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# *The Czech National Bank's Role Since the Global Crisis*

**SUMMARY:** The Czech economy entered the global crisis with no major imbalances. Importantly, it did not suffer from the FX mortgage problem, unlike its regional peers. This was mainly a reflection of its early disinflation process accomplished under the inflation targeting regime from 1998. As a result, the CNB could allow the exchange rate to operate freely as a shock absorber during the crisis. The sharp depreciation of the Czech koruna from mid-2008 until early-2009 helped to ease the overall monetary conditions significantly, together with sharp interest rates cuts from August 2008. As a result, the CNB did not hit the ZLB constraint and got by with standard monetary policy tools in the post-Lehman phase. In 2012–2013, however, the Czech economy slid into another recession driven by very weak domestic demand. The central bank cut the interest rates further and hit the “technically zero” level in November 2012. To achieve further monetary policy easing, the CNB used forward guidance on the nominal interest rates, and established an exchange rate commitment at CZK/EUR 27 one year later. This policy measure has averted the risk of deflation driven by insufficient demand, and has contributed to a notable recovery of the Czech economy.\*

**KEYWORDS:** unconventional monetary policy, deflation risk, exchange rate commitment, foreign exchange interventions, zero lower bound.

**JEL CODES:** E31, E52, E58

## ECONOMIC AND MONETARY DEVELOPMENTS BEFORE THE GLOBAL CRISIS

In early 2000s, the Czech economy was successfully stabilising and recovering from the previous economic crisis.<sup>1</sup> The main driver of the recovery was the renewed and accelerating economic growth in the euro area, which is the main trading partner for Czech export-oriented firms. Improving macroeconomic situation had simultaneously a favourable effect on the Czech financial sector. The gov-

ernment intensified the privatisation process and speeded-up sales of state-owned banks to foreign private investors.

On the top of that, the country's entry to the EU in May 2004 brought about a further growth stimulus for the Czech economy. It benefited not only from abandonment of the last remaining barriers to free foreign trade, but also from a further increase of its attractiveness for foreign investors. Rapidly growing demand was stimulated also by expansionary fiscal policy<sup>2</sup> that was rather pro-cyclical in this “golden age”. The additional government income stemming from rapid economic growth was used to increase expenditures rather than to reduce the budget deficit. In 2007 – owing to a large increase in social expenditure in the pre-election period – pro-cyclicality of fiscal policy even strengthened.<sup>3</sup>

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Being fuelled by booming domestic and foreign demand, the GDP growth accelerated to more than 5% in 2004 – 2007. During this period, the output gap gradually opened into the positive territory and the economy, labour market and price developments exhibited some signs of overheating. In order to prevent inflation from going above the target, the CNB tightened monetary policy by a series of interest rates hikes taking place between late 2005 and early 2008. The gradually increasing domestic fundamental inflationary pressures were accompanied by a strong and abrupt upswing in prices of energy commodities and agricultural products on world markets observed since September 2007. These factors, together with increases in indirect taxes and administered prices, pushed inflation rapidly further upwards to well above the 3% CNB target.<sup>4</sup>

In 2004–2007, the exchange rate continued to exhibit a tendency to gradual nominal appreciation being fuelled by the catching-up process of the country to western standards in terms of GDP per capita. Related convergence in the comparative price level, i.e. real equilibrium exchange rate appreciation (of approximately 3–4% a year), proceeded – due to almost completed disinflation process – only partly through the inflation differential vis-à-vis the euro-area. The rest of it materialised via nominal strengthening of the koruna against the euro. In 2008 the koruna nominal exchange rate – being supported by above-mentioned booming economy, regional safe haven status of the country, foreign currency denominated debt issued by the government, and CNB's interest rates hikes – accelerated its appreciation and reached a record-strong level (slightly below 23 CZK/EUR in summer 2008).<sup>5</sup>

This was helping the CNB to deliver desirable tightening of monetary conditions aimed at cooling the overheated economy. At last, fiscal policy made a turn-around and started to curb – to a certain extent – the excessively

growing demand, too. As a result, inflation stabilized and showed a tendency to gradually decline – from rather high levels not seen long before – since the beginning of 2008. The observed gradually decelerating economic growth and its short-term outlook from that time suggested quite a soft-landing of the somewhat overheated Czech economy in 2008.

We can conclude this part of the paper by stating that the Czech economy was in a relatively good shape on the eve of the global financial and economic crisis and that this was partly a consequence of appropriate monetary and other CNB's policies. Both private and public sector exhibited relatively low indebtedness. Domestic economic agents enjoyed – by regional standards extraordinarily – low nominal interest rates reflecting previous successfully completed disinflation process and limited country-risk premium. The country did not exhibit any major internal or external imbalances and vulnerabilities.<sup>6</sup> Low nominal interest rates comparable to the euro area did not motivate private sector to excessively draw foreign-currency denominated loans. In fact, the FX loans were virtually non-existent in case of households and were observed primarily in the sector of corporations involved in foreign trade.<sup>7</sup> Macroeconomic stability and no major mismatches and vulnerabilities had a positive effect also on soundness of the Czech banking sector. Banks had been almost completely privatised to foreign owners running a conservative business model with collecting domestic deposits and providing koruna loans. Banks traditionally had more than sufficient capital adequacy and their loan portfolio quality was fairly high (with low share of NPLs). They also had good balance-sheet liquidity with traditionally low loan-to-deposit ratios of well below 100% and excess liquidity in the sector sterilized by the central bank.<sup>8</sup> This all enabled the Czech banking sector to stand ready to cope with the forthcoming

global financial and economic crisis without significantly amplifying its negative effects for the Czech economy (see section 2).

## HOW DID THE CRISIS HIT THE CZECH ECONOMY

As described in the previous section, in the 3Q 2008 the Czech economy's cyclical position was already behind its peak, but it still showed signs of an overheating. The excess demand, indicated by the positive output gap, maintained high nominal wage growth in the business sector. The headline inflation was significantly above the CNB's target.<sup>9</sup> All real expenditure items of national accounts were adding to the economic growth, especially investment and real exports. High export dynamics, supported with decent, though gradually slowing foreign demand growth, contributed – together with several financial factors<sup>10</sup> – to a substantial nominal and real exchange rate appreciation. The strong exchange rate, feeding into falling import prices, curbed overall inflation pressures, though not sufficiently to prevent overshooting of the inflation target.

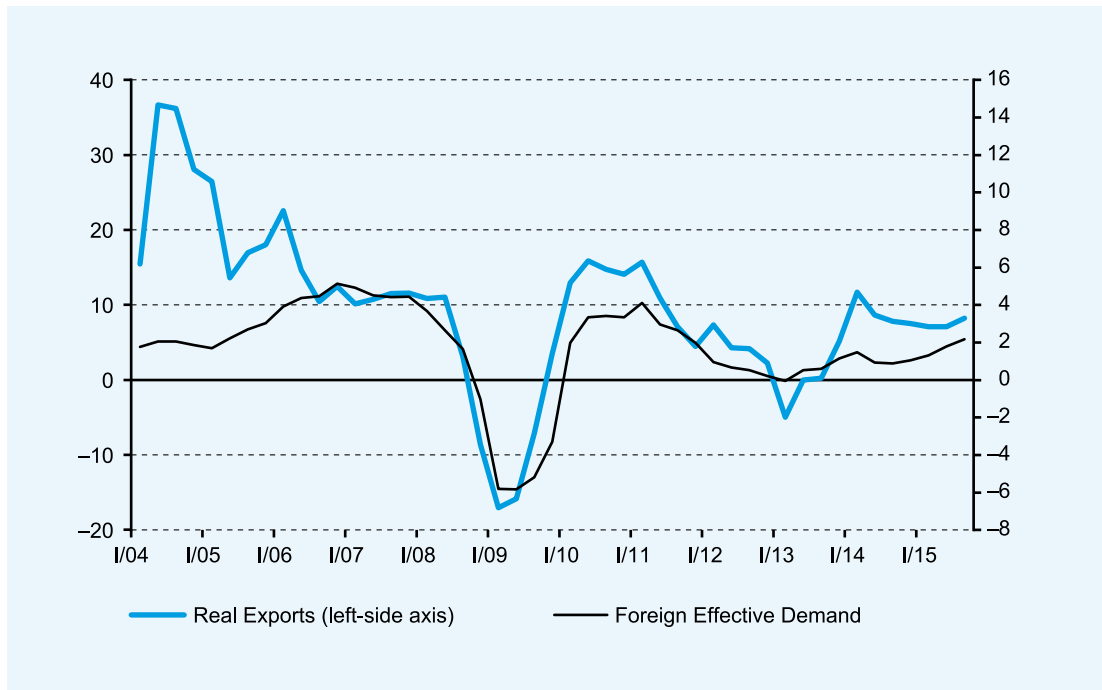
The subsequent fall of the Czech economy into a deep recession by mid-2009 was abruptly fast and it was caused by both external and domestic factors. The main reason behind the dramatically deteriorating economic conditions after the 3Q 2008 was the unexpectedly sudden fall in effective foreign demand for Czech exported goods. While foreign effective GDP grew by 2.6 % y-o-y in the 2Q 2008, due to the deepening global crisis it turned to -5.8 % just three quarters later (Figure 1). As a result of the high openness of the Czech economy, combined with the global character of the crisis, real exports shrank rapidly, by 17 % y-o-y in the 1Q 2009 (see Figure 1). On the other hand, the deepening of the recession was moderated by a de-

preciation of the Czech koruna from by more than 25 % from mid-2008 to the first half of 2009 period, contributing to a significant easing of monetary conditions. In other words, the exchange rate acted as a natural stabilizer, reflecting the worsening prospects of sharply falling external demand. As the adverse effects of the global economic crisis started to disappear, foreign effective GDP switched to positive growth rates again from the beginning of 2010. The effective GDP growth reached its highest point one year later, to slow down to zero again by the first quarter of 2013 due to the escalation of euro area sovereign debt crisis. Starting from the 1Q 2013 foreign effective GDP growth is picking up steadily again, but only gradually. Czech real export growth was determined mainly by the described W-shaped economic developments in the EU, but was also significantly boosted by the depreciation of the Czech koruna against the EUR in November 2013, when the CNB started to use the exchange rate as policy instrument to curb deflationary pressures (see section 3).

Another important factor, suppressing domestic demand in the Czech economy, was systematically pro-cyclical fiscal policy stance implemented by governments elected since 2010 onwards.<sup>11</sup> The stabilizing anti-crisis fiscal package, adopted during 2009, was short lived and it was soon replaced by a fiscal consolidation plan starting in 2010. The main goal of this austerity package was cutting the expenditure side of the budget to compensate for predicted lower revenues, to keep the deficit and the public debt within limits that are judged by international investors as being prudent.<sup>12</sup> The consolidation involved fiscal discretion on both the revenue and expenditure sides, affecting the earnings of both households and enterprises. The series of restrictive measures implemented during the 2010–2012 period involved increases of direct and indirect taxes, abolition of the ceiling for health-insurance

Figure 1

**REAL EXPORTS AND CZECH FOREIGN EFFECTIVE DEMAND  
(Y-O-Y, IN %)**



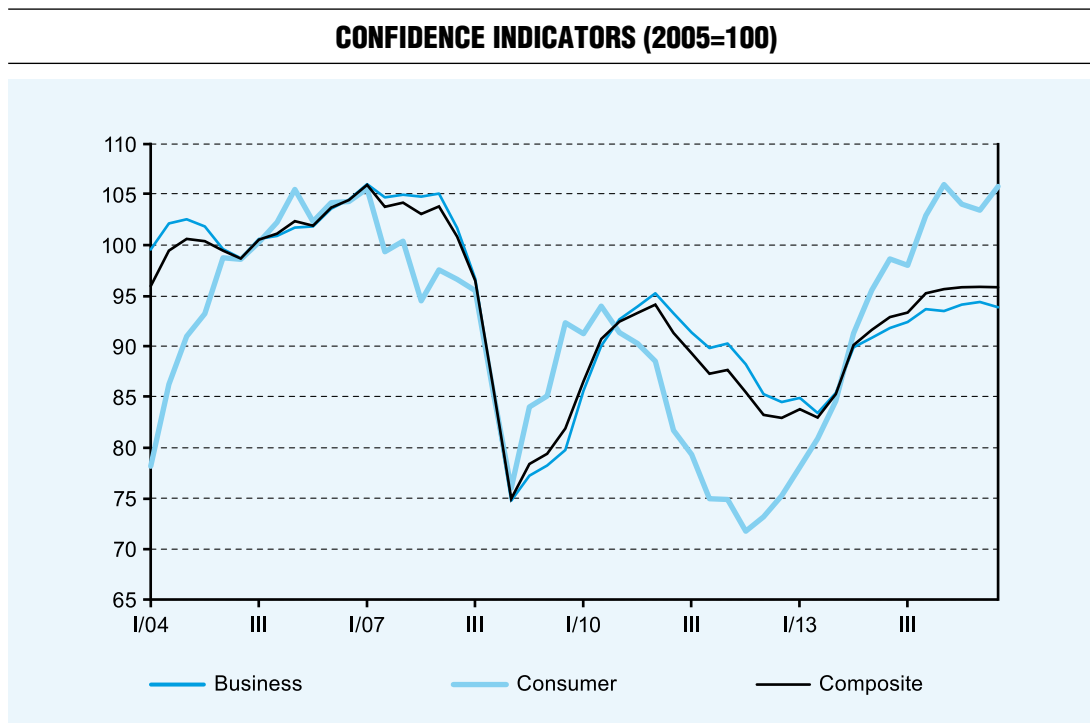
Source: Czech Statistical Office, CNB's calculations

payments, as well as lowering social transfers for households. These fiscal steps had a dampening effect on households' disposable income and in turn on aggregate consumption. A further fiscal austerity package was announced in April 2012. Most of the corresponding measures were implemented from the beginning of 2013. The majority of them (further increase in VAT tax, lower indexation of pensions, freezing wages for state employees, etc.) hit household's consumption, amounting to a total fiscal impulse<sup>13</sup> of -0.9 p.p. in 2013. The estimated impact of the government's fiscal consolidation program on Czech economic growth during the period of 2010–2013 ranged between -0.5 and -1.0 p.p. yearly. Fiscal policy then started to contribute positively to economic growth in 2014, by generating a positive fiscal impulse estimated at around 0.3 p.p. that in-

creased to 0.7 p.p. one year later. A significant share of the positive fiscal impulse was generated by the EU structural and cohesion funds, boosting primarily Czech public investment activity.

