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Expert Comment

Exchange rate and foreign exchange reserve policies

Vladimir Popov (2019)

This expert comment will appear as a chapter of an edited volume with Nova Science Publishers, and is published here upon their agreement.

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Introduction

This paper considers developing country exchange rate and foreign exchange reserve policies. It offers criticism of the conventional approach and argues in favour of a non-conventional policy as optimal in the short term and long term. For macro-economically unstable countries, the conventional approach recommends exchange-rate-based stabilisation and more or less flexible exchange rates – either via ‘clean’ or ‘dirty’ float – to manage external balance-of-payments shocks after macroeconomic stability is achieved. In the longer term, it is generally suggested that foreign exchange reserves (FOREX) should be enough to manage shocks – by accounting for around six months’ worth of imports – and should not be used to ‘manipulate’ exchange rates by under-pricing through large accumulations of FOREX, as many East Asian countries have done. The real exchange rate (RER) is seen as endogenous, i.e., it cannot be influenced by government or monetary authority policies in the long run.

In contrast, my argument in this paper is that in the short term, it is better to manage external shocks to the capital account and the current account through changes in foreign exchange reserves, either through full sterilisation – neutralising change in the money supply by selling or buying government bonds – or through fiscal sterilisation, i.e., by increasing or decreasing stabilisation funds (sovereign wealth funds). In this case there would be no shocks to the money supply, inflation, or the RER, so economic agents are not disoriented by additional volatility. However, for most countries, FOREX and sovereign wealth funds are not large enough to mitigate all negative balance-of-payments shocks, so exchange rate devaluations – implying changes in the RER – become necessary, although this is seen as

a 'second best' option. It is prudent, however, to avoid decreases in FOREX without sterilisation, which can not only result in a depreciation of the RER, but also in a reduction of output if prices are sticky.

In the long term, it is better to under-price the level of the RER than to overvalue it. Firstly, many resource-rich countries suffer from the Dutch disease – an overvaluation of the RER due to high revenues from resource exports, so special efforts are needed to avoid overvaluation. Secondly, the undervaluation of the real exchange rate is a de facto industrial policy that promotes export-oriented development and growth.

How to cope with external shocks: Inflows and outflows of capital and changes in current accounts

Consider a resource-exporting country that experiences a positive terms-of-trade shock, say, through an increase in prices of exported resources, and/or a simultaneous inflow of capital. Or imagine that the shock is negative: there is a deterioration in the current account and an outflow of capital. There are several options to cope with these shocks, which I discuss in detail below and summarise briefly in table 1.

1. The government can cut its own borrowing from abroad – i.e., from other governments and international financial organisations – and/or pay back its external debt and/or issue credits to foreign countries, counterweighing the impact of the improvement in the balance of payments due to the positive trade shock and the inflow of private capital. Or, in the case of a sudden balance-of-payments deterioration, the government could try to borrow more from other countries and international financial institutions.

Private international capital flows are volatile and do not fully mitigate terms-of-trade fluctuations. Even more so, they seem to be pro-cyclical, rather than countercyclical: when terms of trade deteriorate, capital flees the country instead of coming in. The empirical

evidence suggests that this is true for most countries. So, in fact, private capital flows add insult to injury and reinforce terms-of-trade shocks. Official capital flows are counter-cyclical with respect to terms-of-trade shocks: international financial institutions, such as the IMF and the World Bank, as well as national governments, provide additional credits to countries affected by negative trade shocks, but the amounts are too small – one could even say negligible – to fully counter the negative impact of a deterioration in the balance of payments caused by a fall in export prices and/or an outflow of private capital.

Table 1. Advantages and disadvantages of possible policy responses to a balance-of-payments shock via inflows or outflows of capital and/or changes in the current account

	Policy responses	Advantages	Disadvantages	Appropriate conditions
1	Government borrowing abroad	Could help alleviate shocks without affecting trade flows and the real sector.	The amount of new financing from other governments and from international financial institutions is usually very limited compared to the size of the shock.	In the case of a negative shock, it is good to use this tool to the extent possible, especially if the debt-to-GDP ratio is low. In the case of a positive shock, it is good to pay back existing debt, if it exists.
2	Capital control	Could prevent financial and non-financial companies and government bodies from accumulating excessive external debts.	Not efficient in controlling outflows of capital, especially during panic.	The mechanism should be in place before the shock because it takes time to establish and test to make sure it is working properly.
3	Import/export taxes	Taxes on resource exports – with a tax rate tied to world prices – could be efficient instruments to channel windfall revenues into government budgets or stabilisation funds.	A side effect is an impact on real volumes of exports and imports. The impact depends on how the proceeds from export and import taxes are used.	This depends on whether there is a need to influence imports/exports anyway. Such taxes are useful for managing resource rents, but not for non-resource goods. They are also useful as a temporary instrument to adjust to permanent shocks.
4	Change in FOREX with sterilisation	Effectively cushions the real economy from external shocks.	In the case of a positive shock this is a self-defeating policy, without capital controls. In the case of a negative shock it is constrained by the size of reserves.	To be implemented together with capital controls; otherwise it is a self-defeating policy. Large reserves are needed to withstand sizable negative shock.
5	Fiscal sterilisation (stabilisation funds)	Effectively cushions the real economy from external shocks and does not have an impact on domestic money supply.	In the case of a positive permanent shock, this freezes savings in reliable but low-return instruments. In the case of a negative shock this is constrained by the size of the fund.	Very useful for exporters of resources with volatile prices; should be used to manage temporary shocks but not permanent shocks.
6	Changes in FOREX without sterilisation	In the case of a positive shock, this leads to an expansion of the money supply, which may be desirable for developing countries in order to maintain higher rates of inflation and to increase monetisation.	Causes changes in real variables through a reallocation of resources between industries, and could lead to a temporary change in total output, if prices are sticky.	This depends on whether there is a need to change monetary policy – for instance to maintain higher growth rates in the money supply to allow for greater monetisation (M/GDP ratio) and higher inflation than elsewhere.
7	Devaluation/ revaluation	Good to adjust to a permanent shock, but not to a temporary shock.	Affects the real economy and export and import flows. Frequent changes in the exchange rate confuse economic agents.	Useful as an instrument to adjust to permanent shocks.

It suffices to recall the role of international financial institutions in recent currency crises around the world: in East Asian countries in 1997; in Russia in 1998; in Brazil in 1999; and in Argentina in 2002. In all of these cases official capital flows were nowhere near enough to counter the effects of private capital flight. So long as the international financial architecture remains as it is, countries will basically be left to themselves to manage shocks that affect their current and capital accounts.

2. Capital controls in various forms can be imposed (Epstein, 2011; Frenkel, 2011; Ostry et al., 2011; Ostry, Ghosh, and Qureshi, 2011).

Capital controls may be efficient in preventing financial and non-financial companies from borrowing abroad, i.e., in managing capital *inflows*, but much less efficient in preventing the *outflow* of capital, especially during periods of panic. The system of capital flow management has to be designed, implemented, and tested, which takes time, so it is better to have it in place before the shock occurs.

