Forex interventions: the Czech experience

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Introduction

This note discusses the role of foreign exchange interventions in the Czech inflation targeting regime since 1998. It does not aim to provide an exhaustive analysis using econometric techniques, but rather to summarise the major stylised facts and policy considerations. This may be useful on several grounds. First, the Czech National Bank's (CNB's) approach to managing the exchange rate float has gone through a process of evolution. It is thus important to ask where it stands at present, and what the policy recommendations should be if the CNB were to face another period of exchange rate turbulence in the future. Second, the Czech experience may contribute as an interesting case study to the growing international literature on managed floating. The operational issues of the foreign exchange interventions are an important aspect of this debate. Finally, there may also be lessons for future ERM II membership, in which foreign exchange interventions may gain in importance.

I will discuss the direct interventions only. It must be noted that verbal interventions are also used frequently by many central banks, including the CNB, to influence exchange rates. These verbal interventions may be no less important than the direct ones. They are not dealt with here, however, as they do not pose such big challenges, for example, in terms of sterilisation costs or communication openness, which this note discusses.

The note is organised as follows. Section I describes exchange rate developments in the Czech Republic. Section II presents major policy steps in exchange rate management. Section III summarises some stylised facts on the effectiveness of foreign exchange interventions. Section IV analyses the sterilisation costs. Section V is devoted to the public communication of foreign exchange interventions. Section VI summarises and concludes.

1. Exchange rate developments

From the beginning of its economic transition the Czech Republic (Czechoslovakia until the end of 1992) used a fixed exchange rate regime with a narrow band towards a basket of foreign currencies. The band was widened to ±7.5% in February 1996 and abandoned in May 1997, after a bout of currency turmoil that forced the CNB to introduce a managed floating system. In late 1997 the CNB announced that it would use the inflation targeting regime as a new nominal anchor for the economy, starting from January 1998. This regime has been in place since then, even though it has gone through an evolutionary process as far as its particular details are concerned (including exchange rate management issues - see below).

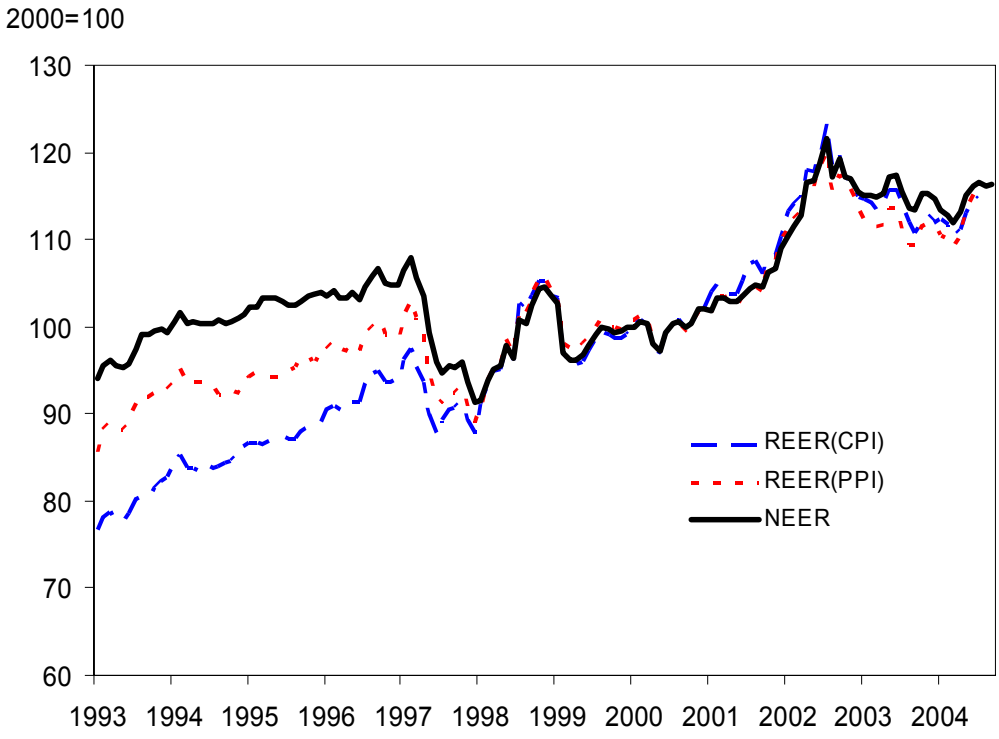
In this section, I briefly describe the exchange rate developments of the Czech koruna. Figure 1 shows the koruna's monthly nominal and real effective exchange rate, based both on CPI and PPI, since 1993.

