Czech Economic Outlook and Consistency of FX Interventions with Inflation Targeting

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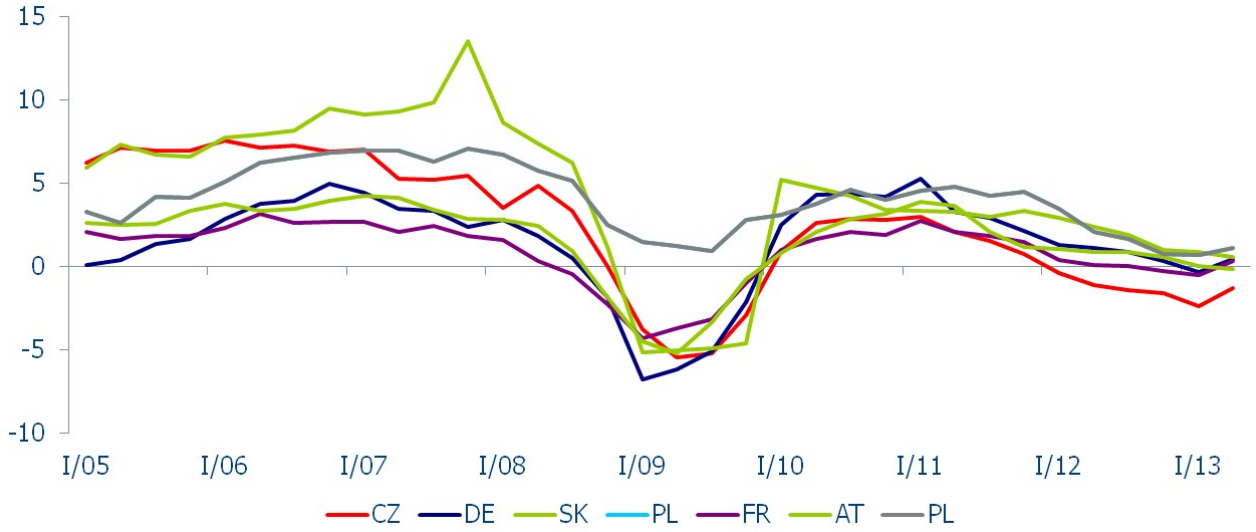
- Through *monetary policy* we seek to preserve price stability, i.e. low and stable inflation.
- Through *macroprudential policy* we foster financial stability and resilience of the financial system, which are necessary conditions for the maintenance of price stability.
- Through the joint action of monetary policy and macroprudential policy, we contribute to maintaining confidence in the value of the Czech koruna and safeguarding the stability of the macroeconomic environment.

- By *supervising the financial market and creating prudential rules and rules of conduct towards clients* we protect the clients of persons and institutions carrying on business on the financial market.
- By *managing the interbank payment system and issuing banknotes and coins we* ensure smooth payments and cash circulation.
- As the *bank of the state*, we provide banking services to the state and the public sector.
- *In line with our primary objective, we manage international reserves with professional care.*
- We are a *part of the European System of Central Banks* and contribute to the fulfilment of the ESCB's objectives and tasks.

The impact of the Eurozone's growth on the CR

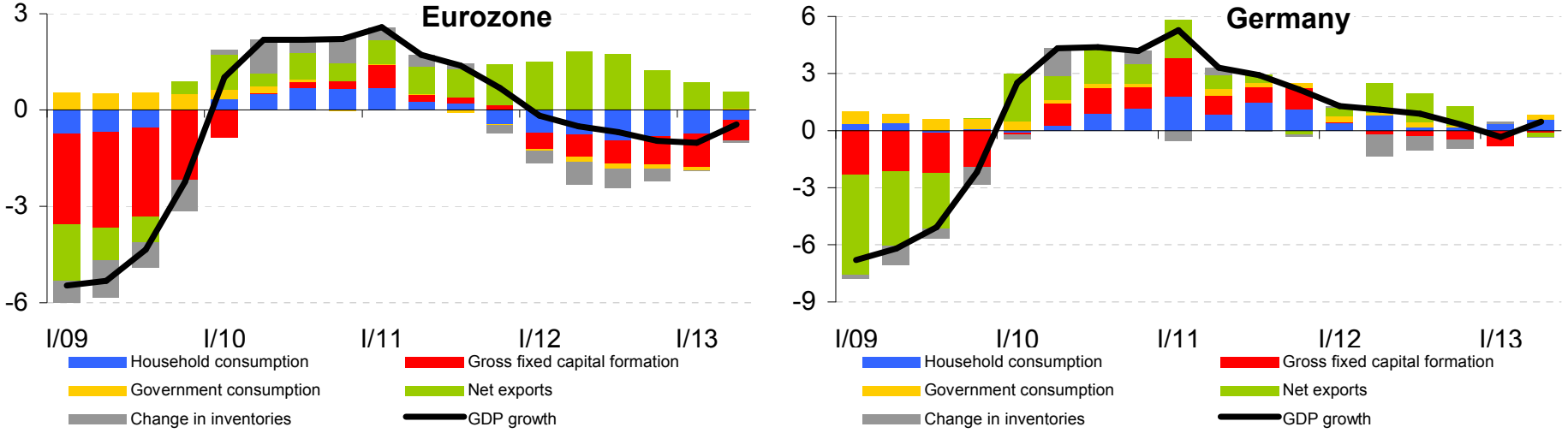
Year-on-year GDP growth in the CR and its main trading partners



- Since the outbreak of the global and later the European debt crisis is the development of the Czech economic activity closely related to foreign demand.
- Since 2012 weak domestic demand plays a substantial role as well.

GDP growth in Germany and the Eurozone

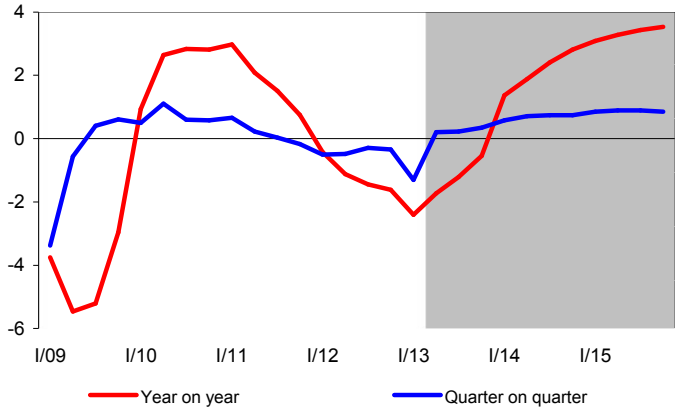
Contributions of individual components to annual changes of GDP growth (in p.p, seasonally adjusted)



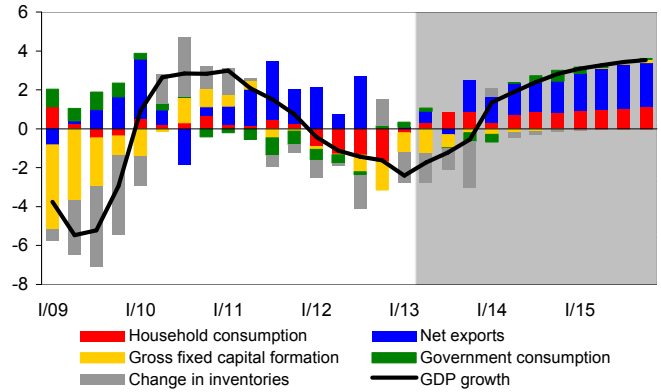
- Development in 2013 2Q shows signs of improvement.
- Germany can more rely on its domestic demand compared to the rest of the Eurozone; net exports in particular constitute a positive contribution to GDP growth in a number of countries.

