these, the BoM has recently started to adopt some macro-prudential measures in order to promote private sector's capital inflows especially to the banking sector. In this purpose, the BoM has decided to exempt new long-term loans and bonds with three or more years of maturity drawn by commercial banks from the international market's reserve requirement. Furthermore, the BoM has introduced an instrument of the long term swap with the central bank to hedge exchange rate risks of the banks' foreign loans and bond with one or more year maturity. The swaps eventually reached a total of US$436 million by the end of 2014. Lastly, the BoM has increased the risk weight of the loans denominated in foreign currency in order to lower the exchange rate risk of private firms and individuals since the beginning of 2015.

3.3. Fiscal Policy Challenges

In addition to the monetary policy, the volatile capital flows have had many implications for fiscal policy of Mongolia. The procyclical fiscal policy driven by huge capital inflows led substantial fiscal expenditures and therefore high fiscal deficits during the capital surges period and increased the government debt in the sudden stops and reversal periods. With the combination of the external imbalances which made real sector worse and created an unsustainable economic growth path.

When the capital flows fluctuated substantially, the procyclical fiscal policy exacerbated the cyclical effects of the capital volatilities on the economy. In the surges period, the budget revenue increased significantly through tax income collected from the commodity exports, new projects' activities in the mining sector and investment goods imports financed by the FDI. However, it has sharply dropped in line with the deterioration of the foreign trade and FDI, as well as, economic slowdown during the sudden stops. The budget revenue fluctuated from 32 percent of GDP in 2010–12 to 28 percent in 2014. When the revenue started to expand substantially, the fiscal policy became highly expansionary due to the coincidence with the government spending

patterns in the year preceding the parliamentary election of 2012 and that induced strong political business cycle. The direct cash distribution to the households, one of the political promises bumps up the budget spending by 4 percent of GDP and the total spending has increased by nearly 5 percent of GDP between 2010 and 2012. Furthermore, the Development Bank of Mongolia, (DBM) financed a number of public infrastructure projects, such as, local paved roads, railroads and industrial constructions on behalf of the GoM. As a result, the total budget deficit (including DBM spending) has increased to 10 percent of GDP (Figure 8).

When the commodity price declined and FDI dropped, the fiscal deficit were on high level where Government debt has increased significantly. The elevated debt ratios also raised a market concern and risk profile of the public debt became less favorable —credit rating agencies have been downgraded Mongolia's sovereign rating and its outlook several times since the late 2012—and sovereign spreads of Mongolia has increased. In addition, substantial refinancing risk has been emerged for Mongolia since the most of the public sector debt is denominated in foreign currency. The external public debt in nominal terms increased to 38 and 43 percent of GDP in 2013 and 2014 respectively compared to 2011 of 21 percent.

The Parliament of Mongolia approved the Fiscal Stability Law (FSL) in 2010 for running countercyclical fiscal policy and offsetting long-term adverse effects of commodity price volatility. The FSL spelled out the vital fiscal rules that the structural budget deficit shall not exceed two percent of the GDP and the public debt-to-GDP ratio in terms of net present value (NPV) had to be at most 40 percent from 2013. For the fiscal year of 2013, the budget deficit was less than the limit set out by the FSL; however, the DBM spending was not included in the budget. Therefore, many public projects were financed off-balance that had to be accounted to the budget deficit. In 2014, Mongolia experienced huge budget revenue shortfall where the deficit exceeded the legal limit that eventually resulted FSL amendment for increasing deficit ceiling up to 4 percent in 2015. Consecutively, due to a surpassing of the government debt ratio, the ceiling increased to 55 percent by the new amendment. Furthermore, by the FSL, the Government of Mongolia founded the "Fiscal Stabilization Fund" in 2010 for accumulating excess revenue from mining sector. Since the establishment, it has reached 430 billion MNT (2 percent of GDP) by 2013. Unfortunately, the Government had utilized the fund asset following the sharp decline in commodity prices in 2014. In fact, due to the futile implementation of the

FSL, the Parliament loosened the strict fiscal disciplines that would result incrementing budget deficit in medium term.