As one can see, the real effective exchange rate has exhibited an appreciating trend over the whole period since 1993 (both in CPI and PPI terms), regardless of exchange rate regime changes. Before 2001, real appreciation was mainly driven by an inflation differential, since then it has been through a strengthening of the nominal exchange rate. The appreciating trend might be explained by a combination of several factors, including the Balassa-Samuelson effect, terms-of-trade gains, deregulation of administered prices, etc. It can thus be considered an equilibrium phenomenon unless it exceeds some reasonable speed. This speed is, however, difficult to determine precisely, as only some of its factors can be quantified relatively easily (most analyses focus on the Balassa-Samuelson

effect only). A challenge potentially stemming from this real trend is that it may coordinate exchange rate expectations in one direction, ie towards appreciation.[1] The price convergence process may also contribute to volatility of the exchange rate if market expectations concerning the long-run trend change substantially over time. It is moreover difficult to find an appropriate monetary policy response to such developments if the central bank is itself fairly uncertain on what the equilibrium real exchange rate might be.

Figure 1

Koruna's nominal and real effective exchange rate



Source: Czech National Bank.

Figure 1 also shows that the medium-term volatility (ie fluctuations around the long-run trend) of both the nominal and real exchange rate has increased substantially since the exchange rate's fluctuation band was widened in February 1996, and abolished in May 1997. The koruna has experienced two waves of rather sharp appreciation in recent years, which were only followed by depreciations to (or below) the trend level with some time lag. The first wave took place in 1998, when the koruna appreciated above its pre-floating level, in spite of the crises in Russia and Latin America. The second, and more pronounced, wave started in 2001 and lasted till late 2002. Although these two periods were both affected by other strong external influences and price shocks, it is probably more than a coincidence that both these cases were marked by sub-trend economic growth and undershooting of the CNB's inflation targets.

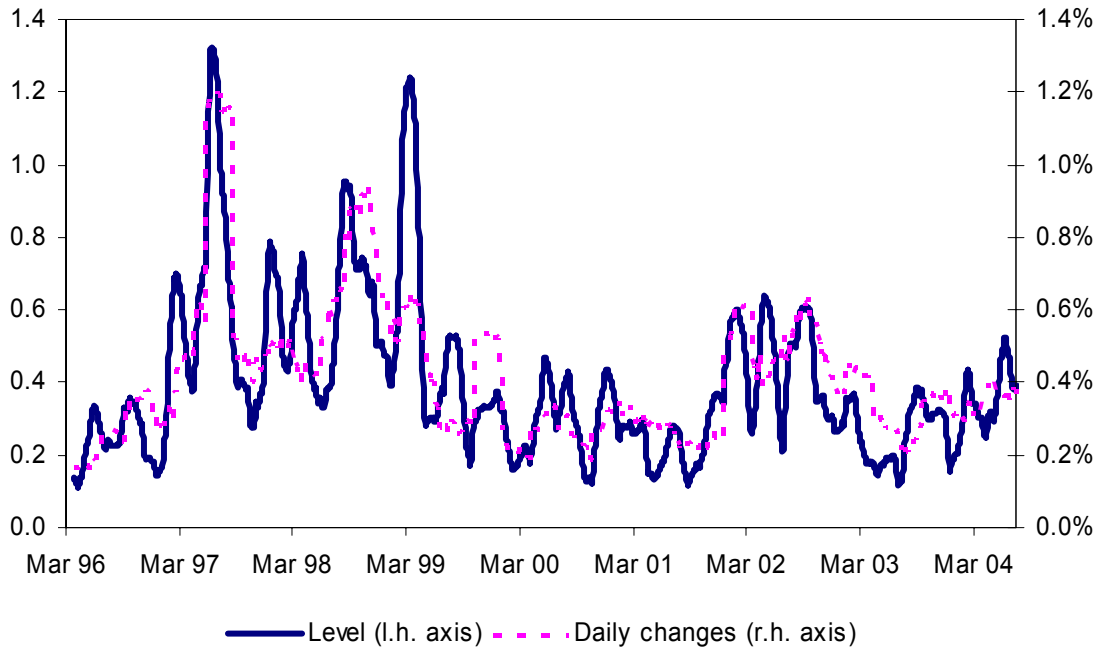
The short-term volatility is summarised in Figure 2 by a moving 60-day standard deviation of the koruna/euro exchange rate in terms of both absolute level and daily percentage changes. From this figure, one can see that the short-run volatility of the exchange rate was, as expected, greatest in the turbulent year 1997, but was also fairly high throughout 1998 and early 1999. After stabilising at quite modest levels since mid-1999, another increase in the exchange rate's short-term volatility was

[1] It might thus be one alternative explanation why interventions have been biased towards purchases of foreign exchange in the Czech case (see below).

observed during the appreciation episode of 2002, even though its magnitude remained - perhaps a bit surprisingly - well below the previous peaks.[2]

Figure 2

Volatility of the koruna/euro exchange rate (60-day standard deviation)



2. Management of the exchange rate

When the floating exchange rate was introduced in May 1997, it was announced that the exchange rate regime would be a managed float, the Deutsche mark (euro at present) serving as a reference currency. The CNB thus retained the possibility to intervene in the foreign exchange market "in the event of excessive volatility or unjustified exchange rate trends". This section summarises the CNB's policy measures responding to the exchange rate developments.

