

# When \$262 Billion Is Not Enough: Rethinking Reserve Accumulation in South Korea

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**ABSTRACT** *In the wake of the 2008 global financial crisis, South Korea was hit hard by a sudden reversal in capital flows, a severe credit crunch and extreme exchange-rate instability. Despite having accumulated large holdings of reserves in a self-help strategy to hedge against such capital account shocks, the government was ultimately forced to abandon its defensive position and ask for external assistance. This article provides a critical examination of the broader forces behind Korea's reserve accumulation and its problematic consequences. In addition to explaining reserve accumulation as a financially induced phenomenon, the economic costs of reserve hoarding are estimated and its efficacy evaluated in light of the crisis. It is shown that Korea's reserve accumulation, undertaken as a costly form of self-insurance, was neither sufficient nor efficient in guarding against the volatility of global financial markets. To navigate the pitfalls of financial globalisation more successfully and cost-effectively, Korea needs to go beyond focusing exclusively on the asset side of its vulnerable international liquidity position by blindly hoarding more reserves at ever-escalating costs. It needs to also tackle the liabilities side of the ledger by reducing its heavy exposure to short-term, flight-prone foreign capital.*

**KEY WORDS:** South Korea, international reserves, financial crisis, external liabilities, capital account liberalisation

The near collapse of the United States (US) banking system in 2008 not only ushered in the worst economic crisis for the US since the Great Depression, but its profoundly destabilising repercussions were also felt much more widely and even more acutely in many emerging market and developing countries (EMDCs) than at the epicentre of the crisis itself.<sup>1</sup> Gripped by fear and uncertainty, foreign investors around the world dumped their large holdings of EMDC financial assets and fled to the perceived safety of US assets, in a “flight to quality” that paradoxically sought refuge in the very country that triggered the global financial meltdown. The ensuing reversal in capital flows pushed many EMDCs to the precipice of a liquidity crisis irrespective of their underlying economic fundamentals, causing widespread financial havoc and destruction. Perhaps faring the worst among such unlucky EMDCs sideswiped by the US banking crisis, South Korea (hereafter Korea) was hit particularly hard by a severe credit crunch, drastic swings in capital flows, and extreme exchange-rate instability that forced the Bank of

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Korea (BOK) to intervene in the currency market, run down its foreign exchange (FX) reserves at an alarming rate, and eventually seek external assistance by asking for and drawing from a US\$30 billion emergency swap facility with the US Federal Reserve Board. While the financial upheaval in the fall of 2008 was not as severe and traumatic as the crisis of 1997, it did display all the signs of serious distress, qualifying as a repeat of the crisis of 1997 on a smaller scale (for a comparison of the two crises for Southeast Asian countries, see Rasiah, Cheong, and Donner 2014).

The 2008 crisis raises a number of questions about the efficacy of various measures implemented in Korea since 1997 in its decade-long drive to strengthen the robustness of its financial system, safeguard its stability, and ensure its resilience in the face of financial globalisation. In particular, the crisis casts serious doubts on Korea's strategy of accumulating massive amounts of FX reserves as a safeguard against the volatility of the global financial system, a self-help strategy adopted by nearly every other EMDC exposed to the vagaries of global finance. Undertaken as a costly form of self-insurance, reserve accumulation has featured prominently in the EMDCs' attempt to cope with the heightened financial volatility accompanying capital account liberalisation and forestall future financial crisis by improving the liquidity of their international investment position (Rodrik 2006; Stiglitz 2006; Ocampo 2007; Teunissen and Akkerman 2006; Cruz and Walters 2008). Yet, the crisis of 2008 in Korea – and elsewhere in the developing world – suggests that this attempt at self-insurance, while imposing a hefty premium, may not actually provide much coverage when the need arises.

In this article, Korea's strategy of reserve accumulation is examined, its costs are estimated, and its efficacy evaluated in light of its experience with the 2008 crisis. This will flesh out important policy implications that are relevant not only to Korea itself but also to other EMDCs that, as noted above and documented in more detail below, have been similarly relying on reserve accumulation as their primary defence against financial volatility. This article begins by tracing the source of Korea's vulnerability to financial shocks to its excessive capital account openness. The second section documents the rapid rise in Korea's reserve holdings and shows that this trend is consistent with the self-help strategy of building a large "war chest" to avoid another liquidity crisis. In the third section, the economic costs of this strategy are estimated using three measures: the quasi-fiscal cost of reserve accumulation for the central bank; the broad opportunity cost of reserves in terms of foregone investment; and the narrower cost measured as the difference of returns on reserve assets and liquid external liabilities. The final section evaluates Korea's strategy of reserve accumulation in light of the crisis of 2008 and discusses two seemingly contending but not necessarily mutually exclusive policy lessons drawn from it. One lesson, emphasising the *insufficiency* of Korea's reserve holdings, calls for even more aggressive reserve accumulation; the other lesson, emphasising the *inefficiency* of reserve accumulation, calls for a fundamental rethinking of the merits and pitfalls of financial openness. It is argued that given the high cost of reserve accumulation and its questionable efficacy, relying exclusively on reserve hoarding is neither ideal nor sustainable. Korea's vulnerability to the intrinsic volatility of the global financial system is not something that can be mitigated just by piling on more reserves, but by expanding its policy menu to include meaningful measures that can reduce its risk-exposure to short-term foreign capital flows, the bane of nearly every emerging-market crash in the last two decades.

### Korea's Financial Openness and Vulnerability

Although the crisis of 1997 is widely perceived to have been the catalytic event that ushered in the era of financial openness in Korea, financial deregulation and capital account liberalisation had proceeded to a substantial extent prior to the outbreak of the crisis. The initial implementation of market-oriented reforms, begun cautiously in the 1980s with a limited scope and gradualism, was deepened and accelerated in the 1990s, especially under the *seggyehwa* (globalisation) policy pursued by the Kim Young Sam administration, persistently escalating US pressure on Korea to open its financial markets, and negotiations leading up to Korea's accession to the Organisation for Economic Co-operation and Development (Woo 1991; Finger 1994; Whitherell 1994; Cumings 1998). Indeed, many of the problems faced by Korea on the eve of the 1997 crisis are traced to its premature financial market liberalisation that formed part of the broader reform initiatives seeking to end state *dirigisme* in the economy, with adverse consequences: an over-leveraged corporate sector resulting from the abandonment of industrial policy and credit control on the *chaebol*; an over-extended banking sector following the adoption of financial deregulation and regulatory forbearance; and most critically, an unmitigated growth in financial institutions' short-term external liabilities resulting from capital account liberalisation (Chang, Park, and Yoo 1998; Radelet and Sachs 1998; Cho 2001). Extensive financial market reforms further brought on under the terms of the IMF rescue completed the task, ending Korea's history of financial repression and moving its financial system towards greater openness.

The breadth of further capital account liberalisation meant a nearly complete elimination of meaningful restrictions on cross-border capital flows, generating what have now become familiar consequences of financial openness in many EMDCs. First, with the lifting of the remaining restrictions on domestic residents' ability to borrow from international capital markets, external liabilities of Korea, which had been wound down significantly in the first few years since 1997, rose again dramatically in the following decade, especially short-term liabilities (see Table 1). From the low of \$121.3 billion in 2001, total foreign debts increased by 274% to \$333.4 billion at the end of 2007, while short-term debts rose four-fold from \$40.3 billion to \$160.2 billion over the same period. The share of short-term liabilities, the bane of the 1997 crisis, had dropped considerably to 25.5% of total external debts by the end of 1998, largely as a result of the capital exodus and the debt restructuring that had turned \$21 billion in short-term interbank loans into medium-term bonds. However, once the crisis was over and Korean financial institutions regained access to international capital markets, the share of short-term liabilities began to climb up steadily to eventually reach over half of outstanding external liabilities by 2006.

**Table 1.** External debts of Korea, 1997–2012 (US\$ billions)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total	167.3	155.5	144.8	141.4	121.3	132.8	141.7	150.6	161.4	225.2	333.4
Long-term	103.5	115.9	101.7	91.8	81.1	84.6	90.8	94.3	95.5	111.5	173.2
Short-term	63.8	39.6	43.1	49.7	40.3	48.2	50.8	56.3	65.9	113.7	160.2
Short-term (% of total)	38.1	25.5	29.7	35.1	33.2	36.3	35.9	37.4	40.8	50.5	48.1

Source: BOK (n.d.).