GDP growth forecast

GDP growth forecast
GDP will decline overall this year, but should start to grow at a gradually rising pace in quarter on quarter terms (percentage changes; seasonally adjusted)



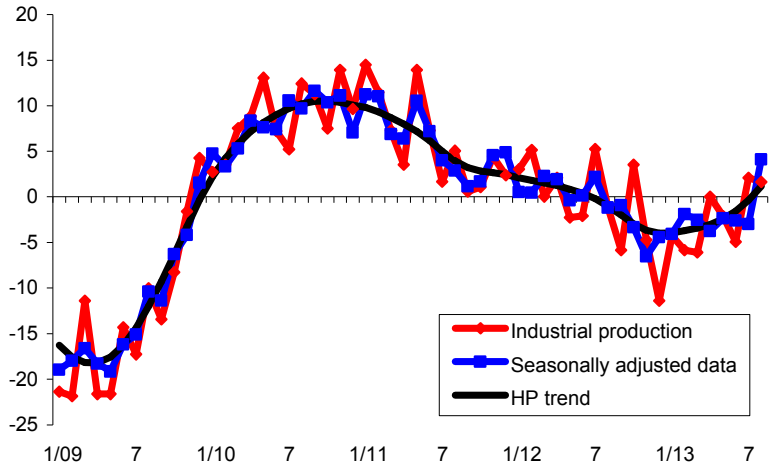
Annual GDP growth structure
Gross capital formation will make a strongly negative contribution to GDP growth this year, while net exports and household consumption will make small positive contributions (annual % changes; contributions in percentage points; seasonally adjusted)



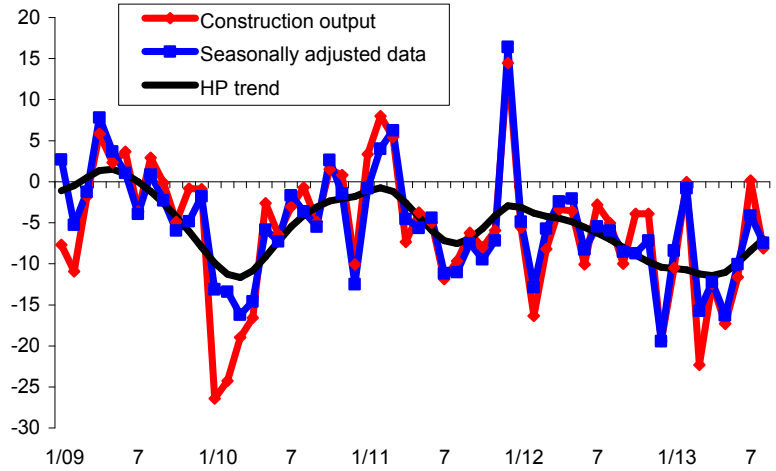
- Real GDP recorded a year-on-year decline of 2.4%. The decline was fostered mainly by gross capital formation.
- In 2013, real economic activity will drop by 1.5% overall due to still restrictive domestic fiscal policy and an only gradual recovery in external demand. The strongly negative contribution of gross capital formation will outweigh the slowly growing household consumption and net exports.
- In 2014, the recovery of foreign trading partners, i.e. the net exports, will be the major contributor to the GDP growth (by 2.1%).

Development of industry and construction

Industrial production
(constant prices, annual percentage changes)

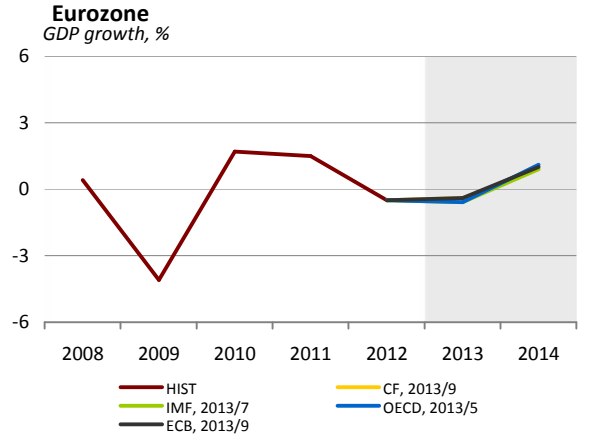


Construction output
(constant prices, annual percentage changes)

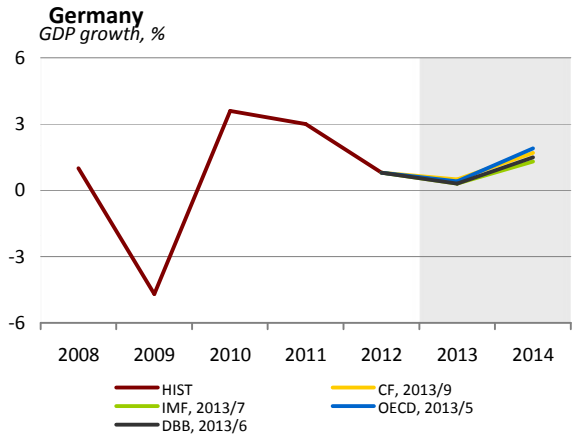


- Industrial production shows signs of recovery, growth mainly in orders from abroad (domestic orders only slightly).
- Situation in construction persistently subdued.

GDP growth outlook in the Eurozone and Germany



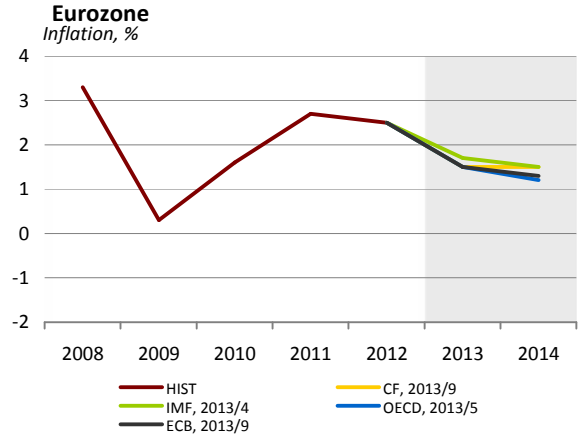
	CF	IMF	OECD	ECB
2013	-0.4	-0.6	-0.6	-0.4
2014	0.9	0.9	1.1	1.0



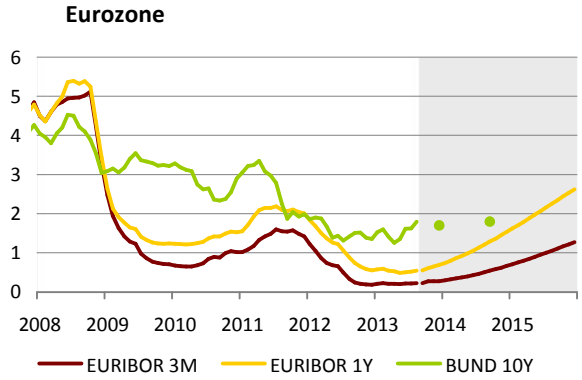
	CF	IMF	OECD	DBB
2013	0.5	0.3	0.4	0.3
2014	1.7	1.3	1.9	1.5

- According to the ECB, the euro area's return to growth will be supported by gradually rising domestic demand thanks to the positive effect of lower commodity price inflation on real income and to easy monetary policy.
- In the longer term, domestic demand in the euro area should be supported by less restrictive fiscal policy and stronger loan supply. Net exports should also contribute positively to overall economic growth, although their contribution to GDP growth will decrease over time.
- Germany, one of our main trading partners, should grow by 0.5% this year, and by 1.7% in 2014. Also our other main trading partners are in a slightly better position than the Eurozone as a whole.

