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Abstract

Sovereign external assets (SEAs) comprise foreign exchange reserves and sovereign wealth funds (SWFs). The global stock of reserves reached 7 $trn in the second quarter of 2008, but data on SWF are rather elusive. Our estimation puts the SWFs at around 2.5 $trn. dollars by 2007 and in the last years they have grown at a high pace, fostered by high commodity prices. Therefore, SEAs have surpassed the 10 $trn mark (around 5% of global assets and 15% of global GDP). This paper argues that reserves and SWF assets should be jointly considered for the assessment of global imbalances. Both are official capital outflows from developing to developed countries, both hinder internal adjustment in current account surplus countries, both help to cover the financing needs of deficit countries, in particular in the US, and, therefore, both contribute to sustain global imbalances.

The importance of SEAs in financing the external imbalances of the US has been widely recognised but scantly measured. Our rule-of-thumb calculations suggests that they have greatly increased their importance in the last years, having surpassed the trillion dollars increase in 2007; relative to US financing needs, this amount represents around a 135% and 50% of net and gross needs, respectively, in 2007. Reserves have in the last years contributed 80% and SWFs 20%. Looking ahead, two main conclusions can be put forward: 1) the relative importance SWFs in the financing of the US deficits and global imbalances is set to increase (also relative to reserves), but this is conditional to commodity prices remaining at high levels. On the one hand, the economic motivation of SWFs —intertemporal smoothing— is more palatable than that of reserves (exchange rate management), despite political concerns on SWFs; on the other hand, SWFs do not have significant internal costs, contrary to reserves, whose monetary and fiscal costs are increasing in the margin; 2) SEAs can well buttress US financial needs in the years ahead, providing resilience to the global imbalances. Dramatic shifts in the pace of SEAs accumulation —due for instance to an adjustment of commodity prices— or in the investment allocation would jeopardise these prospects.

JEL classification: E58, F21, F36, G15.

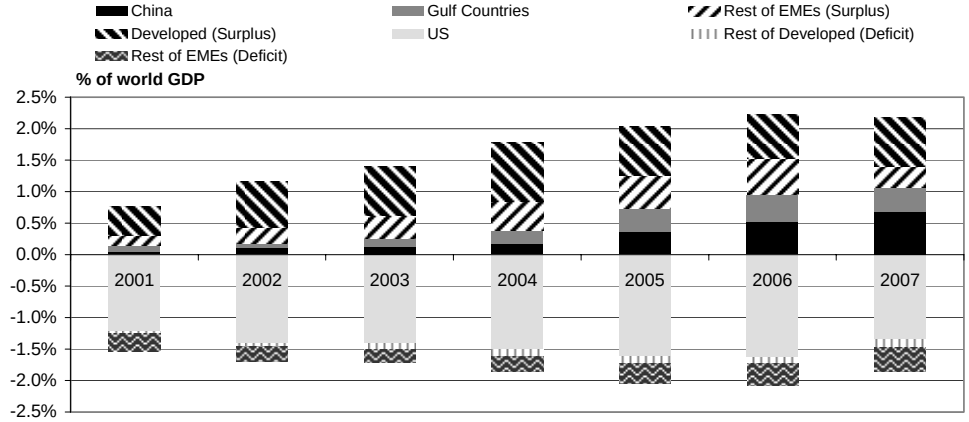
Keywords: International reserves, sovereign wealth funds, global imbalances, exchange rates.

1 Introduction

External imbalances have been widening since the beginning of the decade although they have started to moderate last year. The sum of current account surpluses worldwide has surpassed 2% of global GDP, compared to 0.7% in 2001, as seen in graph 1, top)[1]. More interestingly, *the group* of emerging market countries (EMEs) have become since then net creditors to the advanced economies: the current accounts of EMEs with surpluses add up to close to 1.5% of global GDP, similar to the sum of developed countries external deficits.

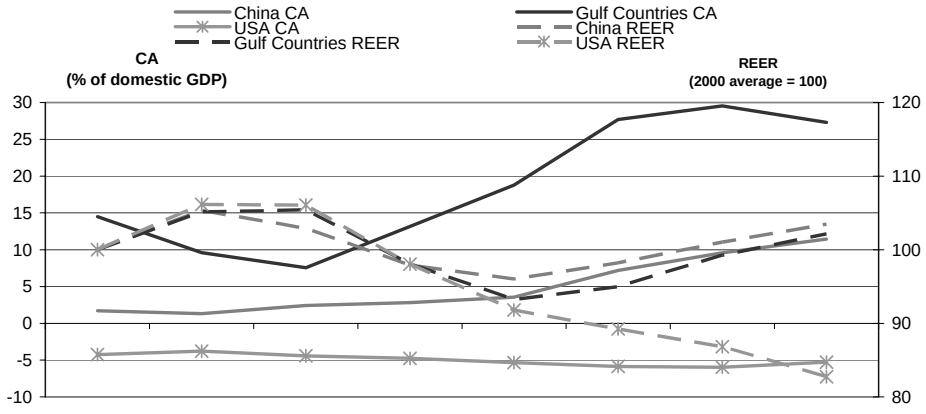
GRAPH 1: GLOBAL IMBALANCES

(A) CURRENT ACCOUNT POSITION AS % OF GDP



Source: IFS (IMF).

(B) CURRENT ACCOUNT TO GDP AND REER* IN SELECTED AREAS



Source: IIF, IFS (IMF), JP Morgan.

Gulf Countries: Kuwait, Saudi Arabia, UAE, Oman, Qatar
(*) An increase in REER means an appreciation.

1. The figures for deficit evolve similarly but there are divergences due to error and omissions and conversions to a common currency.

China (10% of c/a surplus over GDP in 2007, see graph 1, bottom) and oil exporters (Gulf countries surplus surpassed 25% of their domestic GDP) account for 1% c/a surpluses in terms of world GDP; on the deficit side US stands out (5% of its GDP or 1.3% of world GDP). The US has endured a substantial exchange rate adjustment since 2002 which should contribute in the medium run to moderate the external deficit, see graph 1, bottom, although the evolution of oil prices has dampened the adjustment. On the contrary, exchange rate developments in surplus countries have been less favorable for the adjustment: the real exchange rate of China —which still holds a soft peg to the dollar— and the oil countries —many of them dollar pegs have only recently started to appreciate in the last years, and mostly due to inflation differentials.

Economic theory would suggest that capital tends to flow from developed to developing countries, where the expected return on capital is supposed to be larger. Therefore, the financing of developing countries to developed economies can be considered an anomaly, or, as famously labeled by Nobel prize Robert Lucas (1990) a paradox. At that time, the uncertainty on growth prospects in developing countries, the risks perceived and the reduced global financial liberalization could justify the pattern of flows [Alfaro et al. (2008)]. But in the last decade growth prospects have materialized in the developing world, volatility has been lower, and great leaps in global financial integration have been implemented, so that capital inflows to developing countries should increase. Indeed, as observed in graph 2 gross private capital inflows to emerging economies have multiplied by eight during this decade, from less than 200 $bn in the late nineties to more than 1600 $bn in 2007.

How is it then possible to conciliate both facts: their net creditor position against developed countries and the accruing of ever larger capital inflows? Just by the huge growth of capital outflows that emerging economies are engineering through two main mechanisms: foreign exchange reserves accumulation and sovereign wealth funds (SWF). But note that this implies the bulk of EMEs financing to advanced economies is done by public (sovereign) institutions.

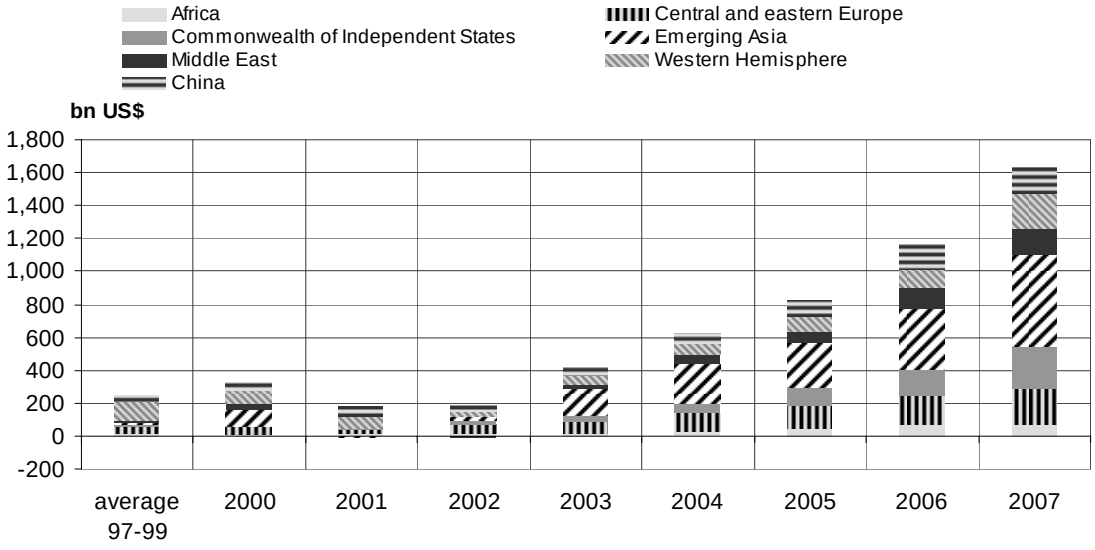
We denote this category of capital as sovereign external assets (SEAs). More precisely we define SEAs as the sum of reserves and sovereign wealth funds assets invested abroad[2]. Since they are central to the economic policy of the main EMEs contributors to the global imbalances (China/reserves, Gulf countries/SWFs) they potentially play a central role in their determination.