In line with the announced managed floating policy, the CNB intervened occasionally in the foreign exchange market. With the exception of the turbulent year 1997 (which does not belong to the period of inflation targeting) the interventions de facto always concerned purchases of foreign exchange to slow down exchange rate appreciation (see Figure 3).[3]

The periods of high intervention activity were typically followed by quite long periods of no interventions. The most active periods were (i) February-July 1998; (ii) October 1999-March 2000; and (iii) October 2001-September 2002. In the first and third cases, this coincided with the periods of fast nominal effective exchange rate appreciation (Figure 1), which peaked above 15% year-on-year. In the second case, the koruna appreciated against the euro, but it depreciated quite strongly against the US dollar at the same time, due to the euro/US dollar exchange rate developments. As a result, there

[2] The short-term volatility of the koruna's exchange rate is analysed econometrically in Bulíř (2003).

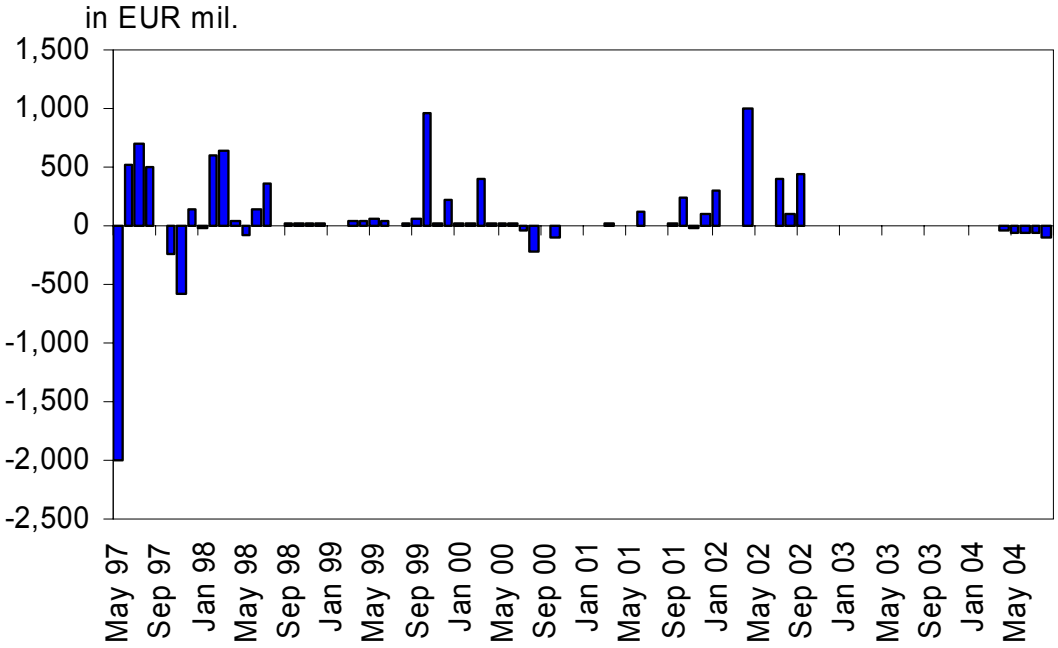
[3] In 2004 the CNB started selling earnings on its foreign exchange reserves to prevent them from growing further (see the end of data sample in Figure 3). This step, however, was not intended as a monetary policy measure, but as a balance-sheet adjustment step.

was no strong nominal effective exchange rate appreciation (Figure 1). This might be interpreted as an indirect 'confirmation' of the euro's reference-currency role in the Czech managed floating.

There are two interesting questions concerning the use of interventions. First, what was the main trigger for interventions, and second, why they were so skewed towards interventions against appreciation? Concerning the first question, one can point to medium-term exchange rate volatility and its impact on macroeconomic developments as the primary trigger of interventions. By this I mean that the CNB usually responded to fast exchange rate movements that exceeded any reasonable equilibrium trend and extended beyond the normal high-frequency volatility of the exchange rate. Such exchange rate developments have a potential to influence the inflation rate and economic activity, both through the direct exchange rate channel and most likely also by bringing the exchange rate out off line with the fundamental value (no matter how difficult it is to determine this precisely). This being said, the first and third intervention episodes also coincided with periods of relatively high short-term exchange rate volatility (Figure 2), which may serve as an additional explanation for the use of interventions.

Figure 3

The foreign exchange interventions (spot)



Source: Czech National Bank.

