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Intervention in the Foreign Exchange Market Rationale, Effectiveness, Costs and Benefits

ABSTRACT

This paper reviews the underlying rationale for intervention in the foreign exchange market and argues that intervention can at times be justified due to the market producing the "wrong rate", to mitigate the effects of exchange rate overshooting and also to slow down the process of economic adjustment. However, in order to be effective foreign exchange market intervention needs to be of the non-sterilized variety, that is, affect the domestic money supply and short term interest rate. Unfortunately, as the case of the Peoples Bank of China and the recent case of the Swiss National Bank's attempts to stem the appreciation of their currencies, the side effects have shown the rapid expansion of their money supplies and low interest rates have had imposed significant costs on their economies. The result is that the Cemtral Bank has to continually monitor the costs and benefits of their foreign exchange interventions and be prepared consider a return to floating when the costs become too high.

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Introduction

Prior to the move to generalized floating in 1973, the adoption of floating exchange rates had long been advocated by eminent economists such as Milton Friedman (1953) and Harry Johnson (1970). However, the experience with floating rates over the last four decades has shown that they are not the panacea that many advocates had presupposed. This has led many economists to propose schemes designed to limit exchange rate flexibility such as John Williamson (1983) Target Zone proposal. In practice, there have been frequent occasions where Central Banks have intervened in the foreign exchange market in a bid to influence the exchange rate at which their currency is traded, hence the term 'managed' floating.

In this paper we look at the economic rationale behind Central Bank intervention in the foreign exchange market. We then proceed to discuss the effectiveness of foreign exchange intervention making the point that the theoretical and empirical literature overwhelmingly suggests that to be effective in the medium term exchange market intervention needs to be non sterilized, that is, result in a change of the domestic money supply and short term interest rate. Sterilized intervention whereby the impact of the intervention on the money supply is offset by an open market intervention by the Central Bank can at best have only a very short term impact on the exchange rate. Finally, we consider two case studies of foreign exchange intervention and the associated costs and benefits in practice, namely, the cases of the Peoples Bank of China and the Swiss National Bank.

Managed floating

Since the advent of floating exchange rates in 1973 it has become evident that authorities have not always allowed their currency float freely but rather they have frequently intervened to influence the exchange rate. A number of rationales have been put forward to justify such

intervention. Before examining some the most frequently used arguments for intervention it is necessary to assume that the authorities can influence the nominal and or real exchange rate in their desired direction, without such an assumption no rationale for intervention can exist. Further, only if it can be demonstrated that foreign exchange intervention has a superior benefit to cost impact than other policies, or that constraints prevent the use of superior policies, can exchange market intervention be justified. In the following discussion, it should be also remembered throughout that exchange rate management by the authorities can vary in degree from occasional intervention to influence the exchange rate to a permanent pegging.

The arguments for some degree of discretionary intervention to some extent overlap but fall into three main categories: (i) the authorities can choose an exchange rate more in line with economic fundamentals than the market; (ii) intervention is required to mitigate the costs of exchange rate 'overshooting'; and (iii) intervention is an appropriate instrument for smoothing necessary economic adjustments.

Authorities might be able to produce a more appropriate exchange rate

For a variety of reasons the exchange rate produced by the market may be the "wrong rate" compared to underlying economic fundamentals. The market may use the wrong model, it may have the wrong perception about the future and will have difficulty in interpreting the implications of news relevant to the exchange rate. However, the fact that the market may produce the wrong rate does not justify intervention by the authorities; it is necessary to demonstrate that the authorities can choose a more appropriate rate.

There exists a case for intervention if the news or information available to the market is efficiently used but the news itself is either inadequate – increasing risk – or misleading,

and the authorities are in possession of superior relevant information. Intervention in such circumstances can prove both stabilizing and profitable. However, it could be argued that a superior policy is for the authorities to abstain from intervention and release the relevant information to the market. Nevertheless, there may be circumstances under which such an information-release is not considered desirable, and even if the authorities were to release the relevant information to the market, there is no guarantee that the market would believe them.