There has been a large body of literature focusing on the contribution of reserve accumulation in EMEs to covering US financial needs, mainly through its role as preventing nominal exchange rate adjustments [see for instance Dooley, Folkerts-Landau and Garber (2008) and references therein]. In contrast, there is hardly any study focusing on SWF in this context, maybe because this financial category has come to the fore of policy discussions only recently.

Therefore, our main contribution in this paper is the attention paid to SWF and the comparison to with reserve accumulation. We argue that they play a similar role explaining global imbalances. As a matter of fact we state that —assuming that commodity prices remain at high levels— SWF may play an increasing contribution to the maintenance of global imbalances, also relatively to reserve accumulation since the perceived costs —economic or reputational— attached to them are low.

2. There are other public or semi-public capital flows, such as those arising from public firms investing abroad which could enter this category. Although relevant in recent times, they are dismissed from the analysis.

GRAPH 2: PRIVATE FINANCIAL INFLOWS, 1997-2007



Source: WEO (IMF).

The paper is organized as follows. First, we present quantifications on the transfers received by SWFs in the last years, and obtain the evolution of their assets under management in the last years. In section 3, we define the concept of sovereign external assets from the decomposition of the balance of payments accounts. Then, in section 4 we compare reserves and SWFs in terms of evolution, motivation, costs, and their economic implications. Finally, we pave the way to assess their importance in sustaining global imbalances, now and in the future.

2 Estimation of assets and transfers of Sovereign Wealth Funds

The analysis of SWFs is heavily conditioned by data limitations on transfers to SWFs, assets under management, and their evolution over time. There are some estimations on the current size of SWFs [Setser and Ziemba (2007 and 2008); Truman (2007); JP Morgan (2008)]. However, to the extent we are aware, there is not a systematic estimation of their evolution over time, and no estimation assures consistency in the methodology across time or countries.

Therefore, our aim is to provide an estimation of a globally consistent time series of SWF assets. We combine a direct approach, namely a quantification of transfers and assets of a given SWF when they are know, and an indirect approach that tracks these variables from the impact of SWFs on other statistics (such as balance of payment, fiscal accounts, or central bank's balance sheets), and ensure the consistency of both. When a country has several SWFs —v.g. Singapore—, we estimate their total assets, and the assets of each of the SWFs, when available, serves just as cross-check.

The countries under study can be divided, according to data availability and institutional framework, in three groups, as shown in table 1: standard SWF with ample disclosure, standard SWF with no disclosure, and SWF embedded in central banks' balance sheets.

Table 1: Classification of SWF according to data availability

Standard SWF		SWF embedded in central bank
Disclosure	No disclosure	
Singapore	China	Russia
Venezuela	Kazahstan	Algeria
Norway	Korea	Hong-Kong
Chile	Kuwait	Saudi Arabia
	Malaysia	
	Oman	
	Qatar	
	UAE	

The first group of countries provides disclosure on its size and transfers received by their respective SWFs. This information allows to compute the evolution of the SWF in a rather straightforward way from their balances and some additional information. For the rest of countries, the computations get more complex, since the degree of transparency is much lower. The estimation of assets and transfers for SWFs with no disclosure is more challenging; however, it is possible to obtain estimations on their size and evolution using data on fiscal accounts, balance of payments, and additional reports.

The third category refers to countries —v.g. Saudi Arabia or Russia— which manage their SWFs through the central bank balance sheets. For this group of countries it is necessary to disentangle "pure international reserves" (those net of the external assets of SWF included in the central bank balance sheet), from those international reserves which are backed by central government deposits, that is, which at the end of the day are the external assets of SWF. To do so, we build on central bank balance sheet data, in which there is usually an account with deposits from central government. The resulting figures are then cross-checked with balance of

payments, fiscal data and other evidence. Two final considerations relevant for the analysis are valuation effects and the share of assets invested abroad. Valuation effects can be relevant for those SWF which have more aggressive investment strategies (such as, for instance, the SWF of Norway, Singapore, Kuwait or UAE) and for all of them due to exchange rate movements because they determine the level and evolution of the assets. However, it is awkward to do even a rough approximation to them. On the contrary, we have disentangled, when possible, external from internal assets of SWF, since we wish to focus in the former[3]. The data are quite patchy, but the difference is particularly important in Singapore and Malaysia, and to a lesser extent in Russia and Norway. Table 2 presents the evolution of SWFs on a country-basis, and the estimated share of external assets in their portfolios —which is extremely high for the aggregate (93% in 2007)—.

Table 2: Total Assets Under Management by SWF (bn US$)

	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total assets (1)+(2)	86	123	150	484	797	1,023	1,364	1,793	2,547
Of which: total external assets	86	123	150	484	765	972	1,302	1,738	2,375
Total oil & energy SWF (1)	28	48	74	408	600	795	1,088	1,475	1,960
Argelia		4	6	6	8	14	29	46	49
Chile							1	9	19
Kazahstan				2	4	5	8	14	20
Kuwait	n.a.	n.a.	n.a.	94	115	140	160	200	250
Norway	28	43	69	85	148	192	238	306	384
Russia						19	44	82	181
Saudi Arabia	n.a.	n.a.	n.a.	21	37	60	126	197	271
Venezuela							8	19	33
Oman	n.a.	n.a.	n.a.	n.a.	n.a.	1	3	5	8
Qatar	n.a.	n.a.	n.a.	1	2	10	20	35	56
UAE	n.a.	n.a.	n.a.	200	286	354	452	571	708
Total, other (2)	59	75	76	75	197	229	276	318	587
China	0	0	0	0	0	0	0	0	200
Hong Kong	59	75	76	75	74	78	77	88	98
Malaysia	0	0	0	0	0	13	15	18	26
Korea	0	0	0	0	0	0	20	20	20
Singapore	n.a.	n.a.	n.a.	n.a.	123	137	163	182	223

Source: Owns estimation from national statistics, SWFs reports and IFS (IMF).

3. It is important to note that the information for GCC is incomplete. We are able to compute transfers of external assets from 2003 onwards, but do not have information neither on the fraction of external versus internal assets before 2003, nor to compute transfers of internal assets from 2003 onwards.

3 Sovereign External Assets (SEAs) and its components

3.1 A balance of payments definition

The nature Sovereign External assets can be well explained, taking into account the balance of payments identity. Net capital inflows into a country have their counterpart in a current account deficit [that is, a negative c/a balance *(CA Balance)]* and/or an increase in reserves (ΔReserves). For our convenience, we can write then

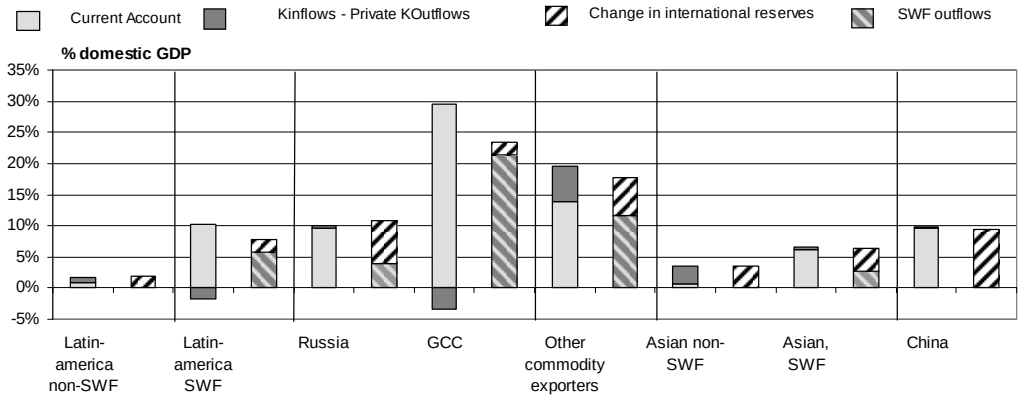
CA Balance + Net capital inflows = ΔReserves

Net capital flows is the result of subtracting gross capital outflows from gross capital inflows. Both have a private and a public component: public capital outflows in developing countries can be assimilated to the increase sovereign wealth funds assets (see section 2 for an exposition of how we have obtained such flows) invested abroad. Rearranging the previous expression along this decomposition, we can rewrite the balance of payments identity as

CA Balance + K inflows – Private K outflows = ΔSWF assets + ΔReserves = ΔSovereign external assets

The right-hand term of the equation, the sum of the increase in SWFs assets and reserve accumulation constitute the increase in sovereign external assets (SEAs) of a country. Note that large current account surpluses and strong capital inflows can be offset by the accumulation of reserves and sovereign wealth funds; that is, the growth in sovereign external assets can explain the puzzle outlined in the introduction.