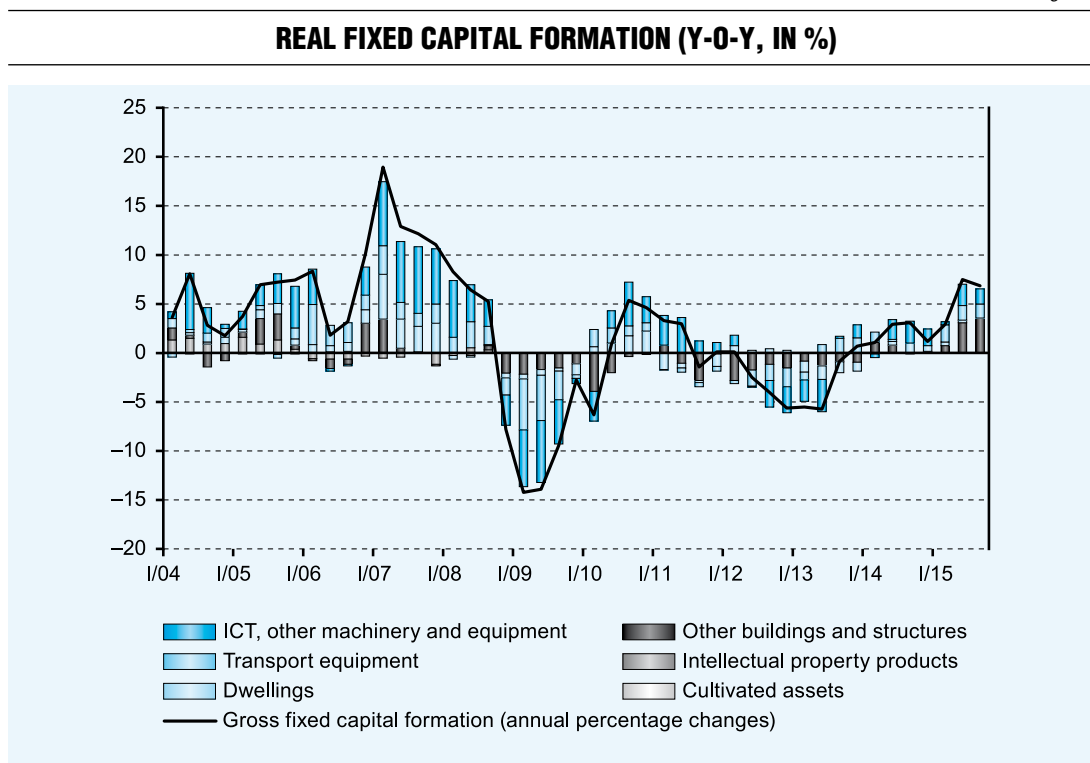
The fast deepening of the global crises and falling revenues of Czech export-oriented enterprises led to a sharp fall in business confidence (see Figure 2) and in turn in investment demand, starting already from the last quarter of 2008. The most pronounced contribution to the overall fall in fixed investment was observed in machinery and transport equipment, followed by buildings and construction (see Figure 3). The fall of overall gross capital formation was deepened by the sharp decline in inventories, reflecting the dramatically reduced demand for intermediate goods. The dynamics of Czech fixed capital formation

Figure 2



Source: Czech Statistical Office

Figure 3



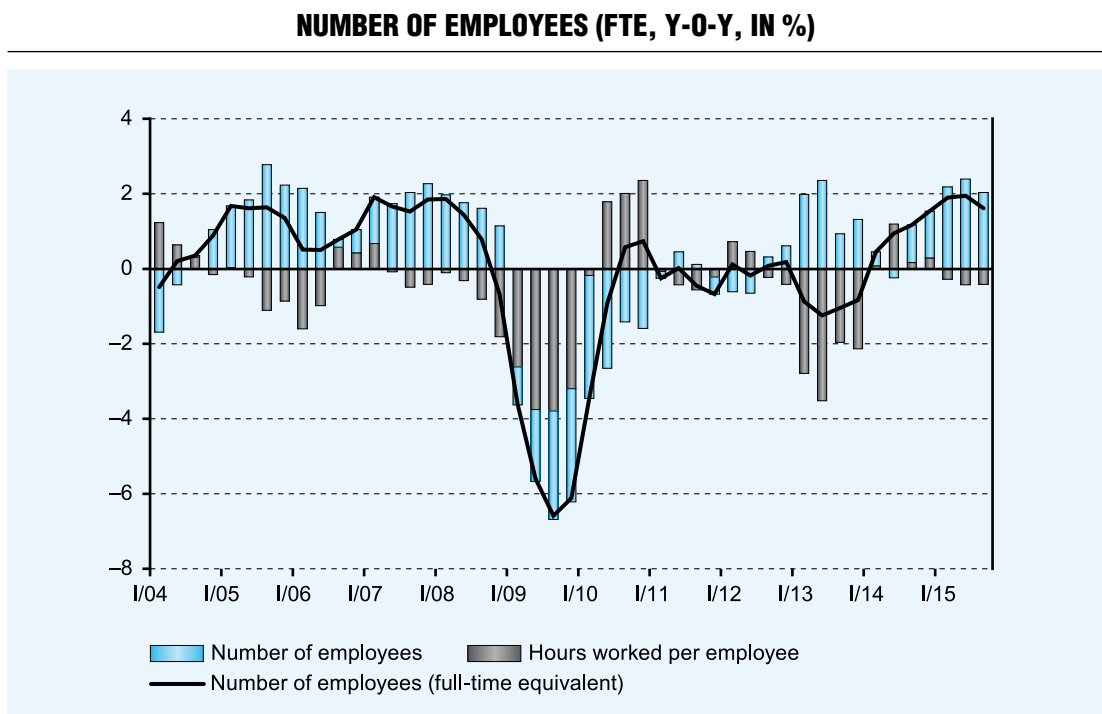
Source: Czech Statistical Office

mirrored the development of foreign effective demand for most of the 2008–2015 period; but the weak domestic confidence and restrictive fiscal policy were also important factors in 2012–2013. In addition, the EU funds added to the y-o-y dynamics of Czech fixed capital formation mainly in 2015 owing to Czech government’s effort to drawdown as much money as possible from the previous programming period, to be followed by an expected marked slowdown of investment activity of the public sector in 2016 due to the only gradual start of the new one.

The labor market, being more inertial than other segments of the economy, reacted to the worsening external and domestic economic conditions with a time lag, at least in terms of employment. In the first phase of the crisis firms tried to adjust to falling demand mainly through reducing hours worked per employee<sup>14</sup> (see Figure 4). The number of unemployed in-

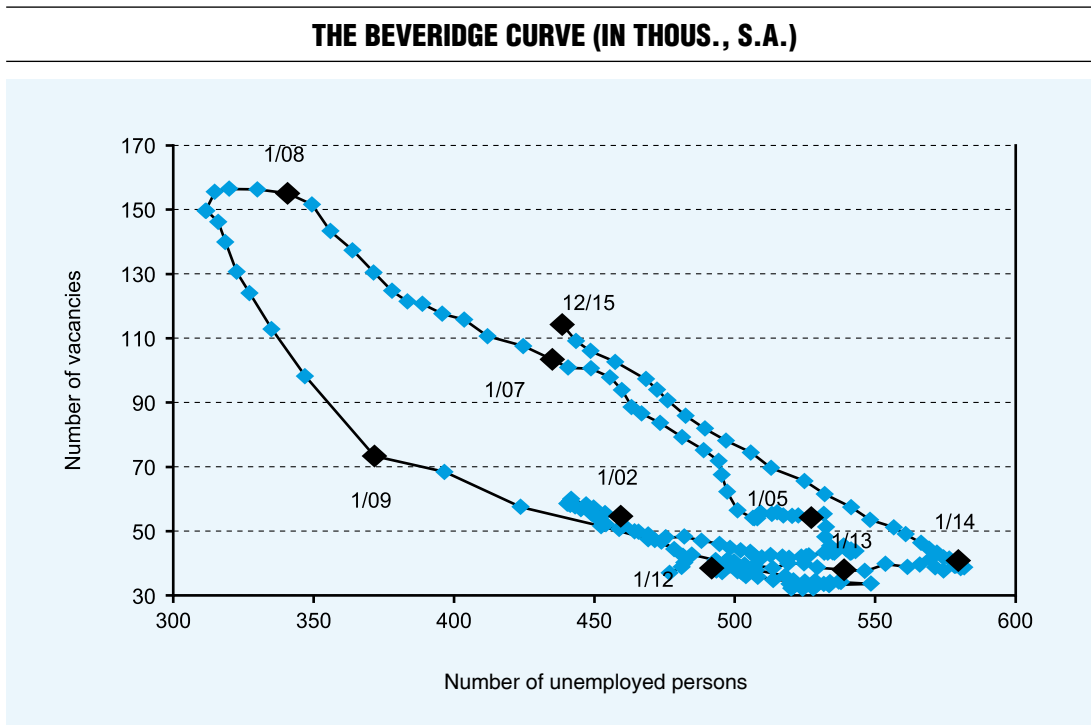
creased only moderately in the last quarter of 2008, vacancies, however, started to fall dramatically. As the economy was sliding deeper into recession, the number of unemployed started to grow rapidly, while vacancies obviously moved in the opposite direction. In other words, as time went on, the economy was moving fast alongside the Beveridge curve in the southeast direction (see Figure 5). As the economy recovered from the sharp contraction in 2009, the labor market improved somewhat as well, mainly by prolonging the hours worked by employee. Although from the beginning of 2013 the public sector started hiring employees more extensively, the hours of work (dominantly in the private sector), fell significantly as a reaction to the renewed recession. The Beveridge curve reveals that the most visible turn on the labor market happened at the beginning of 2014, after the monetary conditions had been relaxed further (see section 3), when the Czech

Figure 4



Source: Czech Statistical Office; Czech Ministry of Labour and Social Affairs

Figure 5



Source: Czech Statistical Office; Czech Ministry of Labour and Social Affairs

economy started to generate more and more vacancies while at the same time it started to reduce the number of unemployed significantly.