Connected with the above argument is a far more convincing reason for the authorities to intervene. While it may be the case that the authorities do not know any more than the market regarding what is the correct rate, they should know better and sooner what they themselves are about to do (in most cases!). The point is that the authorities should be more capable than the market in predicting the future course of their policies and this is of relevance to the correct exchange rate. Given this, intervention in the foreign exchange market may be interpreted by the market as a commitment by the authorities to adopt a given course of action; if this is the case, economic agents may more readily lend their support to the a new policy helping to make it more effective and more speedily so than would otherwise be the case. Thus, there exists a case for official intervention on the grounds that the authorities have a better knowledge of their future policy intentions than private market participants. Official intervention in the foreign exchange market can literally 'buy credibility' convincing economic agents that the authorities intend to fulfill their stated domestic policy targets by committing the assets of the central bank in support of its declared future policy. A key postulate of the rational expectations literature is that the authorities will only be able to achieve their short-run inflation objectives painlessly if economic agents are convinced that the authorities intend to carry out their stated objectives. The opportunity to purchase some credibility by intervening in the foreign exchange market could prove to be a

useful policy tool.

Intervention to mitigate costs of exchange rate overshooting

The Dornbusch (1976) overshooting model shows that a move to monetary restraint can lead to a short-run real exchange rate appreciation, while an expansionary monetary policy can lead to a real depreciation. These real exchange rate movements leading to over and undervaluations in relation to Purchasing Power Parity (PPP) will exert effects on the real economy. In what follows, we shall refer to substantial and prolonged deviations from PPP as exchange rate misalignments.

Misaligned exchange rates distort the allocation of resources between tradables and non-tradables as well as consumption patterns between the two. Undervaluation by raising the domestic price level and placing downward pressure on real wages may spark off inflationary pressures, while overvaluation by squeezing the tradables sector may result in increased unemployment. Misalignment complicates and inhibits investment decisions because uncertainty as to the duration of the over/undervaluation will affect the profitability calculations concerning whether to invest in tradables or non-tradables, particularly inhibiting marginal investment decisions.

Misalignments almost certainly exert a ratchet effect on protectionism. In periods of undervaluation of the currency, resources that would ordinarily not be viable enter into the tradables sector but as the rate corrects itself they will come under increasing pressure and may then seek recourse to protection. Alternatively, if the currency is overvalued this will tend to lead to automatic protectionist cries due to the pressure on the tradables sector. It should also be remembered that undervaluation for one currency involves overvaluation for

another and *vice-versa*, so that one could expect protectionism to be a global and persistent phenomenon so long as exchange rates are misaligned. Since an under/overvaluation must necessarily eventually be corrected, this will involve the various adjustment costs arising because of factor immobility occupationally and geographically; retraining of labour will involve costs and time and aggregate demand cannot be painlessly varied at will.

Foreign exchange intervention designed to reduce the costs and extent of exchange rate overshooting can be justified. It is worth noting that the case for intervention in this instance is not in any way due to inefficiency in the foreign exchange market. The rate produced by the market is the correct rate but because of 'sticky' goods prices there are short-run real exchange rate changes.

Intervention to smooth the economic adjustment process

There may exist a rationale for the authorities to intervene in the foreign exchange market to achieve a preferable exchange rate in the short run to permit a smoothing of the necessary adjustments that the economy must for various reasons undergo. The rationale for smoothing the adjustment process is that it is a painful process for those who have to adjust and is more acceptable at a controlled pace than a market-determined pace.

Suppose that a country has a persistent balance of payments surplus because the traded goods sector is too large relative to the non-traded sector. There will consequently be a tendency for an appreciation of the real exchange rate which will encourage factors to move from the traded goods sector to the non-traded sector. If the authorities are concerned about the possibility of large transitional unemployment resulting from such an appreciation, they may try to moderate the appreciation to allow time for the traded goods sector to contract and

the non-tradables sector to expand, so as to avoid what they consider to be excessive transitional unemployment costs. Corden (1982) has coined the phrase ‘exchange rate protection’ to describe an exchange rate policy whereby a country protects its tradable goods sector relative to the non-tradables sector, for example by preventing or slowing down an exchange rate appreciation that would otherwise take place. Exchange market intervention can compare favourably to other methods of protection for the purpose of slowing down the necessary adjustment such as tariff protection. This is because exchange rate protection which involves influencing the real exchange rate and with it the accumulation of reserves must necessarily be a temporary method of protection, whereas tariffs and subsidies have a habit of becoming permanent features and, because of their explicit protective nature, tend to invite retaliation.