**Table 2.** External Debts of the Korean Banking Sector, 1997–2012 (US\$ billions)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<i>Banking sector as a whole</i>											
Total	91.1	72.5	67.6	61.5	51.3	58.5	67.7	74.5	83.4	136.5	192.9
Long-term	41.8	41.4	33.9	24.1	21.1	20.3	27.0	30.0	32.2	40.4	58.9
Short-term	49.2	31.1	33.8	37.3	30.2	38.2	40.8	44.5	51.3	96.1	134.0
Short-term (% of total)	54.1	42.9	49.9	60.8	58.9	65.3	60.2	59.7	61.5	70.4	69.5
<i>Korean banks</i>											
Total	65.3	53.6	49.9	45.2	37.4	39.2	45.3	50.6	58.4	82.1	109.0
Long-term	38.0	38.6	31.2	22.3	19.6	18.2	24.3	27.1	30.4	37.9	54.3
Short-term	27.3	15.1	18.6	22.9	17.8	21.0	21.1	23.5	28.0	44.3	54.6
Short-term (% of total)	41.8	28.1	37.4	50.7	47.6	53.5	46.5	46.4	47.9	53.9	50.1
<i>Korean branches of foreign banks</i>											
Total	25.8	18.9	17.8	16.3	13.9	19.2	22.4	23.9	25.0	54.4	83.9
Long-term	3.8	2.8	2.6	1.9	1.5	2.1	2.7	2.9	1.7	2.6	4.6
Short-term	21.9	16.1	15.1	14.4	12.4	17.1	19.7	21.0	23.3	51.8	79.3
Short-term (% of total)	85.2	85.1	85.2	88.6	89.5	89.2	88.0	87.8	93.1	95.2	94.5

Source: BOK (n.d.).

The re-ballooning in Korea's external debts, especially pronounced with its short-term liabilities, was largely induced by the banking sector, which resumed borrowing heavily from abroad in the 2000s. By the eve of the 2008 crisis, the borrowing had once again turned into what can only be described as a binge: in just two years of 2006 and 2007, the banking sector as a whole added almost \$110 billion to its total external debt, raising it from \$83.4 billion in 2005 to \$192.9 billion in 2007 (see Table 2). Over the same period, its short-term liabilities skyrocketed by 261% from \$51.3 billion to \$134 billion, taking up well over 70% of its total foreign debts.<sup>2</sup> In particular, the domestic branches of foreign banks operating in Korea greatly expanded their short-term external liabilities, mostly borrowing from their parent banks. These branches had always had a natural bias towards short-term borrowing as an easy way to make profits, raising funds cheaply from their parent banks and using the proceeds to generate highly lucrative returns in Korean financial markets – as a BOK official put it, easy interest-rate arbitrage had meant these foreign bank branches were “stealing candy from a baby” (Interview, anonymous, June 6, 2012). The share of their short-term borrowing never dipped below 85% of their total external borrowing; and even after the 1997 crisis, their bias for short-term borrowing remained, although they had reduced their overall liabilities for a few years. Nonetheless, in the early 2000s these Korean branches of foreign banks, much like Korean banks, also began to expand their external borrowing, and in the two years leading to the 2008 crisis, they upped the ante by increasing their total foreign liabilities by more than three times, letting their debts rise from \$25 billion in 2005 to \$83.9 billion in 2007 – nearly all of these debts, 94.5%, were short-term debts.

The influx of “hot money” through the short-term inter-bank loan market was matched by a sharp rise in the inflow of another form of volatile capital flows, foreign portfolio investment (FPI). Following the near complete removal of the ceilings on foreign ownership of securities markets insisted upon by the IMF, large amounts of FPI poured into Korea, particularly into its equity market. Inbound FPI rose sharply from the low of

**Table 3.** FPI in Korea: flow and stock, 1997–2007 (US\$ billions)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<i>Flow</i>											
Total	13.3	0.8	7.9	12.7	12.2	5.4	22.7	18.4	14.1	8.1	30.4
Equity	2.5	3.9	12.1	13.1	10.3	0.4	14.4	9.5	3.3	-8.4	-28.7
Debt securities	10.8	-3.1	-4.2	-0.4	2.0	5.0	8.3	8.9	10.8	16.4	59.1
<i>Stock</i>											
Total	60.2	65.7	107.2	80.3	106.4	116.2	165.0	210.3	310.5	352.4	456.7
Equity	6.2	18.7	62.9	40.5	70.0	75.7	116.8	156.4	249.5	276.4	320.1
Debt securities	54.1	47.0	44.3	39.9	36.4	40.5	48.3	53.9	61.0	76.0	136.6

Source: BOK (n.d.).

\$0.8 billion in 1998 to the high of \$22.7 billion in 2003; and from 2000 to 2007, a cumulative amount of \$123.9 billion had come into Korea as FPI, with the outstanding stock of FPI rising from \$80.3 billion in 2000 to over \$456 billion in 2007 (see Table 3). Except for 2007, the vast majority of the inbound FPI was channelled into Korea's equity market, resulting in a historically unprecedented and nearly peerless penetration of the stock market by foreign capital. From only around 12% in the pre-1997 period, the share of foreign ownership in the Korean Stock Exchange (KSE) rose rapidly to reach over 42% of total market capitalisation at its height (see Table 4).

The combined result of these developments in foreign capital inflows was not only an outsized build-up in the external liabilities in Korea's international investment position, but also a liabilities structure that was concentrated in short-term, highly liquid and highly unstable types of capital flows, creating the same vulnerability that had led to the crisis of 1997. Thus, by 2008, although Korea's macro-economic fundamentals were on a sound footing – as they had been in the years leading up to the crisis of 1997 – and its micro-economic fundamentals in the corporate and banking sectors were relatively healthy – unlike in 1997 – it was still heavily exposed to the risk of external shocks being transmitted through the capital account side of the balance of payments. The build-up in short-term liabilities had surged to such an extent that all the external conditions were in place for a repeat of the liquidity crunch of 1997 triggered by a sudden reversal in capital

**Table 4.** Foreign ownership of equity and debt securities in Korea, 2000–07

	2000	2001	2002	2003	2004	2005	2006	2007
Korean Stock Exchange								
Trillions of won	56.6	93.7	93.2	142.5	173.2	260.3	262.5	308.0
% of total market capitalisation	30.1	36.6	36.0	40.1	42.0	39.7	37.3	32.4
KOSDAQ								
Trillions of won	2.0	5.4	3.9	5.4	4.8	9.6	10.6	17.4
% of total market capitalisation	7.0	10.4	10.5	14.4	15.4	13.5	14.6	17.4
Debt Securities								
Trillions of won	0.7	0.4	0.6	1.8	3.2	3.3	4.6	38.4
% of total outstanding bonds	0.2	0.1	0.1	0.3	0.5	0.5	0.6	4.6

Source: Financial Supervisory Service (n.d.).

flows: a pattern of large-scale foreign capital inflows that gravitated disproportionately toward hot money; an external debt structure that was composed excessively of short-term debts; and resulting from these developments, a very large logjam of flight-prone capital sitting atop.

Prior to the crisis in 2008, however, few voices of concern had been raised about Korea's increasingly shortening window of external financing and mounting short-term foreign claims that made it extremely vulnerable to external shocks. The primary reason for this indifference is found in the other side of the liquidity position – that is, in the asset side, specifically the BOK's large holdings of FX reserves. It was widely believed that a decade of reserve hoarding would provide the monetary authorities with a war chest large enough to sustain investor confidence, head off panic-driven capital flight, and ultimately make Korea less vulnerable to and more resilient against the volatility of global finance. A closer examination of Korea's reserve accumulation follows in the next section.

### **Reserve Accumulation: Mercantilist or Precautionary?**

While the origins and causes of the Korean financial crisis of 1997 and the broader Asian crisis remain controversial, there seems to be at least one lesson that has been endorsed with near unanimity by both domestic policymakers in EMDCs and their foreign counterparts in developed market economies (DMEs) and multilateral financial institutions (MFIs): to avoid another devastating financial crisis, EMDCs should enhance their FX liquidity position and increase their reserve holdings beyond the traditional benchmark measured in three months of imports (Greenspan 1999; IMF 2001; Wijnholds and Kapteyn 2001). The rationale behind this lesson was derived not only from the Asian crisis of 1997, but also from the numerous emerging market crashes that plagued the 1990s and beyond. Common to nearly all of these crashes, and distinct from the previous debt crises of the 1980s, was the fact that their origins were located in the capital account rather than the current account, triggered by a sudden and large-scale reversal in short-term capital flows ranging from institutional investors' run on Mexico's infamous *tesobonos* to foreign commercial banks' refusal to roll over their short-term claims on Korean financial institutions. These crises had shown that what mattered the most in episodes of panic-driven runs on emerging markets was their risk-exposure to the capital account side of the balance of payments, particularly the maturity structure of their external liabilities. Equally fatal was the monetary authorities' inability to provide sufficient FX liquidity for their respective financial systems to instil foreign investor confidence, forestall a reversal in capital flows, and, when capital exodus did ensue, meet their foreign currency-denominated obligations. In the case of Korea, it was forced into IMF-receivership when the BOK, after playing the role of the lender of last resort to Korean financial institutions besieged by debt repayment demands from foreign banks, could no longer inject liquidity to support them (Dooley and Shin 2000). The problem, of course, was that the BOK was trying to play this role in a currency of another country, one that was only modest in amount and quickly depleted.