GRAPH 3: SOVEREINGN EXTERNAL ASSETS AND BALANCE OF PAYMENT, 2006



Source: IFS (IMF), national statistics, SWFs reports and ows elaboration.

Latin-america SWF: Chile, Venezuela
Gulf Countries: Kuwait, Saudi Arabia, UAE, Oman, Qatar
Other commodity exporters: Algeria, Kazakhstan
Asia SWF: Hong-Kong, Singapore, Malaysia , Korea

This is precisely what can be observed in graph 3 where the two sides of the identity are compared for a selected group of developing countries[4]. The explicit consideration of SWFs estimated investments gives a preliminary indication of their importance relative to reserves in some countries, in particular for several Latin American countries, Gulf economies and other commodity exporters[5].

3.2 The features of SWFs and reserves, compared

The common categorization of reserves and sovereign wealth funds as sovereign external assets suggests that they have common features —in particular, in explaining global imbalances, but they also display important differences in terms of evolution, motivation or management. Table 3 compares both.

One common feature is their *dramatic growth* in the last years, although the stock of reserves was already large at the beginning of this decade (see graph 4, upper left). The stock of the international reserves was around 6 trillion dollars in 2007, twice the level in 2003, and they reached 7 $trn by 2008Q2. In spite of this large accumulation the rate of growth has even increased in the last two years.

Our estimates of sovereign wealth funds in the previous section put their number at around 2.5 $trn dollars in 2007 —2.4 in external assets— from less than 500 $bn in 2002, see graph 4 upper right. The big leap in SWFs assets —a 30% annual rate of growth in the period 2003-2007— has been determined by the increase in commodity and in particular oil prices, since 2003. Graph 4, lower left displays the strong correlation between SWF asset accumulation and oil prices in the Gulf countries in the last years.

All in all, the magnitude of sovereign assets in the order of 8.7 $trn in 2007 from around 4 $trn in 2004. The 2007 figure amounts to the close to 15% of global GDP the 35% of global government securities, 17% of equities and, overall, around 5% of global financial assets. Reserves represent two thirds of this magnitude (11.2% of world GDP) and the SWFs the remaining third (4.5% of world GDP). Growth in SWFs has implied that their share in sovereign assets has substantially: in 2003 they represented around 20% of sovereign assets, by now they are around 30%.

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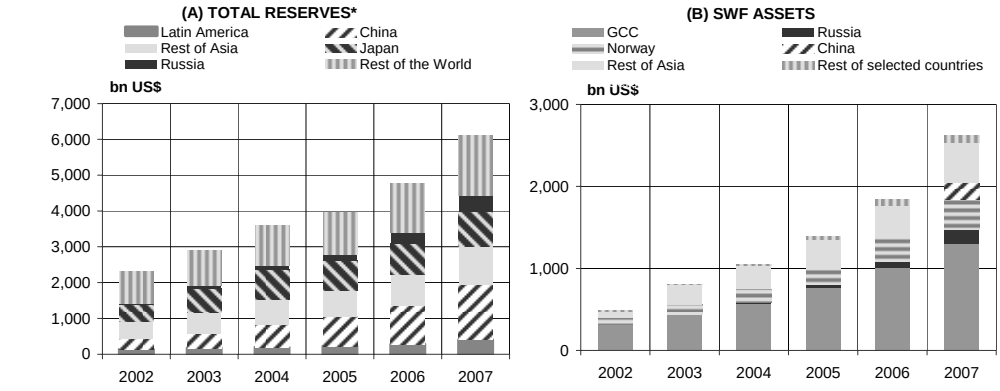
4. The difference between the bars is due to errors and omissions.

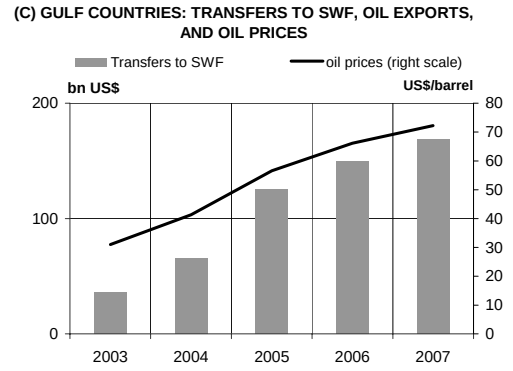
5. The case of China in the figure merits a comment. As shown in the graphs the net private capital inflows were close to nil. This is striking because it is known that capital inflows to China are huge (close to 200 $bn in 2006). Therefore private capital outflows must match that quantity. These private capital outflows took the form of foreign investment abroad (semi-public firms) or holding of foreign assets by domestic banks. This last items is related to monetary policy implementation and, in particular, to avoid, appreciating exchange rate pressures.

GRAPH 4: RESERVES AND SWF

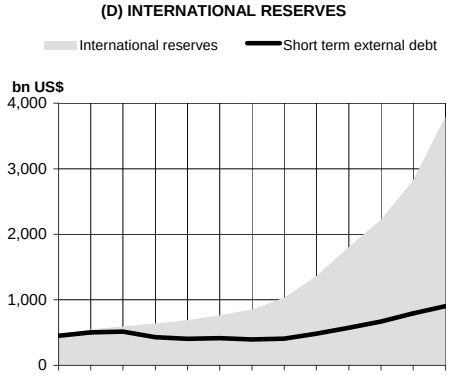


Source: IFS (IMF).

Source: Owns estimation, national statistics and SWFs reports.



Source: WEO (IMF), owns estimaton from national statistics, IFS (IMF), SWFs reports and BP Statistical Review of World Energy (2007).



Source: IFS (IMF).

(*) In Algeria, Russia, Saudi Arabia and Hong Kong, international reserves without substrating external assets of SWFs managed by central banks.

A second common trait is that both international reserves and sovereign wealth funds are very much *concentrated in developing economies* (see graph 4).

The bulk of reserve accumulation (graph 4, upper left) has taken place in Asia —including Japan until 2004), which accounts for more than half of world reserves. China, which holds over 1.5 trillion of international reserves (a 30% of the total), dominates the picture. Other emerging regions, such as Latin America have accumulated large holdings of reserves —reaching 12.7 of GDP in the region as a whole, although their share in the global holdings is much smaller (6.5% of total reserves).

Sovereign wealth funds are concentrated in commodity —in particular oil— exporters (See graph 4, upper right, and table 4). Most of them are emerging countries, Gulf countries and Russia stand out by their magnitude, but some developed countries, such as Norway —which has a large fund— Australia or even Alaska in the US have created SWFs. Some South Asian countries with large fiscal resources have also established SWFs.

In the last years there has been an incipient trend towards the constitution of new SWFs, with a particular development standing out for its relevance in our context: the constitution of SWF whose capital accrues from accumulated reserves, like in the case of China which last year committed a 200 $bn of reserves to a new SWFs (around 100 $bn are now allocated).

The evolution and geographical location of sovereign external assets is explained by the *motivation* for reserve accumulation and SWFs, which is to a large extent different.

Table 3: Size, objectives and investment structure of Sovereign External Assets

	Central banks-International reserves	SWF	SWF-from international reserves
Size	6.000 $bn	1,950 $bn commodity 300 $bn non-commodity [+70 $bn of internal assets]	100 $bn (aprox.) [+100 $bn of internal assets]
Objective	Precautionary By-product of management of exchange rates	Smoothing of the impact of commodity prices (or excess of fiscal resources) over the commodity/fiscal cycle, or keep resources for future generations	Reducing costs of hoarding reserves
Investment	Liquidity	Long-run. Conservative. Low risk aversion. Diversification: (sectors and countries with low correlation with commodities).	Long-run. Conservative. Low risk aversion.
Balance sheet			
Assets	Fixed income.	Equity Fixed income Private equity Deposits	Equity Fixed income
Liabilities	Cash Sterilization bonds	Capital	Debt with the central bank.