It is worth emphasizing that the adjustment arguments advanced for exchange rate intervention involve smoothing the adjustment process, not preventing it. Ideally, the exchange rate should be allowed to adjust towards its equilibrium rate at an optimum pace. It is the acceptance of the principle of exchange rate adjustment that ensures that the required changes in the economy do take place.

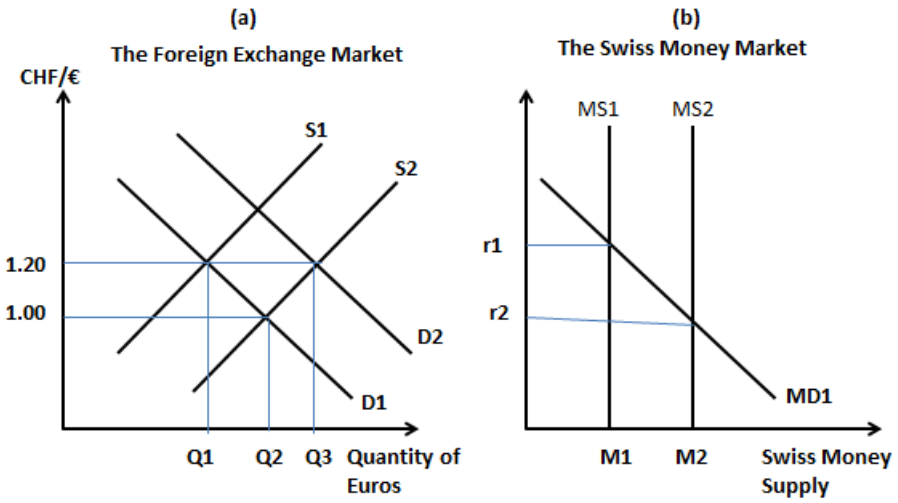
The Effectiveness of Foreign Exchange Intervention

There has been much debate in the literature, see Pilbeam (2001) concerning the effectiveness of foreign exchange intervention in both the long run and the short run. The overwhelming theoretical and empirical evidence suggests that that non sterilized intervention which influences the domestic money supply is far more effective at moving the exchange rate in the desired direction than sterilized intervention. The difference between sterilized and non sterilized intervention is set out below using hypothetical examples of the Swiss Franc and

the Euro and the Polish Zloty and the Euro. In so doing we make a crucial distinction between non-sterilized intervention and sterilized intervention.

In **Figure 1** the exchange rate is assumed to be fixed by the SNB at the point where the demand for Euros schedule (D1) intersects the supply of Euros schedule (S1) In Figure 1(a) the exchange rate is assumed to be fixed by the SNB at SFR 1.20/€1. If there is an increase in the supply of Euros in the foreign exchange market to buy Swiss Francs the supply schedule shifts from S1 to S2 and there is a resulting pressure for the Swiss Franc to appreciate to SFR1/€1. To avert an appreciation of the Swiss Franc, it is necessary for the SNB to buy Q1–Q3 of Euros these SNB purchases shifting the demand for Euros from D1 to D2. Such an intervention enables the exchange rate to remain fixed at SFR 1.20/€1.

Figure 1 Pegged Exchange rate regime with Swiss National Bank intervention to prevent an appreciation of the Swiss Franc