Inflation and interest rates outlook in the Eurozone



	CF	IMF	OECD	ECB
2013	1.5	1.7	1.5	1.5
2014	1.5	1.5	1.2	1.3



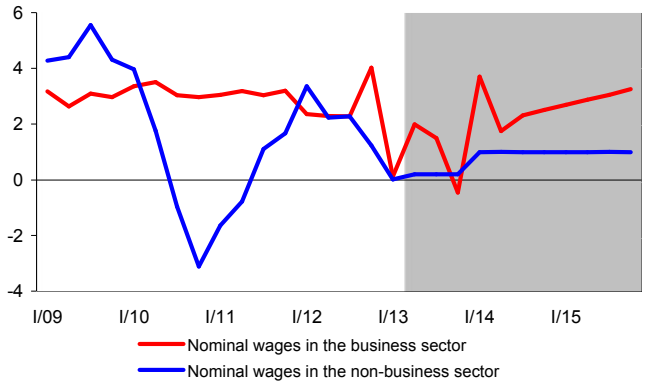
	08/13	09/13	06/14	12/14	06/15	12/15
3M EURIBOR	0.23	0.23	0.43	0.66	0.95	1.27
1Y EURIBOR	0.54	0.55	1.06	1.53	2.07	2.63

	08/13	09/13	12/13	09/14
10Y Bund	1.80		1.7	1.8

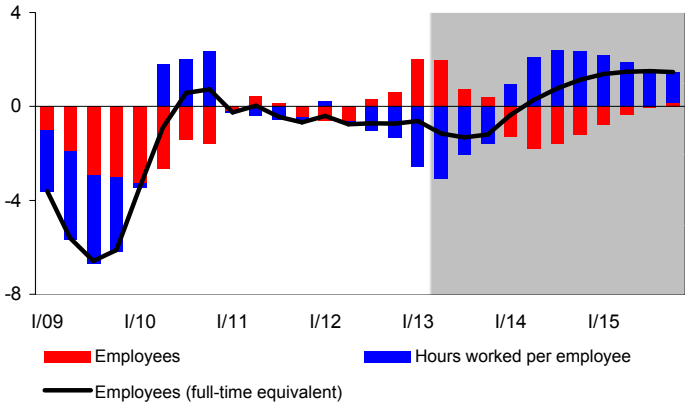
- The outlook of low annual inflation still reflects the slowdown in energy commodity prices and the appreciation of the euro in 2013 H1. The ECB's new inflation outlooks expect a falling trend in oil prices over the entire horizon. Consumer prices can be expected to rise only modestly for now, partly because of weak domestic demand.
- After announcing "forward guidance" in July, the ECB even discussed the possibility of a rate cut, despite signs of a recovery in the euro area. The forward guidance was aimed at reducing volatility and limiting strong market reactions to positive news from the economy.

Labor market forecast

Average nominal wage
Wage growth will be low but volatile due to tax optimisation and will not start to rise until mid-2014
(annual percentage changes; business sector – seasonally adjusted; non-business sector – seasonally unadjusted)



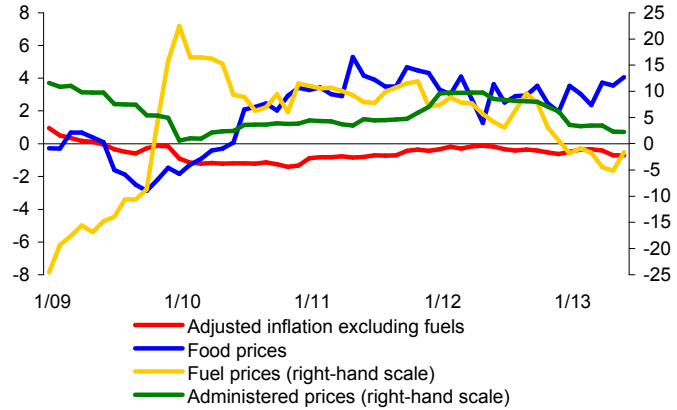
Number of employees (full-time equivalent)
The converted number of employees will start to rise in mid-2014 as the economy recovers
(annual percentage changes; contributions in percentage points)



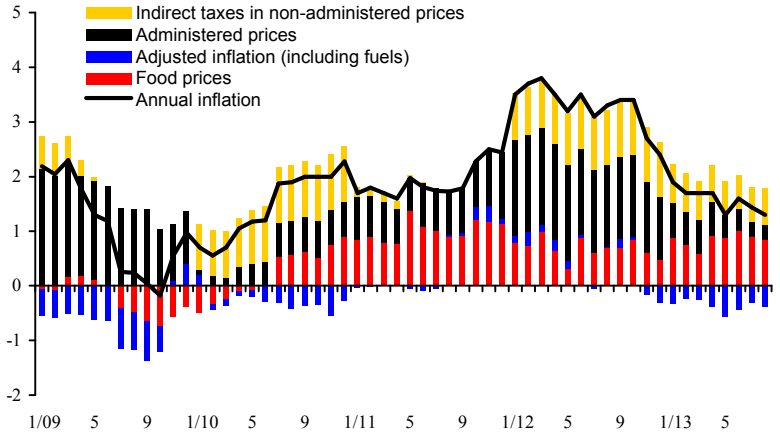
- The average nominal wage in the business sector was volatile in late 2012 and early 2013 due to a time shift in wages caused by tax optimization related to the abolition of the cap on health insurance and additional taxation of higher income at the start of 2013 (the impact estimated to 2 p.p.).
- The wage growth (adjusted for the fluctuations) will stay roughly at 2% until mid-2014, and then will start to speed up.
- Total employment is increasing but hours worked per employee are going down. From the beginning of 2014 we expect opposite development. General unemployment rate around 8% in 2014.