Reflecting this lesson, Korea had been accumulating large reserve holdings since the crisis of 1997 to historically unprecedented levels, rising from the 1997 low of \$19.7 billion to \$261.7 billion at the end of 2007 on the eve of the global financial crisis.<sup>3</sup> This was more than a 13-fold jump in a decade, enough to propel Korea's reserve holdings from the brink of exhaustion just ten years ago to be the fifth largest in the world. The

**Table 5.** Reserve holdings of Korea, 1997–2007

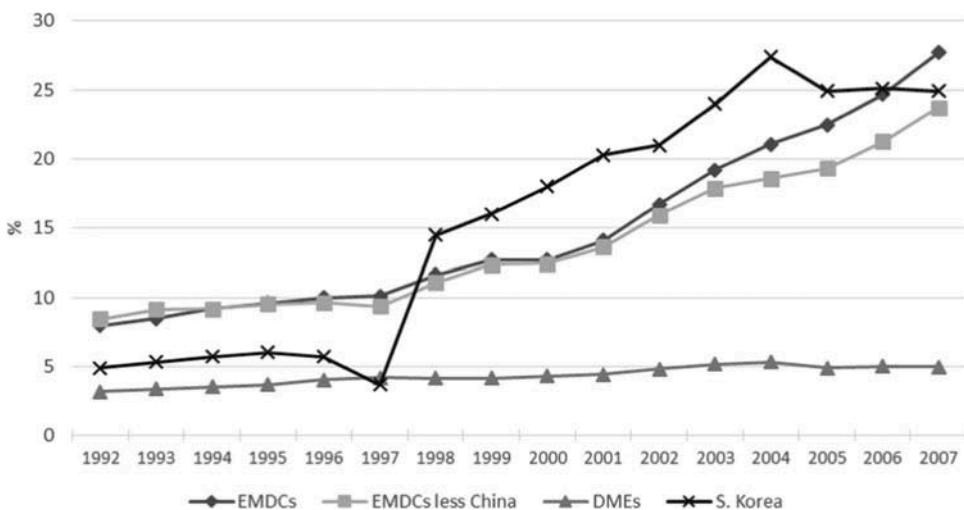
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Billions of US\$	19.7	52.0	73.7	95.9	102.5	120.8	154.5	198.2	210.0	238.4	261.8
Months of imports	1.7	6.9	7.6	7.2	8.9	9.7	10.6	10.8	9.8	9.4	8.9
% of trade	5.8	18.9	23.3	23.8	29.1	31.7	34.3	34.4	32.0	31.0	29.1
% of GDP	3.7	14.5	16.0	18.0	20.3	21.0	24.0	27.4	24.9	25.1	24.9
% of short-term external liabilities	30.9	131.3	171.2	193.0	254.4	250.8	304.1	351.7	318.6	209.6	163.4

Source: BOK (n.d.).

relative scale of the accumulation is shown in Table 5, which presents reserve holdings as ratios of gross domestic product (GDP), monthly imports, and total trade volume; Figure 1 puts one of these ratios in a comparative perspective.

Four aspects are worth noting here. First, as expected from the rapid growth in the absolute amount of Korea's reserve holdings, the increase also shows up as ratios of GDP, import demand, and trade volume. Second, in a well-known divergence, reserve accumulation is conspicuously absent among the DMEs with the notable exception of Japan and Switzerland, whereas it is pervasive among the EMDCs. Third, in contrast to the widespread perception of Korea as one of the most active reserve-hoarding countries, the increase in its reserve holdings does not deviate much from the average for the emerging and developing world. Lastly, while conventional wisdom often points the finger at China as the worst hoarder, in proportionate terms its reserve accumulation had been in line with the rest of the EMDCs, which had collectively enlarged reserve holdings by a roughly equal magnitude as China.

There are two main competing explanations for the enormous reserve accumulation by the EMDCs and, by extension, Korea: one is trade-related, and the other capital flow-



**Figure 1.** Reserve holdings as a percentage of GDP, 1992–2007. Source: IMF (n.d.).

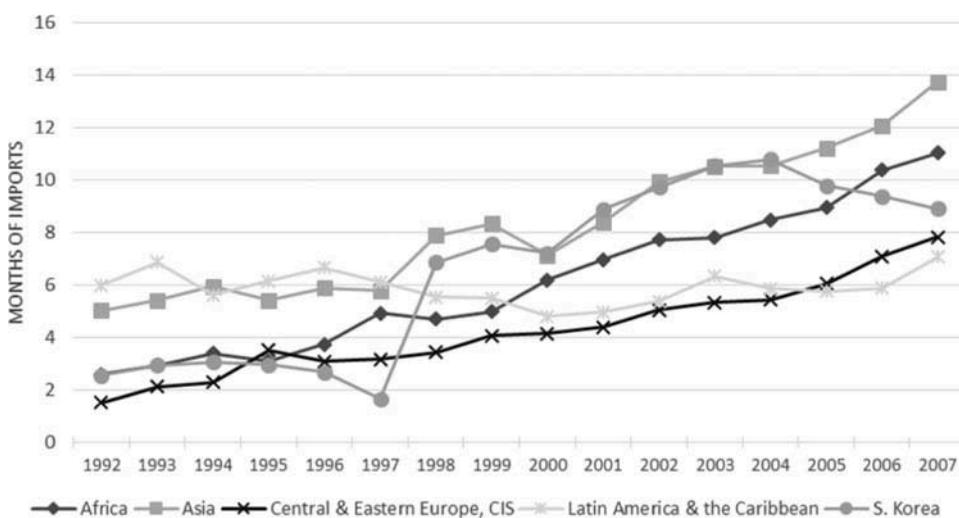
related. The former revolves around the “second Bretton Woods” hypothesis positing that mercantilist motivations are the primary factors driving reserve accumulation in the developing world, particularly in reference to China and other Asian EMDCs (Dooley, Folkerts-Landau, and Garber 2003; Dooley and Garber 2005).<sup>4</sup> The alternative explanation focuses on the capital account instead and sees the dynamics of reserve accumulation as largely financial in nature, a consequence of the aforementioned precautionary, self-defensive strategy adopted by the EMDCs to insure themselves against a sudden reversal in capital flows. I look at each of these explanations in relation to Korea.

### *Reserve Accumulation as a Mercantilist Device*

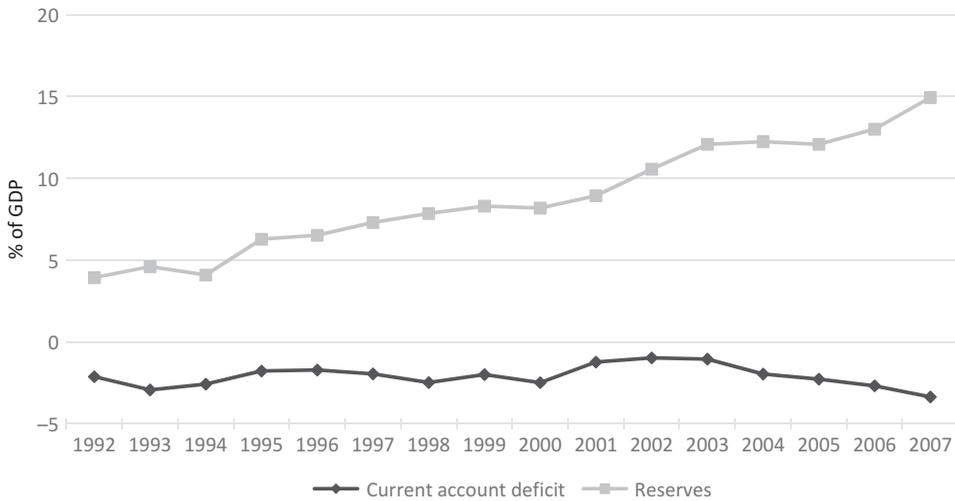
The basic idea behind the mercantilist explanation goes back to the earlier arrangement of the Bretton Woods system under which European countries and Japan had opted for under-valued currencies and reserve accumulation as part of an export-driven strategy of economic recovery and development. In essence, China and other East Asian EMDCs including Korea today are said to be following the same strategy of hoarding international reserves in an effort to prevent exchange-rate appreciation of their currencies for trade-purposes, to induce or sustain a favourable trade balance.

The evidence for the second Bretton Woods hypothesis, however, is weak for both the EMDCs as a whole and Korea more specifically. First, as shown in Figure 1, reserve accumulation is not a country-specific phenomenon limited to Korea, China, or even a regionally specific “pan-Asian” trend, but it is a nearly universal phenomenon evident in practically all EMDCs (Eichengreen 2005). Further evidence of the ubiquity of reserve accumulation in EMDCs is shown in Figures 2 and 3, which track, respectively, reserve accumulation by region and by current account deficit countries.