The second question, concerning the interventions' asymmetry, can be rephrased to query why the CNB did not react to the depreciations of the currency in the same way it did to fast appreciations. An easy answer could be that the central bank was trying to influence the long-run exchange rate trend or targeting a particular level of the exchange rate. Nevertheless, I do not subscribe to this point of view. The long-run appreciating trend has openly been acknowledged in the CNB's strategic documents, and no specific exchange rate targets exist at the CNB, even internally. The asymmetry may thus rather be related to the coordination effect on market expectations of the real appreciation trend (see above) and/or to the inflation target undershooting and an output gap negative since 1997, and which required a relaxation of monetary conditions under the inflation targeting regime (see Holub (2004)).

Besides direct interventions in the foreign exchange market, the CNB has also adopted other measures in response to exchange rate developments. A special account for the government's foreign exchange privatisation revenues was established at the CNB in early 2000, with the aim of reducing the exchange rate impact of large privatisation sales. This step was explained by the fact that massive

privatisations represented a one-off influence on the exchange rate driven by the government's actions, entailing a possible distorsion of the market equilibrium. From this point of view, it was regarded by the CNB as justifiable to offset this influence with a coordinated, non-standard action by the authorities. Moreover, it was also believed that the special account would have a stronger signalling effect on the market than its potential alternative, ie direct interventions by the CNB in the market.

An important aspect of this privatisation account has been facilitated communication between the CNB and government on exchange rate issues. Apart from this positive role, however, the effectiveness of the account was limited till 2001 by the fact that the government never kept its privatisation revenues on the account for long, as it needed the money to improve the weak fiscal situation. With the largest privatisation sales still to come (electricity, gas, telecommunications, etc), which were cited by market participants as the main reason for the exchange rate appreciation in late 2001, the CNB and the government reached an agreement in January 2002. This agreement has kept all of the government's foreign exchange revenues out of the market and at the same time allowed fiscal needs to be financed from privatisation revenues. Direct purchases of the government's foreign exchange revenues by the CNB have been the most important element of the agreement. So far, the CNB has purchased over euro 4.2 billion from the state. Besides being a decision taken to postpone issues of the government's eurobonds, the aim of matching public foreign exchange revenues and outlays (and matching foreign exchange assets with liabilities), etc became more important.

It is also important to keep in mind that the interventions can not be assessed in isolation from changes in the main monetary policy instrument, ie short-term interest rates. The interest rate changes may support the effectiveness of interventions, both via the traditional arbitrage conditions and through the credibility channel. I argued in Holub (2004) that the interest rate changes and interventions should be viewed as reinforcing tools rather than as substitutes. In other words, in order to avoid a loss of monetary policy credibility, the interventions should not go in the opposite direction to the interest rate moves. Moreover, the policy framework should acknowledge that interest rates and interventions are not two independent instruments that would allow the authorities to achieve their price stability objective with their preferred configuration of interest rates and the exchange rate. In the Czech case, nominal interest rates were on a declining trend from the introduction of inflation targeting, with an exception of four minor interest rate hikes so far (by 0.25% in March 1998, July 2001, June 2004 and August 2004). The first period of interest rate cuts started in July 1998 and lasted till late 1999. It thus de facto followed the first wave of foreign exchange interventions (coinciding with it in July 1998 only), and its last stage coincided with the beginning of the second intervention wave. Another period of interest rate cuts started in November 2001 and went on till mid-2003, thus coinciding with (and extending beyond) the last episode of intervention activity.

3. Some stylised facts on the effectiveness of exchange rate management

It would require a detailed econometric analysis to judge whether and to what extent the foreign exchange interventions and other policy measures were effective in influencing exchange rate developments. Moreover, one would need to analyse not only what actually happened after the interventions, but also compare this to what would have happened without them (ie to know the counterfactual). This is however extremely difficult to do, not least because we lack a reliable model describing the short-run dynamics of exchange rates. It would also be necessary to study in detail the microstructure of the koruna's market (see Derviz (2003) for such an analysis), which goes beyond the scope of this note. I thus limit myself to a discussion of some stylised facts. These are summarised in Table 1.

In some cases, the interventions seem to have had a visible, immediate impact on the exchange rate. A typical example is March 2000, when interventions of slightly less than euro 400 million took place. The exchange rate depreciated almost by 2% and remained at a weaker level till mid-2000. Another similar case is February-April 1998, even though this time the weakening of the koruna was more short-lived (till the beginning of May 1998) in spite of a relatively high volume of interventions. In October 1999, the interventions reached almost euro 1 billion, and the exchange rate depreciated by more than 3%, and remained weaker till mid-December 1999. In some other situations, though, the impact was much less clear. For example in June-July 1998, the CNB bought about euro 500 million, but the koruna depreciated only with some lag, which coincided with the out-break of the Russian

crisis. There were even cases in which the short-term impact of interventions was quite weak and non-lasting, such as in December 1999 or in late2001 (even though it may be true that without these interventions the exchange rate might have gone on appreciating further).