Source: owns elaboration.

Two main reasons for reserve accumulation in the central banks have been identified by the literature: the precautionary motive and exchange rate management. Huge reserve accumulation can be explained by the interest of emerging economies to build a buffer against financial instability after their financial crisis in emerging crises in the last decade. Graph 4, (lower right) the evolution of international reserves versus that of short term external debt. According to the Guidotti-Greenspan rule, foreign reserves should cover short-term (up to one year) external debt. This rough measure suggests that the bulk of reserve accumulation could not be explained just by the precautionary motive. Some formal analysis on this issue confirm this impression [Edison (2003); García and Soto (2004); Gosselin and Parent (2005)], although other more recent work suggests that —with the remarkable exception of China— reserve accumulation might be justified by fundamentals [Jeanne and Rancière (2006); Obstfeld et al. (2008); Ruiz-Arranz and Zavadjil (2008)].

In any case, it is hard to deny that the exchange rate management motive is nowadays a significant driver of reserve accumulation. The policy objectives of this strategy can be diverse: to foster competitiveness; to avoid exchange rate overshooting induced by short-term volatile capital inflows or transitory shocks; or to avoid negative sectoral impacts on some exposed sectors (Dutch disease), a reason closely connected to positive commodity shocks, etc. [see Alberola and Serena (2007) for a more detailed discussion].

The rationale for the constitution of SWF is intertemporal and/or intergenerational smoothing. The intensity of commodity price cycle and its large impact of exporters advise for the accumulation of resources in the good times to keep for the bad times. Furthermore, the non-renewable nature of some commodity resources, such as oil, calls for the investment of a part of the accrued resources for the benefit of future generations, in the form of financial

investments abroad, or of real investment at home (predominantly directed to diversify the economic structure of the countries).

The diverse motivation of reserve accumulation and SWFs highlight a fundamental difference among these SEAs. Both are the result of a policy decision. However, SWFs can be understood as a natural consequence —out of prudence— of the economic structure of a country to smooth the impact of commodity shocks. Accumulation of reserves is a discretionary policy geared —beyond the precautionary motive— to maintain the exchange at a desired level and a comfortable external position.

Thus, it can be argued that SWFs are the result of a policy action to smooth extreme economic impact —and drastic adjustments— derived from large exogenous shocks, while reserve accumulation is rather directed to maintain a favourable competitiveness position. In other words, although both limit automatic external adjustment, the case for SWFs is stronger and more justifiable in economic terms than the case for reserve accumulation.

The motivation for each SEA also explains the difference in their *investment strategies.* In general, reserve accumulations are held in fixed income, most of it public (US Treasuries are the main component in reserves, in particular in those countries pegged or with strong links to the dollar), since the priority is liquidity. Therefore, the returns on the reserves tend to be low. On the contrary, investments by SWFs tend to be less conservative —although far from highly risky— and directed to the long run. Sometimes investments are directed to foreign firms, so that the proportion of equity —and private equity— tends to be relevant.

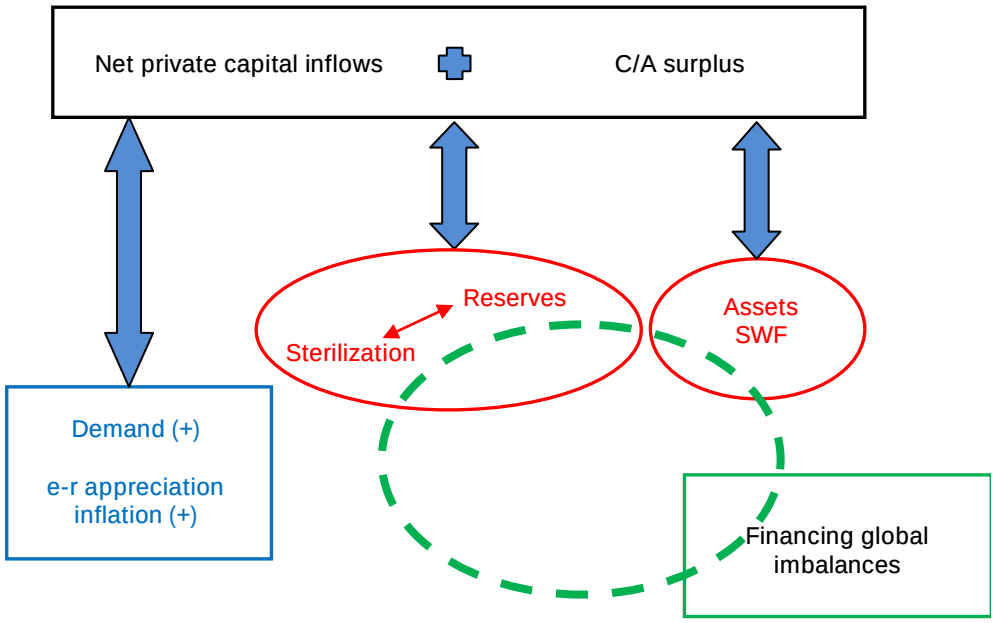
Another relevant difference is the counterpart of the sovereign assets in the balance sheets of the holding institutions. International reserves are central bank assets and their "automatic" counterpart of the increase is an increase in the monetary supply (a liability of the central bank), unless this expansion is avoided by sterilization operations. In this case the liabilities to the banking system (in form of bonds or deposits) become then the counterpart of the increase in reserves. In stark contrast, the counterpart to SWF assets is their own capital, as SWFs are rarely leveraged (which explains their financial strength).

These investment and balance sheet features imply that the net return on SWF tends to be higher than on reserves. Indeed, the return on reserves if the sterilization becomes too costly (see below) can be negative.

4 Sovereign external assets, internal adjustment and global imbalances

The comparison of reserves and SWFs should be completed by exploring its respective role in the persistence of global imbalances. The mechanism is outlined in graph 5, which shows the close similarity between both components. The chart also underscores that there are two dimensions in the analysis: how SEAs act as a barrier to the internal adjustment and how they interact with the global imbalances, which we examine in turn.

GRAPH 5: THE ROLE OF SOVEREIGN ASSETS



4.1 SEAs as preventing internal adjustment

If we recall our previous identity, from a balance of payments perspective the accumulation of SEAs by a country is simply the counterpart of its current account surplus plus capital inflows. However, from an economic viewpoint the existence of current account surplus and capital inflows is an expansionary and inflationary shock whose accommodation requires an internal economic adjustment —see left part of graph 5. More precisely, the correction of a (too wide) current account surplus or a sustained net inflow of capitals requires the appreciation of the real exchange rate, which reduces competitiveness and tends to shrink the trade balance and moderate domestic activity. From a financial perspective, capital inflows increase the demand for domestic currency and therefore tend to appreciate the exchange rate.

The accumulation of SEAs, acts a barrier which prevents this internal adjustment from taking place and, thus, tends to prolong the domestic imbalances.

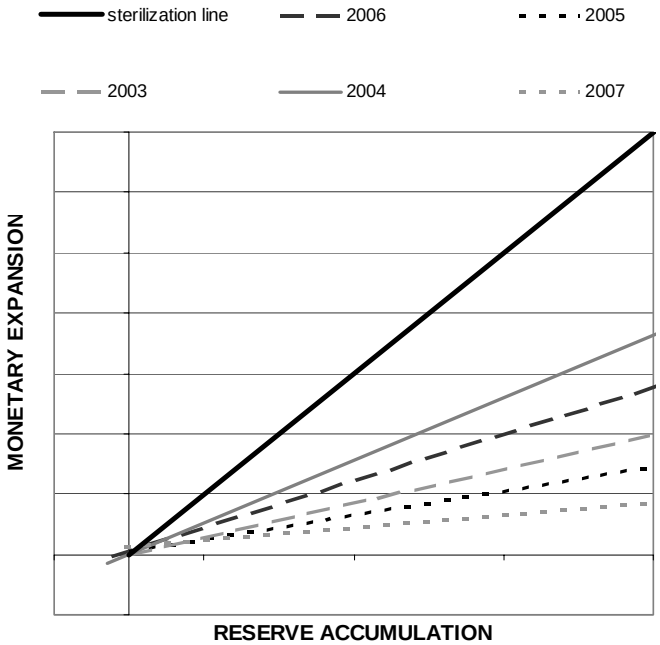
Let us start with the case of reserve accumulation. The intervention of the Central Bank in the forex markets implies the accumulation of reserves counteracts the nominal appreciation pressures, maintains domestic competitiveness and shelters the domestic activity (graph 5). However, as observed above, if nothing is done these reserves add up to the domestic supply of money. If the increase of the money supply surpasses the real demand for money, this imbalance

fuels inflationary pressures which are the alternative to engineer a real exchange rate appreciation. To counteract them, the increase in reserves is usually sterilised by placing central bank or public bonds to banks. In this way, the exchange rate channel remains muted.