Inflation forecast

Inflation components
Administered prices and adjusted inflation excluding fuels contributed to the decrease in inflation
(annual percentage changes; excluding indirect tax changes)



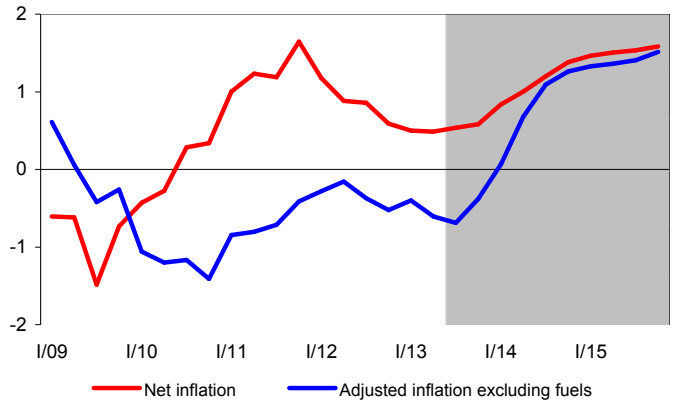
Structure of inflation
(in %, contributions in p.p)



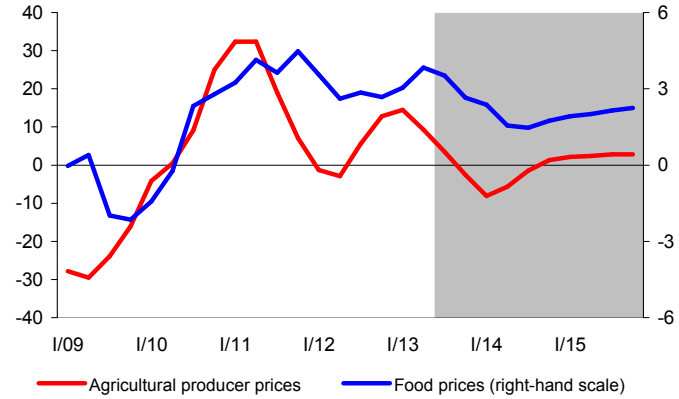
- Food prices remain a source of inflation, while the contribution of tax changes and administered prices has decreased. Negative adjusted inflation excluding fuels continues to reflect the strongly anti-inflationary effect of the domestic economy, whereas a weaker exchange rate of the koruna is acting in the opposite direction via import prices.
- Inflationary pressures will re-emerge only slowly over the forecast horizon, with import prices contributing to rising costs this year in particular.

Inflation forecast

Net inflation and adjusted inflation excluding fuels
Adjusted inflation excluding fuels will turn positive at the start of 2014 and then increase further
(year on year in %)



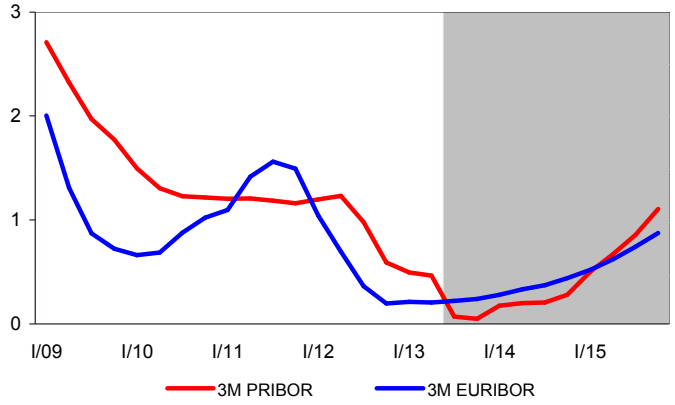
Food prices and agricultural producer prices
Food price inflation will slow until mid-2014 in line with agricultural producer price inflation
(annual percentage changes)



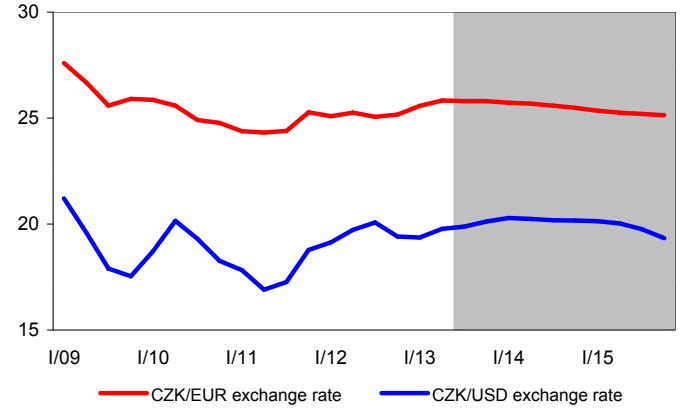
- The anti-inflationary domestic pressures will subside only slowly and developments in the Czech economy will start to push prices slightly upwards in 2014. The inflationary effect of import prices will weaken next year as the exchange rate gradually appreciates, but this will be more than offset by a recovery in the domestic economy.
- Food price inflation will slow until mid-2014, mainly due to a markedly better expected harvest of the main crops compared to last year both in the Czech Republic and abroad.

Interest rates and exchange rate forecast

Interest rate forecast
Consistent with the forecastis a decline in market interest rates to zero, followed by a noticeable rise in rates only in 2015
(3M PRIBOR and 3M EURIBOR in %)



Exchange rate forecast
The exchange rate ofthe koruna against the euro weakened and will appreciate only very slowly over the forecast horizon
(CZK/EUR and CZK/USD)

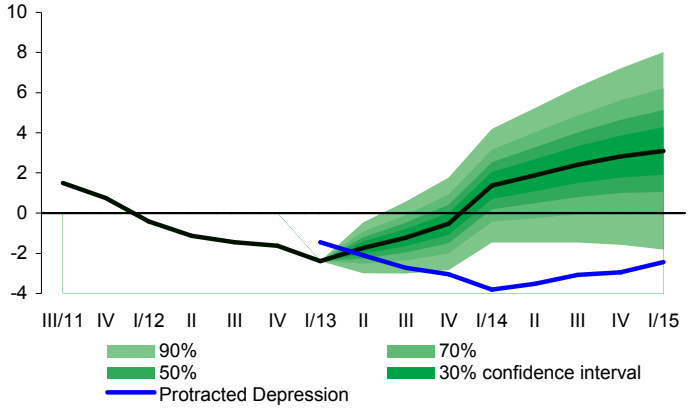


- Consistent with the forecast is a decline in market interest rates to zero, followed by a noticeable rise in rates only in 2015.
- Given the zero lower bound on monetary policy rates, this points to a need to ease monetary policy using other instruments.
- The koruna against the euro on average 25.8 CZK/EUR. Very slow appreciation of the exchange rate over the forecast horizon to CZK 25.1 against the euro at the end of 2015.

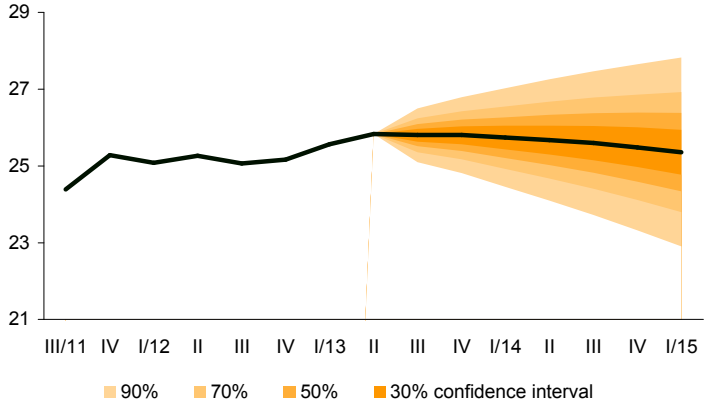
The latest CNB forecast + stress tests (May)

GDP growth forecast + stress scenario "Protracted Depression"
GDP will decline this year overall, but will gradually start to recover