Figure 8. Mongolia: Budget and DBM Spending
billion MNT; percent of GDP
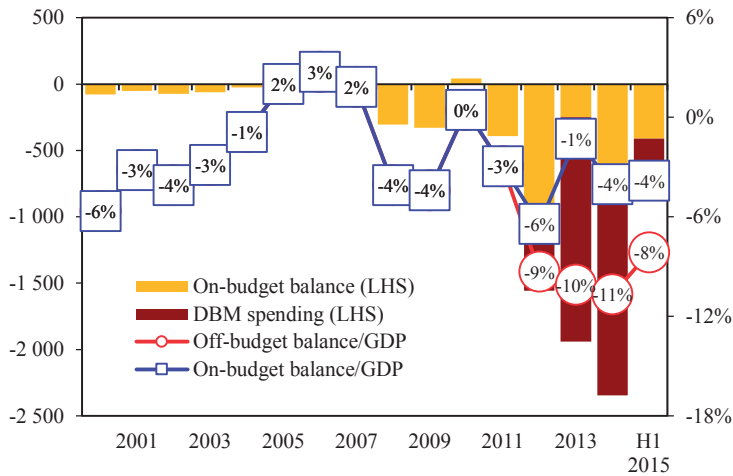
Note: Off-budget balance refers to a fiscal balance of the central government, including DBM spending.

Source: Ministry of Finance, DBM, NSO

Finally, the sudden stop and reversal of the capital inflows created major vulnerabilities in Mongolia, such as, twin deficits of fiscal, balance of payments and unsustainable debt pattern. Thus, it required significant monetary and fiscal tightening which has also substantial negative impact on the further economic growth. In 2011 to 2013, the average annual economic growth of Mongolia was 13.8 percent, however, it has continuously decreased to 7.8 percent in 2014 and 2.5 percent in third quarter of 2015.

IV. CONCLUDING REMARKS AND POLICY DISCUSSIONS

Mongolia literally liberalized its financial accounts during the transition to a market economy in 1990s, however, the capital flows of Mongolia has been relatively moderate until the mining boom and sovereign bond issuances in 2010. Additionally, non-resident flows have been more persistent and significant compared to resident flows. Thus, the movements of the capital flows are mainly driven by the non-resident flows. It has already been proved by the calculation of the openness index to the capital flows which shows all types of the flows are largely one-sided in Mongolia. In addition, the capital

inflows have been less diversified across the types and mainly driven by the mining FDI inflows which composes two-third of the total FDI inflows of Mongolia in the period of 2010–14.

The capital flows volatilities of Mongolia differ by periods and types. The volatilities measured as simple standard deviations increased due to the turmoil of the global financial crisis of 2008–09. However, the mining boom-and-bust during 2010–15 fueled the volatilities much stronger specifically volatility of FDI inflows became the highest among of all the flows. On the asset side, reserve flows have been the most volatile. The strong volatility of the FDI inflows are reflected by strong dependency of Mongolia, solely on the mining sector and commodity price while high FX intervention induced by a fear of floating creates the volatility of reserve flows.

According to our empirical analysis, the main determinants of the FDI inflows in Mongolia are world market prices of the main export commodities, such as, copper, coal, gold, interest rate differential and country risk indicator which is represented by public sector external debt to GDP ratio. This result indicates that Mongolian economy is highly dependent on the commodity prices through both revenue and the capital flow channels. In addition, higher domestic interest rates relative to foreign interest rates encourages the capital inflows while high build-up of public sector external debt negatively affects to the inflows as it increases the local country risk.

The recent substantial and volatile capital flow has been having a number of implications to Mongolian economy including inflationary pressures, exchange rate fluctuations, inadequate foreign reserve, high fiscal deficit and public debts, external imbalances, and unsustainable economic growth. In addition, it has weakened the financial sector instability and has created asset price boom-and-bust cycle. The past capital inflow was transitory, stopping and reversing after three years, then it had much cyclical consequences on the economy. The procyclical fiscal policy during the time also amplified the cyclical effects on the domestic economy which also decreased monetary policy rooms. The Central bank needed to tighten its policy to prevent the overheating pressure during the surges period while to soften its policy during the capital stop and reversal periods in order to promote the economic growth, defend employment and prevent from a credit crunch and liquidity shortfall in banking sector. Furthermore, some macro-prudential measures were implemented by the Central bank to prevent banking sector risks from the hot money and encourages the capital inflows in the response of sudden stops.

Although the Parliament approved the Fiscal Stability Law (FSL) and established the Stability fund in 2010, it moderated the strict fiscal disciplines with the futile implementation of the FSL in following years. The Government increased the budget spending substantially, the deficit became high creating substantial public sector debts and weakening the country's risk profile. Thus, Mongolia should reconsider the macroeconomic policies systematically, providing their consistency and amortizes the externalities and risks of the volatile capital flows in the domestic economy. An appropriate capital flow management and macro-prudential framework should also be considered in Mongolia.