We already saw that reserve accumulation has been working at full steam in the last years. Graph 6 displays in a scatterplot the degree of sterilization for the main countries accumulating reserves year by year. The solid lines represent the regression for the whole sample each year. Points and lines below the 45 degree solid line imply that the increase in money has been lower than the increase in reserves, implying a certain degree of sterilization. The slopes of the lines have tended to flatten, except for the last years, suggesting an increasingly large sterilization in order to offset domestic inflationary pressures.

The accumulation of reserves in foreign assets (securities) also implies a recycling of financial flows to the global financial markets (see the lower right part of the graph 5) and therefore financing the external imbalances of countries with current account deficits. This is precisely the bottom line of the Bretton Woods II hypothesis [BWII, Dooley et al. (2008)], which states that the process of reserve accumulation by Asian countries, and in particular China (some Emerging Asian countries have let their exchange rate appreciate substantially in the last years) is a sustainable, mutually acceptable compromise, between the export-led growth strategy pursued by Asian economies and the need of the US to finance ever wider current account deficits.

GRAPH 6: RESERVE ACCUMULATION AND STERILIZATION



Source: IFS (IMF) and own elaboration.

Indeed, the large increase in reserves —beyond the precautionary motive as noted— and the clear bias towards US securities gives some support to this theory, although there are some doubts about its sustainability.

These doubts are justified by the growing costs that accumulating reserves entails, even if the accumulation is sterilized. Large scale sterilization (through debt issuance) creates different types of problems [see Alberola and Serena (2007) for a detailed account of the costs]. If sterilization is carried out with central bank instruments these problems are: crowding out and reduction in credit to the private sector, put upward pressure on domestic interest rates, generate distortions in the domestic banking systems and can even generate problems domestic financial stability, if the portfolios of the domestic financial intermediaries become too biased toward sterilization instruments. When sterilization is carried out with government debt, a new problem arises, which is the potential conflict between monetary and fiscal policy and the eventual dominance of the later on the actions of the central bank.

Most of these costs are difficult to identify empirically. Mohanty and Turner (2005) point out that —up to that year— interventions did not push up domestic interest rates in reserve accumulating countries. The empirical analysis in Alberola and Serena (2007) shows that accumulation is positively related by the scope of sterilization but that this has not hitherto become an effective constraint to reserve accumulation. However, the costs of accumulating reserves are there, and growing anecdotal evidence points out they are mounting. For instance, in China there has been in the last years a battery of new financial instruments or regulation to contain the costs of reserve accumulation and its impact on the domestic financial system, the increase in reserve requirements, investment by banks in foreign deposits, etc. Last, and not least, the recent move to established a new reserve-linked SWF can be seen as an effort to reduce the opportunity costs by increasing its monetary (or social return). As a matter of fact, some analysts see this shift from reserves to SWFs as the beginning of a trend which may have large implications for global imbalances —see the IMF (2008b), Beck and Fidora (2008).

The macroeconomic impact of *sovereign wealth funds* is not that different but, in our view, they present some advantages, since many of the costs are missing.

In this case, the existence of current account surpluses —in commodity SWFs— the result of a positive terms of trade (TOT) shock. The improvement of economic perspectives associated to the shock can also entail an increase in capital inflows in search of high returns The economic impact of and adjustment to this type of shock has been widely analysed [See Dornbusch (1980) or more recently Obstfeld and Rogoff (1996)]. The TOT shock generates an increase in real domestic income which is translated into an increase in expenditure in domestic and external goods. This provokes an increase in demand and inflationary pressures. The adjustment requires a real appreciation of the currency —engineered through domestic inflation or nominal exchange rate appreciation. This appreciation shifts the demand again towards imports and relieves pressures on domestic goods, mitigates overall demand and reduces the external surpluses.

This is the natural adjustment process, but note that it depends on how and to what extent the increase in income is effectively translated into the domestic economy. Here is where sovereign wealth funds enter the scene. Inasmuch as the financial resources —exports revenues accrued to state firms— derived from the terms of trade shocks accrue to SWFs, the domestic filtering of their impact is greatly smoothed, mitigated or even short cut. The impact in domestic demand and the inflationary and exchange rate pressures are reduced, too[6]. But note

6. Many of the Gulf countries sustain hard pegs with the dollar. But note that this is not a direct consequence of the existence of sovereign wealth funds; it is an independent monetary policy decision. As a matter of fact, in spite of the pegs the increase in reserves in these countries has been limited, implying that the resources accruing to the SWFs act as a substitute to reserve accumulation.

that this mechanism also prevents the economy from adjusting. As long as commodity prices are high (that is, the TOT shock lingers) the economy will be out of its natural long-term equilibrium: the exchange rate will remain misaligned and the external surplus will be kept large. Indeed, the accumulation of assets can be seen as a way to smooth the adjustment or, even, to delay it until the commodity price cycle turns.

Thus, in practice, the mechanism is analogous than in the case in reserves. But, contrary to that case, the accumulation of resources in SWFs does not entail an automatic increase in the monetary supply, it does not require sterilization and therefore overcomes domestic monetary and financial costs and strains identified in the case of reserves. This lack of costs suggests that the domestic constrains to the accumulation of SWFs are much less relevant than in the case of reserves and that, as long as the prices of commodity remain high, they are placed in a better position relative to reserve accumulation going forward.

5 The role of SEAs in covering US external financial needs

The graph 5 suggests the recycling of international reserves and SWF assets into the global markets in the form of capital outflows, feeding the external imbalances of other (developed) countries, and so enabling, also in this case, to avoid their adjustment. In this section, we aim at providing some rule-of-thumb computations of the role of SEAs (in particular SWFs) in the financing of global imbalances, focusing on the US deficit, focusing first in its role to date and second on their prospects.

5.1 US financing needs

The large US deficit is probably the key element of global imbalances. Indeed, it could be argued that the adjustment of the US deficit or net financing needs is well underway (see graph 7). The current account deficit peaked in 2006 both in nominal terms in terms of GDP (790 $bn and 6% GDP) and the exchange rate has depreciated around 30% in real effective terms since 2002. The current account deficit equals the net external financing needs of the US, but another relevant figure is the gross financing needs or total capital inflows, since SEAs are capital inflows into the US. They represent now close to 2000 $bn dollars and their future evolution is even harder to predict.

As shown in graph 7, the adjustment of the current account would have been much larger if the oil prices had not increased to record levels in the first half of 2008. As a rule of the thumb a 10$ increase in the barrel of oil worsens the US trade balance by 0.25 percentage points of GDP. Thus, the increase in the oil bill contributed 170 $bn to the increase in the current account deficit since 2003. Indeed, without the increase in oil prices in the period 2002-2007 the current account in 2007 would have been —*ceteris paribus*— around 4% of GDP. Looking ahead, the current account deficit is expected to shrink to less than 600 bn US$, and stabilise towards the 3% of GDP, as shown in graph 7. These figures assume high oil prices in the next years —100 $/barrel—, which implies a petroleum trade deficit ranging between 2.5% and 3% of GDP. The non-oil current account deficit becomes lower than 100 $bn in the forecast horizon, and less than 0.5 p.p. of GDP[7].