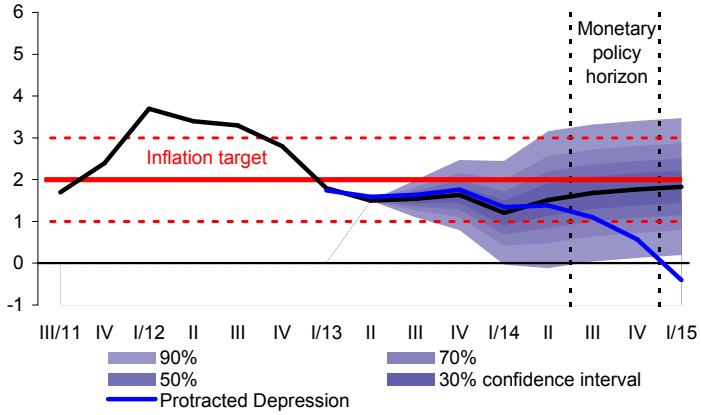
(annual percentage changes; seasonally adjusted)



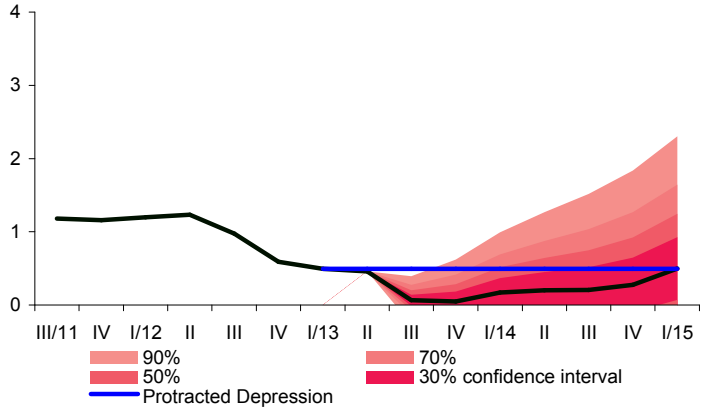
Exchange rate forecast
The nominal exchange rate has weakened and will appreciate only very slowly over the forecast horizon
(CZK/EUR)



Headline inflation forecast + stress scenario "Protracted Depres
Headline inflation will be below the CNB's 2% target this year despite an increase in indirect taxes; after declining further in early 2014 it will rise steadily (year on year in %)



Interest rate forecast + stress scenario "Protracted Depression"
Consistent with the forecast is a decline in market interest rates to zero, followed by a noticeable rise in rates only in 2015
(3M PRIBOR in %)

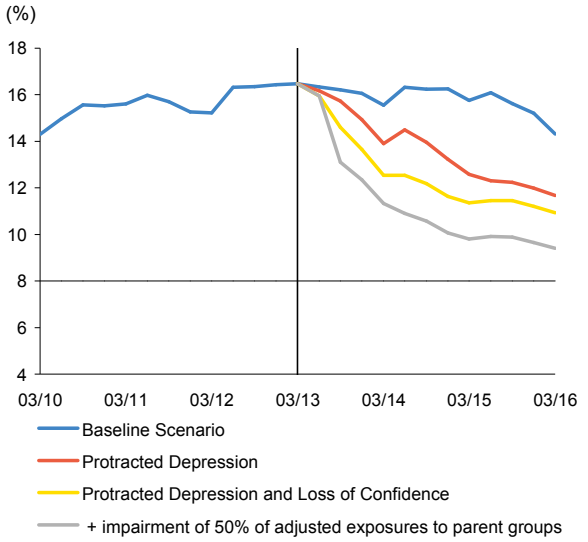


The primary goal of monetary policy is price stability!

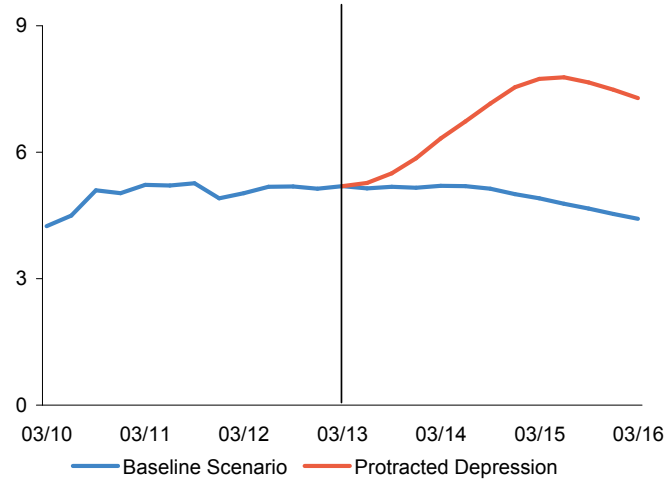
Stress test results from May 2013

- The stress tests showed that the banking sector has sufficient capital to absorb negative shocks and maintain an overall capital adequacy ratio well above the 8% regulatory threshold in all the assumed alternative adverse scenarios.
- Insurance companies and pension funds also passed the stress tests, mainly thanks to their high level of capital.

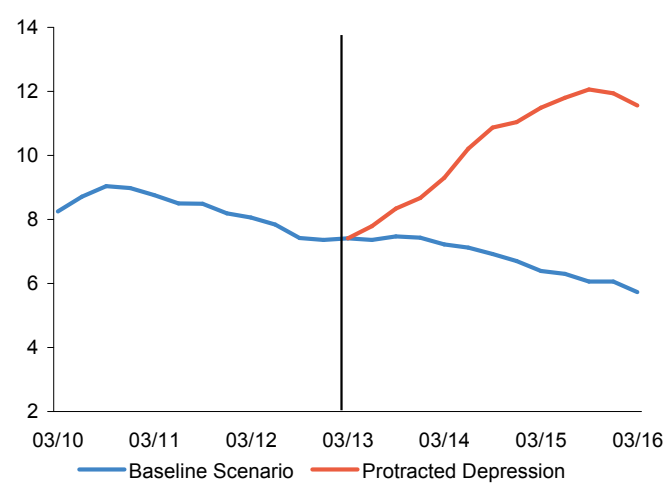
Capital adequacy ratios depending on scenarios



NPL ratio for bank loans in the household segment



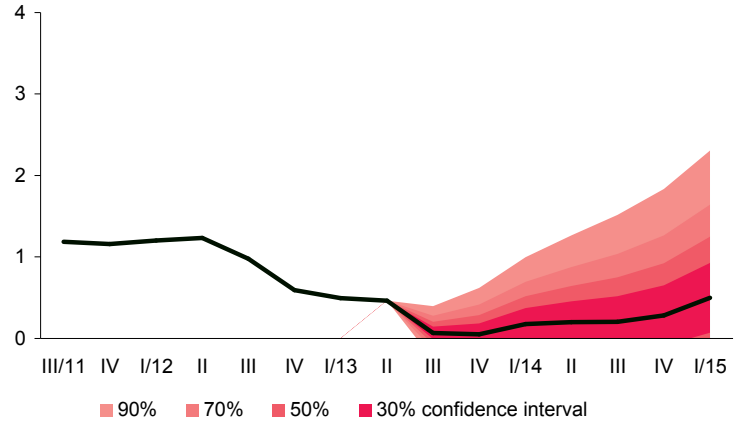
NPL ratio for bank loans in the non-financial corporations sector