3. Taxes on exports and imports could be used to discourage exports of goods and to encourage imports, or vice versa.

Usually, it takes time to impose new taxes, so a scheme that could work quickly is an automatic one. For example, in many oil-exporting countries export taxes on oil depend on the global oil price: the higher it is, the higher the export tax.

The disadvantage of these taxes is that they have an impact on the real economy, so the restoration of equilibrium to the balance of payments comes via changes in the real sector. It may well be that these real changes are desirable anyway, so the government could kill two birds with one stone, but in most cases it is good to choose instruments that do not have side effects.

It is also important to specify how tax proceeds are to be used. If they are diverted to a stabilisation fund that is invested abroad, like with foreign exchange reserves, the money supply does not increase, so there is no increase in demand and there are no inflationary consequences.¹ However, if an increase in export and/or import taxes leads to an increase

¹ See below regarding stabilisation funds.

in government revenues and expenditure, total demand will increase, so the impact of a positive balance-of-payment shock on the domestic economy would not be neutralised.

4. The central bank could enable adjustment via changes in foreign exchange reserves, with appropriate sterilisation and without changing the nominal exchange rate. This means that an increase in FOREX due to a positive balance-of-payments shock would lead to an initial increase in the money supply, but this would be totally neutralised ('sterilised') via open-market operations, i.e., sales of government bonds to the public.

Accumulation of reserves as a reaction to a positive shock to the balance of payments is, however, a self-defeating policy if it is accompanied by sterilisation: sales of government bonds on the open market lead to increase in interest rates, which attracts even more capital from abroad, which leads to even greater accumulation of reserves and the need to sterilise these increases via more open-market operations, etc. Successful accumulation of FOREX with sterilisation thus requires capital controls, as is done in China.

If the shock is negative, reserves in most countries are barely enough to withstand several months of deterioration in the terms of trade and several weeks of capital outflows. Among major resource exporters only Norway – an oil exporter – and Botswana – a diamond exporter – may have enough money in FOREX and stabilisation funds, i.e., more than their annual GDPs, to fully counter the impact of volatile capital movements and resource prices.

Putting aside a portion of GDP into FOREX and stabilisation funds is costly, especially when this money is invested in short-term, low-risk, and hence low-yield securities abroad. This is precisely the reason why the policy of building up FOREX and stabilisation funds faces heavy criticism at home in many countries. Why not use this money for improvements healthcare and education, for helping the poor, or for investment in ailing infrastructure, etc., say the critics.

The counter-argument, however, is no less powerful: if no cushion exists in the form of FOREX and stabilisation funds, the only way to cope with a negative trade shock and the associated outflow of capital is to devalue the real exchange rate, either through a nominal devaluation or through so-called internal devaluation, a relative decrease in domestic prices and wages. When resource prices fall and capital flees, the deteriorating balance of payments can only be remedied by a nominal exchange rate devaluation, in the case of a floating exchange rate, or, in case of a fixed rate, by a slowdown of growth in the money supply; due to reduction of FOREX that is not sterilised; if it was sterilised, the money supply would not contract and the balance of payments will not return to equilibrium, so FOREX would eventually be depleted (Popov, 2011b).

5. The government can increase contributions to a stabilisation fund in the case of a positive balance-of-payments shock and draw on resources from the fund in the case of a negative shock. The fund can invest its resources in the same way that the central bank invests foreign exchange reserves, but unlike the central bank, which creates new money automatically when foreign exchange is purchased, the stabilisation fund receives its money from tax revenues, in the same way the government budget does. Thus, there is an automatic so-called 'fiscal sterilisation' going on when a stabilisation fund expands and the money supply does not increase in the process.

The advantage of a stabilisation fund is that shocks to the balance of payments are absorbed partially or completely by fluctuations in the size of the fund without any impact on the real economy, as money is invested in abroad in foreign currency.

In many countries, however, stabilisation fund that were initially designed to cope with temporary shocks accumulated substantial resources of a permanent or at least very long-term nature. This meant that after the funds had absorbed fluctuations in foreign exchange revenues and expenditure and thus fulfilled their role in cushioning and eliminating external shocks, another problem emerged: how to use the resources for the purposes of national

development. Some countries, like Russia, have created two funds – for the longer term perspective and for the medium term perspective – that are invested in financial instruments with different risks and returns. Other countries, like Chile, established rules that required repayment of national debt after export prices and fund resources accumulated to a certain threshold. In any case, in coping with their primary goal – mitigation of external shocks to the balance of payments – stabilisation funds are fairly successful all over the world.

6. Internal de/revaluation: the central bank enables adjustment via changes in foreign exchange reserves, without sterilisation. Money supply changes lead to changes in price levels and interest rates, which brings the balance of payments into equilibrium.

The previous two options – changes in stabilisation funds and/or FOREX with full sterilisation – are not associated with an adjustment in real trade flows and hence do not entail adjustments in the real sector of the economy because the real exchange rate (RER) remains stable. But if there is no sterilisation of the change in FOREX under fixed exchange rates, there is an automatic mechanism at work to correct the disequilibrium in the balance of payments. The reduction of foreign exchange reserves leads to the reduction in the money supply: this will drive domestic prices down and stimulate exports, raise interest rates, and stimulate the inflow of capital, which will finally correct the balance of payments.

Because national prices are less flexible than exchange rates, this type of adjustment, when compared to a nominal exchange rate change, is associated with a greater reduction in output. The empirical evidence from Eastern European countries and other transition economies for the 1998–99 period – an outflow of capital after the 1997 Asian crisis and the 1998 Russian currency crisis and a slowdown of output growth rates – suggests that the second type of policy response – devaluation – was associated with a smaller loss of output

than the first type – monetary contraction. The 2008–09 developments provide additional evidence for this hypothesis (Popov, 2011a).

In a sense, the downsides of this type of adjustment match all the disadvantages of fixed exchange rates. With fixed exchange rates, a country loses control over its monetary policy due to the ‘impossible trinity’. When accepting a monetary policy that is ‘made abroad’, a country runs into a ‘one size does not fit all’ problem. In the long term, it cannot maintain inflation rates that differ from its major trading partners. In the short term, it does not have appropriate instruments to react to asymmetric shocks. For example, if an oil-exporting country’s currency is pegged to the dollar, an increase in oil prices will cause a devaluation of the national currency – because the US is a net importer of oil, which would add insult to injury – with respect to other currencies as a response to the improvement in the terms of trade.

7. Nominal re/devaluation: the central bank keeps reserves stable by allowing the exchange rate to adjust (known as a ‘clean float’) and bring the balance of payments back into equilibrium.

Like in the previous case, the result is a real devaluation of the national currency, i.e., a decrease in the ratio of domestic prices – expressed in foreign currency – to foreign prices. This mechanism implies that export and import volumes change in response to changes in the RER, hence the real sector of the economy also responds, as seen in output changes. And even though the impact on the real sector may be less pronounced than under fixed exchange rates and internal re/devaluation, there is at least an impact on the output of particular industries, if not for the total level of output.