5.2 The coverage of US financing by SEAs to date

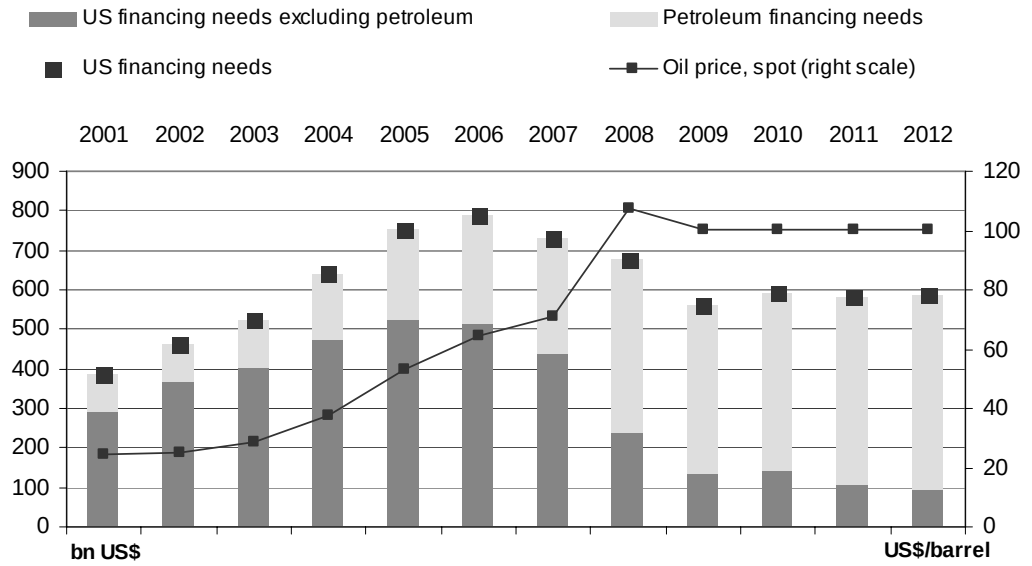
These numbers suggest that, in spite of the adjustment the US imbalance is still large and it is expected to remain so. Now we move to assess role of sovereign external assets —first the SWF assets then reserves— in its financing, through some simple and approximate back-of-envelope calculations. Given the lack of accurate data on *sovereign wealth funds* holdings, it does not come as a surprise that there is no analysis of their role in covering US financing needs. In annex 1 we explain the methodology used to estimate financial inflows of SWFs into US, which roughly consists in estimating the weight of US assets within SWFs investments portfolio, and assuming that average holdings match marginal holdings (that any increase in the assets managed by SWF will be invested in US assets in the same proportion). We estimate —with a large degree of uncertainty— there that around 40% of SWF assets may be invested in US assets. In the last year the figure has increased to 42% due to a higher growth of SWFs more prone to invest in the US —in particular some oil-related SWFs. Therefore, asset holdings of SWFs in the US would have increased from 320 $bn in 2003 to 997 $bn in 2007. As displayed in graph 8, the contibution of SWFs to cover US financing needs has become significant, from being irrelevant

7. The estimation is 107 $/br in 2008, and 100 $/br until 2012.

just some years ago: from 5% in 2003 to 13% in 2005, and to 28% in 2007, when purchases surpassed the 200 $bn mark. And their relevance —also in qualitative terms— has remarkably increased in the last year of turbulence, offering a crucial support to the capitalisation of strained financial entities in the U.S. Obviously, this increasing importance has been closely related to the high oil and other commodity prices, the basic resource of most SWF.

Although, as seen above the important role of *reserves* in financing the US and sustaining global imbalances has been object of thorough analysis, the quantitative measurement has been scant, probably conditioned by the lack of reliable data.[8] National central banks do not tend to report the geographical allocation of the international reserves, nor their currency breakdown. The COFER database (IMF) provides information on currency composition, but only for a limited number of countries —covering only around 62% of total reserves, and around 52% of international reserves of emerging economies (less than 3000 $bn dollars at 1Q08), and excluding some of the main contributors of the current process of reserve accumulation, such as China. Notwithstanding these problems, COFER provides the best available information on currency breakdown[9]. Thus, we use it to provide some back-on-the-envelope calculations on the weight of central bank flows on financial inflows into US.

GRAPH 7: US FINANCING NEEDS



Source: IFS and WEO (IMF).

Assets denominated in US$ account for 60% of international reserve holdings, according to COFER. It can be argued that the number obtained from COFER that this figures understates the fraction of purchases of dollars by central banks in the last years —for instance it is thought that the proportion of Chinese reserves in dollar is higher. However, changes in international

8. See for instance chapter 5 of Dooley, Garber, Folkets-Landau (2008), ECB (2006). Among other analysts, Brad Setser tracks in his blog the role of central banks in the financing of the US deficit.

9. Of the alternative sources of information, the Treasury data on international transactions and holdings (TIC) stands out. However, it has important and well known shortcomings. An important one is that it does not track transactions between non-residents, so that all transactions in the secondary markets, or done through intermediaries, are not properly compiled; moreover the figures of official transactions, used often as proxy of central bank's purchase and holdings, group together a wide set of official institutions (for instance, SWFs), and not only central banks.

reserves include both purchases of US assets and valuation effects. Given the trend depreciation of the dollar in the last years this implies a reduction of the stock of US$ reserves, relative to dollar original purchases. This offset to some extent —but surely not completely— the previous bias. In any case, we stick to the COFER figure, in absence of any better non-arbitrary alternative.

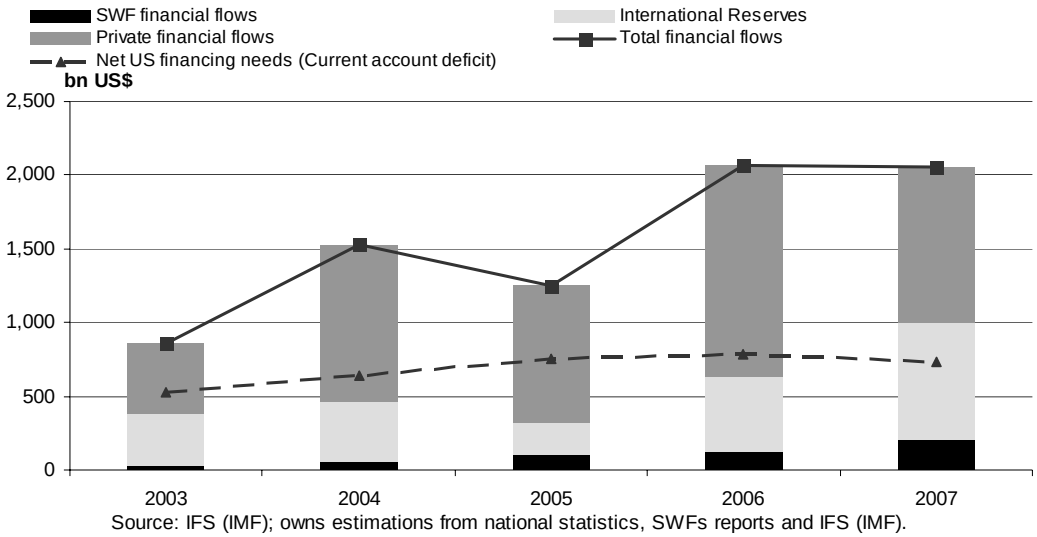
As shown in graph 8, with such number, central banks would have add up more than 250 bn of assets in US dollars in 2005, 520 bn in 2006, and around 820 bn in 2007. These figures are extremely high, even if we take a rather conservative benchmark as seen above. They represent more than 40% capital inflows in the US and more than cover the whole net financing needs of the US in 2007.

When we consider the whole SEAs, that is, the sum of reserves and SWF assets, we observe that, the coverage ratio of the net financing needs (SEAs US inflows / current account) was 135% last year from an average 80% since 2003. The share of reserves has been stable around 80% and the SWFs the remaining 20%.

Therefore, the importance of sovereign external assets has greatly increased in the last years, surpassing the trillion dollars in 2007 and thus, representing more than half of the gross capital inflows into the US last year.

These results are quite remarkable, but the quantitative and qualitative importance of SEAs could even increase in relative terms, if the fragile financial situation of the US continues —which implies that other sources of financing are becoming less available— and commodity prices recover the high levels of the recent years.

GRAPH 8: ESTIMATION OF FINANCIAL FLOWS TO US



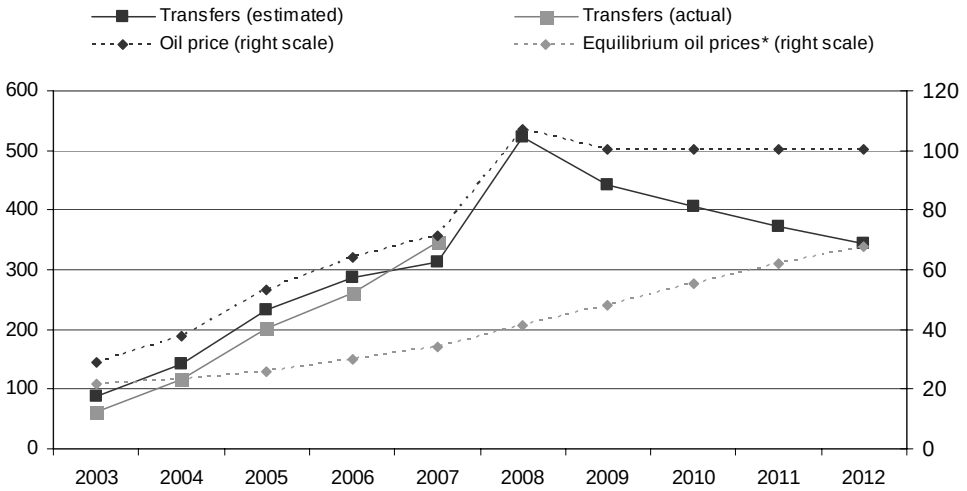
Source: IFS (IMF); owns estimations from national statistics, SWFs reports and IFS (IMF).