The immediate impact of the interventions thus looks quite uncertain, but the impact occasionally might last up to two or three months according to the Czech experience. No particular, ideal intervention strategy (eg open vs undisclosed; large vs smaller; etc) can be identified at first sight, though. Something that did work in one situation may have had little effect in another one. Moreover, even many of the "successful" interventions were not able to prevent relatively prolonged periods of exchange rate overvaluation in 1998 or in 2002. A key issue for the effectiveness seems to be how the interventions interact with market expectations, which may be very different in different periods. This is, unfortunately, quite hard to tell before an intervention is actually carried out.

Table 1

Effectiveness of foreign exchange interventions

Some stylised facts

Starting month	Final month	Overall volume[4]	koruna/euro (ECU prior to 1999)						
(t)	(T)	euro million	t-3M average	t-1M average	Start of t	Low of [t;T]	End of T	T+1M average	T+3M average
02/1998	04/1998	1285	37,87	38,50	38,37	36,30	36,46	36,11	35,11
06/1998	07/1998	508	36,95	36,11	36,49	34,35	34,35	35,47	35,17
10/1999	10/1999	966	36,52	36,36	35,72	35,68	36,62	36,40	36,03
12/1999	12/1999	229	36,36	36,40	36,08	35,83	36,13	36,03	35,60
03/2000	03/2000	394	36,05	35,71	35,65	35,53	35,63	36,31	36,02
10/2001	01/2002	643	33,86	34,19	33,91	31,46	31,92	31,79	30,36
04/2002	04/2002	1 009	32,08	31,39	30,62	30,06	30,63	30,56	29,75
07/2002	09/2002	954	30,36	30,30	29,25	28,97	30,30	30,65	31,19

Source: Czech National Bank.

The most recent experience, in late 2001 and during 2002, fits rather well into this picture. When the exchange rate started to appreciate abruptly in the second half of 2001, it was usually attributed by analysts and market participants to expectations of future foreign exchange privatisation revenues. The CNB tried to resist this tendency with foreign exchange interventions in October 2001 (euro 240 million) and December 2001 (euro 100 million). At the same time, from October 2001 the CNB signalled to the market its intention to reach an agreement with the government on the privatisation revenues. Nevertheless, the market seemed to be discounting this information heavily, and the expectations remained biased towards appreciation. When the agreement was approved on 16 January 2002, it had surprisingly little effect on the market, even though its mechanisms were quite strong (unprecedentedly) and removed the major alleged source of appreciation.[5] The major

[4] To get a feeling of the relative scope of the CNB's interventions, note that the average daily turnover in the koruna foreign exchange market was about US dollar 700-800 million (euro 800-820 million) in 2002. The Czech yearly GDP is roughly equivalent to euro 75 billion.

[5] The minutes of the 21 January extraordinary Board meeting state: "The rapid strengthening of the koruna observed at the end of 2001 was primarily linked to the anticipation of converting a significant part of the state's foreign exchange incomes into Czech koruna. It was stated that considering the extent of the approved measures (ie the agreement with the government), the exchange rate was likely to shift back to a level corresponding to the economic fundamentals. However, the exchange rate did not react in this way, and as a result, monetary conditions were disproportionately tightened." (see www.cnb.cz)

explanation for the continued strengthening shifted from the privatisation revenues to the long-run, real appreciation trend of the Czech koruna.

Therefore, the CNB Board held an extraordinary meeting on 21 January 2002, at which it decided to carry out open foreign exchange interventions (altogether euro 305 million in January 2002) and an interest rate cut of 0.25% points. The koruna weakened by slightly less than 1.5% on that day, but was back at its pre-intervention level in four days and continued strengthening at a pace that even accelerated till the beginning of April 2002. On 4 April, the CNB thus started to openly intervene again. Overall, the volume of interventions reached euro 1 billion during April 2002. The exchange rate ended the month where it had been at its beginning (see Table 1), which was perhaps a rather disappointing result, given the high intervention volume, although the appreciation tendency was at least halted till late June 2002. This experience suggests that even relatively large interventions may have a modest effect at best when market expectations are set in one direction and the central bank tries to "lean against the wind".

Nevertheless, the "undisclosed" interventions that the CNB made in July-September 2002 (together roughly euro 1 billion) seem to have had an important effect. The koruna/euro exchange rate ended the year 9% weaker compared to its all-time high of 10 July 2002, and remained relatively weak in 2003 as well. The apparent effectiveness of these interventions can be explained by a combination of several factors. These included: (i) a change in market expectations, supported by some adverse macroeconomic news; (ii) a negative interest rate differential, making the koruna less attractive for investors; (iii) a change in the market's perception of the sterilisation costs after the interest rate differential became negative; (iv) implementation of the agreement with the government in practice, combined with delays in further privatisation.