Suppose oil prices fall and the national currency of the oil-exporting country is devalued to keep the balance of payments in equilibrium. For oil producers, the positive

impact of devaluation neutralises the negative impact of falling oil prices, but for other producers of tradable goods – machinery, for instance – real devaluation means higher prices and profits, so there is a reallocation of resources – capital and labour – from oil to the machinery sector. The problem is that this reallocation is *temporary* because after a while, oil prices will rise and resources should flow in the opposite direction. Inasmuch as oil prices fluctuate around the trend, it does not make sense to change the structure of the economy in response to their fluctuations; this is just too costly. To word it differently, the real exchange rate should be as stable as possible; if it fluctuates a lot, this is a definite sign of bad policy that misleads economic agents. Real re/devaluation as a response to the temporary shock is a bad policy because it inevitably causes adjustments in the real sector and these adjustments are by definition temporary.

Is it possible to manage the real exchange rate?

The real exchange rate (RER) is the nominal exchange rate adjusted for the ratio of prices between two countries. To give an example, the real exchange rate of the US Dollar in terms of the Chinese Yuan is the nominal rate (6 yuan per dollar) multiplied by the ratio of US prices to Chinese prices. When the US price of a particular good is multiplied by the nominal rate of the Dollar in Yuan (6 yuan per dollar), we get the price of American good in Yuan. When we divide this latter value by the price of the same good in the Chinese market, we get the ratio of prices between the two countries. Normally, the RER is computed for a basket of goods – with weights that coincide with the share of these goods in GDP – of one country or another, or the geometric average of weights in two countries. The ratio of US prices to Chinese prices is about 1.5-2, as various calculations suggest. In most developing countries, price levels – especially for non-tradables – are lower than in rich countries. This is usually explained by the Balassa-Samuelson effect, which I discuss later.

The RER is very important because it determines competitiveness: if prices in country A, expressed in US dollars, are lower or getting lower than prices in country B, then exports from A to B are likely to increase, whereas imports from B to A are likely to fall. The decline in the RER and the rise in competitiveness may result from devaluation – i.e., a lower nominal exchange rate – or from slower inflation in this particular country compared to its trading partners.

In macroeconomic textbooks, the RER is usually seen as endogenous, i.e., determined within the system by objective conditions so that it cannot be influenced by particular government or central bank policies in the long run. For example, if the country devalues its national currency via the nominal exchange rate, there will be an increase in export revenues and a reduction in imports, an inflow of foreign investment and hence an improvement in the balance of payments. If the exchange rate is floating, it will rise back to its initial value before devaluation. If the exchange rate is fixed and there is no sterilisation, the increase in foreign exchange reserves will cause the money supply to expand, which in turn will contribute to higher prices of national goods, i.e., to a *real* depreciation of the national currency, so that the RER will remain unchanged.

If monetary authorities pursue a sterilisation policy – i.e., selling bonds to the public to pump out the excess money supply that gets into circulation via purchases of foreign currency – the RER may be lower than before devaluation for a while, but will eventually have to adjust due to the high interest rates resulting from central bank borrowing from the capital market and leading to an inflow of capital from abroad. A sterilisation policy is hence considered self-defeating under conditions of free movement of capital. The ‘impossible trinity’ expression is used to describe the impossibility of having an independent monetary policy that maintains control over the money supply under conditions of fixed exchange rates and perfect capital mobility.

However, capital mobility is never perfect; some countries exercise controls over capital movements, and the size of foreign exchange reserves varies greatly across countries, even after controlling for objective determinants such as the size and volatility of foreign trade and the size of foreign debt (Polterovich and Popov, 2004). This means that many countries pursue policies that influence their RER. An excess accumulation of FOREX creates additional demand for foreign currency and an additional supply of domestic currency, so that with a sterilisation policy, the RER depreciates, thus deviating from equilibrium value.

In practice, an accumulation of FOREX is financed mostly through a government budget surplus and debt accumulation, but not through printing money: regressions show that inflation is not significant as an explanatory variable for reserve accumulation (Polterovich and Popov, 2004). Most countries that have rapidly accumulated reserves exhibited low budget deficits – or budget surpluses – or increasing government debt, but small increases in money supply and low inflation.²

Actual fluctuations of the RER vary from country to country. Clearly, insufficiency of buffers in Latin American commodity exporters in the past, along with pro-cyclical policy responses, have led to strong fluctuations in the RER. In Latin America countries, the RER was more volatile than in East Asian and Middle Eastern and North African countries (fig.1).

² Formally, the following identities hold:

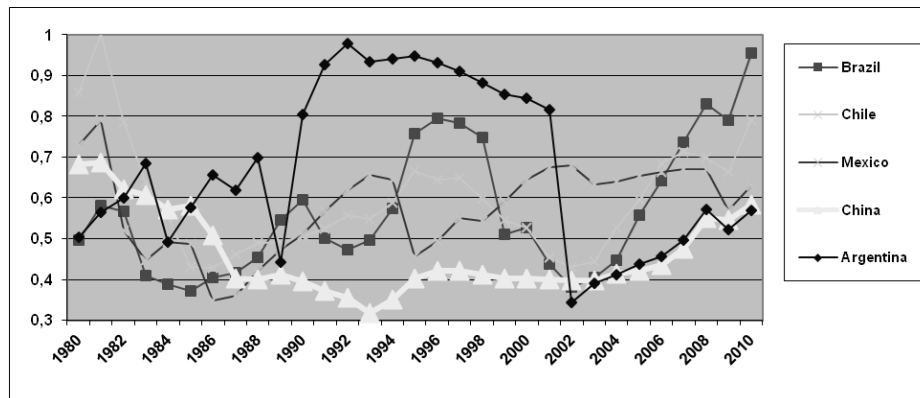
$$\Delta M = \Delta \text{FOREX} + \Delta B_{CB}$$

$$BD = \Delta B_{CB} + \Delta B_P$$

$$\Delta \text{FOREX} = \Delta M + BS + \Delta B_P,$$

where ΔFOREX – increase in foreign exchange reserves, ΔM – increase in money supply, BS – budget surplus (BD – budget deficit), ΔB_P – increase in bonds held by the public, ΔB_{CB} - increase in bonds held by the central bank. The last identity implies that the increase in foreign exchange reserves can be financed by the increase in money supply, i.e. inflation tax on everyone (ΔM), budget surplus (BS), accumulation of debt held by the public (ΔB_P).

Figure 1. Real exchange rate of some Latin American countries and China versus the US Dollar, 1980-2010



Source: WDI database.