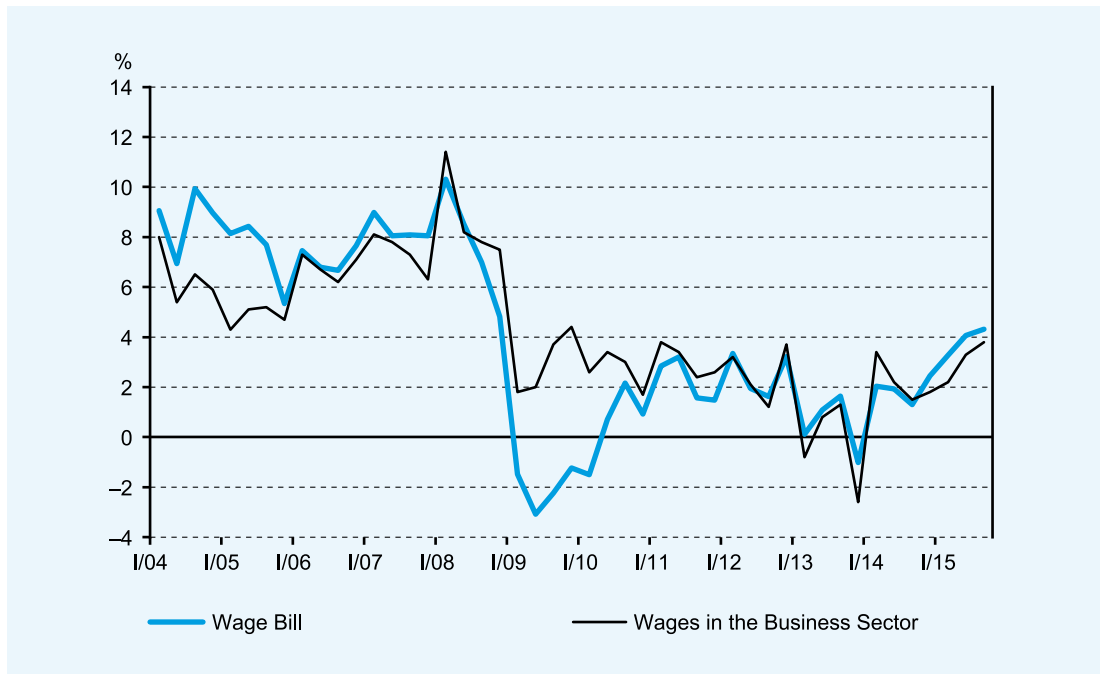
The depth of the recession was clearly visible in the speed of wage growth adjustment in the early stages of the crisis. The average wage dynamics in the business sector, having been around 8 % in the 3Q 2008, fell below 2 % in just three quarters of 2009 (see Figure 6). As mentioned earlier, public sector average wage growth, due to the countercyclical fiscal package implemented in 2009, even slightly increased. The change in the y-o-y total wage bill dynamics, reflecting besides wage developments also the fall in employment, was even more dramatic, dropping in the same period by more than 9 percentage points. Although the y-o-y growth of nominal wages somewhat recovered from the beginning of 2010 and the wage bill did so six months later, the deceleration in the y-o-y

dynamics of wages in the business sector renewed again from the second half of 2011 and fell to 1%<sup>15</sup> by the 3Q 2013. This was one of the key factors contributing to the lack of demand-led price pressures in the economy. Subsequently, nominal wage dynamics started to pick up, but initially more sluggishly than it would have been justified by labor productivity<sup>16</sup>, despite the significant easing of monetary conditions in November 2013 by the CNB. The subdued wage dynamics was, however, in line with the estimate of the output gap implying excess supply for the whole post-crisis period (until late-2015). Wages in the business sector started to reflect visibly the improving labor market trends only at the beginning of 2015.

The worsening situation on the labor market after the start of the global crisis was mirrored immediately in household's expectations (see Figure 2 above) regarding their future income.

Figure 6

**TOTAL WAGE BILL AND WAGES IN THE BUSINESS SECTOR (Y-O-Y, IN %)**



Source: Czech Statistical Office

The dynamics of household’s disposable income started to fall rapidly already in the 3Q 2008, mainly due to the drop in the y-o-y dynamics of wages and salaries (see Figure 7). During 2009 most components of disposable income were deteriorating, only social benefits, taxes and social contributions, due to the anti-crisis fiscal package, mitigated somewhat the worsening trend in households’ income situation. Obviously, the rapid reduction of the nominal disposable income of households was accompanied with a deep fall of households’ consumption (see Figure 8), reaching its bottom in the 3Q 2009. Compared with other countries in the region (Hungary, Poland), however, household consumption was not affected by balance sheet effects stemming from foreign currency denominated loans.<sup>17</sup> Real consumption started to grow again from the beginning of 2010, which (besides some base effects) was given by

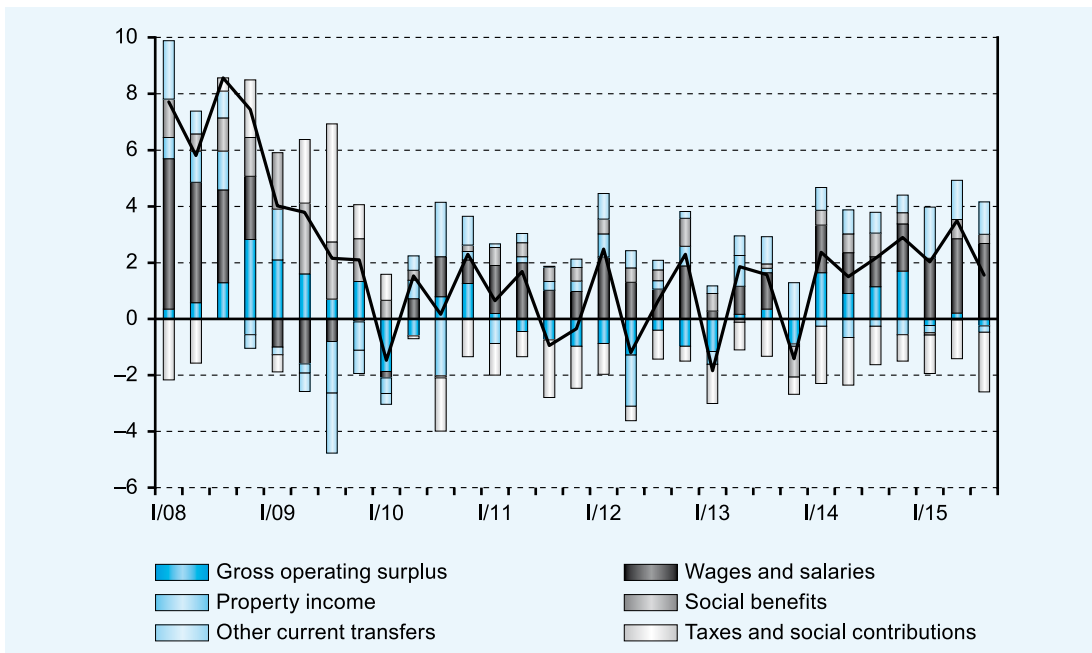
the expansionary fiscal anti-crisis package implemented in 2009 and the gradual recovery in Europe. The subsequent deterioration of the households’ confidence indicator mirrored the implications of the fiscal consolidation package being carried out from in 2010<sup>18</sup> and the slowdown of the Czech economy due to weak foreign demand. These factors pushed consumption dynamics back to the negative territory in 2012. Households’ spending, supported by many factors, started to accelerate again from 2013. Not only fiscal policy switched to an expansionary stance, but also relaxed monetary conditions, improving labor market conditions and from 2014 low commodity prices boosted household consumption demand.

Given the deep fall in most real expenditure components of GDP described previously, it is not surprising that total GDP fell deeply during 2009 (see Figure 9). The output gap



Figure 7

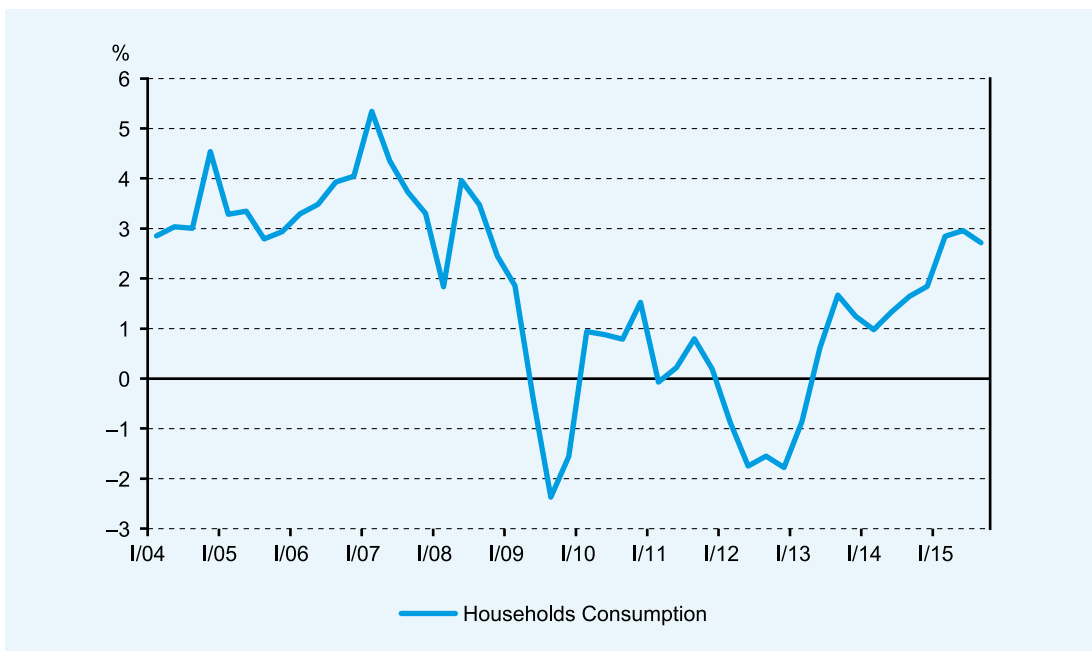
**NOMINAL DISPOSABLE INCOME (Y-O-Y, IN %)**



Source: Czech Statistical Office

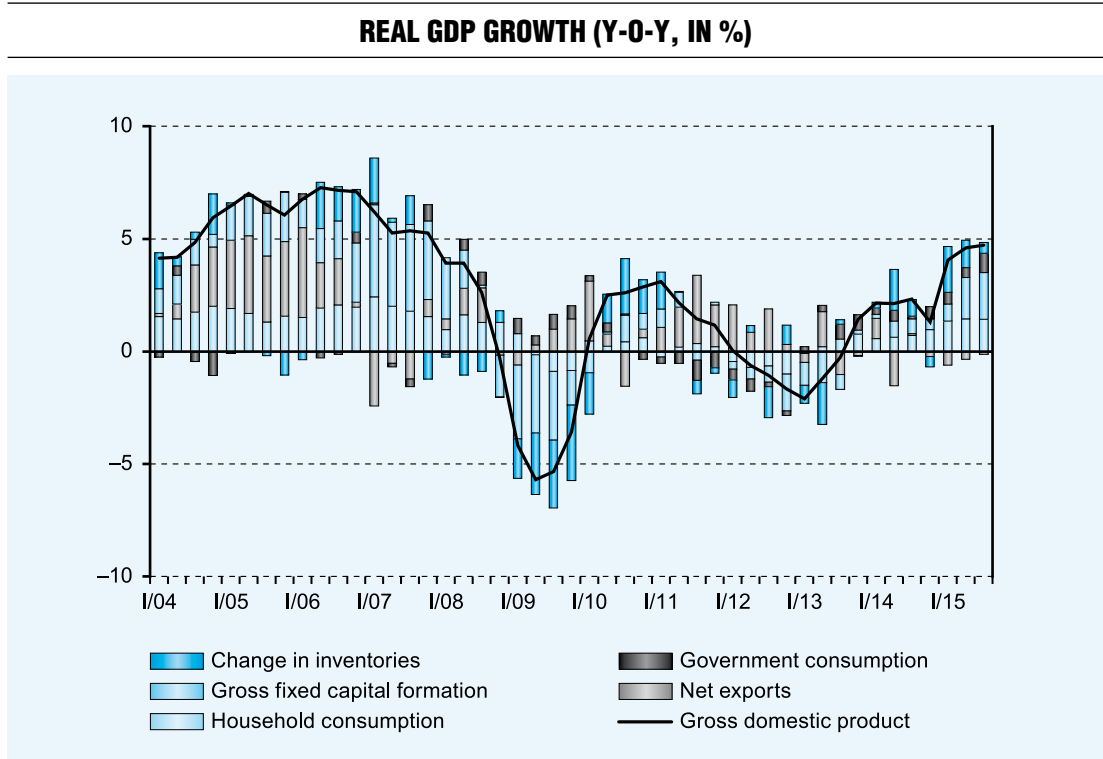
Figure 8

**REAL HOUSEHOLD CONSUMPTION (Y-O-Y, IN %)**



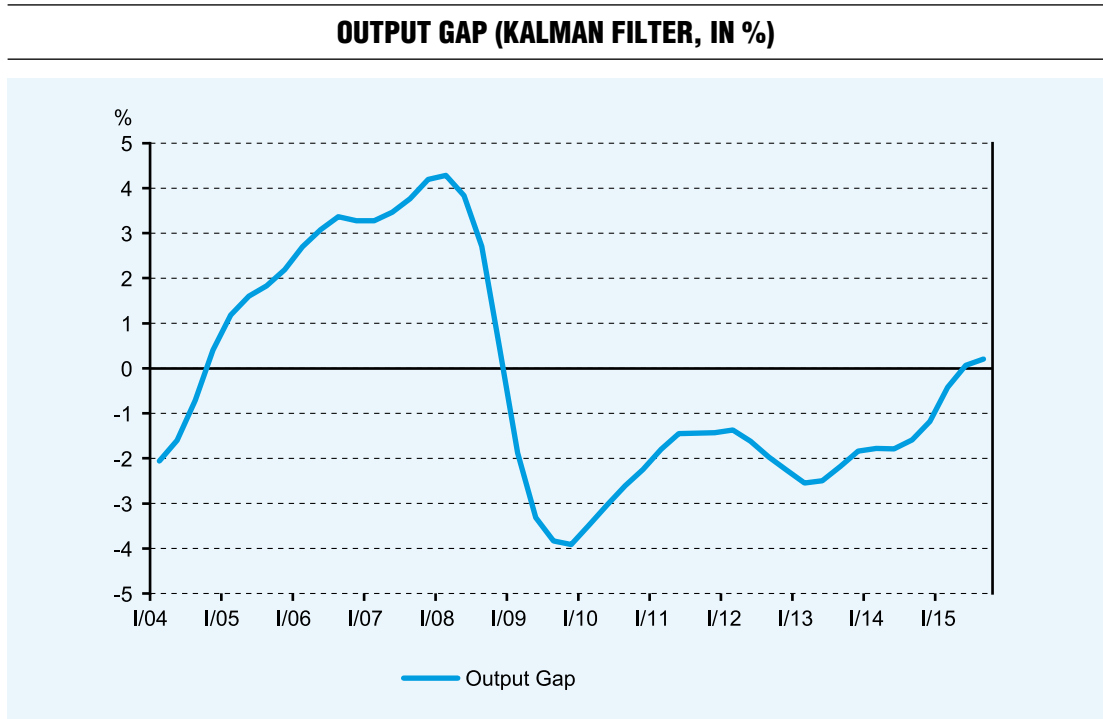
Source: Czech Statistical Office

Figure 9



Source: Czech Statistical Office; CNB's estimate

Figure 10



Source: Czech Statistical Office; CNB's estimate

got close to  $-4\%$  in the second half of 2009 (see *Figure 10*), indicating strong deflationary pressures that were only partially offset by the weakening of the nominal exchange rate. After the temporary recovery in 2010–2011, the negative output gap started to widen again in 2012–2013 due mainly to the weak domestic demand. As a reaction, short-term interest rates reached the ZLB in November 2012 (see *Figure 14* in section 3), and further monetary stimulus came one year later by the CNB’s weakening of the Czech koruna’s exchange rate. The upturn in GDP growth and the gradual elimination of economic slack during the 2014–15 period were given by the combination of relaxed monetary and fiscal policies, the pick-up in foreign demand and low energy prices<sup>19</sup>.