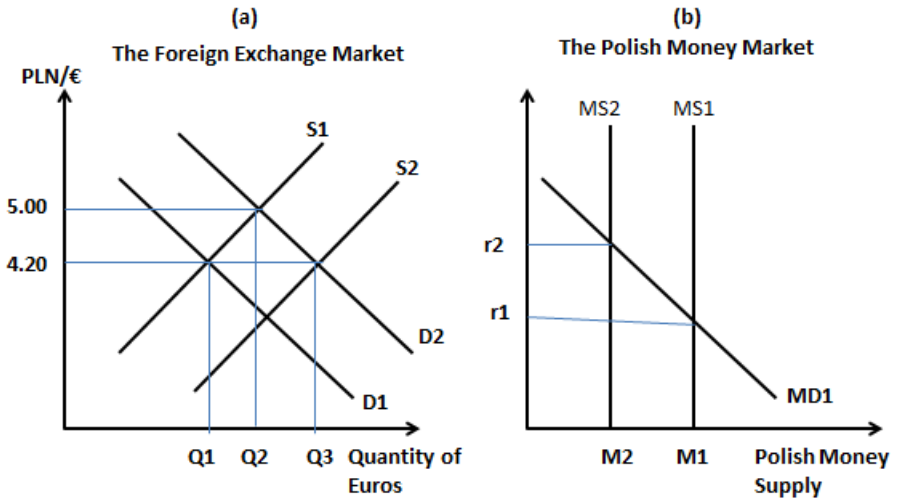


The effect on the Swiss money market of the SNB buying Euros in the foreign exchange market is to increase the Swiss money supply from M1 to M2 and consequently lower the Swiss short-term interest rate from r1 to r2. Since buying Euros in the foreign exchange

market has increased the Swiss money supply from M1 to M2, the intervention is of the non-sterilized type. It is likely to be very effective in weakening the Swiss franc back to SFR 1.20/€1 because it increases the amount of Swiss Francs in circulation and lowers the Swiss interest rate, both of which work to weaken the Swiss Franc to the desired level.

The SNB could do as above, and allow the foreign exchange market intervention to increase the Swiss money supply and lower the Swiss interest rate, but this would risk the causing inflation in property, stocks and the prices of goods and services potentially causing overshooting its inflation target. In such circumstances, the SNB might try to sterilize the effects of the increased money supply by selling Treasury bills in an open-market operation, reducing the Swiss money supply in Figure 1(b) from M2 back to the original level M1. The problem with doing this, however, is that the Treasury bill sales will lower the price of Treasury bills and thereby raises the Swiss interest rate from r2 back to r1. The decrease in the amount of Swiss francs and the rises in the short term interest rate resulting from the sterilization policy would then tend to once again increase the attractiveness of Swiss franc in the foreign exchange market and induce further selling of the Euros (i.e. buying of Swiss Francs) which by shifting the supply from S2 further to the right would mean that the exchange rate will tend to go back towards SFR1/€1. As the Swiss money supply and interest rate returns to their levels M1 and r1 prior to the foreign exchange market intervention then it is highly likely the exchange rate would return to the SFR1/€1 rate prior to the intervention and consequently sterilized foreign exchange market intervention would be ineffective in achieving the weaker Swiss Franc desired by the SNB.

Figure 2 Fixed exchange rate regime and National Bank of Poland intervenes to prevent a depreciation of the Polish Zloty



Alternatively, consider the hypothetical case of the National Bank of Poland (NBP) pegging the Zloty to the Euro at PLN4.20/€1 but finds that there is pressure for the Zloty to depreciate due to increased demand for Euros which shifts the demand schedule from D1 to D2, there is a resulting pressure for the Euro to appreciate to say PLN5/€1. To avert a depreciation it is necessary for the NBP to sell Q1–Q3 of Euros in the foreign exchange market to purchase Zloty, these sales shifting the supply of Euros from S1 to S2. Such an intervention strengthens the PLN4.2/€1, decreasing the Polish Central Banks reserves of Euros and decreasing the amount of Zloty in circulation from M1 to M2 and raising the Polish interest rate from r1 to r2 as shown in **Figure 2(b).**

The effect on the Polish money market of the NBP selling Euros in the foreign exchange market is to decrease the Polish money supply from M1 to M2 and consequently raise the Polish short-term rate of interest from r1 to r2 in **Figure 2(b)**. Since the sale of Euros has decreased the Polish money supply the intervention is of the non-sterilized type. Such an intervention is likely to be very effective in strengthening the Zloty to PLN4.2/€1 because it decreases the amount of Zloty in circulation and raises the Polish interest rate both of which strengthen the Zloty in the foreign exchange market. Non-sterilized intervention of this type that directly affects the money supply and short-term interest rate is very effective in moving the exchange rate in the desired direction.