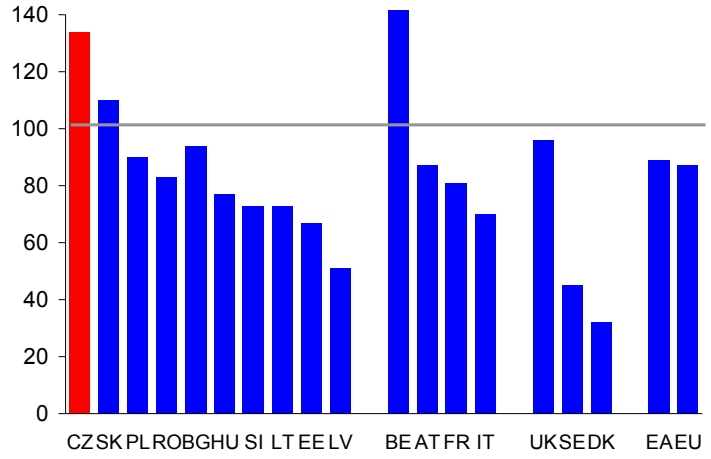
(Un)conventional monetary policy tools

- Central banks face the limits of the standard monetary policy instrument due to long-lasting stagnation.
- Turned their attention to various unconventional MP measures – negative interest rates, liquidity provision (QE), FX interventions.
- Most economies have been hit by liquidity crisis and subsequent credit crunch, but Czech financial system has abundance of liquidity.
  - Ratio of deposits to loans above EU average, total deposits exceed total loans.
  - Excess liquidity absorbed by the CNB using repo tenders.

Interest rate forecast
Consistent with the forecast is a decline in market interest rates to zero, followed by a noticeable rise in rates only in 2015
(3M PRIBOR in %)



Ratio of deposits to loans granted in selected EU countries
(%; end of 2011; deposits/loans to residents)

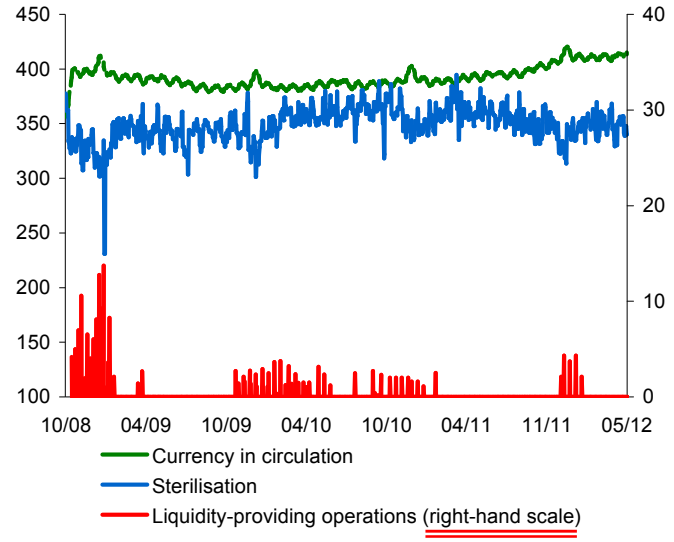


Source: CNB Inflation Report III/2013; ECB

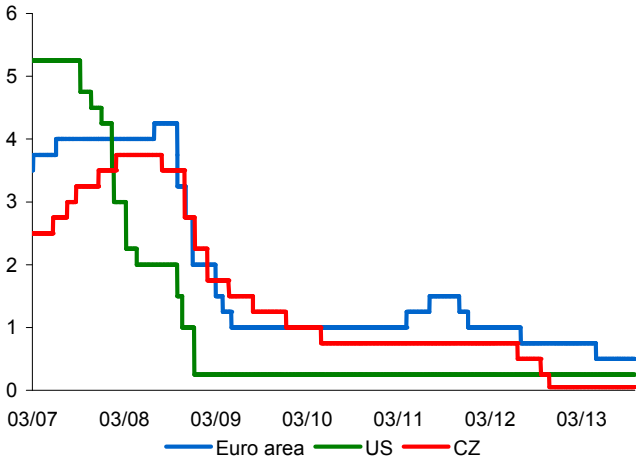
(Un)conventional monetary policy tools

- In 2008, the CNB introduced liquidity-providing repo operations, but they were used very rarely.
- Experience with negative deposit interest rates is very limited, the consequences in general very unclear.
  - Also potential legal complications with negative rate (penalty interest bound in multiplicative manner to the discount rate).
- Therefore, FX interventions selected by the Board as the most appropriate MP tool when interest rates hit zero.
- 2W repo rate lowered to 0.05 % on November 1, 2012.

Open market operations and currency in circulation
(CZK billions)



Monetary policy rates since the start of the financial turbulence (%)



Source: CNB

(Un)conventional monetary policy tools: Two views

- Trichet (2010): "There are two distinct views on non-standard measures."
  1. Continuation of standard policy by other means: Nominal rates hit zero, another tool needed to achieve price stability (= approach of Fed & view of the CNB).
  2. "At the ECB, we have a different view of our non-standard measures:" Interest rates used in a standard way to maintain price stability; non-standard measures help restoring a more effective transmission of monetary policy (in this particular case hampered by the financial crisis).

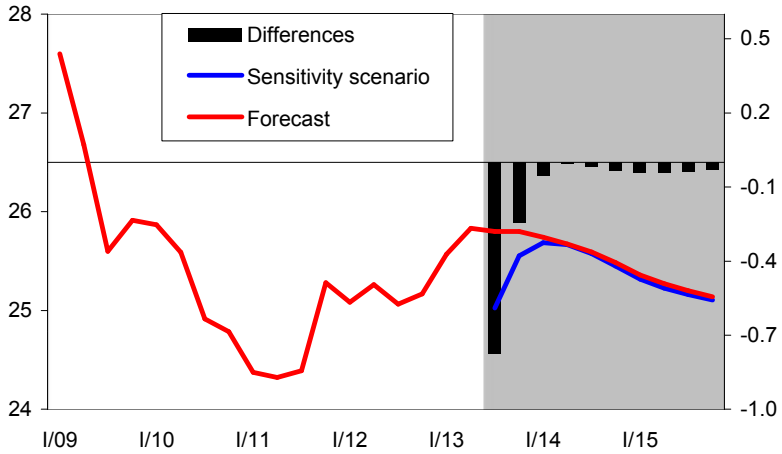
Trichet, J.-C. 2010. "Reflections on the Nature of Monetary Policy Non Standard Measures and Finance Theory." Speech at the ECB Central Banking Conference, Frankfurt, November 18, http://www.ecb.europa.eu/press/key/date/2010/html/sp101118.en.html