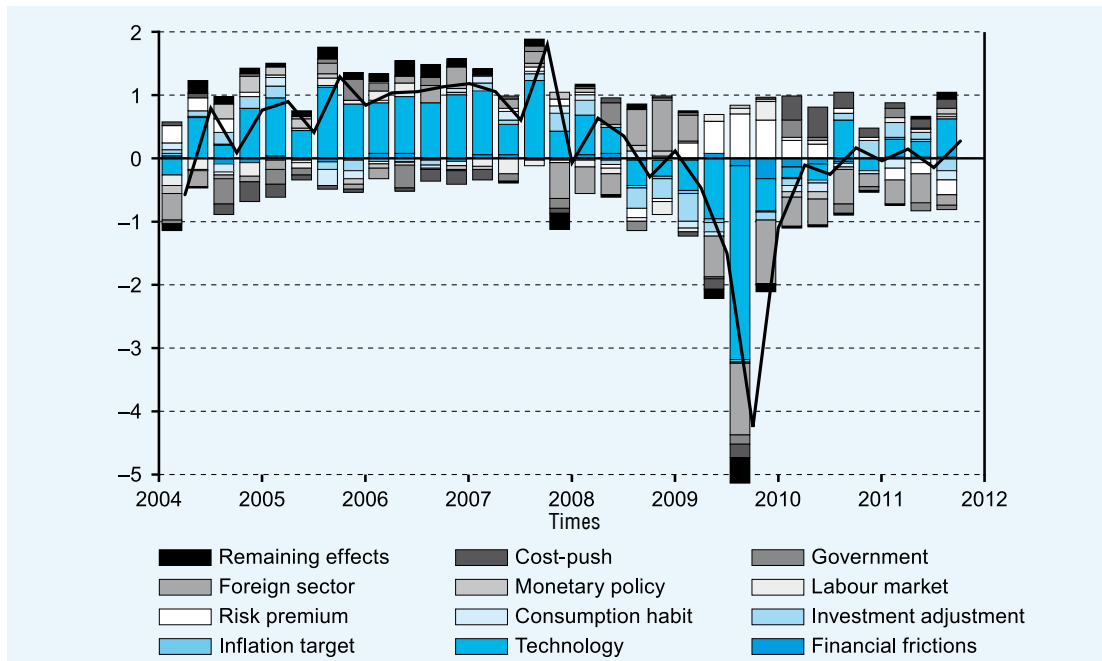
The financial system, which contributed significantly to the recession in many countries during the crisis period, was in the case of the Czech Republic a source of macroeconomic stability. Its balance sheets were not burdened with toxic assets, therefore it provided reliable financial intermediation. Interest rate margins, although increased during the crisis, were reflecting in a standard way a higher risk premium corresponding with the cyclical downturn of the economy (Brůha, 2011). Based on internal analyses of the CNB, there was no evidence that financial frictions played an important role in the depth of the Czech post-Lehman recession. Ryšánek et al. (2012) estimated a DSGE model following the framework of Christiano et al. (2011). Their empirical results, based on shock decomposition with a model structure allowing for financial frictions, suggest that financial factors contributed to the fall of Czech GDP only marginally (see dark blue bars “Financial frictions” in *Figure 11*).

Inflation was in the post-crisis period affected by both supply- and demand-side factors. Insufficient demand, however, played the key role in the emergence of deflationary risks

towards the end of 2013. The dramatic fall in foreign demand, paired with fiscal restriction starting in 2010, resulted in a fast evaporation of still substantial inflation pressures prevailing in the second half of 2008, despite the forward-looking, stabilizing policy reaction of the CNB. Both headline- as well as monetary policy relevant inflation started to fall rapidly already from the last quarter of 2008 (see *Figure 12*). Inflation rates fell further during 2009, and in the 3Q 2009 they got close to zero. Monetary policy-relevant inflation bottomed out half a year later, in the first quarter of 2010. Adjusted inflation excluding fuels and food (core inflation) got negative already in the second half of 2009 (see *Figure 13*), reflecting mainly low demand pressures indicated by the negative output gap. The fall in headline inflation combined with negative core inflation continued during the 2012–13 period, due to mainly worsening demand conditions (the output gap turned to more negative values)<sup>20</sup>. Diminishing inflation pressures and the growing risk of prolonged deflation implied by inflation forecasts since mid-2013 were the reasons for weakening of the CZK/EUR exchange rate (see *Figure 15* in section 3) by the CNB in November 2013. The depreciation of the nominal exchange rate reversed the negative trend of falling inflation pressures, and the core inflation turned positive already in the first half of 2014. Supply-side factors and weakening global price pressures, however, started to push inflation down again from the start of 2014. Falling energy prices were one of the main factors behind deflationary pressures, and from the beginning of 2015 food prices started to contribute negatively as well. The combination of steadily growing foreign demand, relaxed monetary and fiscal policy stance (supported by the EU funds), however, generated sufficiently strong domestic demand pressures that compensated for imported deflationary pressures stemming from low commodity prices prevailing since 2014.

Figure 11

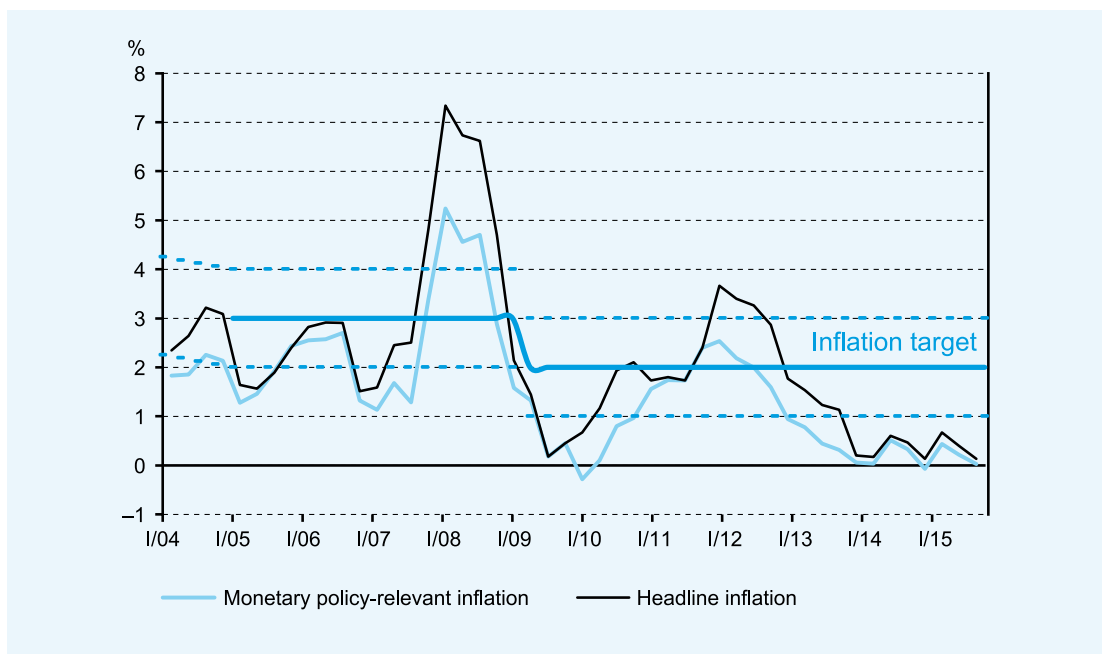
**SHOCK DECOMPOSITION OF CZECH GDP GROWTH  
(PERCENTAGE DEVIATION FROM STEADY-STATE)**



Source: Ryšánek et al. (2012)

Figure 12

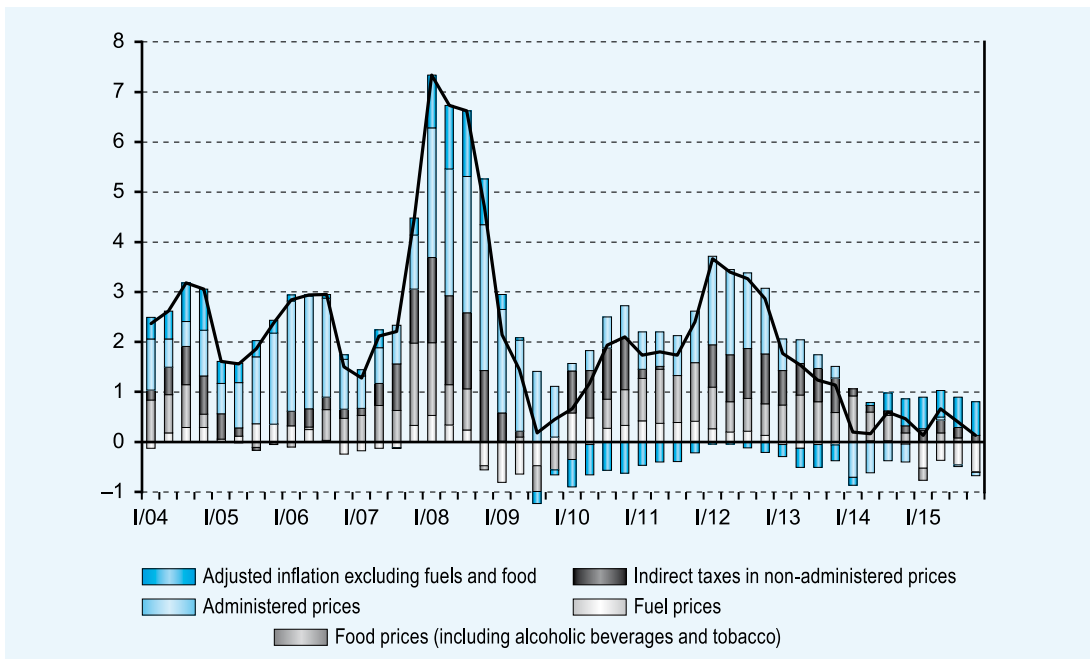
**HEADLINE AND MP-RELEVANT INFLATION (Y-O-Y, IN %)**