5.3 Perspectives on US financing by Sovereign External assets

The assessment of the future importance of SWF in US financing requires some projection of the evolution of transfers to SWF. For this purpose, it is useful to divide SWFs between oil-related SWFs, and other SWFs, given the importance of the former and its close link to oil prices, (graph 4 C shows the close correlation between the oil prices and transfers to oil-related SWFs). There is not concrete information on the determinants of transfers to oil-related SWFs, and on whether

they are discretionary or rule-based, so we attempt to fit a regression on their evolution. The precise functional form of the regression is inspired by the accepted rationale of the SWFs, although by lack of a long time series the projections are necessarilly very rough. The resulting increase in (transfers to) oil-related SWF assets is assumed to depend on the current price of oil (saving motive) and on the difference between the current oil price and a reference medium-term equilibrium price (smoothing motive)[10]. We take the equilibrium price to be the moving average of oil prices the previous 4-years. The fitted curve is plotted as the dark green dashed line in graph 9, and we see that it closely matches the actual transfers.

GRAPH 9: TRANSFERS TO OIL-RELATED SWFs



Source: WEO (IMF), owns estimation from national statistics, SWFs reports and IFS (IMF).
(*) Average last 12 years

Looking ahead, rough estimates of the increase in oil-related SWFs can be computed, for any forecast of oil prices The fitted regression suggests that a fall (increase) of 10 dollars in oil prices reduces (increases) transfers to SWFs in 95 bn US$. Therefore, using the IMF's October 2008 medium term forecasts (107 $/br in 2008, stabilizing in 100 $/br afterwards), the increase in these SWF would peak in 2008, to dip in the next years before stabilizing in 200 bn US dollars in 2012, as shown in graph 10[11]. Since, around 40% of transfers to SWFs are invested into the US, this implies that, on impact, the increase of SWFs' investments in the US (0.4x95 $bn) covers the estimated increase in the US trade deficit and financing needs (40 $bn) derived from the higher oil prices[12].

10. The fitted equation is the following: $\Delta SWF_t = 2000 * oil\_price_t + 10{,}000 * (oil\_price_t - equilibrium\ price_t)$.

11. We are aware that extrapolating the results might yield inexact results, due to issues such as the discretionary component in transfers, the possible instability of the transfers' rule, or possible non-linearities in the link between oil prices and transfers. Finally, we estimate transfers to oil-related SWFs in an aggregate way, and given that different countries probably have different transfers' rules (policy reaction functions), changes in oil prices might change the aggregate reaction function.

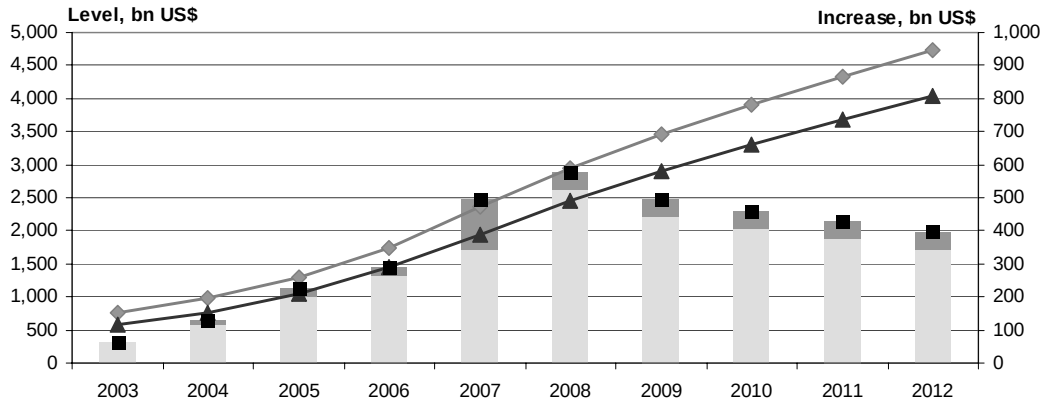
12. The US imports of oil barrels are around 4.0 billion. Assuming a zero-elasticity of imports to prices, an increase of 10 dollars in oil prices increases US financing needs in 40 billion US$.

However, in the following years –according to our SWF accummulation rule —see footnote 11—, the increase in SWF progressively diminishes to just 20 $bn. This means that, in steady state, the impact of a permanent increase in oil prices only finances half of the additional trade deficit in the US.

Forecasting the evolution of transfers to the rest of SWF is more complex, given the different sources and determinants. Hence, we assume that they will grow the average of the last four years (the years for which we have reliable information), that is, 54 billion US dollars per year.

According to our results, SWF assets would increase more than 500 $bn in 2008, and they would average close to 250 bn in the remaining years until 2012, so that the stock of SWF assets would almost double by the end of 2012 to reach more than 4 trillion dollars at the end of 2012, of which 3.5 trillion would be managed by oil-related SWF (see graph 10).

GRAPH 10: EVOLUTION OF SWF, 2008-2012



Source: WEO (IMF), owns estimation from national statistics, SWF reports and IFS (IMF).

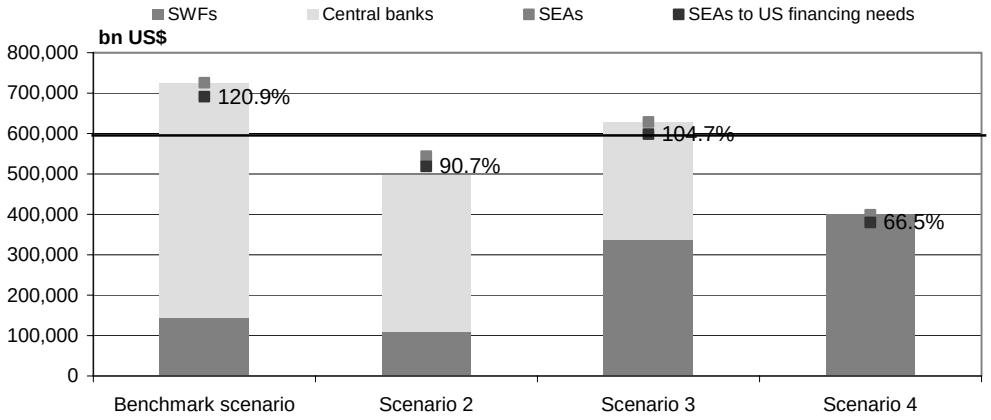
We can make a similar exercise with the evolution of reserves, but forecasting their evolution is more problematic. As a matter of fact, the growth of reserves has even accelerated in the last years, and, again in 2008 they are growing at two-digit rates (1.5 $ trillion increase is the forecasted increase by the IMF). Given the recent impact of the turmoil on the pace of reserve accumulation by emerging countries, for the period 2009-2012, we take a more conservative stance. We simply assume that reserves increase in the next years the average of the period 2005-2008: 835 billion dollars per year. Note that the persistence of global capital outflows from emerging economies and develeraging pose downward risks to this forecast.

What do these numbers imply for the financing of the US going forward? If the share of US investments (40%) is maintained, SWFs would invest 240 $bn in US assets in 2008, covering close to 34% of US net financing needs (that is, of the current account deficit). The fraction of US financing needs covered by SWF would peak in this year, and afterwards inflows would fall to 160 bn in 2009, and still amount to 100 bn in 2012. We assume that central banks would invest 60% of their new assets in US, so that investments in US would reach 900 $bn in 2008, and 600 $bn

in the next years. All together, inflows from SWFs and central banks (sovereign external assets) would reach this year 168% of US financing needs, and their coverage ratio would fall towards 100% over the forecast horizon. On average in the period 2008-2012 the coverage of the net financing needs would be 120% in this benchmark scenario, as seen in graph 11.

This exercise has assumed that the share of investments in the US remains fixed at the current high levels, which is a rather strong assumption. As a matter of fact, some analyst expect or predict that sovereign external assets will start moving out of the dollar, due to the doubts on the financial and currency strength of the United States. There are two kind of expected shifts: first, a lower share of investments in the US by reserve managers and SWFs; second, a move from reserves to SWFs, searching for a higher yield along the lines of the Chinese SWF mentioned above [see Beck and Fidora (2008)].