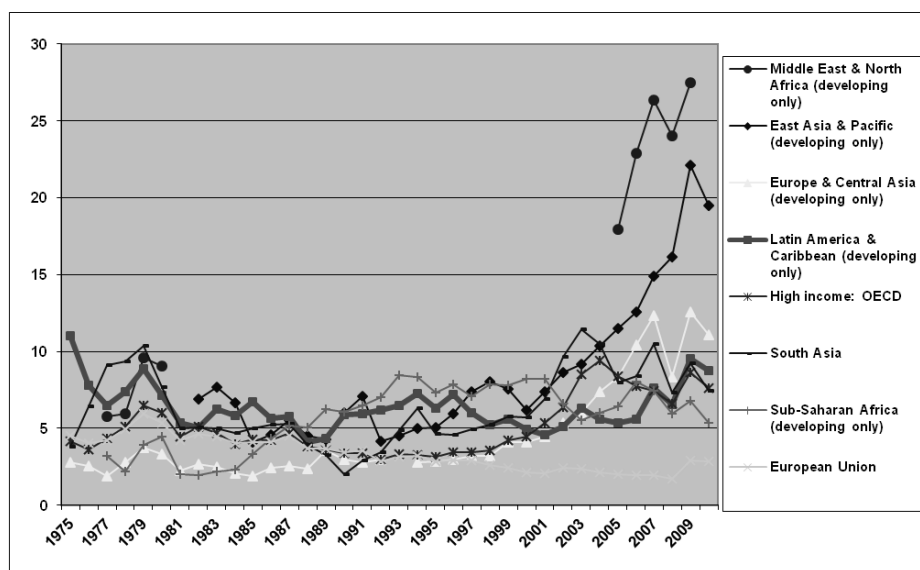
To put it differently, it seems like Latin American countries reacted to trade and financial shocks more through changes in the real exchange rate than through changes in reserves and stabilisation funds. As figure 2 suggests, Latin America had relatively high reserves in the 1990s, but recently has not accumulated FOREX as quickly as East Asian and Middle Eastern and North African countries. Today, Latin American countries have smaller buffers and hence weaker abilities to manage negative terms-of-trade and financial shocks than East Asian and Middle Eastern and North African countries.

The same pattern can be observed for the sovereign wealth funds that are concentrated in East Asian and Middle Eastern and North African countries. In 2011, North and South America accounted only for 3% of sovereign-wealth-fund assets, and all the countries of Latin America together accounted for less than 1%.

Countries that devalued their currencies in response to outflow of capital during the Asian currency crisis of 1997 and the global recession of 2008-09 were able to support output and employment better than countries that kept their nominal rates stable (Popov, 2011b). Cespedes and Velasco (2012) provide empirical evidence – using commodity price boom and bust episodes – that commodity price shocks have a less significant impact on

output and investment dynamics in economies with more flexible exchange rate regimes. The reason for such a pattern of adjustment to external shocks is most often associated with an inadequacy of FOREX reserves and an inability to sterilise, i.e., an inability to shelter domestic money supply from outside shocks without devaluation.

Figure 2. Foreign exchange reserves in months of imports in major regions of the world



Source: WDI database.

Long term goals: Promoting export-led growth

It is well known that prices in developing countries are mostly lower than in developed countries, i.e., the RER is relatively lower in poor countries. This is usually explained using the Balassa-Samuelson effect: there is a smaller productivity gap between developing and developed countries for the non-tradable goods sector than for tradables, but equal wages in both sectors, so prices for non-tradable goods turn out to be lower. And in terms of dynamics, if productivity grows faster in sectors producing tradable output – mainly goods – than in sectors producing non-tradable output – mainly services – and if wage rates are

equalised across sectors with the result that economy-wide real wage increases lag behind productivity growth, then the real exchange rate (RER) can appreciate without undermining business profits.

There is an obvious relationship between GDP per capita and the ratio of national prices to US prices (RER). This correlation exists not only for non-tradables, but also – although not as significantly – for tradable goods.

But it is difficult to detect the effect of RER appreciation for particular countries even for a period of 25 years, even in fast-growing developing countries the RER generally declined, driven more by a deterioration in the terms of trade than by the Balassa-Samuelson effect (Polterovich and Popov, 2004).

Besides, many developing countries that are rich in resources try to limit appreciation of the RER due to the Dutch disease and many others pursue deliberate low exchange-rate policies as part of their general export-orientated strategy. By creating downward pressure on their currencies through a build-up foreign exchange reserves, they are able to limit consumption and imports and to stimulate exports, investment, and growth.

Undervaluation of the exchange rate via accumulation of foreign exchange reserves is in fact an industrial policy to promote export-oriented growth. It benefits the producers of tradables and exporters at the expense of the producers of non-tradables and importers. This view is gaining support in the literature (Dollar, 1992; Easterly, 1999; Polterovich and Popov, 2004; Rodrik, 2008; Bhalla, 2012). If there are externalities from exports and the production of tradables – such as industrialisation – undervaluation of the exchange rate resulting from the accumulation of reserves provides a subsidy to these activities and this subsidy is automatic, i.e., it does not require a bureaucrat to select possible beneficiaries. In short, this is a non-selective industrial policy promoting export and the production of tradables that seems to be quite efficient, especially in countries with high levels of corruption and poor quality institutions (Polterovich and Popov, 2004; Rodrik, 2008).

“When other instruments for stimulating the economy are limited (as they typically are in developing countries), a weak exchange rate can be an effective instrument for economic growth and job creation. Weak exchange rates increase the attractiveness of exporting by making the country’s products cheaper abroad, and help domestic industries that compete with imports (import substitution industries) by making foreign goods more expensive relative to domestic goods. Exchange rate policy, then, is not simply a tactical matter of getting-prices-right, but may turn out to be a strategic matter of a deliberately undervalued exchange rate, maintained over a period of time, to provide an entry into the world market for differentiated manufactured goods. Several Asian countries have used such strategic exchange rate policy to promote manufactured exports. Similarly, the build-up of the Chilean boom of the 1990s was clearly preceded by a weak exchange rate policy in the late 1980s and early 1990s” (Spiegel, 2007).

The formal model demonstrating how an accumulation of reserves can spur growth, as well as the empirical evidence, is presented by Polterovich and Popov (2004). It is shown that an accumulation of reserves leads to exchange-rate disequilibrium, which in turn causes an increase in export-to-GDP and trade-to-GDP ratios, which stimulates growth.

The actual accumulation of FOREX can be partly explained by *objective self-insurance circumstances*, such as the level of development and the investment climate, the accumulated level of FOREX, and the level and dynamics of foreign trade. FOREX is correlated with imports – it is correlated with exports as well, but the correlation is much weaker; adjusted R^2 is 26% and 13% respectively – but not correlated with many other variables that are supposed to explain the level of reserves (Polterovich and Popov, 2004). The volatility of external trade, the terms of trade, net fuel imports, the current account, private capital flows, total debt and short-term debt, debt service payments, international and domestic interest rates; none of these indicators are statistically significant.