Source: Czech Statistical Office

Figure 13

**STRUCTURE OF INFLATION (Y-O-Y, IN %, CONTRIBUTIONS IN P.P.)**



Source: Czech Statistical Office

**MONETARY POLICY REACTION**

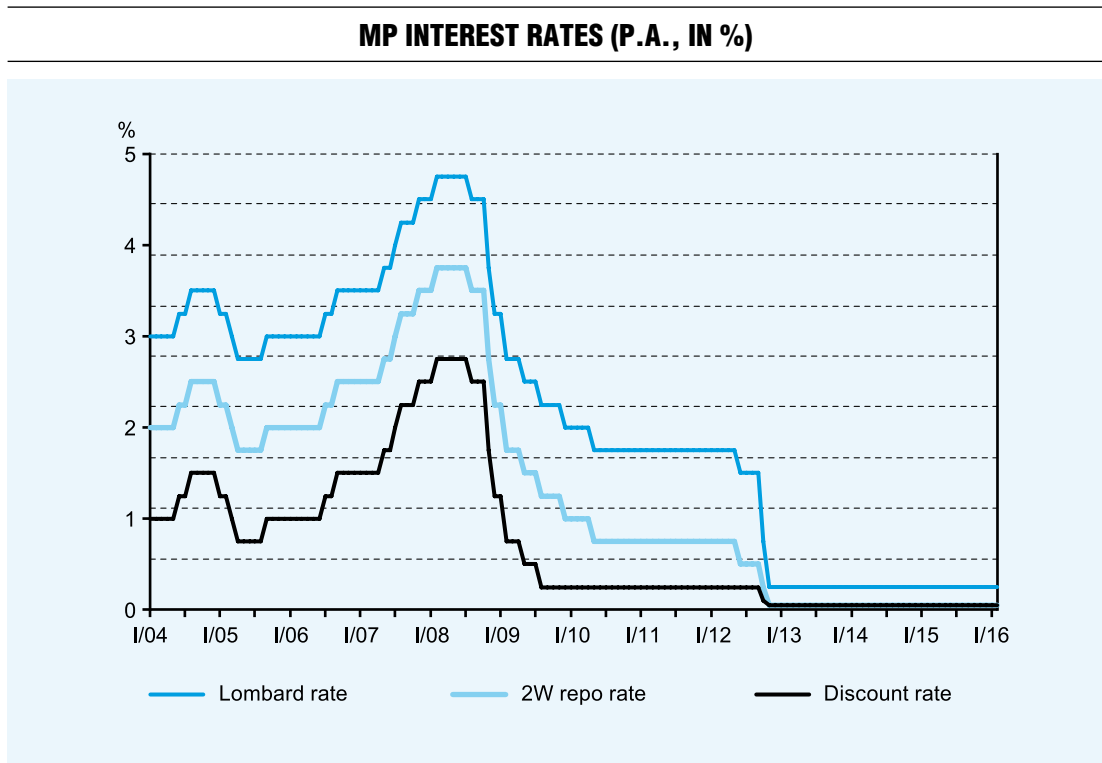
In 2007–2011, the Czech National Bank (CNB) got by with standard monetary policy tools. The monetary policy easing cycle started already in August 2008 (see Figure 14), i.e. in a period before the bankruptcy of Lehman Brothers, when Czech inflation was still significantly exceeding the inflation target and many European central banks were hiking their interest rates. This decision reflected the forward-looking nature of the CNB’s inflation targeting framework, as the forecast suggested that inflation would fall below target at the beginning of 2009 and the real Czech economy would turn rather quickly from inflationary to anti-inflationary due to the expected slowdown in foreign demand. The CNB rate cuts were then accelerated significantly from November 2008 when the speed of disinflation and the depth of the global recession

were becoming obvious. Overall, the CNB cut its policy rates by almost 4 percentage points between August 2008 and November 2012 (Figure 14). In spite of some temporary disruption related to the crisis, these interest rates cuts were transmitted into the economy in a fairly standard manner thanks to the strong domestic financial sector (see Babečková Kucharčuková, et al., 2013).

In addition, the CNB introduced liquidity-providing repo operations in 2009 to prevent banks from experiencing liquidity problems and to support the functioning of the domestic government bond market. Such operations were supplementing the CNB’s standard instruments and had mainly a favourable signalling impact, as the facility has been largely unused in practice, except for a short period after its introduction.

From mid-2008 onwards, the monetary policy easing was also strongly aided by a

Figure 14



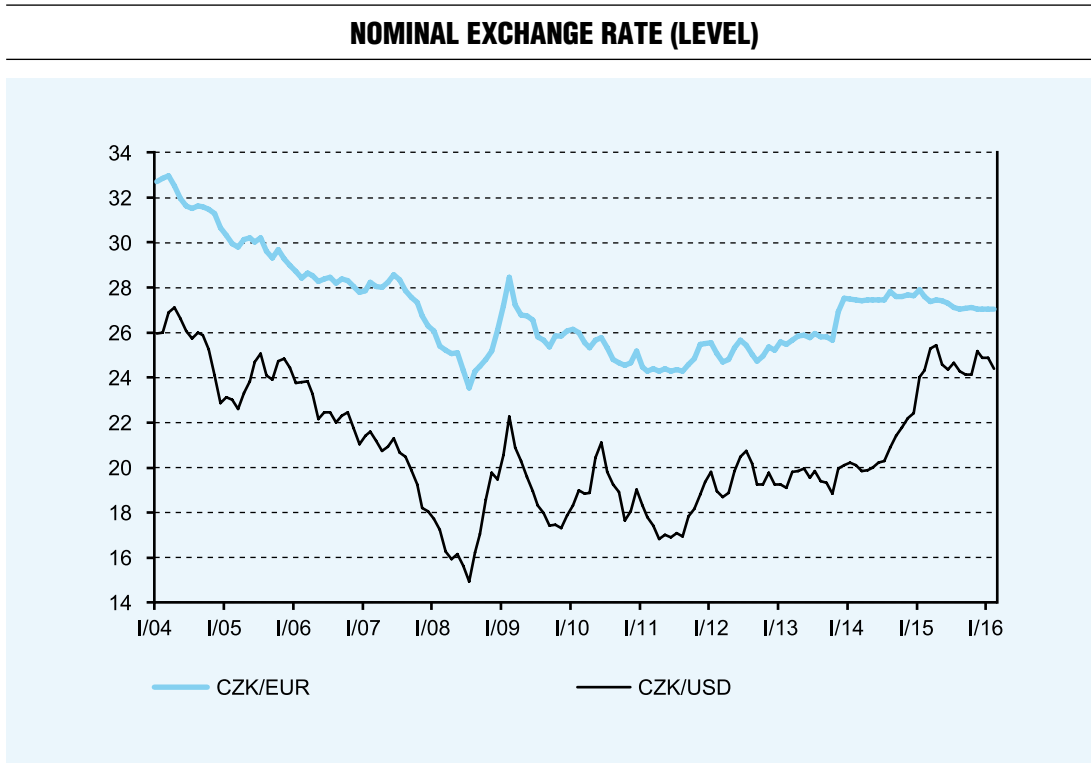
Source: CNB

spontaneous depreciation of the Czech koruna (after its sharp appreciation in 2007 and the first half of 2008; see *Figure 15*) in response to a contraction in both external demand and the domestic economy. The exchange rate at that time proved its ability to act as an automatic adjustment mechanism.<sup>21</sup> The CNB was able to allow this market mechanism to operate fully due to the fact that the Czech Republic did not suffer from the FX mortgage problem or other kinds of exchange rate mismatches. The overall monetary conditions thus eased significantly, helping the Czech economy, together with a counter-cyclical fiscal stimulus (see section 2), to withstand the impact of the global demand shock and to curb the subsequent disinflation. The zero lower bound (ZLB) on nominal interest rates was thus not reached in the post-Lehman phase in the Czech Republic, and no truly

unconventional monetary policy measures were thus needed.

However, as the renewed recession of the Czech economy started, being this time driven by subdued domestic demand (see section 2), and predicted inflation was declining, the CNB hit the zero lower bound (ZLB) on interest rates in autumn 2012 (*Figure 14*). In particular, the monetary policy interest rates were lowered to “technical zero” level (0.05% for the two-week repo rate and the discount rate and 0.25% for the Lombard rate) in November 2012. At that time, it was viewed as inappropriate to consider negative monetary policy interest rates in the Czech context. In addition to the fact that the benefits of negative interest rates are generally debatable and it is impossible to go below a particular threshold leading to a strong preference for cash, some legal complications on introducing negative rates in the Czech Republic

Figure 15



Source: CNB

were taken into account, as certain laws and by-laws defined penalty interest as a multiple of the CNB discount rate. Acknowledging the binding nature of the ZLB, the CNB started to use forward guidance on interest rates in autumn 2012, pledging to leave interest rates at the technical zero level for a prolonged period, until inflation pressures increased significantly. This forward guidance contributed to the decline in long-term interest rates recorded in the Czech Republic in late 2012, but ultimately was not sufficiently effective to break the deflationary tendencies in the economy.

The central bank at the same time announced that it was ready to use the exchange rate as an additional instruments should further monetary policy easing become necessary. Related to this, the CNB's Board decided in November 2012 to suspend sales of income on its international reserves, as such

operations might have clashed with monetary policy implementation at the ZLB. This further strengthened the signal that the CNB was ready to carry out foreign exchange interventions to weaken the koruna. The communication of the CNB that it was prepared to use the exchange rate caused the koruna to weaken in late 2012/early 2013 (Figure 15). This eased the overall monetary conditions, and the impact lasted until the summer of 2013.

So, it was not until November 2013 that the CNB resorted to actually using an extraordinary instrument, the koruna's exchange rate vis-à-vis the euro. The CNB took this step at a time when the impacts of the global financial and economic crisis and the subsequent EU sovereign debt crisis were subsiding only slowly. The CNB's forecasts and supplementary analyses were meanwhile making it increasingly plain that the previous monetary easing

would not be sufficient to keep inflation on target and reduce the risks of deflation.<sup>22</sup> The CNB therefore announced that it would (if necessary) intervene in the foreign exchange market to weaken the koruna so as to maintain the exchange rate close to CZK/EUR 27. The CNB also stated that it was resolved to intervene in the FX market in such volumes and as long as needed to achieve the desired exchange rate level with the aim of smoothly hitting its inflation target in the future.

The decision to use the exchange rate of the koruna as a monetary policy instrument was preceded by a series of internal discussions that started at the general level back in 2009 and became increasingly specific between 2012 and autumn 2013. In these discussions, the CNB assessed all the unconventional policy options discussed in the literature: forward guidance, quantitative and qualitative easing, and foreign exchange interventions or the exchange rate. Given the high openness of the Czech economy, with its well researched exchange rate transmission, long-term liquidity surplus in the banking sector, already low long-term government bond yields, shallow markets for private debt instruments and no FX mismatches in the economy, the CNB eventually opted to use the exchange rate of the domestic currency (see Franta, et al., 2014).

In the small open Czech economy, weakening the exchange rate of the koruna is an effective tool for increasing the domestic price level and stabilising inflation expectations close to the CNB's target (Svensson, 2001; Alich, et al., 2015). In addition, the impacts of exchange rate changes could be expected to be considerably stronger than usual with the exchange rate being used as a systematic monetary policy instrument at the ZLB (Franta, et al., 2014).

It is important to stress that the CNB preferred direct use of the exchange rate as

a monetary policy instrument and regarded quantitatively unlimited interventions merely as a means of reaching the exchange rate level consistent with hitting the inflation target in the future. An alternative would have been to use fixed-size interventions as an instrument. The IMF formulated a recommendation to this effect (see IMF, 2013, p. 10).<sup>23</sup> However, the CNB rejected this approach for several reasons: (i) the small expected liquidity impact of the interventions, linked directly with their size (see above); (ii) the reliance conversely on the inflation expectations and real interest rate channel in combination with standard exchange rate transmission channels linked with the exchange rate level and its change over time; (iii) the impossibility of determining ex ante the appropriate intervention size delivering an exchange rate weakening consistent with hitting the inflation target; (iv) the related generally debatable effectiveness of this type of intervention in influencing the exchange rate.

When deciding to use the exchange rate of the koruna as a monetary policy instrument, the CNB needed to determine the appropriate intervention level for hitting the inflation target and exiting the ZLB in the future. An alternative forecast scenario assuming the use of the exchange rate as an additional monetary policy instrument was therefore drawn up using the core forecasting model g3 and published in November 2013.<sup>24</sup> In this scenario, the impact of interventions was simulated using expected shocks to the exchange rate equation, the size of which was derived<sup>25</sup> with respect to (i) observation of the ZLB constraint; (ii) the speed of return of inflation to the CNB target; (iii) the intuitive exchange rate path and the pattern of the interventions contained therein.

Several variants of this scenario were drawn up internally, differing mainly in the weight placed on the speed of attainment of the infla-



tion target and the assumed moment of exit from the exchange rate instrument and from the ZLB in the future. Expert judgement was used to select the variant best ensuring fulfilment of monetary policy objectives while respecting the recommendations made in the economic literature regarding the need to temporarily overshoot the inflation target in order to exit the ZLB and overcome the risk of deflation. Account was also taken of the fact that the change in the nominal exchange rate in the alternative scenario should be sufficiently large to influence the expectations of economic agents and also to ensure that the level of the exchange rate commitment will not have to be changed in the future if anti-inflationary risks occur to the ordinary extent.