The NBP could do as above and allow the foreign exchange market intervention to decrease the Polish money supply and raise the Polish interest, but this would risk a recession, a possible fall in stock and property prices and the risk of undershooting the NBP's inflation target. In such circumstances, the NBP might try to sterilize the effects of the decreased money supply by buying Treasury bills in an open-market operation that would increase the money supply in **Figure 2 (b)** from M2 back to the original level M1. However, the Treasury bill purchases would increase the price of Treasury bills and lower the Polish interest rate from r2 back to r1**.** The increase in the Zloty money supply and the fall in interest rates resulting from the sterilization policy would then tend to shift the demand for Euros (D2) to the right such that the Zloty would head back towards 5PLN/1EUR. As such, it is highly unlikely that a sterilized foreign exchange market intervention would be effective in achieving the stronger Zloty desired by the NBP.

This begs the question as to why the central bank would wish to sterilize their foreign exchange market interventions, as this would undermine its ability to achieve the desired exchange rate? Part of the answer is that the central bank may hope to have a psychological impact on market participants whilst sticking to existing monetary and interest rate targets. Also knowledge that a Central Bank has been intervening in the foreign exchange market even if sterilized might in the very short term make traders reluctant to take on the Central Bank. Having said this, most traders will tend to quickly discount central bank intervention unless they see it is of the non-sterilized type, that is, leading to changes in the money supply and money-market interest rate.

The policy lesson is clear, if a central bank want to influence the exchange rate then the most effective type of foreign exchange market intervention would be of the non-sterilized type because such intervention leads to changes in the money supply and interest rates that reinforce the impact of the intervention. If the authorities decide to sterilize the impact of their interventions by offsetting open-market operations that move the money supply and interest rates back to the levels prior to the intervention, then they will most likely have no lasting exchange rate impact since none of the fundamentals change.

3 Intervention in Practice the Cases of the Peoples Bank of China and the Swiss National Bank

In this section, we briefly review the problems and issues faced by the Peoples Bank of China (PBOC) and Swiss National Bank (SNB) resulting from their attempts to prevent their currencies appreciating in the foreign exchange market. The two cases are interesting in that the People's Bank of China has engaged in an unprecedented intervention over a long period of time. Whereas the Swiss National Bank ended its attempt to peg the Swiss Franc at a minimum of SFR1.20/€1 after just 3 years and 4 months and caused major market disruption when ending the peg on January 15th 2015 with the Swiss Franc jumping briefly from

SFR1.20/€1 to SFR 0.8/€1 before setting later in the morning slightly above SFR1/€1.

The PBOC has been engaged in intervention on an unprecedented scale. As is shown the fact that its foreign exchange reserves have risen from $165 billion in 2000 to over $3,800 billion in 2015. This suggests an average annual purchases of foreign currencies equivalent to over $240 billion and given that there are only around 250 trading days, suggests purchases of close to $1 billion equivalent per day. The main aim has been to prevent too rapid and appreciation of the Renminbi so as to keep up exports and so promote employment in the export industries. Also because the intervention has been of the non sterilized variety, it has meant that there has been a large growth in the Chinese money supply, artificially low interest rates and a rapid growth of related credit aggregates. This in turn has fuelled a massive increase in investment which since 2000 has averaged 43% of GDP the greatest ever recorded in history, which to some extent has been an objective of the policy makers keen to keep up the Chinese economic growth rate and levels of employment.

There have, however, been serious implications of this massive foreign exchange market intervention both for China and its trading partners. Most importantly, China has become an unbalanced economy over dependent on exports and investment with too little of its economic growth coming from domestic consumption (a mere 34.1% of GDP 2010-14 according to the World Bank). There is also a suspicion that a lot of the domestic investment possibly as much as a staggering $6.8 trillion of investment since 2009 has been largely wasted according to a recent Chinese study by Xu Che and Wang Yuan published in the Shangha Securities News 20th November 2014. This means there could be a substantial amount of non performing loans hidden in the Chinese banking system. It has also meant that there is structural surplus in the Chinese current account which has led to frequent trade

related clashes with its main trading partners particularly the United States. In addition, since much of the dollars that the Chinese have purchased in the foreign exchange market are then invested in US Treasury bonds it has enabled the US government to finance its record fiscal deficits at lower rates of interest and with greater ease than would ordinarily be expected. It is a strange world whereby communist China with a GDP per capita of around $6,800 in 2013 lends money year after year to the capitalist United States that has a GDP per capita of $53,000 in 2013. We have now reached a point whereby the Chinese are so heavily invested in US Treasury securities that they are very concerned about programmes like quantitative easing and the risk of a spike in the US inflation rate and Treasury bond yields which could mean large capital losses on their holding of US Treasuries.