GDP per capita and the indicator for the investment climate have a negative impact; the poorer the investment climate, and the poorer the country, the more rapidly reserves increase. To put it differently, all other things being equal, poor countries with a poor investment climate should increase FOREX reserves faster than others, probably by using them as a de facto 'collateral' for foreign investors and traders. The average *level* of the FOREX-to-GDP ratio for the long term period (1960-99) has a negative impact on the *change* of FOREX in 1975-99, which is in line with what one would intuitively expect – countries with high level of FOREX did not need to increase it.³

After subtracting the objectively determined accumulation of reserves from the actual indicators, we get a residual – ΔR_{pol} – that could be called *policy-induced change in foreign*

³ For the 1975-99 period the best equation explaining changes in FOREX is shown below:

$$\Delta R = 39 - 0.4(R/Y_{60-99}) - 6.2 \lg Y - 0.3 ICI_{84-90} + 0.2(T/Y) + 0.3(\Delta[T/Y]),$$

$R^2=50\%$, $N=72$, all coefficients significant at 3% level or less, where:

ΔR – the increase in the reserves/GDP ratio in 1975 - 99, p.p.,

Y - initial (1975) GDP per capita,

T/Y - average ratio of foreign trade to GDP over the period,

$\Delta[T/Y]$ - the increase in the same ratio over the period,

R/Y_{60-99} - average ratio of FOREX to GDP in 1960-99,

ICI_{84-90} - average investment climate index in 1984-90 (ranges from 0 to 100, the higher, the better).

Obstfeld, Shambaugh and Taylor (2008) show that the size of domestic financial liabilities that could potentially be converted into foreign currency (M2), financial openness, the ability to access foreign currency through debt markets, and exchange rate policy are all significant predictors of reserve stocks. They use a panel of 26 years (1980-2004) and 134 countries that shrinks to 626 observations when all the variables are included. The R^2 , however, in regressions without fixed effects does not rise above 60%, so the unexplained residual is also very large.

exchange reserves. This *policy-induced change in foreign exchange reserves* turns out to be an important explanatory variable in growth regressions.

There is strong evidence that an accumulation of reserves can spur long-term growth in developing countries, although not in rich countries.⁴ If all countries use these policies, all will lose, and, on top of that, for developed countries this policy does not work. But for developing countries it works, and there are good reasons why such countries should have sufficient policy space to use this tool to promote catch-up development. Previously, between the 16th and 20th centuries, it was the West that developed fastest, accumulating surpluses in trade with ‘the rest’ and using these surpluses to buy assets in developing countries, while ‘the rest’ were going into debt. Now it is time for ‘the rest’ to accumulate assets and for the West to go into debt (Popov, 2010).

Accumulating reserves means that the country saves more than it invests and produces more than it consumes, providing its savings to finance investment and consumption in other countries. This may sound like a drag on development; it is often argued that capital should flow from rich to poor countries because K/L ratios are lower in

⁴ The resulting equation suggests a threshold relationship:

$$GROWTH = CONST. + CONTR. VAR. + Rpol (0.10 - 0.0015Ycap75us)$$

R² = 56%, N=70, all variables are significant at 10% level or less, where

GROWTH – annual average growth rates of GDP per capita in 1975-99, and control variables are population, population density, initial level of GDP per capita in 1975, and population growth rates;
Rpol - *policy induced accumulation of reserves*, i.e. accumulation of reserves above the level required by objective circumstances (computed as the residual from the equation that explains the increase in the level of reserves to GDP in 1975-99 by PPP GDP per capita in 1975, average ratio of trade to PPP GDP in 1975-99 and the increase in the ratio of trade to GDP in 1975-99 in p.p)

It turns out that there is a threshold level of GDP per capita in 1975 – about 67% of the US level: countries below this level could stimulate growth via accumulation of FER in excess of objective needs, whereas for richer countries the impact of FER accumulation was negative (Polterovich, Popov, 2004).

developing countries and hence the returns on capital are greater. However, this is only one effect; the other effect is a dynamic one and it works in completely the opposite direction: if a country somehow manages to become competitive on the world markets – either via higher productivity or through lower wages or via a low exchange rate – it starts to export more than it imports and develops a trade surplus. If this surplus is stored in the form of foreign exchange reserves, the exchange rate gets undervalued and the trade surplus persists. That is why countries that develop faster than the others usually have a trade surplus.⁵ An accumulation of reserves – which are invested in reliable short-term government securities and yield very low interest rates – implies losses for the national economy (Rodrik, 2006), but every policy has costs; this is the price for promoting growth.

In fact, countries that have managed to achieve high growth rates in 1970-2013 have mostly been net creditors, not net borrowers; their current accounts were positive, i.e., they were saving more than they were investing (fig. 3). For an earlier period, 1960-99, even controlling for the level of development, PPP GDP per capita in the middle of the period, 1975, the relationship between the current account surplus and growth rates is also positive and significant (Popov, 2010).⁶

⁵ For example, the United States after the Civil War of 1861-65 and before the 1970s, Japan and Germany after World War Two, the East Asian Tigers and Dragons and of course China.

⁶ $GROWTH = 0.68^* Ycap + 0.12^{***} CA + 0.05,$

(1.80) (3.44)

N=91, $R^2 = 0.23$, robust standard errors, T-statistics in brackets below,

where

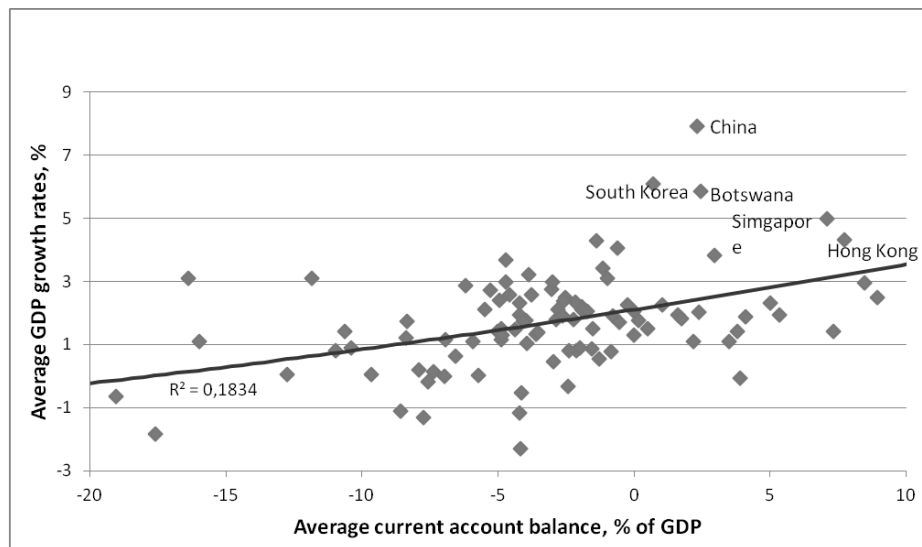
GROWTH – annual average growth rates of per capita GDP in 1960-99, %,

Ycap – logarithm of per capita PPP GDP in 1975,

CA – average current account to GDP ratio in 1960-99, %.

This is known as the Feldstein-Horioka puzzle (Feldstein and Horioka, 1980): high correlation between domestic savings and investment, even among countries with relatively open capital accounts, contrary to the prediction of the theory that capital should flow to countries with a better investment climate and better rates of return on investment. With a high domestic savings rate comes a high investment rate, which usually, although not always, leads to faster growth. Positive current accounts in developing countries mean that capital is flowing uphill, i.e., that the global South is financing the global North, but apparently this is simply the affordable and reasonable cost of the policy of fast export-oriented growth.