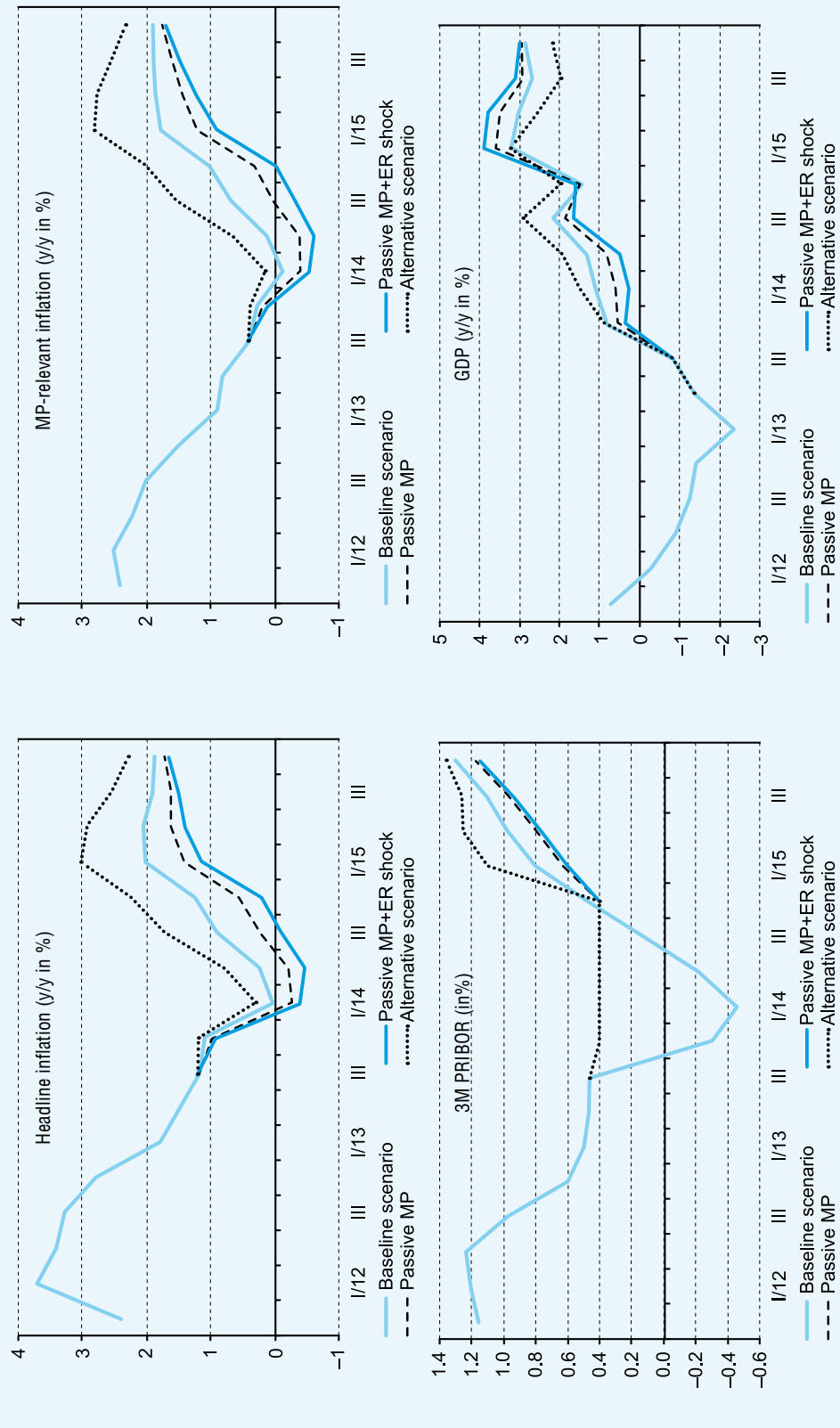
In the chosen version of the alternative scenario, the exchange rate of the koruna moved close to CZK/EUR 27 and was therefore weakened by 4%–5%. According to the scenario, this would significantly lower the risk of deflation, accelerate the return of inflation towards the target, and enable a robust exit from the ZLB in early 2015. As regards inflation, the weaker exchange rate was expected to get gradually reflected in the first few quarters of the alternative scenario in a rise in import prices increasing both headline and monetary-policy relevant inflation, which thus would reach very low but positive levels in early 2014. This was followed by a gradual resurgence of inflation pressures from the domestic economy, which would take over the main role in inflation from import prices. Thanks to this, inflation in the alternative scenario returned to the CNB's target as early as 2014 H2. It subsequently moved into the upper half of the tolerance band around the target, and even towards its upper boundary, and then converged towards the target from above during 2015 (see *Figure 16*). The temporary overshooting of the inflation target in this scenario offset the significant undershooting in

2014 and led overall to an average inflation rate for the two years of just under 2%, i.e. almost equal to the CNB's target. The alternative scenario also showed favourable effects of the weakened exchange rate on the Czech real economy during 2014, when the Czech economy would grow more than one percentage point faster than with passive monetary policy.

After the CNB decided in November 2013 to start using the exchange rate as an instrument for easing monetary policy, the koruna depreciated sharply against the euro towards the level of the exchange rate commitment. The exchange rate commitment had to earn credibility in the first few days. This is evident from the massive intervention purchases that the CNB needed to carry out in a short period of time. These purchases totalled around EUR 7.5 bn. However, the exchange rate broke through CZK/EUR 27 quickly and has stayed above that level ever since. Until the summer of 2015, this was achieved without the need for further foreign exchange interventions, as the exchange rate was moving clearly above the established floor (see *Figure 17*).<sup>26</sup> Nevertheless, in July 2015 the CZK/EUR exchange rate appreciated to the floor due to favourable domestic economic developments reducing the likelihood of a future increase in the exchange rate commitment, lagged effects of the surprising exit by the Swiss National Bank from its own exchange rate commitment in January 2015, and further easing of the ECB's monetary policy. This initiated automatic interventions by the CNB totalling EUR 11.2 bn. from July 2015 till January 2016. The resulting increase of the liquidity surplus in the Czech banking sector pushed nominal interest rates in some market segments (including Czech government bonds up to 4–6 years of maturity) into the negative territory, delivering some further endogenous monetary easing.

Figure 16

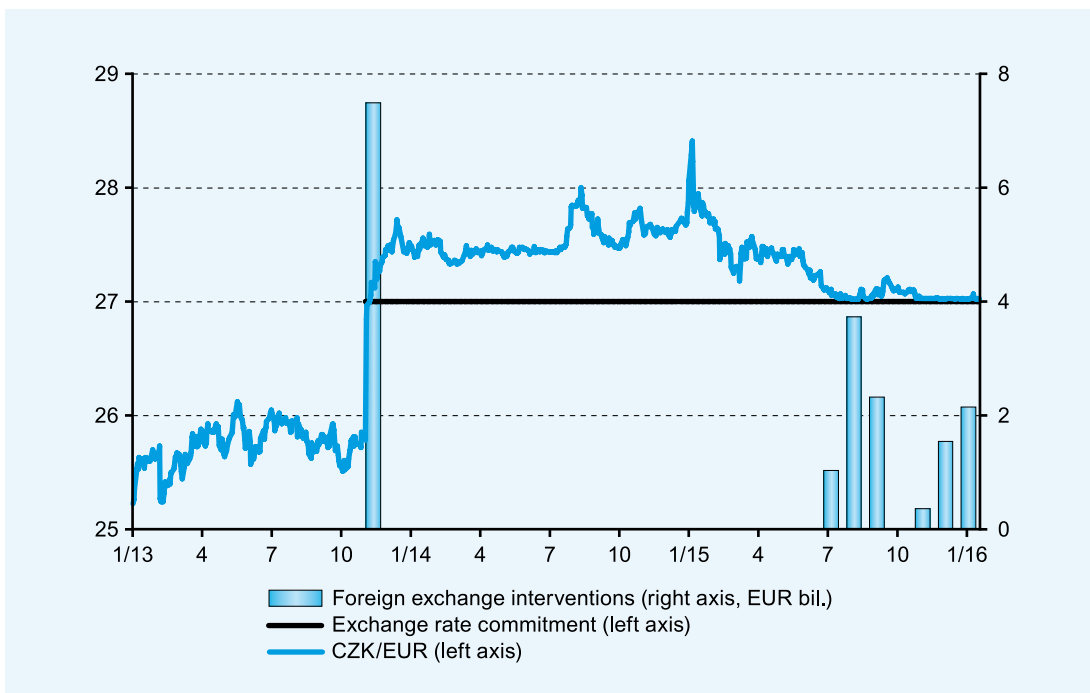
SCENARIO FOR USING THE EXCHANGE RATE IN NOVEMBER 2013



Source: CNB simulations

Figure 17

**CZK/EUR EXCHANGE RATE AND CNB'S INTERVENTIONS**



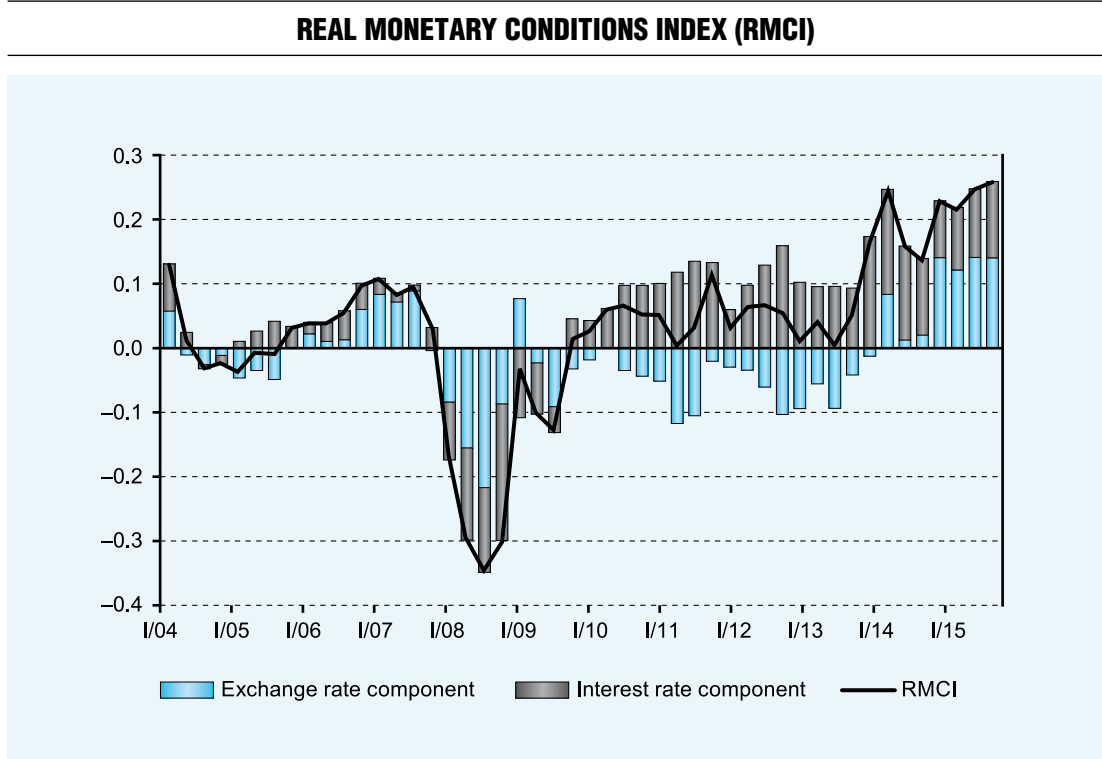
Source: CNB

The CNB's exchange rate commitment has relaxed the monetary conditions significantly (see Figure 18) both in their exchange rate and interest rates component (due to higher inflation expectations), and has had the expected positive impact on economic activity as well as on the labour market situation. In 2014, the Czech economy recovered from the preceding long-lasting recession and the GDP increased by 2%. In its Inflation Report IV/2014, the CNB estimated the contribution of monetary policy easing to this turnaround in economic activity at 1.5 percentage point, while more recent estimates after data revisions are somewhat lower (0.7–1.4 p.p.). At the same time, the exchange rate commitment contributed to a return of Czech core inflation from negative levels before November 2013 to positive numbers of more than 1% during 2015. The domestic economy has

started generating inflationary pressures, as expected. Nonetheless, headline inflation has remained stubbornly low (0.3% on average in 2015) due to imported deflationary pressures stemming mainly from falling producer prices in the euro area and the slump in global energy prices.

The subdued actual and expected inflation developments resulted in a need to ease monetary policy further. In the regime of using the exchange rate as an additional monetary policy instrument, this can be achieved in two ways: (i) by extending the duration of the exchange rate commitment or (ii) by moving the level of the commitment. The CNB has so far chosen the former option only. The Board has extended the CNB's exchange rate commitment in several steps, well beyond the early 2015 communicated when the commitment was intro-

Figure 18



Source: CNB

duced. Most recently, the Board stated at its first monetary policy meeting held in 2016 (on 4 February) that the CNB would not discontinue the use of the exchange rate as a monetary policy instrument before 2017. As regards the potential shift of the exchange rate to a weaker level, the CNB has never excluded this option. In December 2014 and again in February 2015, the CNB’s Board made any shift of the exchange rate commitment to a weaker level conditional on there being a long-term increase in deflation pressures capable of causing a slump in domestic demand, renewed risks of deflation in the Czech economy and a systematic decrease in inflation expectations. However, given that the first-round effects of the slump in global oil prices have been assessed as a positive supply-side shock for the Czech economy, and given the fast GDP growth, the likelihood of

such developments declined significantly by the middle of 2015.

On the other hand, the cuts of the ECB’s deposit rate (and of the policy rates of several other European central banks) into the negative range have prompted a debate of possible introduction of negative monetary policy rates also in the Czech Republic as a complement to the CNB’s exchange rate commitment. During 2015, the CNB has taken preparatory steps to make this instrument feasible if needed. The decline of yields in some segments of the Czech financial markets below zero during the autumn of 2015 made the debate of negative policy rates temporarily less urgent. But in February 2016, the CNB’s Board again discussed the possibility of introducing negative interest rates in light of the widening of the interest rate differential vis-à-vis the euro area and developments in domestic financial markets.