Changed market expectations were probably the most important factor. Once market expectations ceased to be skewed towards appreciation, and the one-sided bets became less interesting due to a combination of a zero interest rate differential with more exchange rate uncertainty, it was perhaps a matter of time only until some negative fundamental news initiated a correction. And to the extent that the policy measures (interest rate cuts, interventions and the agreement) contributed to this change, we can say that they might have had a medium-term impact on the exchange rate. This medium-term effect was - perhaps surprisingly - stronger than the immediate impact. This highlights the signalling role of foreign exchange interventions as opposed to their "market-equilibrating" effect. At the same time, it is very difficult to assess the contribution of interventions in isolation from other factors and policy steps (such as interest rate changes), and it is therefore not possible to arrive at a clearly positive judgement on their role in the Czech inflation targeting framework.

On balance, the Czech experience does not shed too much light on the inconclusive debate on the effectiveness of interventions, and both critics and supporters of interventions can find their favourite bits in the overall evidence. Nonetheless, it is fair to note that the apparent instability of transmission between the interventions and their outcomes casts a serious doubt on the possibility of using them more systematically as a policy instrument under the inflation targeting regime.

4. Sterilisation costs

It is widely accepted that monetary policy goals must not be subordinated to profit considerations. Nonetheless, when considering the use of foreign exchange interventions, which are supposed to be a complementary policy instrument at best, and are not crucial for achieving the main goal of long-run price stability, the sterilisation costs should be taken into account. This section presents a simple estimate of these costs for the Czech Republic.

The foreign exchange interventions and purchases from the government within the special agreement have resulted in a growth of the CNB's foreign exchange reserves. The volume of foreign exchange reserves was growing rapidly during the period of fixed exchange rate and fast capital inflows till 1996. After declining during 1997, they started to grow gradually again due to the occasional interventions from 1998 till early 2000. Since late 2001, the reserves have increased considerably, though, to over euro 22 billion (koruna 700 billion).

This has important implications for the structure of the CNB's balance sheet, and consequently for its financial results. The volume of foreign exchange reserves exceeds the currency in circulation almost threefold. The liquidity is sterilised using reverse repo operations, the volume of sterilisation reaching

about koruna 460 billion at present. This means that the sterilisation costs are substantial compared with the monetary income (seigniorage) the CNB can earn due to its monopoly of issueing currency. Indeed, there are accumulated losses from the past in the CNB's books that reached koruna 72 billion at the end of 2003, and are likely to increase even further at the end of 2004.[6]

The overall sterilisation costs can be estimated as a difference between the koruna yield on net foreign exchange reserves and the yield the central bank could earn by investing the same amount of money in the domestic money market (or by reducing the volume of reverse repo operations by the same amount). Table 2 shows an estimate of the CNB's sterilisation costs calculated for the period of 1993-2003 from Holub (2004). As we can see, the estimated sterilisation costs were increasing from 1993 to 1996. The central bank accumulated more and more foreign exchange reserves, which were to a large extent being sterilised by the issue of CNB treasury bills that had to pay a higher interest rate than the foreign exchange reserves were earning. In 1996, in addition, the costs of foreign exchange reserves were increased by an appreciation of the exchange rate within its widened fluctuation band. From 1997, ie under the floating, the estimated costs were very volatile due to exchange rate changes, but were still negative on average. As a result, the total sum of these costs since 1993 has reached about koruna 190 billion (8-10% of yearly GDP at present).

We can thus see that the CNB's sterilisation costs have indeed had a strong empirical relevance, even though the computations presented here are only a rough measure of these costs based on many simplifications (for detail see Holub, 2004). These financial costs of interventions should be taken into account - and compared with the expected macroeconomic benefits - when discussing the exchange rate management, swinging the balance further towards being faithful to pure floating.[7]

Table 2

Estimated sterilisation costs

Koruna billions

CZK billion	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Net foreign assets	24	112	248	342	359	378	439	488	510	630	706
Domestic int rate (%)	11.1	8.6	10.9	12	14	13.8	6.6	5.3	5.1	3.5	2.2
Foreign int rate (%)	5.9	4.9	5	4	4	4.1	3.5	5.1	5.5	4.3	2.9
Exchange rate gains/losses	–0.3	0	0.2	–8.6	44.7	–35.6	31.8	–3.5	–40.1	–26.2	–29.8
Estimated costs of sterilisation	–1.6	–4.1	–14.5	–36.1	8.6	–72.1	18.5	–4.4	–38.1	–20.9	–25.3

Source: Holub (2004).