Compatibility of FX interventions and inflation targeting

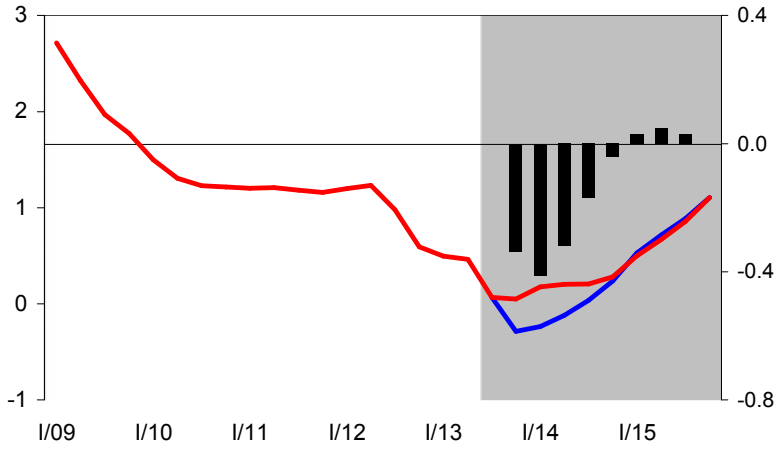
- Inflation targeting used by many central banks as the means of achieving and maintaining price stability (CNB since 1998).
- Under IT, the MP tool is the interest rate – exchange rate is an endogenous variable affecting inflation expectations.
- Are FX interventions compatible with IT? Leaving aside technical and procedural compatibilities, does influencing FX compromise the credibility and goals of the CB?
- MP implicitly reacts to exchange rate shocks under standard conditions:
  - An unexpected appreciation shock tightens the monetary conditions;
  - Interest rate is lowered to easy the conditions again.

The CNB's exchange rate sensitivity scenario (a 3% appreciation shock)

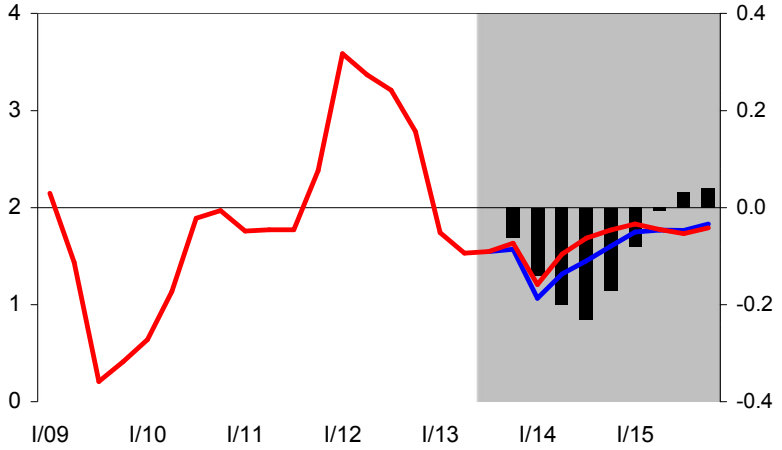
Exchange rate
(CZK/EUR; differences in CZK – right-hand scale)



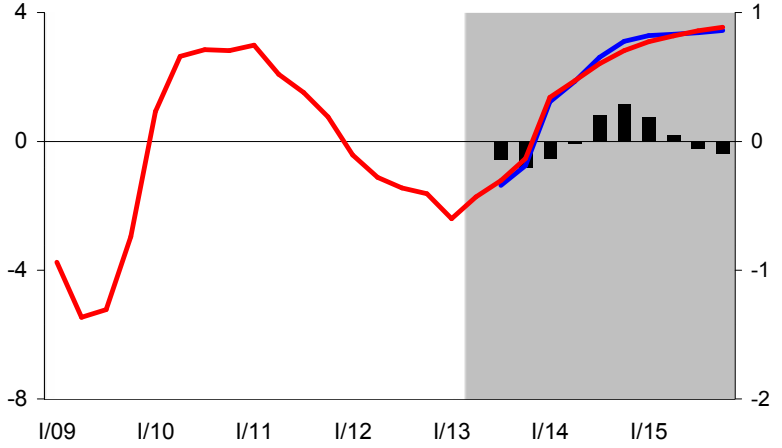
Interest rates
(3M PRIBOR in %; differences in pp – right-hand scale)



Headline inflation
(year on year in %; differences in pp – right-hand scale)



GDP growth
(annual percentage changes; differences in pp – right-hand scale)



Source: CNB Inflation Report III/2013

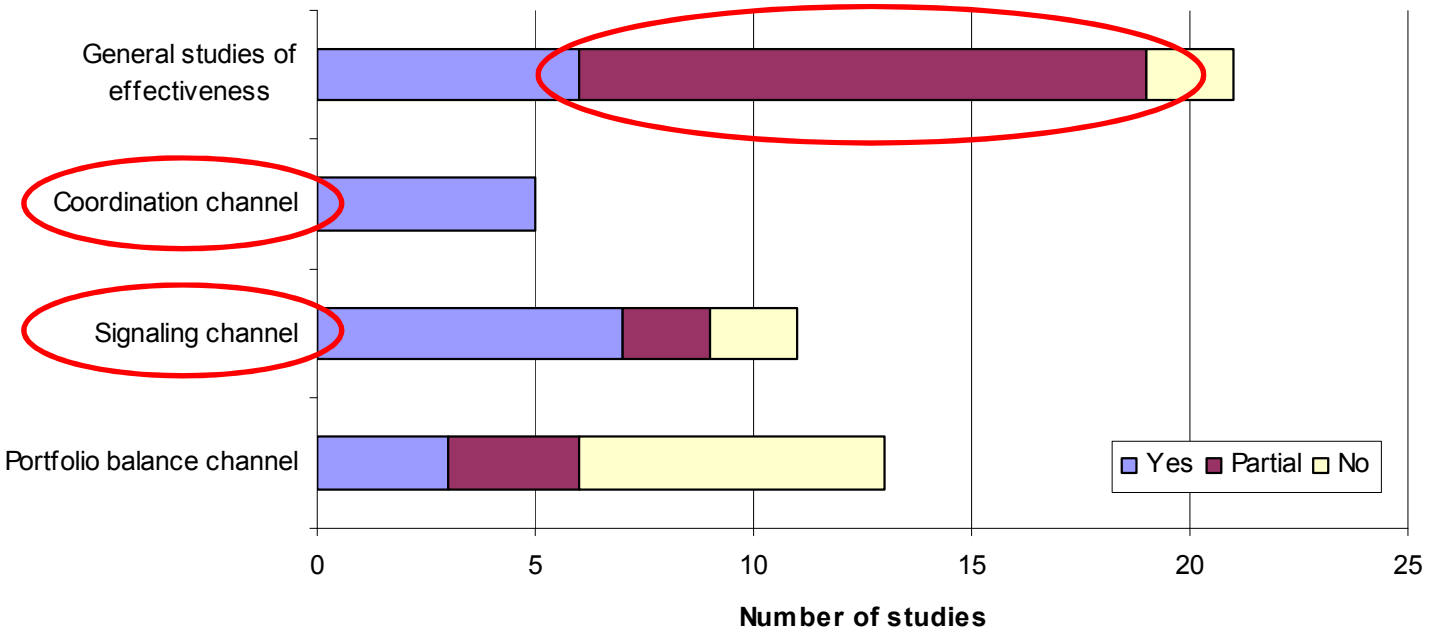
Compatibility of FX interventions and inflation targeting