## CONCLUSIONS

The Czech economy entered the global financial and economic crisis with no major imbalances. Even though there was some macroeconomic overheating in 2007–2008, inflation was significantly above the CNB target, the exchange rate was appreciating well above its equilibrium trend, and real estate prices were growing relatively rapidly, the magnitude of these challenges were smaller to many other countries. Importantly, the Czech Republic had a strong banking sector, and did not suffer from the FX mortgage problem, unlike Hungary and Poland. This was mainly a reflection of its early disinflation process accomplished under the inflation targeting regime, which had been in place already from 1998, and closely related to that, of nominal interest rates that had been close to the euro area levels for many years. Czech households thus had no incentive to take on debt in foreign currencies.

As a result, the CNB could allow the exchange rate to operate freely as a shock absorbing mechanism during the crisis without worrying about FX balance sheet mismatches in the household sector. The sharp depreciation of the Czech koruna from mid–2008 until early–2009 helped to ease the overall monetary conditions significantly, together with unprecedentedly decisive interest rates cuts, which started in a forward-looking manner already in August–2008. There were no major problems in the domestic financial sector, and the recession of the Czech economy was thus purely imported from abroad due to a slump in the demand for exports, which subsequently also hit the domestic demand via falling employment, decelerating nominal wage growth and a drop in private fixed investment. Fiscal policy was counter-cyclical in 2009, and as the foreign demand started to improve, the Czech economy started to recover in 2010–2011. In-

flation got temporarily very low in 2009, and then turned up quickly too form 2010.

Therefore, the Czech National Bank (CNB) got by with standard monetary policy tools in 2007–2011, as it did not hit the zero lower bound on nominal interest rates, and as the monetary policy transmission continued – despite some temporary disruptions – to function in a standard manner. The only additional monetary policy instrument in that period was an introduction of liquidity-providing repo operations in 2009 to prevent banks from experiencing liquidity problems and to support the functioning of the domestic government bond market. Such operations were supplementing the CNB’s standard instruments and had mainly a favourable signalling impact, as the facility has been largely unused in practice, except for a short period after its introduction.

In 2012–2013, however, the Czech economy slid into another recession, which was – besides the EU sovereign debt crisis – driven mainly by very weak domestic demand. The domestic demand weakness was associated with pro-cyclical, sharp fiscal consolidation and very weak business and consumer confidence. The inflation started to decline, core inflation remained negative, and the CNB’s forecasts were showing a clear risk of inflation-target undershooting. The central bank thus cut the interest rates further, and hit the “technically zero” level in November 2012. To achieve further monetary policy easing, the CNB used forward guidance on the nominal interest rates, pledging to leave interest rates at the technical zero level for a prolonged period, until inflation pressures increased significantly. At the same time, the central bank announced that it was ready to use the exchange rate as an additional instruments should further monetary policy easing become necessary. This communication of the CNB caused the koruna to weaken in late 2012/early 2013,

with the impact lasting until the summer of 2013.

Nonetheless, even this was not sufficient to eliminate the increasing deflation risks and to bring inflation back to the CNB's 2% target quickly. In November 2013, the CNB thus established an exchange rate commitment, announcing that it would (if necessary) intervene with no quantitative or time limits in the foreign exchange market to weaken the koruna so as to maintain the exchange rate close to CZK/EUR 27. Once again, the use of exchange rate to achieve further monetary policy easing was enabled by the absence of FX balance sheet mismatches in the Czech economy. The weaker exchange rate thus provided the desired boost to the Czech economy both by improving the price competitiveness, as well as by increasing inflation expectations and thus reducing the ex ante real interest rates. According to the CNB's estimated, the relaxed monetary conditions, together with improved sentiment in the economy, boosted the Czech GDP growth in 2014 by 0.7–1.4 p.p. With the usual time lag, this started to have a notable positive effect in the labour market, in terms of growing employment/declining unemployment and ac-

celerating nominal wage growth, thus boosting the nominal disposable income of households and their consumption. In terms of inflation, the weaker exchange rate initially had an upward effect mainly through the direct import price channel, but over time the positive effects on the domestic economy started to play the main role. Core inflation has thus turned positive and exceeded 1% in 2015.

Headline inflation, on the other hand, remained stubbornly low due to the drop in global oil prices and persisting decline of producer prices in the euro area. In response of that, the CNB postponed its future exit from its exchange rate commitment in several steps. At the time of the writing, there was a public commitment of the CNB's Board not to discontinue the use of the exchange rate as a monetary policy instrument before 2017. The Czech monetary conditions will thus remain relaxed for some more time. The main precondition for the future exit from the exchange rate commitment will be a prospect of stabilising inflation close to the CNB's 2% target, without a risk of having to go back to some unconventional monetary policy measure in the foreseeable future.

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## ANNEX I

### ECONOMIC AND MONETARY DEVELOPMENTS IN LATE 1990S AND EARLY 2000S

To be able to understand properly CNB's policy in recent years, one has to go back to late 1990s and to the first half of 2000s when the main grounds of the Czech economy and monetary policy regime were laid down.

The first Czech post-transformation economic recession in 1997–1999 – unlike the one coming much later in 2008 – originated primarily in the domestic economy as it was caused by disorder-

ly correction of previously accumulated (and for long time unsolved) internal and external imbalances. The escalating problems led to an abrupt adjustment of both fiscal and monetary policies (including the regime change to inflation targeting decided in late 1997). The resulting domestic macroeconomic restriction was coupled with subdued global economic activity and volatile oil and food prices being observed in the global markets

at those times. After the exchange rate peg was abandoned by the CNB under market pressure in May 1997, koruna depreciated quite markedly. Together with massive deregulations and indirect tax changes implemented by the then government, this led to a jump in actual and expected inflation above 10% in 1998.

Hence, the starting conditions of the newly introduced inflation targeting regime (put in place as of the beginning of 1998) were quite challenging. The new monetary policy regime was used as a strategy for disinflation in a destabilised, small, open, converging economy, still undergoing the transition process.<sup>27</sup> The ongoing domestic economic recession, a swift nominal exchange rate correction back to stronger levels and a sharp drop in oil price caused strong decline in consumer price inflation already in 1999. This unexpectedly fast disinflation caused a marked undershooting of targets set for net inflation by the CNB in these initial several years of the existence of its new monetary policy regime.

However, already in early 2000s the Czech economy was successfully stabilising and recovering from the above-mentioned economic crisis. The main reason was the renewed and accelerating economic growth in the euro area, which is the main trading partner for Czech export-oriented firms. Improving macro-situation had simultaneously a favourable effect on the Czech financial sector. The government intensified the privatisation process and speeded-up sales of state-owned banks to foreign private investors.

Starting late 2001, privatisation-related inflow of foreign capital led to the building-up of asymmetric expectations of market participants that the nominal exchange rate – appreciating until then only gradually – would strengthen more rapidly. These expectations exhibited self-fulfilling pattern and koruna started to appreciate quite sharply. In the autumn of 2001 the CNB – in line with its managed floating exchange rate regime – decided to enter the forex market and intervened several times within approximately a year against this ex-

cessive koruna appreciation. The CNB supported its activities by a series of interest rates cuts being lowered in many steps cumulatively by 3 percentage points in 2001–2003. Despite these CNB steps, the excessive exchange rate appreciation (real exchange rate got quite severely overvalued) inappropriately tightened domestic monetary conditions.<sup>28, 29</sup> These brought about – together with an observed marked slowdown in foreign demand growth – not just a significant deceleration of Czech economy, but also a strong decline in domestic inflation that temporarily went even slightly below zero and undershot the CNB inflation target significantly and for quite a long time (2002 – 1H of 2004).<sup>30</sup>

Against the backdrop of the above-mentioned undesired frequent undershooting of the inflation target<sup>31</sup> in the late 1990s and early 2000s, the positive outcome was that the disinflation process was successfully completed quite shortly after the new inflation targeting regime had been established which was earlier than in other countries of the region. Low and relatively stable inflation enabled the CNB to gradually decrease the nominal interest rates to levels observed in advanced EU countries. Completed nominal convergence has been positive for further economic and financial developments in the Czech Republic in many aspects as emphasised in the main text of this article.

From the supply-side point of view, the foreign direct investment (unlike short-term speculative capital in the 1990s) played a positive role in the transition process and economic development of the Czech Republic in 2000s. The observed massive FDI inflow to the Czech Republic was prevalingly of a vertical character, with greenfield and brown-field projects built especially in export-oriented manufacturing sector.<sup>32</sup> Companies under foreign control settled in the Czech Republic in “clusters” and started to produce, export and co-operate with local firms. In turn, the Czech enterprises learnt from them how to absorb modern technologies. Besides that, the Czech firms imitated new schemes of industrial organisation and up-to-date

managerial/marketing practises. This process was accompanied by an increased gross fixed capital formation when building-up new or renovating the existing physical capacities. Booming investment activity resulted in overall enhanced capital

endowment. Increasing capital stock together with higher productivity gains and technological innovations led to gradually accelerating potential output growth in 2002–2008 to approximately 4%.

## ANNEX 2

### MAJOR FEATURES OF THE CURRENT MONETARY POLICY REGIME IN THE CZECH REPUBLIC

Since 1998, the CNB has been conducting its monetary policy within an inflation targeting regime. In this regime the CNB commits itself to bring and/or maintain inflation close to an announced numerical inflation target. The regime thus focuses directly on controlling inflation, a variable that affects the decision-making and behavior of most of economic agents in the areas of consumption, investment and saving. The central bank objective is communicated to the public and the inflation target provides an explicit anchor for inflation expectations and relevant other expectations or processes (wage bargaining for example). In the Czech Republic, the inflation targeting regime was introduced because the previously applied policy regime combining monetary targeting with an exchange rate peg had not been sustainable, failed to stabilize the economy and to bring inflation down to levels observed in advanced countries.

The changeover to the inflation targeting strategy was subsequently reflected in the legislation on the Czech National Bank's mandate. Under the Czech Constitution and the Czech National Bank Act, the CNB's primary objective since 2001 has been to maintain price stability.<sup>33</sup>

In the pursuit of its statutory objective, the CNB has a high degree of independence from political influence. Above all, it is independent in making decisions on the settings of monetary policy instruments. Its independence is also re-

flected in the manner in which its senior officers are elected and dismissed (they are appointed and – under very strict conditions – dismissed by the Czech President). This independence protects the central bank from any political pressures aimed at affecting its decisions.

To implement its monetary policy decisions the CNB makes use of “indirect”, non-administrative market instruments. The main CNB monetary policy instrument in normal times is the two-week repo rate for liquidity sterilizing two-week repo-operations with commercial banks. By changing the repo rate, the CNB influences interest rates on the financial market from which the commercial banks derive interest rates for their clients for both deposit and credit banking products.

The exchange rate regime consistent with the inflation targeting has been the so-called managed float. Under this regime, the koruna exchange rate is determined by market supply and demand while the CNB reserves the right to intervene in the foreign exchange market in exceptional situations. Since late 2013, the CNB's exchange rate commitment at 27 CZK/EUR has been in place as a further monetary policy tool to relax monetary conditions after the zero lower bound for the nominal interest rates has been reached.

When setting its monetary policy instruments, the CNB concentrates on so-called monetary-policy horizon (12–18 months ahead in the future).



In line with that, forecasts for inflation and the economy as a whole serve as a major input into the decision-making process of the CNB's board responsible for monetary policy conduct. The forecasting exercise is organised around a modern general-equilibrium macro-economic forecasting model. In the initial years of inflation targeting regime, the CNB relied on a suite of (partial or complex) econometric models. In mid 2002, the new core macro-economic forecasting model (so-called Quarterly Forecasting Model, QPM) was introduced. The model was a relatively small gap-type forward-looking model of the New Keynesian style with endogenous monetary policy and model-consistent inflation expectations. In summer 2008, the QPM was replaced by an incomparably larger and more complicated DSGE model of the third generation (called "g3") that is strictly micro-founded with full stock-flow consistency and tightly optimising economic agents. Beside this well developed technical toolbox, the forecasting process is also significantly affected by the professional discussions and expert opinions of CNB economists and policy makers.

The CNB's first inflation targets were set in terms of net inflation (app. 80% of the consumer basket) excluding price effects of administrative measures (changes to regulated prices and the first-round impacts of indirect taxes changes). Since April 2001, the CNB has set its targets in the form of headline consumer inflation. The target announced in April 2001 (set for the first and last time by agreement with the Government) took the form of a continuously falling band. Since 2006 the inflation target was a point tar-

get of 3% with a tolerance band of  $\pm 1$  percentage point. The inflation target of 2% announced in 2007 effective since January 2010 has been in place until now. As before, the CNB tries to make sure that actual inflation does not differ from the target by more than one percentage point in either direction. By doing so it applies a completely symmetric approach meaning that undershooting of the target is equally undesirable as it is its overshooting.