GRAPH 11: SOVEREIGN EXTERNAL ASSETS AND US FINANCING NEEDS (Average 2008-2012)*



Source: WEO (IMF); ows estimations from national statistics, IFS (IMF), SWFs reports and Setser and Ziemba (2008).

**Benchmark scenario: SWFs 40%, CBs 60%; scenario 2: SWFs 30%, CBs 45%; scenario 3: SWFs 40% of the increase in their assets and half of the increase of international reserves; CBs 60% of the increase in international reserves; scenario 4: SWFs invest 30% of the total growth of SEAs*

Hence, we assess the impact of this sort of shifts in the coverage of the US financing needs, comparing our benchmark with three additional scenarios, which are summed up as follows:

I. **Benchmark**. 40% of SWFs increase and 60% of the increase in reserves are invested in the US.

II. **Scenario 2**. The share of US investments reduced by a quarter. Thus 30% of SWFs increase and 45% of the increase in reserves are invested in the US.

III. **Scenario 3.** The benchmark shares are maintained, but we assume that 50% of the increase in reserves is moved to SWFs, as the incipient trend of reserve-related SWFs would suggest[13].

IV. **Scenario 4** is the most extreme, combining a stronger version of the two previous scenarios. All the increase in reserves is shifted to SWFs, and they allocate only 30% of their assets to the US.

Under these alternative scenarios, the coverage of the net financing needs is reduced relative to the benchmark: 90% in scenario 2, 104% in scenario 3 and falls below total coverage (to 66%) in scenario 4.

All in all, these results suggest that asset accumulation by central banks and SWFs generates large financial inflows to the US relative to US net financing needs, even if the investment strategies SEAs are notably modified.

We could thus conclude that the financing of the US current account deficit should not be difficult in the years ahead because SEAs provide a thick buffer. This conclusion could be jeopardised under a dramatic turnaround of recent trends. Three main factors could trigger such reversal:

a) the end or reversal of SEAs growth, due to a collapse in the price of commodities (affecting SWFs) the move to a free float (affecting reserves) or a capital flow reversal (affecting probably both). In the first case, it is important to note that, as mentioned above, lower oil prices not only reduce SWFs' resources, but also the US financing needs.

b) a massive shift of SEAs out of US dollars;

c) a massive shift of reserve stocks to SWFs assets, which are less prone to invest in US.

An alternative reading is that a reduction in the available resources to SWFs —consequence of lower oil prices— is not worrisome, indeed, to the extent that would be associated to a larger reduction of the US financing needs.

13. Beck and Fidora (2008) consider the extreme scenario in which the whole reserve holdings are moved to SWFs, which we consider rather unrealistic. Our exercise (analyzing the impact on capital flows of sovereign saving through SWFs, instead than doing it through central banks) is more similar in spirit to that of IMF (2008b).

6 Conclusions

The original motivation of the paper has been to explain the apparent puzzle in a large number of emerging market economies: they have large current account surpluses —and therefore, they are net creditors to the rest of the world— while they have been flooded by foreign capital inflows in the last years.

The answer to this puzzle is the massive amounts of sovereign external assets (SEAs) accumulated by these states: Central Banks' foreign exchange reserves and transfers to Sovereign Wealth Funds (SWFs). We analyze in this paper their role in sustaining global imbalances in the recent past and going forward. The following conclusions can be derived from this analysis:

- SWF and reserves assets play a similar role regarding global imbalances: both help to cover the financing needs of deficit countries —in particular in the US— and simultaneously, both hinder internal adjustment in current account surplus countries.

- In quantitative terms the role of SEAs in covering US financial needs has become central, according to our back-of-envelope calculations. Assuming that 60% of reserves and 40% of SWF assets are invested in the US, SEAs are estimated to represent one trillion dollars, that is around half of the gross financial inflows in the US, and 130% of the net financial needs.

- Reserves have been relatively much more important in the recent past: in 2007, the stock of reserves was three times larger than SWF holdings; the estimated contribution of reserves to covering the US financial needs was four times larger than SWF.

- However, going forward, SWF are expected to gain relevance, provided that commodity prices in the long run regain high levels. In this case, the increase in SWFs will remain large, while the future accumulation of reserves is much more difficult to predict. Furthermore, the marginal costs of accumulating reserves are increasing in monetary, fiscal and financial terms; on the contrary, the perceived costs of SWFs accumulation are low or non-existent. Finally, and related to this, there is an incipient trend of shifting reserves towards SWFs, which is expected to gather speed in the next years.

- A simple exercise projecting SEAs into the next five years —estimating the growth of SWF assets under the expectation of high oil prices and assuming the continuation of growth in reserves— suggests that their role in financing will be even more relevant going forward, even under a moderate reduction of the share of US assets in SEAs investments.

- Only the end or reversal of SEAs growth, a massive shift of SEAs out of US dollars or the massive shift of reserve *stocks* to SWFs assets, which are less prone to invest in US could jeopardise these conclusion. It is difficult to assess the probability of the turnaround, although it could be argued that the current financial context may have increased it.

- All in all, the central scenario implies that the continued expansion of SEAs will support the global imbalances in the short and medium run.

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Annex 1: Asset allocation of SWF: share of investments in US

The importance of SWFs in the financing of the US current account deficit is determined by the proportion of assets invested by SWF in the US. In this annex, the approximate weight of US assets in SWFs portfolios is assessed, assuming —as a benchmark case— that their marginal investment matches their portfolio allocation[14].

Table 4: Estimated SWFs Investment in US dollars and in the US*

	Assets (bn US$)	Fraction invested in US$	Fraction invested in the US
Total external assets held by SWFs	2,387	47.0%	40.0%
Of which	0		
Transfers in last year, 2007	496	49.4%	42.0%
	0		
Oil &energy	356	50.3%	42.7%
	0		
Of which	0		
Argelia	17	47.0%	40.0%
Kazahstan	6	47.0%	40.0%
Kuwait	34	**52.0%**	44.2%
Norway	47	**33.0%**	28.1%
Russia	99	**45.0%**	38.3%
Saudi Arabia	74	**75.0%**	63.8%
Venezuela	8	47.0%	40.0%
Oman	2	**47.0%**	40.0%
Qatar	18	**40.0%**	34.0%
UAE	40	**45.0%**	38.3%
Chile	11	47.0%	40.0%
	0		
Others	140	47.0%	40.0%

Source: Owns estimation (building on national statistics, SWFs reports), IFS (IMF) and Setser and Ziemba (2008)
**In bold SWFs for which there is either official information, or estimations in Setser and Ziemba (2008).*

SWF do not usually provide the currency breakdown of their portfolios, with the remarkable exceptions of Norway (where one third of the assets are held in dollars), and Russia (where dollar-denominated assets account for 45% of the portfolio). Setser and Ziemba (2008), which provide estimations for some SWFs: according to them Kuwait, Qatar and UAE would hold about 52% and 40%, and 45% of its total SWF assets in dollars, while about 75% of the assets of the Saudi Arabian SWF could be denominated in US dollars[15]. The total proportion of SWF in dollars for these countries —which represent 1800 $bn, 80% of total SWF assets— is 47%. For the remaining eleven countries with SWF we assume that they hold the same proportion of the assets in US dollars, which is the weighted average of the countries for which there are estimations.

Note that a final step is needed, since it cannot be assumed that currency breakdown matches geographical allocation (i.e., that all assets denominated in US dollars are issued in the US), especially for fixed income. For non-fixed income assets we assume that currency breakdown matches geographical allocation, but for fixed income, we adjust the share of dollar assets by the fraction of the global fixed income dollar portfolio invested in US assets, which can

14. The alternative approach to estimate the investments in US is the use of official US data on foreign holdings of US assets (TIC data), but it displays many important and well-known problems (the same that the identification problems of central banks' transactions). Plainly, that they do not track transactions between non-residents, and that group all official transactions (SWFs and central banks, among others). Furthermore, the larger share of investments in equity expected by the SWF heightens the uncertainty. Indeed, according to TIC data, oil exporting countries would hold over 340 billion dollars, which is a very low figure, if oil & energy related SWFs manage close to 2 trillion dollars.

15. The bulk of the assets of the SWF of Saudi Arabia are managed by the central bank (Saudi Arabia Monetary Authority, SAMA) on behalf of the last owner, and their investment strategy of such assets is very similar to that of the international reserves of SAMA.

be obtained from BIS statistics, and it is 75%. Since fixed income is 60% of the global portfolio, this implies that 85% of SWF dollar assets are invested in the US. As a result of these computations, 40% of total SWF holdings, and 42% of the increase in 2007 are estimated to be invested in US. The difference is due to the higher rate of growth of those SWFs which higher propensities to invest in the US.

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