Figure 3. Average current account as a percentage of GDP and growth rates of GDP per capita (%) in 1970-2013.



Source: World Development Indicators

The argument against a policy of low exchange rates is that the accumulation of reserves leads to monetary expansion and hence to inflation. Calvo, Reinhart, and Vegh (1995) argue that the undervaluation of the exchange rate is inflationary in theory and was inflationary in practice for Latin American countries in the 1980s. Sterilisation is often viewed as a self-defeating policy, since it is only achieved at the cost of higher domestic interest rates, which

in turn leads to a greater inflow of capital, the need for new sterilisation, and thus even higher interest rates. However, in practice sterilisation is usually carried out by countries exercising some kind of capital control, either administrative or in the form of the Tobin tax, which makes a sterilisation policy efficient. It appears also that countries that accumulated FOREX faster than others usually financed such accumulation with a government budget surplus and thus managed to escape high inflationary pressure. Data for all countries (Polterovich and Popov, 2004) do not show any link between the accumulation of FOREX and inflation.

The other argument against the policy of reserve accumulation and undervaluation of the exchange rate for developing countries is the following: if all poor countries pursued this policy, developed countries would finally accumulate unsustainable levels of debts and the inevitable subsequent adjustment would be painful.

But even today the debt of rich countries is not that high. The US has net international indebtedness of about 30% of GDP, the Euro area has net international liabilities of 16% of GDP, and Japan is a net creditor with net international assets of nearly 50% of GDP. It is developing countries that are the major international debtors, whereas developed countries – with the notable exceptions of the US and the UK – are mostly net creditors, so there is still room for the West to go into debt.

In the long run, reserve accumulation works as a development tool – theoretically, every externality could be taken care of through taxes, but in practice selective policies rarely work in developing countries, where the quality of bureaucracy is far from perfect. And, because protectionism is currently de facto outlawed by the WTO, *exchange-rate protectionism* through an undervalued RER is one of the few available tools for promoting catch-up development; in a way, it is the instrument of last resort. Reserve accumulation in poor countries will not continue forever; it will come to an end once they catch up with the West. Meanwhile, developed countries get the chance to consume more than they produce by going into debt.

The accumulation of FOREX and long-term growth

What are the reasons for accumulating reserves in greater or smaller amounts and under-pricing the RER to varying degrees? Is there a rationale, except for the goal of ensuring the stability of external transactions, for differing magnitudes of foreign exchange reserves? There are different *raison d'être*s for manipulating the RER in the short term and in the long term. As Griffith-Jones and Ocampo (2010) observe, the rationale for FOREX accumulation “is usually found in either one of two explanations: the “competitiveness” – or, in more pejorative terms, “mercantilist” – and the “self-insurance” motives.

The mercantilist view – that undervaluation of the exchange rate via an accumulation of foreign exchange reserves is in fact an industrial policy aimed at promoting export-oriented growth, which benefits exporters and producers of tradables at the expense of the producers of non-tradables and importers – is gaining support in the literature (Dollar, 1992; Easterly, 1999; Polterovich and Popov, 2004; Rodrik, 2008; Bhalla, 2012). If there are externalities from exports and the production of tradables – such as industrialisation and the development of high tech sectors – the undervaluation of the exchange rate resulting from the accumulation of reserves provides a subsidy to these activities and this subsidy is automatic, i.e., it does not require a bureaucrat to select possible beneficiaries. In short, this is a non-selective industrial policy promoting exports and the production of tradables that seems to be quite efficient, especially in countries with high levels of corruption and poor quality institutions (Polterovich and Popov, 2004; Rodrik, 2008). Thus, an accumulation of reserves and an undervaluation of the exchange rate may be good for long-term growth.

If reserves are needed to ensure smooth foreign-exchange operations, as the theory suggests, it might be expected that smaller countries with higher levels of foreign trade would have relatively – as a percentage of GDP – higher reserves.⁷ In practice, however,

⁷ The standard formula for explaining FOREX in the absence of destabilising capital flows is $FOREX = Y^\alpha * O^\beta * \sigma O^\gamma * i^\delta$, where Y is income, O is the measure of openness of the economy

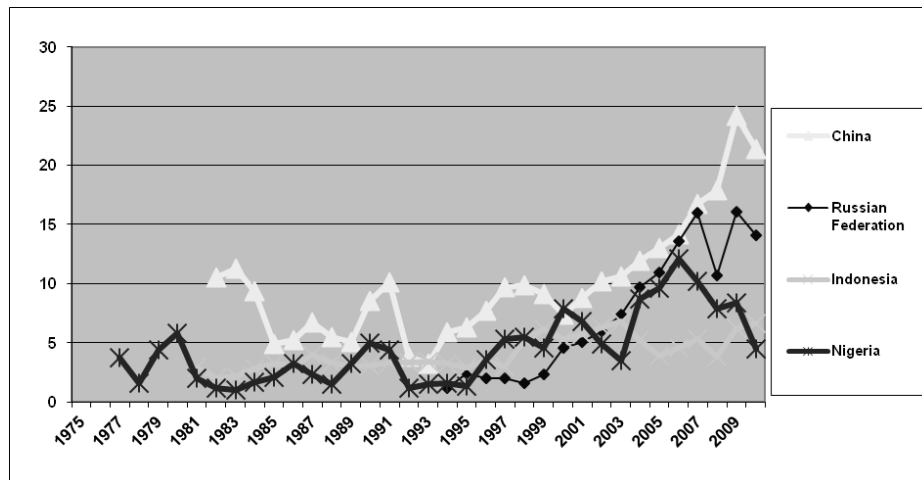
this is not the case: there is practically no correlation between FOREX-to-GDP ratios and GDP itself, no matter whether the latter is measured with PPP or official exchange rates. Similarly, when FOREX measures are adjusted for the volume of international trade of a country – measured in months of imports – they differ considerably, from less than one month to over one year. Botswana, for instance, kept enough reserves in the late 1990s to support imports for 24 months, whereas Jamaica, with a similar magnitude of international trade – 40-50% of GDP – was unable to finance its imports for even two months.

As figures 2, 4, and 5 suggest, Latin America had relatively high reserves in the 1970s, but has recently not accumulated FOREX as quickly as East Asian and Middle Eastern and North African countries. Today Latin American countries have smaller buffers and hence weaker abilities to manage negative terms of trade and financial shocks than East Asian and Middle Eastern and North African countries.

The rule of thumb in the 1960s-1980s, before the rise of short-term capital flows and derivatives, was three months of imports, but today most countries consider this level inadequate and try to accumulate more. Ideally, reserves are supposed to insulate the country not only from trade volatility, but also from the volatility of capital flows. As Obstfeld, Shambaugh, and Taylor (2008) emphasise, the key to understanding the evolution of reserves, especially in recent years, is the inclusion of measures of financial openness and financial development into the analysis. The current international financial system is characterised by the “absence of adequate supply of collective insurance to manage balance of payments crises” (Ocampo, 2007), so countries are left to themselves to build sufficient reserves that enable them to withstand shocks to their current and capital accounts.