The CNB applies so-called escape clauses (or caveats) when the economy is hit by an external, supply-side or administrative price shock (most frequently in the form of indirect tax changes) and undesired GDP and employment volatility would occur if the central bank tried to keep inflation on target. In such a situation the central bank does not respond to the first-round impacts of the shock and accepts a temporary deviation of inflation from the target. However, it prevents the shock from passing through to inflation expectations. The "exempting" of price shocks due to indirect tax changes has meant that the CNB in its forecasts monitors the fulfilment of the inflation target for "monetary policy-relevant inflation", which abstracts from such changes to indirect taxes (e. g. excise duties on tobacco products). Recently, an escape clause was also applied to the first-round domestic price effects of the global oil price shock.

The CNB is – according to international rankings – currently one of the most open and transparent central banks in the world. The vast majority of the information that enters its decision-making is disclosed with minimal delays.

## NOTES

<sup>1</sup> Annex 1 provides some details on economic and monetary developments in late 1990s and early 2000s. Annex 2 summarizes major features of the inflation targeting regime within which the CNB has been conducting its monetary policy since 1998.

<sup>2</sup> For a detailed analysis of the Czech fiscal policy in this period see Ambriško et al. (2012).

<sup>3</sup> Although the government debt recorded a significant increase, its ratio to GDP was only 30.1% in

2006, thanks to its relatively low starting level and fast growth of nominal GDP.

- <sup>4</sup> In March 2007 the CNB announced a new 2% target, which has been effected since 2010 – see Annex 2.
- <sup>5</sup> As a matter of fact, domestic exporting companies started to complain loudly about negative impacts of firming currency on their businesses and intensified their calls for quick euro adoption.
- <sup>6</sup> With the benefit of hindsight, one can argue that in 2006–2008 the economy was getting overheated and there were some risks for financial stability building up, e.g. in terms of growing real estate prices. Nonetheless, the extent of these phenomena was rather limited. All in all (as described in detail further), the Czech economy has not undergone any financial crisis but it “only” suffered – due to its high openness – from an imported deep economic recession.
- <sup>7</sup> Foreign currency loans are used by corporations as a form of natural hedging against exchange rate risk.
- <sup>8</sup> The Czech banking sector had been – unlike many other countries in the region – in a positive net external position.
- <sup>9</sup> Temporary factors, such as increases in indirect taxes and high commodity prices contributed to the overshooting of the target, though (see section 1). But core inflation had been gradually increasing, too.
- <sup>10</sup> The CNB’s Inflation Report III/2008 identified these financial factors as follows: “*The main cause of the appreciation of the koruna was foreign short-term investors’ persisting interest in koruna assets, which, at a time of uncertainty in the financial markets, are regarded as a safe investment. The appreciation of the Czech koruna was also fostered by a sharp appreciation of the Slovak koruna in response to the revaluation of its central rate in ERM II and the recommendation to admit Slovakia into the euro area.*”
- <sup>11</sup> The only year, when fiscal policy was countercyclical after the burst of the global economic crisis, was 2009. The government in February 2009 approved an anti-crisis fiscal package that most importantly cut the social security contributions paid by enterprises and the corporate income tax rate, broadened the VAT deduction on personal vehicles, increased infrastructure expenditures and provided guarantees to SMEs. The total impact of this anti-crisis package is estimated at about 0.9–1.5 % of GDP (see Ambriško et al, 2012; and “*An analysis of the impacts of fiscal measures in the Czech Republic in 2001–2011*”, Box 3 in the CNB’s Inflation Report I/2012).
- <sup>12</sup> Simultaneously, the Czech government had to comply with provisions of the corrective arm of the EU Stability and Growth Pact as the Excessive Deficit Procedure (EDP) was opened against the Czech Republic soon after the crisis had hit the economy.
- <sup>13</sup> Government’s fiscal stance is defined by means of the so called fiscal impulse. It is defined as a contribution of a fiscal *discretion* of the government to annual real GDP growth. The estimates are based on the CNB’s internal calculations.
- <sup>14</sup> Laying off employees in a reaction to the ongoing recession started to dominate over hours-of-work adjustment only from the beginning of 2010. Compared with previous recessions in the Czech Republic, the labour market became more flexible in terms of trying to avoid reducing employment, while relying more extensively on reducing hours of work as a shock absorber. This new strategy was motivated by the firm’s attempt to preserve well-balanced teams with highly qualified staff and helped by the subsidised reduction of working hours introduced by the Czech government.
- <sup>15</sup> Adjusted for wage optimisation effects at the turn of 2012/2013 due to anticipated tax changes.

- <sup>16</sup> “*Wageless recovery*“, keeping inflation pressures subdued, was a problem for many central banks, complicating the task of keeping inflation close to the inflation target (see e.g. Calvo, et al., 2012).
- <sup>17</sup> Due to a fast disinflation after the introduction of inflation targeting in the Czech Republic in 1998, Czech interest rates had reached soon levels close to those prevailing in most industrialized European countries. There had been, therefore, no motivation for Czech households to finance their mortgages by foreign currency denominated loans (see section 1).
- <sup>18</sup> The austerity measures implemented by the government were communicated in a way that led to an increase of precautionary savings and postponement of consumption and investment (spending deferral).
- <sup>19</sup> Low energy prices contributed to the acceleration of economic growth by at least 1p.p. in 2015, based on the estimates of the CNB. See section II.4.1 in the CNB’s Inflation Report I/2015.
- <sup>20</sup> Price changes in other segments within the CPI (regulated prices, food prices, etc.) were positive for the whole period of 2010–2013, though with diminishing contribution to inflation. Indirect tax changes, implemented within the fiscal consolidation programme, contributed positively to headline inflation, but at the same time they had a dampening effect on consumer demand.
- <sup>21</sup> The CNB made no interventions in the foreign exchange market between autumn 2002 and November 2013. See Geršl and Holub (2006) or Égert and Komárek (2006) for an analysis of the earlier FX intervention episodes.
- <sup>22</sup> See Franta, et al. (2014) for a detailed analysis of the situation before this policy decision. Two scenarios of passive monetary policy in Figure 16 below show that with no monetary policy action the Czech inflation was expected to turn negative for at least 2–3 quarters in 2014. At the same time, the economic recovery would be only very anaemic in 2014. Moreover, the CNB viewed a considerable risk of getting trapped in a much longer-lasting deflation with significantly adverse consequences for the real economy, if there were to be some further anti-inflationary shocks and/or if the Czech inflation would become unanchored (Franta, et al., 2014). With the benefit of hindsight, these concerns were indeed justified.
- <sup>23</sup> “For example, the use of pre-announced interventions of fixed sizes per period would be a good candidate in terms of market communication and ease of exit, while allowing sufficient flexibility to adjust as needed.”
- <sup>24</sup> The extent of the needed further monetary policy easing was at that time estimated to broadly correspond with hypothetical four “standard” nominal interest rates cuts each amounting of 0.25 p.p. (so-called “four missing cuts”). Exchange rate depreciation served as a substitute for this undeliverable interest rates reaction.
- <sup>25</sup> The inspiration was the algorithm contained in Holden and Paetz (2012).
- <sup>26</sup> The exchange rate got temporarily even above CZK/EUR 28 in January 2015, but this depreciation was partly corrected by the CNB’s own communication, which classified the drop in global prices as a favourable supply-side shock, which required no further monetary policy easing. The CNB has emphasised that a move of the exchange rate commitment to an even weaker level would be warranted only “if there were to be a long-term increase in deflation pressures capable of causing a slump in domestic demand, renewed risks of deflation in the Czech economy and a systematic decrease in inflation expectations.”
- <sup>27</sup> In the years under scrutiny, the share of exports to GDP reached almost 80 % of GDP with 25% of CPI basket being directly imported from abroad and volatile items (food, fuels) accounting for almost 30% of the CPI basket.

- <sup>28</sup> In 2002, the experience with the inappropriately appreciating exchange rate led the CNB and the Czech government to agree on the *Strategy for Dealing with the Exchange Rate Effects of Capital Inflows from Privatisation of State Property and from Other Foreign Exchange Revenues of the State*. This strategy said *inter alia* that foreign exchange resources of the government (both the existing resources and those acquired in the future) would be purchased directly from the state by the CNB's so that the foreign exchange market and the koruna exchange rate would not be influenced. For further details on CNB's FX interventions in this period see Geršl and Holub (2006) or Ěgert and Komárek (2006).
- <sup>29</sup> Sterilized massive inflows of foreign capital (especially FDI and sales of state-owned property) from 1990s and early 2000s is a source of a long-term liquidity surplus that the Czech banking sector has been exhibiting since then.
- <sup>30</sup> At that time, the CNB target had been set (since 2002) already for headline inflation taking a form of continuously declining targeted band, which was 2 percentage points wide.
- <sup>31</sup> Detailed CNB's analyses and views concerning the frequent undershooting of its targets can be found in Šmídková, ed. (2008).
- <sup>32</sup> Multinational companies considered the Czech Republic to be a suitable destination for their foreign affiliates focusing on country's comparative advantage in terms of input prices, favourable geographical location, government investment incentives and promotion of FDI and limited economic vulnerability.
- <sup>33</sup> Without prejudice to this primary objective, the Act also requires the CNB to support the general economic policies of the Government leading to sustainable economic growth. Recently, the CNB legal mandate has been enriched by including that the CNB fosters financial stability and sees to the sound operation of the financial system in the Czech Republic. To this end, the CNB sets macro-prudential policy by identifying risks jeopardising the stability of the financial system and contributing to its resilience.

## LITERATURE

- AMBRIŠKO, R. – AUGUSTA, V. – HÁJKOVÁ, D. – KRÁL, P. – NETUŠILOVÁ, P. – ŘÍKOVSKÝ, M. – SOUKUP, P. (2012): "Fiscal Discretion in the Czech Republic in 2001–2011: Has It Been Stabilizing?" CNB Research and Policy Note, No. 2012/1.
- ALICHI, A. – J. BENES, J. FELMAN – I. FENG – C. FREEDMAN – D. LAXTON – E. TANNER – D. VAVRA – F. ZHANG (2015): "Frontiers of Monetary Policymaking: Adding the Exchange Rate as a Tool to Combat Deflationary Risks in the Czech Republic." IMF Working Paper No. 15/74.
- BABECKÁ KUCHARČUKOVÁ – O., M. FRANTA – D. HÁJKOVÁ – P. KRÁL – I. KUBICOVÁ – A. PODPIERA – B. SAXA (2013): "What We Know About Monetary Policy Transmission in the Czech Republic: Collection of Empirical Results." CNB Research and Policy Note, No. 1/2013.
- BRŮHA J (2011): "Retail Credit Premiums and Macroeconomic Developments." Thematic Article 4. CNB Financial Stability Report, 2010/2011, pp. 133–140.
- CALVO, G.A. – F. CORICELLI – P. OTTONELLO (2012): "Labor Market, Financial Crises and Inflation: Jobless and Wageless Recoveries," NBER Working Paper, No. 18480.
- CHRISTIANO L. – TRABANDT M – WALENTIN K (2011): "Introducing Financial Frictions and Unemployment into a Small Open Economy Model." Jour-

nal of Economic Dynamics and Control, 35:1999–2041.

ÉGERT, B. – L. KOMÁREK (2006): “Foreign Exchange Interventions and Interest Rate Policy in the Czech Republic: Hand in glove?” *Economic Systems*, vol. 30, iss. 2, pp. 121–140.

FRANTA, M. – T. HOLUB – P. KRÁL – I. KUBICOVÁ – K. ŠMÍDKOVÁ – B. VAŠÍČEK (2014): “The Exchange Rate as an Instrument at Zero Interest Rates: The Case of the Czech Republic,” CNB Research and Policy Notes, No. 3/2014.

GERŠL, A. – T. HOLUB (2006): “Foreign Exchange Interventions under Inflation Targeting: the Czech Experience.” *Contemporary Economic Policy* 24(4), pp. 475–491.

HOLDEN, T. – M. PAETZ (2012): “Efficient Simulation of DSGE Models with Inequality Constraints.” School of Economics Discussion

Papers 1612, School of Economics, University of Surrey.

RYŠÁNEK, R. – Tonner, J. – TVRZ, S. – VAŠÍČEK, O., (2012): “Monetary Policy Implications of Financial Frictions in the Czech Republic,” *Czech Journal of Economics and Finance (Finance a úvěr)*, Charles University Prague, Faculty of Social Sciences, vol. 62(5), pages 413–429, November.

SVENSSON, L.E.O. (2001): “The Zero Bound in an Open Economy: A Foolproof Way of Escaping from a Liquidity Trap.” *Monetary and Economic Studies* 19(S–1), pp. 277–312.

ŠMÍDKOVÁ, K. (ed.) (2008): “Evaluation of the Fulfilment of the CNB’s Inflation Targets 1998– 2007.” Czech National Bank, ISBN 978–80–87225–11–0.

IMF (2013): “Czech Republic 2013 Article IV Consultation.” International Monetary Fund, Country Report No. 13/242 (August).