For Mongolia, allowing flexible exchange rate is appropriate policy choice since it helps to smooth the negative effects of external shocks in domestic economy which is playing the role of shock absorber and most importantly prevents the international reserves to deplete. Even the economy has high pass through effects of exchange rate on inflation, flexible exchange rate also provides the opportunity to adjust trade balance through cost channels and leads BOP to be balanced again and decreased the exchange rate pressure to be depreciated. However, high exchange rate appreciation can be harmful for industry for small developing countries especially commodity based such as Mongolia. To avoid the Dutch disease in the early stage of industrialization, countries also considers buying excess foreign exchanges in FX market during capital inflows surges. They assume that huge capital inflow affects domestic exchange rate to appreciate and weakens the country's competiveness. Therefore, the high exchange rate appreciation is inconsistent to the long term economic development policy of the countries.

Macro-prudential policy measures are important to manage the volatile capital flows and to soften its negative impacts on the financial sector in Mongolia. The huge capital inflow impacts banking lending to increase substantially and leads asset price boom. On the other side, it also creates high banking sector liquidity and credit risks and asset price boom-bust cycle when the capital inflow stops. Moreover, macro-prudential measures are preferable to prevent these risks of financial sector in the framework of capital flow management.
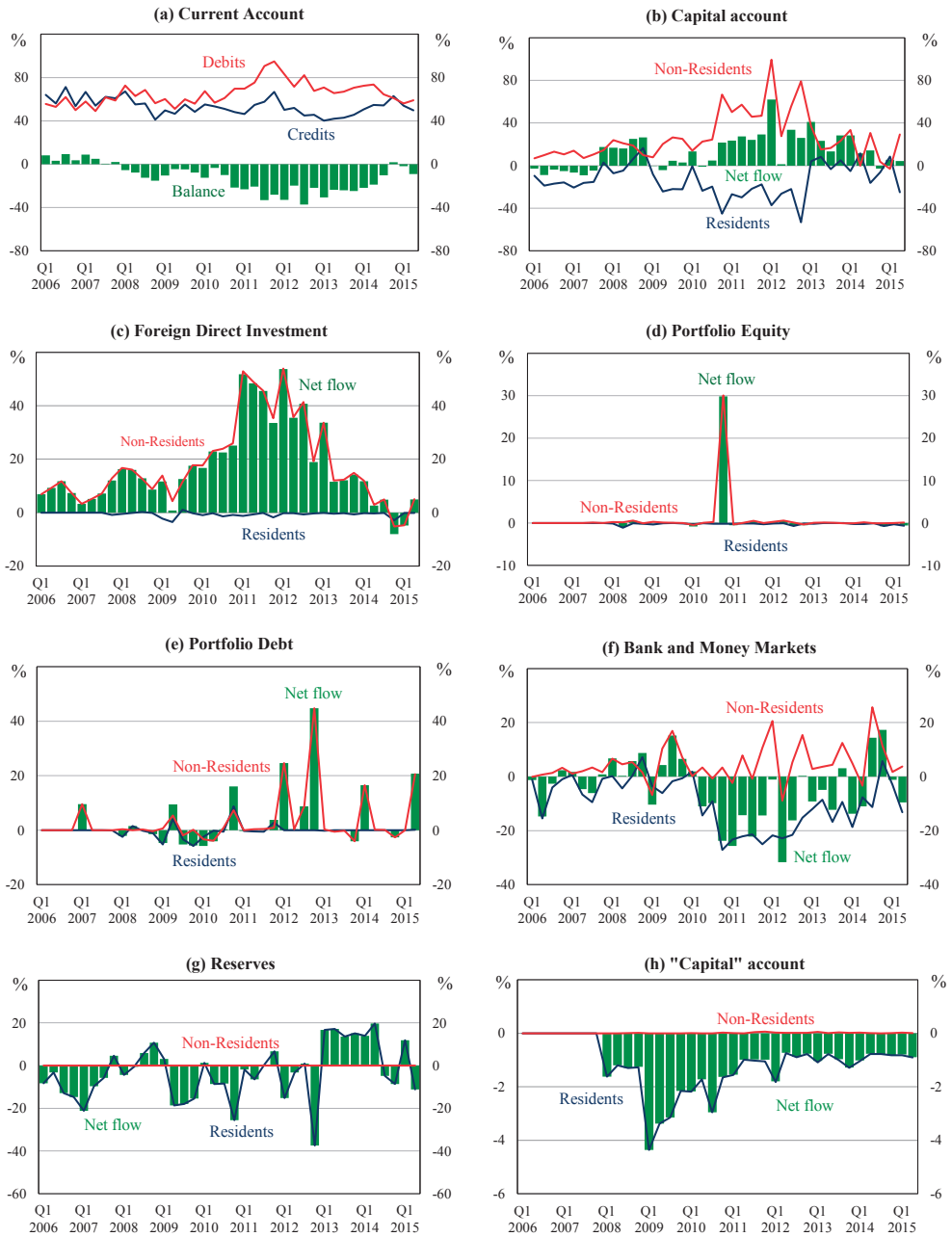
The fiscal discipline and sovereign welfare fund is also crucial to mitigate high cyclical effects of the volatile capital flows. The budget should be countercyclical and able to soften the negative effects of the volatile capital flows on the economy. Therefore, it promotes long-run sustainable growths. In addition to this, the sovereign fund is helpful to prevent high