(external trade-to-GDP ratio), σ is the volatility of openness, and i is the opportunity cost of holding foreign exchange reserves (difference between the interest rate earned on FOREX invested into short-term low risk securities and interest rate on alternative investment), and $\alpha, \beta, \gamma, \delta$ are respective elasticities (Grennes, 1984, ch. 22).

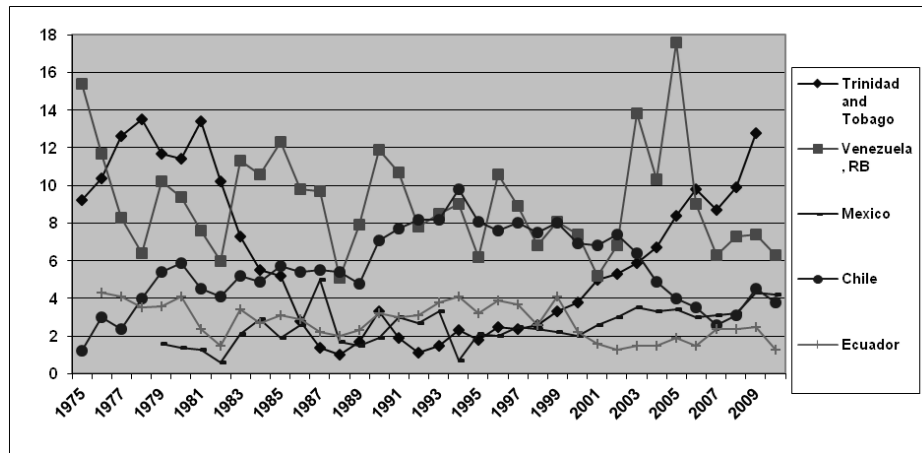
Figure 4. Total foreign exchange reserves in China, Indonesia, Nigeria, and Russia, months of imports.



Source: World Development Indicators

It is better to carry out accumulation of FOREX to the desired level via purchases of foreign currency by the central bank in the FOREX markets, with simultaneous sales of government bonds – i.e., sterilisation – so that the total domestic money supply does not change. This would cause downward pressure on a national currency, which in most cases would be desirable to counter the Dutch disease and to spur export-led growth. In an extreme case, however, when a country has very low reserves, but faces highly volatile trade and capital flows, a temporary immediate solution may be to build up reserves through borrowing from the international capital market.

Figure 5. Total foreign exchange reserves in some countries of Latin America, months of imports.



Source: World Development Indicators

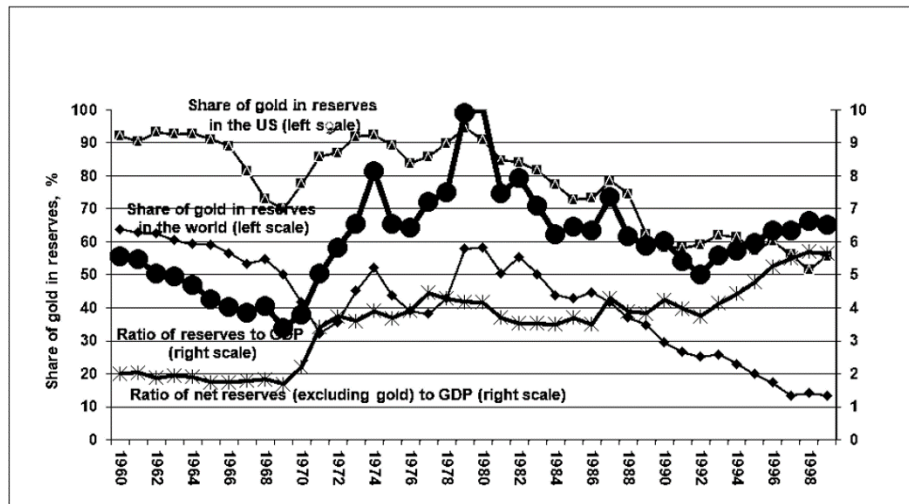
However, putting aside a portion of GDP into FOREX and sovereign wealth funds is costly, especially when this money is invested in short-term, low-risk, and hence low-yield securities abroad (Rodrik, 2006). This is precisely the reason why policies to build up FOREX and sovereign wealth funds face heavy criticism at home and abroad: why not use this money for the improvement of healthcare and education, for helping the poor, and for investment in ailing infrastructure, say the critics. The counter-argument, however, is no less powerful: if there is no cushion in the form of FOREX or a sovereign wealth fund, the only way to cope with the negative trade shock and the associated outflow of capital is to devalue the real exchange rate, which is associated with costly restructuring in the real sector and external trade flows.

Foreign exchange reserves (FOREX) as a percentage of GDP vary dramatically across different time periods and countries. The share of gold in total global reserves has dropped to about 10% today, but in the US, the EU – i.e., the European Central Bank – and some European countries it exceeds 50%. Net global FOREX – excluding gold, which is a very volatile component of total reserves because its price fluctuates enormously – as a

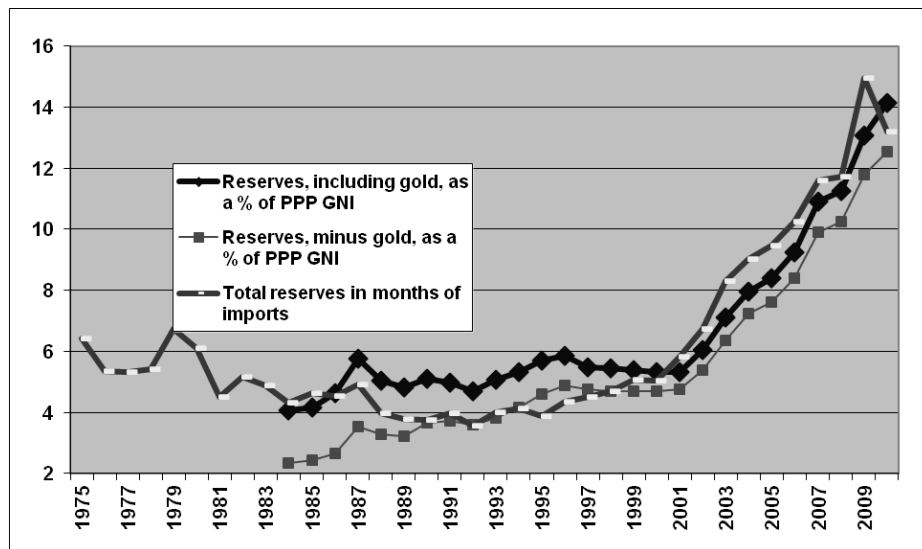
percentage of GDP increased from 2% before the collapse of the Bretton Woods system in 1971 to 4% in the 1970s-1980s, to 6% in the 1990s, and to 12% in 2010 (fig. 6).