While there are some regional variations, the overall trend of rapidly growing reserve accumulation for EMDCs as a whole remains intact. A rather striking and counter-



**Figure 2.** Reserve holdings by region, 1992–2007. *Source:* IMF (n.d.).

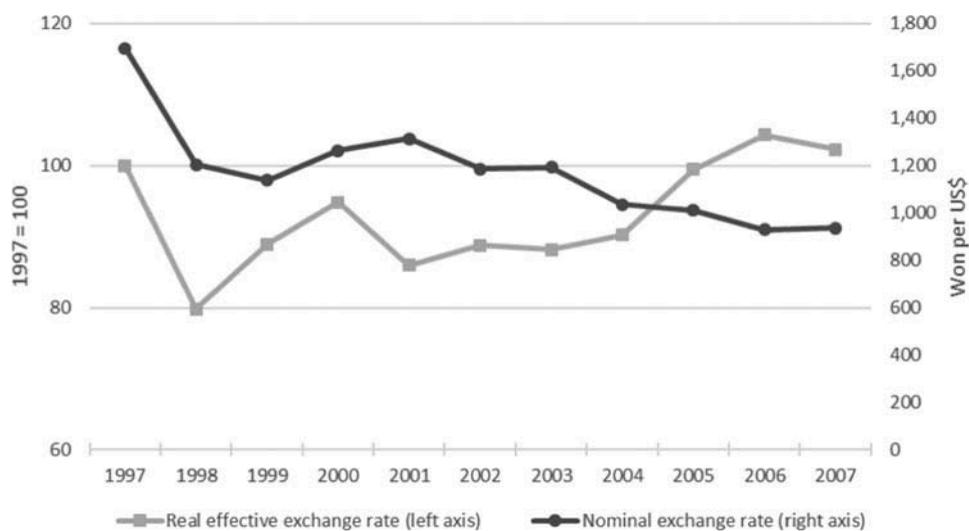


**Figure 3.** Reserve holdings of selected deficit countries, 1992–2007. *Source:* IMF (n.d.).  
*Notes:* Countries included are: Colombia, Mexico, Nicaragua, Kenya, Mali, Niger, Tanzania, South Africa, Uganda, Poland, Hungary, Jordan, Turkey, India, and Vietnam.

intuitive trend is the dramatic increase in the reserve holdings amongst the economies of the African region, one hardly known for its mercantilist inclinations or the size of its FX earnings. Yet, from a miniscule amount measuring less than two months of imports in the 1980s, Africa's collective reserve holdings had jumped to the equivalent of over 11 months of imports by 2007, exceeding those of Latin America and coming very close to those of Asia. In addition to demonstrating that “the reserve buildup is a phenomenon that affects the world's poorest countries as well” (Rodrik 2006, 258) rather than just relatively more prosperous EMDCs, this remarkable development in Africa also casts doubts on the mercantilist explanation.

Nor is reserve accumulation restricted to just surplus countries; it is instead a practice evident even among countries running chronic current account deficits. The sample of 15 deficit countries selected from various regions in Figure 3 posted, on a weighted basis, an average current account deficit of around 2.1% of GDP during the 1992–2007 period. Despite the hefty and persistent nature of the deficits, however, their reserve holdings increased steeply from just \$50 billion in 1992 to \$607 billion in 2007, surging from 3.9% of GDP to 14.9%. Again, the second Bretton Woods thesis cannot readily explain this development: if reserve hoarding is meant to be a mercantilist device, it has obviously not worked well for any of these deficit countries.

The near uniformity of unprecedented reserve accumulation in the developing world provides an important window into understanding the driving force behind the hoarding, as it implies, if the mercantilist thesis is correct, that practically all EMDCs are now exchange-rate manipulators regardless of their variations and differences, a conclusion that is rather implausible to reach. While the colossal size of China's reserves may indeed be a reflection of its mercantilist aim of deliberately undervaluing its currency for trade-purposes as alleged (Goldstein and Lardy 2009; Corden 2009), it can hardly be the case that the whole developing world suddenly became converts to mercantilism,



**Figure 4.** Nominal and real effective exchange rates of the Korean won, 1997–2007.  
 Source: BOK (n.d.); World Bank (n.d.).

especially in a decade marked by the end of the East Asian model of development and the triumph of the Anglo-Saxon, *laissez faire* market model.

Second, and more specifically for Korea, the reserves accumulated by the BOK are, despite their large absolute size, not out of line in proportionate terms from its peers, and had actually been declining since reaching the peak in 2004. Measured as months of imports, Korea's reserve holdings fell to 8.9 months in 2007, being well below the average of both Asia and Africa. This is hardly a hoarding behaviour worthy of a mercantilist country. More importantly, the BOK's reserve accumulation had not kept the exchange rates of the Korean won artificially undervalued. The movements of the real effective exchange rates (REER) of the won show that while the overshooting from the crisis of 1997 had rendered the currency substantially undervalued in real terms for a number of years, by 2005, it had recovered the lost ground, and from then on until the crisis of 2008, the won had actually been *over-valued* in real terms (see Figure 4). This does not square well with the mercantilist goal of engineering undervalued exchange rates for trade-purposes. For the second Bretton Woods thesis to hold for Korea, its reserve accumulation should have been much larger in scale, and its impact on the won's REER should have shown up as a downward trend. Neither is evident.<sup>5</sup>

#### *Reserve Accumulation as a Self-Defensive Strategy*

The alternative explanation, focusing on the capital account side, sees reserve accumulation as a financially-induced process driven by the precautionary desire of EMDCs to enhance their FX liquidity and better manage the risk of potential disruptions in capital flows. It is essentially a form of self-insurance, hedging against the kind of sudden changes in capital flows that had pushed so many EMDCs to the brink of default in the 1990s. From this perspective, reserve hoarding by the EMDCs has less to do with the

alleged mercantilist desire to maintain trade competitiveness than their fear of crippling capital account shocks. For Korea, this meant piling up enough reserves for the BOK to do what it could not do in 1997: instil and sustain foreign investor confidence, fend off speculative attacks, and, in the event of serious disruptions in capital flows, provide FX liquidity for the financial system and act as the lender of last resort in the reserve currency.

A growing number of recent studies have found more empirical evidence for this precautionary view than the mercantilist thesis. Finding much more robust evidence for the precautionary explanation, Aizenman and Lee (2007, 212) conclude, “variables associated with mercantilist concerns are practically flat, and their economic significance in accounting for the observed hoarding of international reserves is close to zero.” These findings are supported by numerous other studies arriving at basically the same conclusion (see, for example, Bird and Rajan 2003; Calvo, Izquierdo, and Loo-Kung 2012; Steiner 2013).

Notably, in an analysis of 65 developing countries, Mendoza (2004) finds that the pattern of reserve accumulation has been consistent with the self-insurance motivation, linked to the series of emerging-market crashes that plagued the developing world in the 1990s and the concomitant volatility of global financial markets. Elsewhere, pointing out that reserve accumulation in developing countries, despite its rapid rate of growth, has barely kept pace with the explosive growth of financial assets and liabilities resulting from financial liberalisation, Rodrik (2006, 257) notes that “the increase in developing country’s reserves is related to changes not in *real* quantities (such as imports or output) but in *financial* magnitudes” (original emphasis).

In principle, conceptualising reserve accumulation as a self-insurance strategy is consistent with the “Guidotti-Greenspan” rule, which redefines the appropriate level of reserve holdings as an amount equal to a given EMDC’s total short-term external liabilities.<sup>6</sup> Endorsed by the IMF in its policy recommendations to EMDCs (Fischer 2001), the Guidotti-Greenspan rule has shifted the focus from the current account to the capital account, setting the new barometer as a reserves/short-term external debt ratio of one instead of three months of imports. This new guideline is clearly premised on the widespread recognition of the many emerging-market crashes of the past two decades as crises of liquidity rather than insolvency, and thus is designed to provide a better benchmark for measuring the adequacy of reserve holdings than just relying on the traditional rule of thumb (see IMF 2001; Wijnholds and Kapteyn 2001; Jeanne and Raci re 2006).

By the Guidotti-Greenspan principle, however, Korea’s reserves far exceeded the precautionary level endorsed by the IMF. From the 1997 low of 30.9% of total short-term liabilities, reserve holdings had already climbed up to 131.3% by the following year and reached 351.7% at its 2004 peak (see Table 5). It may then be tempting to interpret any excess reserve holdings beyond the Guidotti-Greenspan rule as a sign of Korea’s mercantilist motivation. It should be pointed out, however, that whether or not the new benchmark captures the optimum level of reserves remains unsettled, as indicated by Fischer’s (2001) observation that “it is only a starting point.” In other words, even if an EMDC has sufficient reserves to cover all its short-term external liabilities, it still may not provide enough insurance against adverse shocks in the capital account. The reason is simple: short-term external liabilities are only one type of highly mobile capital flow. Equally mobile and thus potentially as volatile are equity FPI, financial derivatives, and, where there are liquid secondary markets, even long-term debt securities. Moreover, in countries where restrictions on capital outflows by residents have been removed, sources

**Table 6.** Sources of external capital drain and reserve coverage ratios, 2001–07

	2001	2002	2003	2004	2005	2006	2007
Sources of drain (billions of \$)							
3 months of imports (A)	34.5	37.2	43.9	55.1	64.3	76.3	88.1
Short-term external debts (B)	40.3	48.2	50.8	56.3	65.9	113.7	160.2
Net financial derivatives (C)	0.0	0.0	0.1	-0.2	0.3	1.0	2.6
FPI (D)	106.4	116.2	165.0	210.3	310.5	352.4	456.7
Reserves (billions of \$)	102.5	120.8	154.5	198.2	210.0	238.4	261.8
Reserve coverage ratios (%)							
A+B	137.0	141.4	163.1	177.8	161.3	125.5	105.4
A+B+C	137.0	141.5	163.0	178.2	160.9	124.8	104.3
A+B+C+D	56.6	59.9	59.5	61.6	47.6	43.9	37.0

Source: BOK (n.d.).

of capital drain are not limited to foreign investors and lenders. To really capture and insure against the risk of disruptive changes in capital flows, then, the precautionary benchmark must go well beyond the Guidotti-Greenspan rule. The question is, how far?