government debt positions when the economy has significant negative shocks. Furthermore, deep financial integration with international financial markets and central bank swap agreements are the possible solutions during the capital inflow stops and reverses. However, the authorities should be concerned about the sources to repay debts because debt repayment management is crucial part to the economy.

Mongolia needs to develop its own financial markets to attract other types of inflows. For example, Mongolia can develop secondary market for financial assets such as mortgage backed securities and open access for non-residents to buy these products. In addition, the development and deepening of local capital and bond markets are also helpful to strengthen the financing base of Mongolia and the strong financial markets are beneficial to absorb substantial capital inflows in domestic economy efficiently by not creating an overheating risks and keep the financial stability. In fact, more sophisticated financial markets tend to attract more capital inflows and, thus, can reduce the risks of sudden outflows and decreases the risks of financial instability.

In conclusion, some macroeconomic policies should promote the diversified economy and to attract FDI inflows to non-mining sectors of Mongolia, such as, agriculture, construction and tourism which decrease the risks of high dependence on the commodity prices and diversified FDI inflows.

APPENDIX A – COMPOSITION OF THE BALANCE OF PAYMENTS

(a) Current Account

(b) Capital account

(c) Foreign Direct Investment

(d) Portfolio Equity

(e) Portfolio Debt

(f) Bank and Money Markets

(g) Reserves

(h) "Capital" account

APPENDIX B – DATA ANALYSIS

Table 6. Unit Root Tests, ADF

		Test Statistic by Unit Root Test					
		ADF: intercept & trend		ADF: intercept		ADF: none	
		Level	1st diff.	Level	1st diff.	Level	1st diff.
Variables	**FDI**	-1.15	-6.08	-1.33	-5.99	-0.92	-6.07
			***		***		***
	BMM	-7.08	-9.22	-5.96	-9.35	-4.47	-9.49
		***	***	***	***	**	***
	PFD	-5.84	-5.58	-5.59	-5.75	-5.00	-5.86
		***	***	***	***	***	***
	PFE	-6.04	-10.00	-6.13	-10.15	-6.03	-10.30
		***	***	***	***	***	***
	VIX	-2.88	-7.81	-3.14	-7.87	-0.99	-7.99
			***		**	***		***
	RATE_DIF	-2.74	-3.44	-2.09	-4.81	-2.13	-4.88
			*		***	**	***
	GDP_US	-5.70	-4.56	-2.75	-4.59	-2.19	-3.71
		***	***	*	***	**	***
	GDP_CHN	-4.08	-3.72	-2.40	-3.78	-0.89	-3.79
		**	**		***		***
	GDP_MNG	-1.73	-5.90	-1.80	-5.89	-1.19	-5.97
			***		***		***
	DEBT_GOV	-1.53	-5.97	-1.17	-5.76	0.12	-5.82
			***		***		***
	COPPER	-2.87	-5.52	-2.93	-5.62	-0.36	-5.71
			***	*	***		***
	COAL	-0.84	-5.37	-1.18	-4.92	-0.48	-4.99
			***		***		***
	GOLD	-0.59	-6.78	-1.65	-2.81	0.48	-2.76
			***		*		***

Notes: H_0: Unit root process for ADF

*, **, *** refers to the rejection of H_0 at .10, .05, .01 significance level, respectively.