It should be also mentioned that sterilisation costs may have important implications for the effectiveness of interventions, as the Czech experience illustrates. They may undermine the interventions' credibility in those circumstances where sterilisation costs are potentially high, which might further increase costs, as unsuccessful interventions tend to be more costly than the successful

[6] These accumulated losses, however, do not reflect the sterilisation costs only, but also past quasi-fiscal operations by the central bank, such as its involvement in the clean-ups of ailing banks (Holub (2001)) or the cost of the Czechoslovak federation split-up. These transformation costs alone had the same order of magnitude as the CNB's accumulated loss.

[7] Unfortunately, the scope for a central bank to reduce sterilisation costs is quite limited once high foreign exchange reserves are accumulated on its balance sheet, if it does not want to influence the exchange rate substantially or to give up its monetary policy goals. One possibility is to start selling the reserves gradually. This was in fact the motivation behind the CNB's decision to start selling the earnings on its foreign exchange reserves to prevent their further growth - see footnote 3.

ones (there is thus a self-fulfilling element in an intervention's financial credibility).[8] If financial credibility is low, it might be helpful to strengthen it by making the interventions more sustainable. For example, the CNB's agreement with the government has included as its crucial part the government's participation in sterilisation costs incurred by the CNB due to the direct purchases of public foreign exchange revenues. This provision has made the agreement financially sustainable for the CNB, and thus more credible. Similarly, the credibility of the CNB's foreign exchange interventions increased when the interest rate differential vis-à-vis the eurozone became negative, which led to the interventions being viewed by the market as profitable.

5. Communication issues

Typically, the procedures governing decisions on interventions are much less clearly defined than the rules for interest rates. The international standards on transparency of exchange rate management policies are rather vague, compared with other policy areas. On the one hand, there are arguments in favour of clarity on the mandate, rules and procedures for the authorities carrying out interventions. On the other hand, it is acknowledged that "there are circumstances in which it would be inappropriate for central banks to disclose their near-term monetary and exchange rate policy implementation tactics and provide detailed information on foreign exchange operations" (IMF (1999); see also Chiu (2003)). The international practice is also quite diverse, and there are considerable differences in the disclosure policy even among countries practising the same exchange rate regime (Chiu (2003)). The difficulty in defining clear procedures may be partly connected to the fact that the economic literature gives no clear guidance in this respect. The literature on the effectiveness of interventions leads to differing conclusions, based on which channel of their transmission is emphasised. With regard for example to transparency procedures, if one relies on the signalling effect a logical recommendation would be to carry out open foreign exchange interventions. On the other hand, if one bets on the order flow effect, policy announcements may be counterproductive (see Canales-Kriljenko et al (2003); Chiu (2003)).

The lack of transparency and other operational rules may also be justified by the fundamental difference in the central bank's position in the foreign exchange market compared with the domestic money market. While in the money market, central banks have an almost perfect control over short-term interest rates, in the foreign exchange market they are only one of many players, too weak to lean against the market. A central bank can afford to discuss openly the pros and cons of its interest rate decisions and possibly signal the likely direction of its future actions. This does not weaken its impact on the short-end of the yield curve, and may only increase - and make more predictable - its impact on longer-term interest rates. On the other hand, foreign exchange interventions may be ineffective when anticipated by the market, as they may have no further signalling effect or impact on the risk premium. It could also be strongly counterproductive if the central bank expressed any doubts about the interventions' effectiveness or appropriateness, as this could weaken their signalling effect. Publishing the voting ratios or dissenting views in real-time might thus be damaging.[9]

Let me now look at the communication of foreign exchange interventions in the Czech Republic. At times, the fact that the CNB was intervening was announced immediately (eg on 31 March 1998, 4 October 1999, 21 January 2002, or most recently 10 April 2002; see Table 3), but on other occasions the CNB carried out "undisclosed" interventions (eg in December 2001 or in July-September 2002). Discussions of exchange rate issues appeared in the minutes of the regular monetary policy meetings or extraordinary monetary policy meetings at which interest rate decisions were discussed. Only sometimes, however, did the minutes also include clear information on interventions. This happened either in the case of extraordinary meetings called due to exchange rate developments (such as on 21 January 2002 or 11 July 2002) or after some regular meetings (eg 4 October 1999,

[8] Note that this credibility aspect is exactly opposite to what has been suggested by Mussa (1981). He has argued that the possibility of a central bank's losses is positive for credibility, because it can work as a commitment device. In our case, it was the reduction of the possible losses that helped, by causing the interventions to be viewed as financially sustainable.

[9] It might still be possible and advisable, though, to publish the Board discussions with rather a long time lag for the sake of accountability.

30 March 2000, and 25 October 2001). But information on the voting ratio was given only in some of those cases, when the decision was unanimous.[10] The CNB also published its agreement with the government, including the alternatives that had been considered; in this exceptional case the exchange rate policy was very transparent.