There does not appear to be an easy answer to this question.<sup>7</sup> Fundamentally, the optimum level of reserves remains a malleable concept as there is no *a priori* way to estimate the magnitude of the volatility in capital flows until after the fact. It is at best a stochastic process, weighing heavily towards the contingent and the unpredictable. The precise amount of reserve holdings would thus depend on a number of imprecise factors influencing the preferences of the given country, including its past experience with different types of short-term capital flows, the cost of any previous crisis, the scale of ongoing capital flows and the risk-adverseness thus shaped. The greater the volatility of capital flows, the higher the cost of the previous crisis, and the deeper the penetration of foreign capital in the domestic financial system, the more risk-adverse a country is likely to be, and accordingly the more its reserve policy would be driven by precautionary motivation. Korea fits the bill, given not only its traumatic experience with the crisis of 1997 but also the extraordinarily deep penetration of foreign capital in its financial markets subsequent to the crisis (see Table 4).

The potential sources and sizes of external capital drain for Korea are broken down in Table 6, which also shows its reserve holdings as a percentage of a range of these sources. The narrowest measure, combining both the old and the new rules of thumb, presents reserves as a ratio of three months of imports plus total short-term liabilities, while the broadest measure adds to this metric net liabilities generated by financial derivatives plus foreign holdings of equity and tradable long-term debt securities. As can be seen, although Korea's reserves were large enough to cover for three months of imports and all its short-term external liabilities, they were clearly nowhere near hedging for possible disruptions in FPI flows. Put differently, despite the huge increases in the absolute size of the BOK's reserves, we are merely looking at Fischer's "starting point."

In addition to these economic factors behind precautionary reserve accumulation, there is also an important political impetus. The crisis of 1997, the loss of policy autonomy following the IMF rescue, and the economic hardship that followed still haunt many Koreans. In a country where the IMF remains synonymous with unprecedented economic dislocation and suffering in the collective consciousness of the nation, there is a powerful

political incentive to avoid the IMF like a plague. In this light, reserve accumulation is also a politically motivated step towards preserving policy autonomy and economic sovereignty in the face of financial globalisation, by preventing future financial crisis and thus pre-empting the prospect of having to seek IMF assistance and submit to its conditionality (Bird and Mandilaras 2005, 88).

Korea's precautionary reserve accumulation, then, is a function of its past trauma and current risk-exposure to the volatility of foreign capital flows, motivated by both economic and political desires to insure itself against capital account shocks. The dominant factor behind Korea's reserve policy is financial rather than trade-related; its strategic orientation is defensive rather than offensive; and its explanatory roots are located in the broader process of financial globalisation rather than elements that are *sui generis* to Korea. It is, in short, a coping device to navigate through the pitfalls of global finance.

### The Costs of Korea's Reserve Accumulation

To the extent that reserve accumulation improves an EMDC's liquidity position and thus makes it less vulnerable to volatile swings in capital flows, the increase in reserves is seen largely as a step in the right direction. Certainly, at the end of 2007, the BOK governor slept better than his predecessor in 1997, knowing that he had a war chest of \$262 billion at his disposal rather than just \$30 billion. The downside to this war chest, of course, is that reserves are not cost-free.

There is in fact a very large price that Korea, along with other EMDCs, is paying for every dollar it adds to its reserves to protect itself from unstable capital flows. Most existing studies estimating the economic costs of reserve accumulation treat reserve holdings as a whole stock, whose entirety is assumed to have been accumulated as a form of self-insurance against disruptions in capital flows. This overstates the actual insurance premium, however, as part of FX reserves are held for current account needs, which are captured by the traditional rule of thumb prescribing sufficient reserves to cover three months of imports. This cost needs to be netted out to isolate the cost of reserves in the *absence* of an open capital account from the cost of *additional* reserve accumulation required for self-protection with the adoption of an open capital account (Rodrik 2006, 260). The former is the cost of hedging against disruptions in the current account side of the balance of payments, one that has been borne by every country except the issuer of the reserve currency long before the advent of financial globalisation; the latter, in contrast, is the cost of hedging against disruptions in the capital account, one that has been borne *only* by EMDCs, and *only* after capital account liberalisation. Thus, any additional reserves added to the BOK's coffers beyond the amount equal to three months of imports can be construed as excess reserves necessitated by capital account liberalisation. The cost of these excess reserves is the true cost of "self-insurance."

There are three broad ways to measure the economic costs of holding reserves: first, its impact on the balance sheet of the central bank, known as the quasi-fiscal cost of reserves; second, the opportunity cost of foregone investment that could have added to the capital stock, which is the broadest (and most difficult-to-measure) metric; and third, the narrower metric measuring the difference between the returns to the central bank on its reserve assets on the one hand, and the returns to foreign lenders and investors on their liquid loans and investment backed by reserves on the other.<sup>8</sup> To isolate the cost of the capital account-related reserve accumulation from current account-related reserve

accumulation, I net out three months of imports from my calculations and use this baseline to estimate each of the three economic costs of reserves.

*The Cost of Reserve Accumulation on the BOK's Balance Sheet*

The quasi-fiscal cost of reserve holdings is relevant solely from the public sector's perspective, incurred when the central bank sterilises its intervention in the foreign currency market through open market operations to offset the expansionary impact of reserve accumulation on the money supply. Since reserve assets do generate returns, the pertinent measure here is the difference between the returns on reserve assets and the interest payments on government bonds sold to mop up excess liquidity in the domestic financial system, expressed in a common currency (Rodrik 2006, 260; Wijnholds and Sondergaard 2007, 24–27). The size of the quasi-fiscal cost of reserve accumulation therefore depends on the yield differential between domestic bonds and reserve assets, the extent of sterilisation, and the fluctuations in exchange rates.

Table 7 estimates the impact of capital flow-induced reserve accumulation on the balance sheet of the BOK in the 2001–07 period. On the revenue side, the calculation uses the yields on three-year government bonds issued by the US, Eurozone countries and Japan to approximate the returns on reserve assets, with their respective share in the BOK's reserve portfolio estimated at 64.5%, 20% and 15.5%. Rates of return are then calculated in dollar terms taking into account fluctuations in dollar-euro and dollar-yen exchange rates, which are then expressed as won-denominated returns using the year-end exchange rate.

On the expense side, the expenditure is calculated based on the interest payments on government bonds associated with the BOK's reserve accumulation. There are two types of debt securities relevant for estimating these payments: the Foreign Exchange Stabilisation Fund Bonds (FESFBs), created explicitly for the purpose of stabilising the currency market, and the Monetary Stabilisation Bonds (MSBs), the primary instrument used by the BOK in open market operations to control the money supply.<sup>9</sup> As can be expected from the large scale of the BOK's reserve accumulation and its potential impact on the money supply, sterilisation ratios were quite high over the period, ranging from the

**Table 7.** Quasi-fiscal cost of excess reserve accumulation, 2001–07 (trillions of won unless otherwise noted)

	2001	2002	2003	2004	2005	2006	2007	Total
Returns on reserve assets (A)	0.3	8.4	7.8	5.3	-1.8	8.1	10.2	38.3
Interest payments on:								
FESFBs	0.9	1.0	1.3	3.7	2.9	3.1	3.0	15.8
MSBs	3.2	3.3	3.6	4.0	4.2	4.6	5.0	28.0
Subtotal (B)	4.1	4.3	4.9	7.7	7.1	7.7	8.0	43.8
Exchange-rate revaluation adjustment (C)	-0.7	-4.8	4.7	-12.6	-9.5	-5.3	6.1	-22.1
Net cost								
Amount: (A-B)+C	-4.6	-0.7	7.7	-15.0	-18.5	-4.9	8.4	-27.6
% of GDP	-0.70	-0.10	1.00	-1.82	-2.13	-0.54	0.86	-0.48

Source: BOK (2002–08); Government of Korea (2002–08).