The second case to consider is that of the Swiss National Bank which became increasingly concerned about the rapid rise of the Swiss Franc from SFR1.67/€1 on November 2007 to SFR1.10/€1 by September 2011. Such a rapid appreciation was particularly damaging in the case of Switzerland where over 70% of GDP is exported. The Governor of the SNB on 6th September 2011 made an announcement that with immediate effect the SNB would not tolerate an exchange rate below SFR1.20/€1 and that the SNB was prepared to intervene to an unlimited extent to maintain that rate. The signal to the market was clear, the SNB would engage on unlimited printing of Swiss Francs to buy Euros in the foreign exchange market to maintain the new target rate, in other words, the intervention would be of the non sterilized type. The market reaction was to immediately move the rate above SFR1.20/€1 where it stayed without breaking the SFR1.20/€1 for three years and 4 months.

The costs to the Swiss National Bank of trying to peg the exchange rate against the

Euro have been mainly in the form of a rapid expansion of their monetary base and the lowering of short term interest rates such that they have even fallen below the zero bound. There has also been a massive increase in foreign exchange reserves from 255 billion CHF August 2011 to CHF 510 billion December 2014, the latter figure to equivalent over 78% of the Swiss GDP (CHF 650 billion). As such; the benefits of the peg such as an undervaluation of the Swiss Franc boosting exports, artificially low interest rates boosting property and stockmarket valuations have increasingly been offset by the rising costs of the policy.

The costs of the policy include the risk of large capital losses for the SNB from its holding of Euro denominated debt. The risk of capital losses from its accumulation of Euros because of its ownership structure may have been a particular concern. The SNB is 45 per cent owned by private shareholders and the rest by the cantons. Many of the private individuals receive dividends from the SNB and the cantons were already complaining about insufficient cash transfers from the SNB. This ownership structure is very different from most other central banks which are basically government departments owned by the Treasury and ultimately the taxpayer.

Other costs of the SNB policy included the risk of future inflation from the rapid expansion of the monetary base and the risk that a greater appreciation would eventually be required in the long run the more the longer policy persisted. The timing of the ending of the peg decision was undoubtedly influenced by the fact that the ECB was likely to announce a large scale Quantitative Easing programme which by further weakening the Euro would have required even more extensive money creation by the SNB and even larger rises in its foreign exchange reserves of Euros.

Conclusions

There are many reasons that may justify intervention in the foreign exchange market such as the market producing the wrong rate, a desire to reduce the impact of real exchange rate overshooting on the economy and as a means to slow down the process of economic adjustment. However, as discussed in this paper it is essential to carefully weigh up the costs and benefits of a foreign exchange policy over the short, medium and long term.

The overwhelming theoretical and empirical suggests that foreign exchange policy can only exert significant effects on the exchange rate if it is of the non sterilized variety. That means changes in the domestic money supply and short term interest rates are required to exert significant exchange rate effects. In the cases of both China and Switzerland the costs of their monetary expansions and low interest rates resulting from their foreign exchange interventions have risen over time/ One sign of this was when the Chinese ended their for peg to the dollar in July 2005 and replacing it with a policy of heavily managed floating designed to prevent too rapid an appreciation of the Renminbi. In the case of Switzerland, a policy designed to prevent the appreciation of the Swiss Franc below a minimum of SFR1.20/€1 became increasingly untenable eventually resulting in a far more sudden unexpected appreciation to take place. The loss of credibility to the SNB, that right up until the announcement said that it would maintain the 1.20SFR/€1 peg may yet prove to be major watershed as it has signaled to financial market participants that Central Bankers cannot be taken at their word.

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