Table 7. Descriptive Statistics

	FDI	VIX	GDP_ US	GDP_ CHN	COP- PER	COAL	GOLD	GDP_ MNG	RATE_ DIF	DEBT_ GOV
Mean	17.77	20.55	1.38	9.08	0.89	0.85	0.68	9.64	0.10	0.31
Median	12.50	17.67	1.80	9.05	0.90	0.82	0.71	10.36	0.30	0.31
Maximum	54.13	44.14	3.20	12.40	1.19	1.31	1.06	20.59	11.50	0.46
Minimum	-3.93	11.39	-4.10	6.20	0.39	0.45	0.35	-2.28	-18.30	0.18
Std. Dev.	15.01	8.83	1.87	1.73	0.17	0.29	0.21	5.73	6.08	0.08
Skewness	0.95	1.44	-1.77	0.26	-0.88	0.22	0.00	-0.23	-0.69	0.03
Kurtosis	3.05	4.17	5.26	1.80	4.36	1.56	1.95	2.99	3.94	1.97
Jarque-Bera	5.75	15.34	27.90	2.71	7.87	3.60	1.74	0.34	4.37	1.67
Probabil-ity	0.06	0.00	0.00	0.26	0.02	0.17	0.42	0.84	0.11	0.43
Sum	675.34	781.00	52.40	344.90	33.71	32.17	25.98	366.20	3.67	11.73
Sum Sq. Dev.	8,341.6	2,884.6	129.6	110.83	1.02	3.05	1.58	1,215.75	1,368.51	0.24
Observa-tions	38	38	38	38	38	38	38	38	38	38

Table 8. Correlation Matrix

	FDI	VIX	GDP_ US	GDP_ CHN	COP-PER	COAL	GOLD	GDP_ MNG	RATE_ DIF	DEBT_ GOV
FDI	1	0.10	0.12	-0.02	0.62	0.83	0.69	0.69	0.18	-0.76
VIX	0.10	1	-0.61	-0.17	-0.35	0.35	-0.01	-0.05	-0.16	-0.36
GDP_US	0.12	-0.61	1	0.24	0.53	-0.07	0.20	0.51	-0.15	0.08
GDP_ CHN	-0.02	-0.17	0.24	1	0.30	-0.08	-0.54	0.14	-0.24	-0.17
COPPER	0.62	-0.35	0.53	0.30	1	0.43	0.44	0.67	-0.03	-0.42
COAL	0.83	0.35	-0.07	-0.08	0.43	1	0.65	0.55	0.13	-0.69
GOLD	0.69	-0.01	0.20	-0.54	0.44	0.65	1	0.46	0.34	-0.29
GDP_ MNG	0.69	-0.05	0.51	0.14	0.67	0.55	0.46	1	-0.22	-0.65
RATE_ DIF	0.18	-0.16	-0.15	-0.24	-0.03	0.13	0.34	-0.22	1	0.30
DEBT_ GOV	-0.76	-0.36	0.08	-0.17	-0.42	-0.69	-0.29	-0.65	0.30	1

APPENDIX C – JOHANSEN COINTEGRATION TEST

Sample (adjusted): 2006Q2 2015Q2
Included observations: 37 after adjustments
Trend assumption: No deterministic trend
Series: FDI DEBT_GOV
Exogenous series: COPPER COAL GOLD RATE_DIF
Warning: Critical values assume no exogenous series
Lags interval (in first differences): No lags

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.527165	27.75051	12.32090	0.0001
At most 1	0.001005	0.037211	4.129906	0.8746

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.527165	27.71329	11.22480	0.0000
At most 1	0.001005	0.037211	4.129906	0.8746

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

FDI	DEBT_GOV
0.188560	16.90313
0.009784	-9.785426

Unrestricted Adjustment Coefficients (alpha):

D(FDI)	-4.001834	-0.114746
D(DEBT_GOV)	-0.007350	0.001231

1 Cointegrating Equation(s):	Log likelihood	-39.94205

Normalized cointegrating coefficients (standard error in parentheses)

FDI	DEBT_GOV
1.000000	89.64321
	(9.45433)

Adjustment coefficients (standard error in parentheses)

D(FDI)	-0.754586
	(0.17468)
D(DEBT_GOV)	-0.001386
	(0.00131)

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