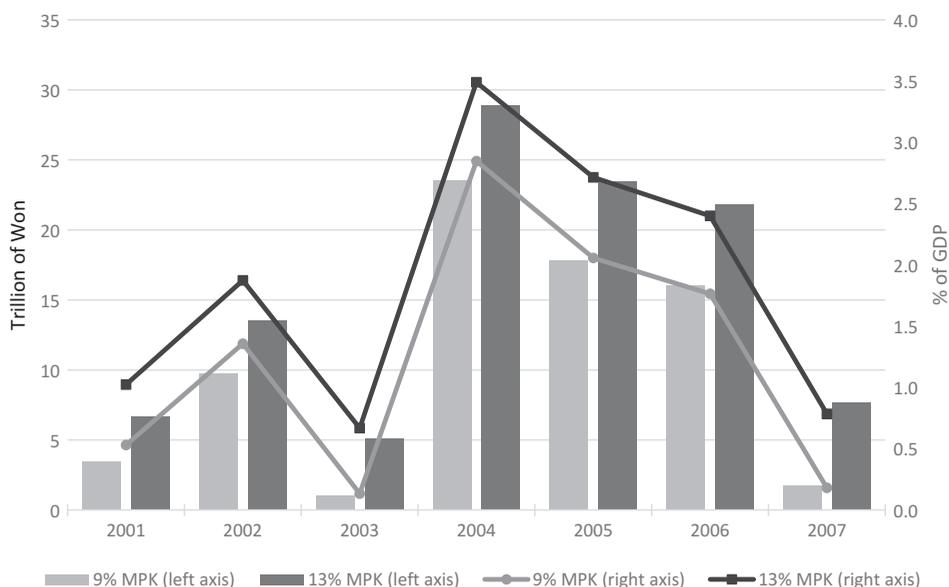
low of 63% in 2002 to the high of 74% in 2005, with an average ratio of 67% (Korea Institute of Finance 2009, 12). Accordingly, the monetary cost of sterilisation is not negligible, with the cumulative interest payments amounting to 28 trillion won. Together with interest payments accruing from the FESFBs, the total interest payments over the 2001–07 period are estimated at 43.8 trillion won. The majority of this interest expenditure, however, is offset by the returns on reserve assets, which have amounted to 38.3 trillion won over the same period. The cumulative net cost on the BOK's balance sheet is thus reduced substantially to 5.5 trillion won, a relatively modest sum measuring only 0.01% of GDP.

This metric, however, does not capture the full extent of the impact of reserve accumulation on the BOK's balance sheet. The central bank's reserve portfolio is also exposed to FX risk, and therefore exchange rate-induced losses (and gains) need to be taken into account to arrive at a more accurate estimate. At a 2001–07 cumulative loss of 27.6 trillion won, this exchange rate-induced cost was very large for Korea, due to the heavy weight of US dollar-denominated assets in the BOK's reserve portfolio and the weakening of the US dollar over the period.<sup>10</sup> With this cost of exchange-rate re-valuation added, the net quasi-fiscal cost of reserve accumulation for the BOK is estimated at 27.6 trillion won over the period, around 0.48% of the cumulative GDP.<sup>11</sup>

#### *The Cost of Reserve Accumulation as Foregone Investment*

While 0.48% of GDP is a large cost for any country, from a national perspective, the quasi-fiscal cost of reserve holdings is not the most relevant measure. Since the government bonds sold by the BOK through open market operations are predominantly purchased by domestic entities, the counterpart to its sterilisation cost is actually an interest income for domestic residents, and therefore it is indistinguishable from a transfer of income from the BOK to the private sector (Rodrik, 2006, 260; Wijnholds and Sondergaard 2007, 27). For the whole economy, the more germane cost of reserve accumulation is the opportunity cost of holding low-yielding reserve assets in lieu of investing in higher-yielding assets. This opportunity cost may take various forms, the broadest of which is foregone investment that could have added to the capital stock to produce higher returns (Singh 2006; Stiglitz 2006; Cruz and Walters 2008). The Counter-factual scenario here is that every dollar added to the BOK's reserves beyond three months of imports is instead invested in the domestic economy. Estimating marginal product of capital (MPK) is notoriously difficult, however, and consequently measuring the broadest opportunity cost of reserves is rather difficult. Nonetheless, a range of MPKs can give us at least some sense of the broadest measure of the cost of reserve accumulation. Figure 5 shows these costs for 2001–07, expressed as the spread between the rates of returns on reserve assets in won and two estimated MPKs for Korea drawn from a recent study, with a lower bound of 9% and an upper bound of 13% (Caselli and Feyrer 2007).

As is evident, the opportunity cost of Korea's reserve accumulation expressed in terms of foregone investment is staggeringly high. Even the conservative estimate of a 9% MPK translates into very high costs, ranging from the low of 1 trillion won (0.13% of GDP) in 2003 to the high of 23.5 trillion won (2.85% of GDP) in 2004. The cumulative cost over the seven-year period is in excess of 73.4 trillion won, accounting for 1.28% of the total output over the same period. Using the upper bound MPK at 13% puts the cost in a much higher range, from the low of 5.1 trillion won (0.67% of GDP) in 2003 to the high of 28.9



**Figure 5.** Opportunity costs of reserve accumulation as foregone investment, 2001–07.

*Note:* MPK denotes marginal product of capital. *Source:* BOK (n.d.; 2002–08).

trillion (3.49% of GDP) in 2004; and the cumulative cost rises to a hefty 107.1 trillion won (1.87% of GDP).

#### *The Cost of Reserve Accumulation as Reverse Carry-Trade*

Although conceptualising the opportunity cost of reserve accumulation as the cost of foregone investment gives the broadest measure, it is admittedly “a slippery concept” and can only give us a very rough approximation. There is, however, another way to narrow down the opportunity cost of reserve holdings further, by unpacking the Guidotti-Greenspan rule and extending its rationale.

Recall the simple prescription of the Guidotti-Greenspan rule: to ensure sufficient FX liquidity, an EMDC should match every dollar in its short-term external liabilities with a dollar in its reserves. Since the marginal increase in short-term liabilities is equal to the marginal increase in reserve holdings in principle, the narrowest opportunity cost of reserve accumulation can be conceived of as the net returns on a reverse carry-trade, measured as the spread between the returns on low-yielding reserve assets on the one hand, and the higher cost of short-term external borrowing on the other. As previously noted, however, short-term external liabilities are only one source of volatility in capital flows. The Guidotti-Greenspan rule therefore needs to be extended to other liquid types of foreign claims on Korea, including financial derivatives, equity FPI, and foreign holdings of tradable long-term debt securities.

There are a number of hurdles to clear before implementing this measure empirically. First, because the BOK does not release time-series data on the private sector’s cost of short-term borrowing, some other benchmark has to be used as a proxy for this metric.

Existing studies often use sovereign spreads to estimate this cost and apply them across the board to the whole stock of reserves, but this is problematic as it understates the true opportunity cost of reserve holdings by a large magnitude, for the following reasons: (i) government bonds typically carry a much lower risk premium than the liabilities incurred by the private sector; and (ii) since Korea's reserves exceed its short-term external liabilities, the appropriate metric to measure the opportunity cost of the marginal increase in reserves in excess of short-term external debts is neither sovereign spreads nor the private sector's cost of short-term borrowing, but returns to foreign investors on other types of liquid claims, namely FPI. Therefore, in lieu of applying sovereign spreads across the board, I apply different rates of returns to foreign lenders and investors on different types of financial claims on Korea: yields on three-month certificates of deposit as a rough proxy for the cost of short-term borrowing; three-year yields for government and corporate bonds for returns on foreign holdings of tradable debt securities; and estimated unrealised returns on foreign equity investment.

Second, measuring the true extent of vulnerability to the liabilities created through financial derivatives can be tricky as by their nature these instruments almost always have their counterparts showing up on the asset side. Accordingly, taking the whole of the liabilities associated with financial derivatives grossly overstates their extent. To avoid this, I use the net amount between assets and liabilities instead of the gross liabilities figures, and add this amount to short-term external liabilities.

Finally, the additional consideration of FPI is qualified by the assumption that while every dollar in FPI is potentially liquid, it is highly unlikely that the whole stock of FPI will exit at once. Korea's experience during the crisis of 1997 indicates that whereas the rollover rates on short-term commercial loans did fall to near 0% at the height of the crisis, the drain through FPI was partial. Accordingly, a conservative benchmark of 30% is set as the upper bound of the BOK's reserve coverage of FPI stock rather than assuming a 100% coverage.

As Table 8 shows, even the narrowest measure of the opportunity cost of reserve accumulation carries a high price tag. In 2001–07, Korea absorbed large net losses every year except 2002, when it posted a small net gain of 0.7 trillion won due to the poor

**Table 8.** Cost of reserve accumulation as carry-trade, 2001–07 (trillions of won unless otherwise noted)

	2001	2002	2003	2004	2005	2006	2007	Total
Returns on reserve assets (A)	0.3	8.4	7.8	5.3	-1.8	8.1	10.2	38.3
Returns on foreign financial claims								
Short-term external claims	3.3	2.5	2.5	2.3	2.1	3.0	5.5	21.3
FPI: tradable bond claims	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2
FPI: equity claims	9.6	0.4	10.3	3.2	27.5	4.8	13.0	68.9
Subtotal (B)	13.0	2.9	12.8	5.6	29.7	7.8	18.6	90.4
Exchange-rate revaluation adjustment (C)	-0.7	-4.8	4.7	-12.6	-9.5	-5.3	6.1	-22.1
Net cost								
Amount: (A-B)+C	-13.4	0.7	-0.3	-12.9	-41	-5	-2.3	-74.2
% of GDP	-2.06	0.10	-0.04	-1.56	-4.74	-0.55	-0.24	-1.30

Source: BOK (2002–08); Financial Supervisory Service (n.d.).

performance of equity FPI. Over the seven-year period, the cumulative cost is estimated at 74.2 trillion won, around 1.3% of GDP. This is by no means a negligible cost for any country; Korea had clearly been paying a very high premium for its self-insurance. The key question, then, is whether or not such a high insurance premium paid off when the need arose.