Table 3

Communication of interventions

Starting month	Final month	Short description
02/1998	04/1998	Open interventions on 31 March announced by a press release (but some interventions already in February), no minutes
06/1998	07/1998	Open entry to the market on 14 July; stated in minutes of the monetary policy Board meeting of 16 July
10/1999	10/1999	Open interventions on 4 October, published in minutes (detailed explanation; unanimous voting)
12/1999	12/1999	Minutes only mention a consensus view on the necessity to prevent excessive appreciation (+warning against interventions was given already in November)
03/2000	03/2000	Open interventions on 30 March, announced by press release, published in minutes (unanimous decision)
10/2001	01/2002	25 October: regular MP meeting, decision to intervene published in minutes (unanimous); 20 December: regular meeting, interventions discussed, but no decision announced; 21 January 2002: extraordinary meeting, interventions announced and published in separate minutes (unanimous decision)
04/2002	04/2002	4 April: extraordinary MP meeting, interventions announced by press release; 10 April: interventions with a press release
07/2002	09/2002	11 July: extraordinary meeting, no decisions announced immediately, minutes include decision on interventions (no voting ratio); subsequent interventions not disclosed directly

The monthly volume of interventions is published with a lag of two months (since July 1998), which is the main regular channel for communicating the interventions. As reported by Canales-Kriljenko (2003), intervention volumes are published only by 25 percent of all central banks that responded to questions in a survey concerning the transparency of their intervention policies. This means that the CNB belongs to the minority group of more transparent central banks in this respect (even though some other banks publish daily intervention volumes, which is a step further in transparency). It can thus be concluded that some minimal communication standards are in place concerning the CNB's decisions on foreign exchange interventions, but a considerable degree of discretion remains in this area, unlike for interest rate decisions.

6. Summary and conclusions

In this note, I discussed the role of foreign exchange interventions in the Czech inflation targeting regime. Since May 1997, the Czech Republic has operated a managed floating exchange rate with the euro (previously the Deutsche mark) serving as a reference currency. In line with that, the CNB has

[10] In mid-2001, the CNB's Board decided to publish full transcripts of its monetary policy meetings with a lag of six years. This means that the details of the intervention debates from these meetings will also become public. Nevertheless, the transcripts are produced only from those meetings at which interest rate changes are discussed.

intervened occasionally in the foreign exchange market. With the exception of the year 1997, the interventions were directed against the koruna's appreciation only. The periods of intervention activity included December 1997 to July 1998, October 1999 to March 2000, and the period from late 2001 till September 2002.

Moreover, a special account for the government's foreign exchange privatisation revenues was established at the CNB in early 2000, and strengthened by an agreement between the CNB and the government in January 2002. This agreement has kept all the government's foreign exchange revenues out of the market and at the same time allowed the government to finance its fiscal needs out of the privatisation revenues. So far, the CNB has purchased over euro 4.2 billion directly from the state. The agreement includes the government's participation in sterilisation costs of the CNB due to these direct purchases.

The stylised facts do not give any clear answer concerning the effectiveness of the interventions. It seems that sometimes they might have had an immediate impact, lasting up to two or three months. However, no particular, "ideal" intervention strategy can be identified at first sight. Something that worked in one situation may have little effect in another. Moreover, even many of the "successful" interventions were not able to prevent quite prolonged periods of exchange rate overvaluation in 1998 and in 2002. The initial impact of the CNB's agreement with the government was also disappointing. Nevertheless, the undisclosed interventions that the CNB used in July-September 2002 (altogether roughly euro 1 billion) seem to have had an important effect thanks to a combination of several factors, a change in the market expectations being probably the most important of these. And to the extent that the policy measures contributed to these changed expectations, one could say that they had a medium-term impact on the exchange rate. In sum, the experience so far seems to favour a signalling role for foreign exchange interventions, which however implies a rather unstable transmission between central bank actions and market reactions. The strategy that worked in the second half of 2002, for example, cannot be thought of as a universally effective recipe for any future turbulent period.

An important aspect of the interventions that must not be overlooked is sterilisation costs. I have shown that these have indeed had a strong empirical relevance in the Czech Republic. Their volume since 1993 has been considerable, partly as a heritage of the fixed exchange rate regime till May 1997 and partly due to interventions under floating. The sterilisation costs had a negative impact on the interventions' credibility and effectiveness till 2002, when the interest-rate differential vis-à-vis the eurozone became negative and the interventions started to be viewed as profitable by the market.

Another issue that has often been overlooked by the literature on managed floating is the difficulty in defining clear procedural rules for foreign exchange interventions. This may be quite important, though, when managed floating is combined with the inflation targeting regime. The lack of clear rules and transparency typically surrounding foreign exchange interventions contrasts with the clearly defined procedures guiding the interest rate decisions, which may occasionally create tensions in the monetary policy regime. The Czech experience has been in line with this general conclusion.

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