The increase in the early 1970s is usually linked to the transition from the fixed exchange rates of Bretton Woods period to floating rates, even though theoretically floating rates do not require as much reserves as fixed exchange rates. The increase in reserves in the 1990s and beyond is usually attributed to increased capital movements due to the liberalisation of capital accounts and to the proliferation of new financial instruments like derivatives, which enhanced the risks of rapid changes in the balance of payments. Since 2000, FOREX as a percentage of GDP or in months of imports doubled or tripled in most countries (fig. 7), which can hardly be explained only by the need to create a cushion against increased volatility.

Figure 6. Share of gold in FOREX, globally and in the US (left scale), and the ratio of FOREX-to-GDP globally (%) (right scale).



Source: World Development Indicators

Figure 7. Ratio of FOREX-to-world PPP GNI (%) and months of imports

Source: World Development Indicators

The variations in relative FOREX levels across countries are even more impressive. The average ratio of FOREX-to-GDP for 1960-99 ranged from several percentage points of GDP for most countries to several dozen percentage points for some: Hong Kong, over 40%; Singapore, over 60%; Botswana, 69%. By the end of 1999, Botswana had reserves of over 100% of GDP. In East Asian and Middle Eastern and North African countries, the ratio of reserves-to-GDP increased, on average, over the course of the last four decades, whereas in African and Latin American countries, foreign exchange reserves grew less rapidly than GDP (fig. 2, 7).

Conclusions

To conclude, the RER should not be used to cope with temporary shocks because it disorients producers and causes costly adjustments in the real sector. The RER should be as stable as possible. Besides, the long-run level of the RER should be kept low – i.e., undervalued – to avoid the Dutch disease and to promote export-oriented growth. This policy of low RER could be carried out in the long run via an accumulation of foreign exchange

reserves and stabilisation funds in foreign currency. Such accumulation enables countries to kill two birds with one stone: to create a cushion for mitigating short-term fluctuations and to reap externalities from the expansion of the tradable sector and of exports.

It is true that accumulating reserves means that the country saves more than it invests and produces more than it consumes, providing its savings to finance investment and consumption in other countries. This may look like a drag on development; it is often argued that capital should flow from rich to poor countries because K/L ratios are lower in developing countries and hence the returns on capital are greater.

However, this is only one effect, the other effect is a dynamic one and it works in completely the opposite direction: if a country somehow manages to become competitive in global markets – either via higher productivity or through lower wages or via a low exchange rate – it starts to export more than it imports and develops a trade surplus. If this surplus is stored in the form of foreign exchange reserves, the exchange rate gets undervalued and the trade surplus persists. That is why countries that develop faster than the others usually have a trade surplus.

Besides, in resource-rich countries there is always a threat of the Dutch disease – excessive growth of the resource sector at the expense of the manufacturing sector, which most often happens through an overvaluation of the exchange rate due to the inflow of easy revenues in foreign currency (rent) from resource exports. This overvaluation of the currency hurts manufacturing exports and leads to the underdevelopment of manufacturing and high-tech industries and exports. Hence, for resource-rich countries, an accumulation of reserves is especially important, not only to create a cushion for possible fluctuations in resource prices, but also to prevent the overvaluation of the national currency that leads to the Dutch disease. Theoretically, the Dutch disease can be cured with a proper tax policy – differentiated taxation of various industries – but in practice an accumulation of reserves, as a non-selective industrial policy, works better in countries with non-perfect institutions.

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References

- Bhalla, S. (2012). *Devaluing to Prosperity. Misaligned Currencies and Their Growth Consequences*. Peterson Institute for International Economics.
- Calvo, G., Reinhart, C., and Vegh, C. (1995). Targeting the Real Exchange Rate: Theory and Evidence. *Journal of Development Economics*, 47, pp. 97-133.
- Céspedes, L. F. and Velasco, A. (2012). Macroeconomic Performance During Commodity Price Booms and Busts. *IMF Economic Review*, 60(4).
- Dollar, D. (1992). Outward-oriented developing economies really do grow more rapidly: evidence from 95 LDCs, 1976-1985. *Economic Development and Cultural Change*, 40(3), pp.523-44.
- Easterly, W. (1999). *The Lost Decades: Explaining Developing Countries Stagnation 1980-1998*. Washington, DC: World Bank.
- Epstein, G. (2011). Using Capital Management Techniques to Manage Disruptive Capital Flows. *MAC Policy Brief*.
- Feldstein, M. and Horioka, C. (1980). Domestic Saving and International Capital Flows. *Economic Journal*, 90, pp. 314–329. Retrieved from <http://www.jstor.org/stable/2231790?origin=crossref>.
- Frenkel, R. (2011). Managing Capital Flows in Emerging Markets. *MAC Policy Brief*.
- Grennes, T. (1984). *International economics*. NJ: Prentice-Hall Inc.
- Griffith-Jones, S. and Ocampo, J. A. (2010). *Sovereign wealth funds: A developing country perspective*. Foundation for European Progressive Studies. Retrieved from http://www.jean-jaures.org/content/download/14006/134854/file/1005_SovereignWealthFunds_SGJ_JAO.pdf.
- Ocampo, J. A. (2007). The Instability and Inequities of the Global Reserve System. *DESA Working Paper no. 59*.
- Obstfeld, M., Shambaugh, J. C., and Taylor, A. (2008). Financial Stability, the Trilemma and International Reserves. *NBER working paper no. 14217*. Retrieved from <http://www.nber.org/papers/w14217>.

- Ostry, J. D., Ghosh, A. R., Habermeier, K. Laeven, L., Chamon, M., Qureshi, M. S., and Kokenyne, A. (2011, April 5). Managing Capital Inflows: What Tools to Use? *IMF Staff Discussion Note*.
- Ostry, J. D., Ghosh, A. R., and Qureshi, M. S., (2011). Capital Controls: When and Why? *IMF Economic Review*, 59(3), pp. 562-80.
- Polterovich, V. and Popov, V. (2004). Accumulation of Foreign Exchange Reserves and Long Term Economic Growth. In S. Tabata and A. Iwashita (Eds.), *Slavic Eurasia's Integration into the World Economy*. Sapporo: Slavic Research Center, Hokkaido University.
- Popov, V. (2010). Global Imbalances: Non-Conventional View. *NES and CEFIR working paper no. 160*.
- Popov, V. (2011a). Exchange Rate in the Resource Based Economy in the Short Term: The Case of Russia. *IUP Journal of Monetary Economics*, 9(3).
- Popov, V. (2011b). To devaluate or not to devalue? How East European countries responded to the outflow of capital in 1997-99 and in 2008-09. *Acta Oeconomica*, 61(3).
- Rodrik, D. (2006). The Social Cost of Foreign Exchange Reserves. *International Economic Journal*, 20(3), pp. 253-256.
- Rodrik, D. (2008). The Real Exchange Rate and Economic Growth. Undervaluation is good for growth, but why? *Brookings Papers on Economic Activity*, Fall 2008.
- Spiegel, S. (2007). Macroeconomic and Growth Policy. *Policy Note. UN DESA*. Retrieved from http://esa.un.org/techcoop/documents/pn_macrogrowthpolicynote.pdf.