### The Crisis of 2008 and Reserve Accumulation

In 2008, despite the large size of its reserve holdings built at a very high cost, Korea still fell victim to severe financial instability triggered by the near collapse of the US banking system, manifested in massive capital outflows, a collapsing won, and the eventual need to seek external assistance. Given the scale of the banking crisis in the US and its widespread global impact, it is probably unreasonable to expect that Korea would have remained immune from the adverse external shocks just by virtue of holding large reserves. It is not, however, so unreasonable to expect that \$262 billion in reserves should have at least enabled Korea to cope with the disturbances in the global financial system with fewer difficulties. Yet, at the height of the miniature crisis in the fall of 2008, financial conditions in Korea came very close to those of 1997.

Korea's enhanced liquidity position did play an important role in its policy response to the capital exodus of 2008, as it enabled the BOK to run down its reserve holdings to offset the effects of capital outflows in an attempt to defend the won. However, despite its large-scale interventions in the currency market to the tune of \$27.4 billion in October and another \$12 billion in November, foreign capital continued to flee. As shown in Table 9, the capital drain was immense in both its securities markets and inter-bank loan markets. Although foreign investors' exit from the securities market had proceeded earlier than foreign creditors' exit from the inter-bank loan market, the latter's scale was much larger once it was set in motion. The last quarter of 2008 was particularly disastrous, with foreign capital fleeing Korea by \$15 billion via FPI and \$46.9 billion through the withdrawal of inter-bank loans, whose rollover rates had plummeted below 40% (BOK 2009, 41). Altogether, \$74.9 billion left Korea over the period from July 2008 to March

**Table 9.** Foreign capital drain and reserves by month, July 2008–March 2009 (US\$ billions)

	2008						2009			Total
	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	
<i>FPI</i>										
Equity	-4.3	-2.6	-3.1	-4.0	-1.5	1.2	0.1	-0.7	1.3	-13.5
Debt securities	-3.7	1.4	-2.8	-4.7	-4.8	-1.2	3.6	-0.7	-3.7	-16.5
Subtotal (A)	-8.0	-1.2	-5.9	-8.7	-6.3	0.0	3.7	-1.3	-2.4	-30.1
<i>Bank loans</i>										
Long-term	0.2	-0.9	-0.5	0.3	0.7	-0.4	0.2	0.2	-0.1	-0.2
Short-term	4.8	6.8	-1.2	-18.8	-10.9	-17.9	-7.6	-0.9	1.0	-44.6
Subtotal (B)	5.0	5.9	-1.7	-18.5	-10.2	-18.2	-7.4	-0.7	0.9	-44.8
Total drain (A+B)	-3.0	4.7	-7.6	-27.1	-16.4	-18.2	-3.7	-2.0	-1.5	-74.9
Reserves	247.0	242.7	239.2	211.8	199.8	200.5	201.0	200.8	205.6	-

Source: BOK (n.d.).

2009, wreaking havoc on Korea's financial system and throwing the won into a free-fall to drop from 934 won per dollar at the beginning of 2008 to the low of 1,570 won, a depreciation of 45% (BOK n.d.; see also BOK 2009). Revealingly, the market was not stabilised until the BOK reached a \$30 billion emergency swap agreement with the US Federal Reserve Board, followed by additional swap facilities created with the BOK's Japanese and Chinese counterparts.

Ultimately, it was not the confidence instilled by the BOK's reserve holdings that arrested the run on the won. By the end of November the central bank had run down its reserves by \$64 billion from the March high of \$263.8 billion. While it still had around \$200 billion in reserves, the rate of reserve depletion was overwhelming. What brought stability back to the market was the policy decision made by the US to set up a series of swap facilities with a number of panic-stricken EMDCs, including Korea as one of these recipients.<sup>12</sup> Given that the daily turnover in Korea's FX market was well in excess of \$60 billion, the BOK's remaining reserves could be and would have been run down quickly without the wider panic gripping the global financial system being addressed. This was not a problem that could have been fixed by throwing the remaining \$200 billion reserves at it. The rescue, as had been the case a decade earlier, came from Washington. By opening a swap line, the US enabled the BOK to use the proceeds to inject dollar liquidity into the domestic financial system without running down its reserves, keep its reserves to the psychologically important floor of \$200 billion, and send an important signal to the market that it now had the implicit backing of the US Federal Reserve Board.

In light of this experience, one may ask if Korea's insurance policy paid off in 2008. The answer appears to be less than a ringing endorsement, although there is some room for debate. On the one hand, one could argue that the crisis of 2008 was less severe than the crisis of 1997 precisely because the BOK's reserve holdings were much larger, giving it the breathing space required to negotiate an agreement with the Federal Reserve. Certainly, the BOK was better off to have \$262 billion in reserves in a time of crisis than a lesser amount. However, the precautionary rationale behind Korea's strategy of reserve accumulation is not merely buying some time for the monetary authorities to negotiate an agreement for external assistance, but to *avoid* having to seek such external assistance in the first place. Korea failed to achieve this. The "usable" cushion provided by its reserve holdings was in fact rather thin at only about 25% of the total reserve holdings – once the BOK ran down its reserves to \$200 billion, it did not dare to tap it further for the fear of ratcheting up the already intense pressure on the won and triggering a bank run – and the central bank was forced to abandon its self-help strategy in quick order and turn elsewhere for liquidity support, much as it had done so in 1997 (see Aizenman and Sun 2012). Had the US government not been receptive to the plight of EMDCs in the fall of 2008, Korea would probably have had to again turn to the IMF for assistance.

There are two important policy implications to draw from this experience. One implication, which has been dominating Korea's subsequent policy formulation, is that since \$262 billion was not large enough, it should hoard even more reserves. From this perspective, which focuses on the insufficiency of reserve holdings, the idea of self-insurance itself was not wrong; the problem was that Korea had not paid for a large enough coverage. Judging from the breath-taking pace of reserve accumulation since 2008, the BOK seems to have taken this lesson to its heart, to such an extent that the US Treasury (2011) expressed some dissatisfaction over the BOK's reserve hoarding and

called “for a greater degree of exchange rate flexibility and less intervention” – as of March 2014, Korea’s reserve holdings stood at over \$354 billion. Yet, this lesson raises more questions than answers: what level of reserves is enough, and at what cost?

For the governor of the BOK to sleep with ease, the hypothetical upper bound of reserve holdings would be an amount equal to all the external sources of capital drain. In essence, the BOK would have to increase its reserves to cover all short-term liabilities and the entire stock of FPI, rather than assuming a 30% coverage ratio for FPI. By that stringent criterion, at the end of 2007 the BOK was \$446 billion short of giving its governor a good night’s sleep. Obviously, the cost of this sleep would be prohibitively high.

The other lesson, derived from the questionable cost-efficiency of Korea’s strategy, calls for a fundamental rethinking of capital account liberalisation and reserve accumulation, predicated on the recognition that if an annual premium of 1.3% of GDP does not provide an adequate coverage against the volatility of foreign capital flows, the answer to this conundrum is not continuing to pay an escalating premium for, and rely exclusively on, an insurance that may or may not pay off when needed. Rather, addressing the problem requires Korea to also take into account the onerous cost of its reserve accumulation, reconsider the root cause driving it to hoard reserves at such a high price, and reassess the costs and benefits of pursuing financial openness. Specifically, the welcome mat rolled out indiscriminately to hot money deserves greater scrutiny.

At the heart of Korea’s financial vulnerability is its exposure to unstable and destabilising short-term foreign capital flows, which is also the fundamental factor behind its reserve accumulation. In this light, the cost of reserve accumulation should be seen more accurately and essentially as the cost of excessive financial openness, a cost that would not have been borne had Korea been more cautious about the inherently volatile nature of hot money. Not only is this cost of excessive financial openness high for Korea as documented, but it also defeats the very purpose of capital account liberalisation. An open capital account has long been pushed by DMEs and MFIs as a necessary step to induce capital inflows to EMDCs to finance productive investment and spur economic growth. Yet, Korea’s need to offset the inflow of liquid foreign capital with reserves means that there has been no net financial resource transfer from abroad. Indeed, since the crisis of 1997, Korea has been consistently posting a net transfer of financial resources abroad, with the cumulative transfer in 1998–2012 reaching over \$330 billion (BOK n.d.). In essence, the BOK has been merely repackaging privately incurred external liabilities into publicly held external assets, sending the money back to the countries issuing reserve instruments (predominantly the US), and the Korean economy as a whole has been absorbing the wide difference in returns as the cost of reserve accumulation. This, of course, is a bad investment decision in every sense: borrowing at high interest rates and lending the proceeds at much lower rates.

The “irrationality” of this outcome is explained by Korea’s almost singular focus on the asset side of the ledger for enhancing its liquidity position. Accumulating reserves is one way to reduce vulnerability to capital account shocks, but this carries an onerously high price tag whose underlying logic makes little economic sense. The other, much neglected side to Korea’s vulnerable liquidity position is its heavy exposure to short-term capital flows. There is no *a priori* reason why enhancing the liquidity position should be approached from the asset side *alone*; reducing volatile foreign financial claims in the liabilities side will have the same effect, without incurring the excessively punishing costs

of reserve accumulation. Viewed in this way, the policy lessons and choices discussed here are not mutually exclusive, as though pursuing one policy would necessarily preclude the other. Rather, it is a matter of expanding Korea's policy menu and finding a more appropriate weight and balance in its difficult search for financial resilience. The point is not that prudent reserve management has no place in the BOK's arsenal; on the contrary, in the absence of any clear consensus on reserve adequacy at both theoretical and practical levels, large reserve holdings will continue to be a key component to the BOK's self-help strategy. It does not, however, have to be the *only* component.

## Conclusion

The extraordinary amount of exchange reserves accumulated by Korea is primarily an outcome of financial globalisation, resulting from its adoption of capital account liberalisation, the attendant exposure to greater financial instability, and the consequent need to develop a self-defensive strategy to hedge against volatile swings in capital flows – to avoid, in short, a repeat of the 1997 crisis. Yet, this article reveals serious limits to this strategy, both in terms of its excessive cost and disappointing effectiveness, the latter of which was laid bare by the crisis of 2008. Such limits suggest that a truly “self-help” strategy should go beyond simply hoarding reserves and begin addressing the fundamental source of Korea's financial vulnerability.

Expanding Korea's policy menu to include capital control to scale back its exposure to short-term foreign capital flows does not mean returning to the heyday of the developmental state and financial repression, when the state acted as the *de facto* banker with a tight-fisted control over financial markets and even more control over capital flows. This is neither desirable nor achievable in the prevailing economic and political circumstances, given Korea's deep integration with the global financial system and its position as a rule-taker rather than a rule-maker. There is, however, a compelling and feasible case for Korea to strike a better balance in managing its liquidity position, a direction towards which the government has finally begun to move by introducing a number of macro-prudential regulations.<sup>13</sup> The 2008 global financial crisis, moreover, has created auspicious conditions for opening up a space beyond the narrow parameters of the neo-liberal orthodoxy, for several reasons.

First, as the late Susan Strange (1994, 247) observed, “the power of bankers and financial markets is seldom checked until *after* a financial crisis” (original emphasis). The world is barely crawling out of a financial crisis of monumental proportions, presenting that rare opportunity that Strange spoke of. Second, the intellectual credibility of capital account liberalisation in EMDCs has eroded to such an extent that even the IMF, the erstwhile champion of financial openness, is having a road-to-Damascus conversion to endorse at least some form of capital controls (see Ostry et al. 2010). Third, the findings of this article, while focused on the experience of Korea, are not irrelevant to other EMDCs struggling to cope with the challenges of financial globalisation. Korea is certainly no stranger to financial crisis; it is not an outlier when it comes to reserve accumulation; and the burdensome cost of this strategy is not a weight shouldered uniquely by Korea – these issues are all quite familiar to most other EMDCs. Because practically all other EMDCs have been hoarding reserves to hedge against financial upheaval, so have they also been dabbling in a reverse carry-trade with reserve accumulation. The result has been a massive transfer of financial resources from developing to

developed countries, not vice versa as predicted by the proponents of capital account liberalisation. From 1997 to 2007, net transfer of financial resources from the EMDCs to the DMEs rose by an astounding order of a 350-fold increase, with the cumulative amount of net financial resource transfer reaching well in excess of \$3.9 trillion (United Nations 2008, 69). Essentially, poor countries have been paying for the profligate spending habits of rich countries – one could go as far as to say that much of the Bush tax cuts over this period were effectively financed by the central banks in EMDCs (see Cho 2014a). Accordingly, Korea's experience not only offers a cautionary tale for other EMDCs, in both Asia and beyond, about their strategy of choice for managing the risks of capital account liberalisation, but it also points towards a common page from which a more concerted collective action can flow. Korea has already begun to take advantage of these openings, but it is a window of opportunity that can and should be explored further.

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### Notes

- <sup>1</sup> This paper follows the International Monetary Fund's (IMF) definition of EMDCs, except for the inclusion of Korea, Taiwan and the Czech Republic. Although the IMF classifies these countries as advanced countries, the vast majority of emerging market indices still classify them as EMDCs.
- <sup>2</sup> A significant part of this increase in short-term liabilities was due to a burgeoning volume of currency forward contracts entered by Korea's exporters, particularly shipbuilders, and asset management companies to hedge against the depreciation of the US dollar. In entering into these derivative contracts as the counterparts, the Korean banks were exposed to dollar overbought positions. To "square" their overbought positions, the banks borrowed dollars, usually through short-term currency swaps with the Korean branches of foreign banks, converted these dollars into won, and invested them in fixed-income markets to generate returns. At contract maturity, the banks liquidated their won-denominated bonds, delivered the won proceeds to the shipbuilders in return for dollars, and used these dollars to meet their foreign obligations. The foreign bank branches, for their part, also invested their won proceeds from the currency swaps in Korean bonds to generate lucrative returns. About half of the Korean banks' increase in short-term liabilities is traced to these derivative transactions. See Ree, Yoon, and Park (2012).
- <sup>3</sup> The BOK's usable reserves at the end of 1997 were actually down to only \$4 billion, due to its attempt to provide dollar liquidity to domestic banks by depositing its FX reserves in their overseas branches (Shin 1998).
- <sup>4</sup> The backdrop to this trade-related explanation is the huge global imbalances generated by the persistent and growing US current account deficits and the matching surpluses in a number of mostly Asian countries, of which China is the most prominent case. See Mann (2003) and Edwards (2005).
- <sup>5</sup> Of course, this does not mean that reserve accumulation has no influence on trade flows – it obviously does, via its effect on the exchange rate – or that there is no benefit accruing to Korean exporters from the BOK's currency market interventions. There is indeed some overlap between the effects of reserve accumulation on trade and financial variables. The question here, however, is not whether reserve accumulation boosts Korea's exports or is trade-neutral. Rather, it is whether to characterise this export-enhancing effect as the primary target of the BOK's reserve policy or one of its externalities.
- <sup>6</sup> The "Guidotti-Greenspan" principle is named after Pablo Guidotti, former deputy finance minister of Argentina who first articulated it, and Alan Greenspan (1999), former chairman of the US Federal Reserve Board who endorsed it subsequently.
- <sup>7</sup> Measurement issues surrounding reserve adequacy continue to be controversial with no clear consensus emerging, a problem that has been exacerbated by the fallout from the 2008 crisis. For an overview see IMF (2011); for critical assessments of the fund's guideline, see Independent Evaluation Office of the IMF (2012) and Dhar (2012); for a survey of central banks' management of reserves during the 2008 crisis, see Morahan and Mulder (2013).

- <sup>8</sup> In addition to direct economic costs, there are indirect costs to reserve accumulation as well, such as increased risk-exposure to potential macro-economic and financial sector imbalances, including excessive credit expansion, asset bubbles, and less efficient domestic financial intermediation. However, due to the difficulty of measuring and implementing them empirically, this article focuses on the more tangible, direct economic costs of reserve accumulation. See Mohanty and Turner (2006).
- <sup>9</sup> The FESFBs were issued in both won and foreign currencies until 2003; won-denominated FESFBs are no longer issued.
- <sup>10</sup> The BOK does not explicitly recognise foreign exchange-induced gains and losses on its financial statements; they are instead recorded under a special asset category called the Exchange Revaluation Adjustment Account.
- <sup>11</sup> The large losses resulting from the reverse margin between the BOK's reserve assets and interest costs on government bonds had already become a controversial issue in the early 2000s, eventually prompting the Korean government to launch a sovereign wealth fund called Korea Investment Corporation (KIC) in 2005. Funded mostly by the BOK's FX reserves, KIC was to serve as a vehicle to invest in higher-yielding assets. However, due to the entrusted nature of KIC's funding sources, their continuing classification as FX reserves, and the legislative limits imposed on its investment portfolio, the vast majority of its assets, now totaling over \$56 billion, are still invested in traditional assets that are practically indistinguishable from the BOK's own reserve assets. On the origins and evolution of KIC, see Kim (2012).
- <sup>12</sup> The BOK could have activated regional swap facilities arranged through the Chiang Mai Initiative (CMI), but the amount of disposable financing from the CMI was pitifully small, and it instead chose to seek help from Washington rather than relying on its regional partners. In fact, no East Asian country tapped into the CMI, which says something profoundly significant about the actual state of the CMI behind the rhetoric of regional co-operation. See Grimes (2011) and Cho (2014b) for a discussion of the limits of the CMI during the 2008 crisis.
- <sup>13</sup> While there is no clear consensus on the general effectiveness of capital controls and related macro-prudential policies (Magud, Reinhart, and Rogoff 2011), this does not necessarily imply that such capital flow measures are ineffective across the board. As a recent IMF study puts it, "for reasons that are not yet fully understood, capital controls and related prudential measures achieve their stated objectives in some cases but not in others" (Habermeier, Kokenyne, and Baba 2011, 6). In the case of Korea, ceilings were imposed in 2010 on FX derivative contracts at 50% of the capital base for domestic banks and 250% for the local branches of foreign banks; and in the following year, the government also began to roll out what is known as the "Macro-prudential Stability Levy," a small charge (an annualised 20 basis points) applied to the banking sector's foreign currency-denominated liabilities with a maturity of 12 months or less. Bruno and Shin (2014) show that these macro-prudential policies have been effective in reducing the sensitivity of capital flows to external conditions.

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