CNB CZECH NATIONAL BANK

- According to the IMF's classification, independent floating dominates among IT countries (with 19 countries as of April 2008), but managed floating coexists with this regime, too (10 countries).
- Many of officially independent floaters do occasionally intervene, with interventions more common during the recent crisis: Brazil, Chile, Indonesia, Israel, Mexico, New Zealand, Poland, South Korea, Switzerland.
- The literature advocates freely floating exchange rate for IT regime but doesn't deal with situation when interest rates hit the zero lower bound (ZLB).
- FX interventions with (almost) zero interest rates: Switzerland & Japan (both independent floaters)

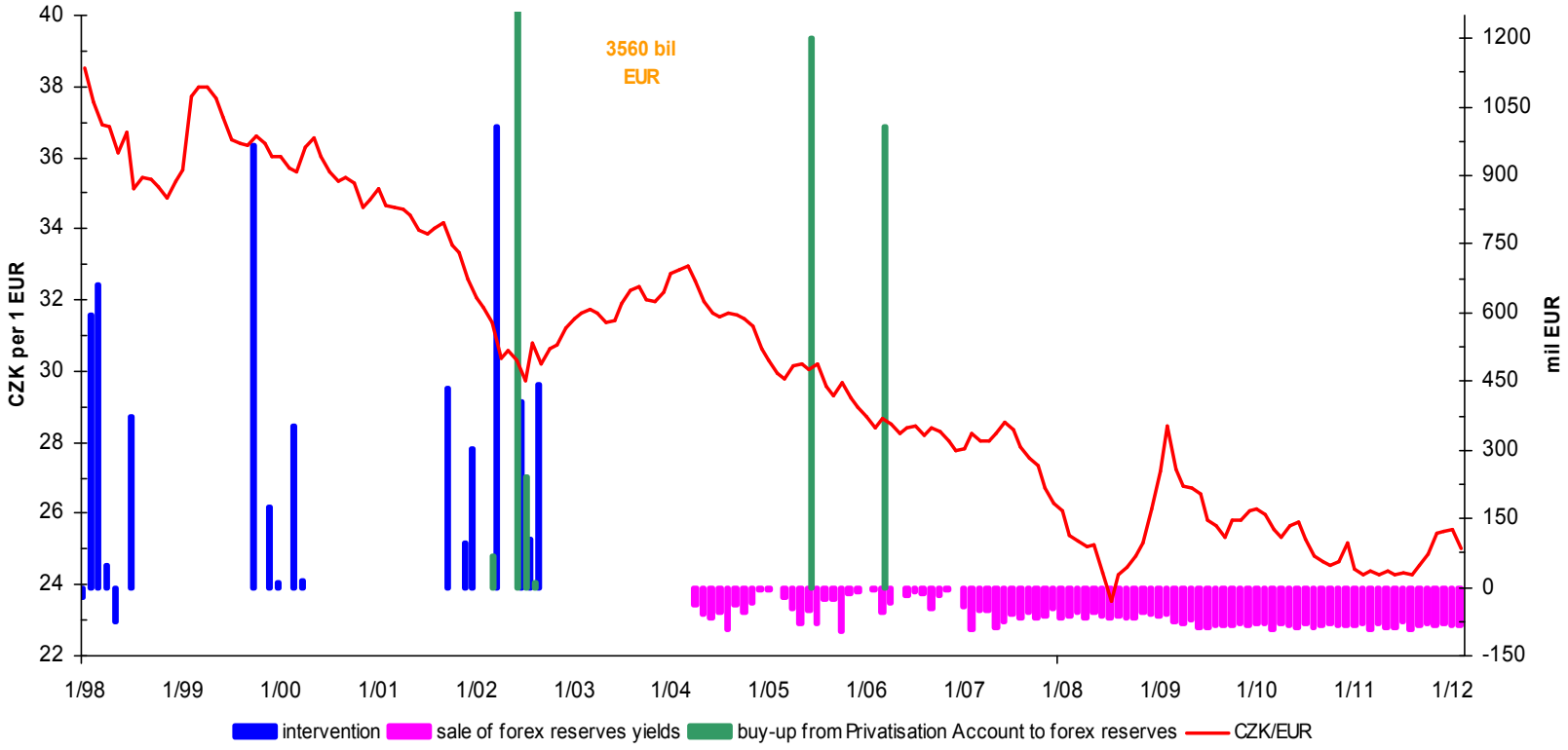
International experience with FX interventions

- In the situation of a zero lower bound, appreciation shocks cannot be accommodated by a standard interest rate cut to ease the monetary conditions.
- The implicit reaction of MP affects our ability to estimate the true effects of FX interventions.
- Do interventions work? Cavusoglu (2010): Evidence of longer term effect very limited; evidence on effectiveness in general is mixed.



Czech experience with FX interventions

- Intervention periods: February – July 1998, October 1999 – March 2000, October 2001 – September 2002
  - Evidence of effectiveness: studies identify small but statistically significant short-term effect in most cases.
- Selling yields on FX reserves also statistically significant effect.

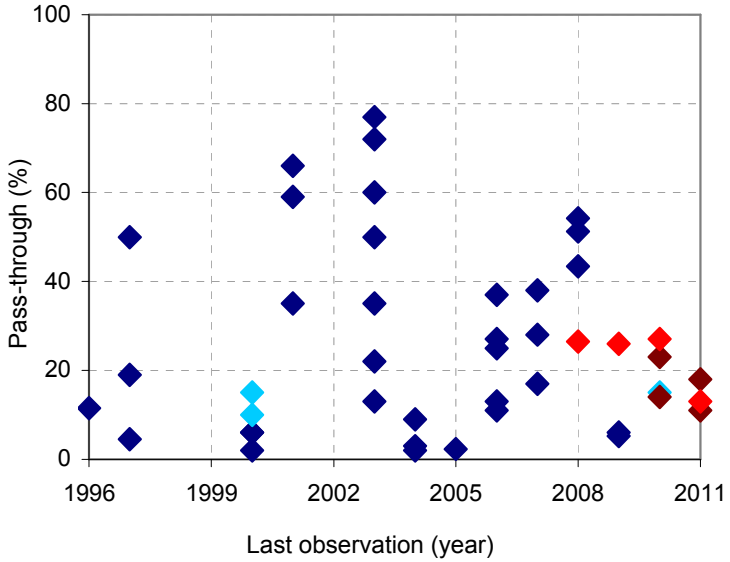


- Existing empirical evidence suggests that FX interventions have the ability to influence the exchange rate, but not necessarily in the long term.
- Fatum & Pedersen (2009): Sterilized FX interventions in Denmark have a significant influence on exchange rate returns when the direction of intervention is consistent with the MP stance.
  - This is the case when an FX shock is NOT accommodated but rather fueled by MP inactivity.
  - When the interest rate hits zero and can no longer be used or is insufficient to influence inflation expectations and achieve price stability, FX interventions become a viable option.

Exchange rate pass-through to consumer price inflation

- But how do exchange rate changes affect prices in the Czech Republic?
- Is the existing evidence of exchange rate pass-through relevant for FX interventions?
- The estimates of the transmission of an exchange rate shock to Czech inflation lie between 0% to 80%.
- In the standard inflation-targeting regime, a shock transmits:
  - directly through import prices;
  - indirectly through economic activity: real volumes of imports and exports -> wages -> employment;
  - moderated by reaction of interest rates: correction of nominal exchange rate & through real interest rates influences investment and private consumption

Exchange rate pass-through to Czech inflation based on a literature review



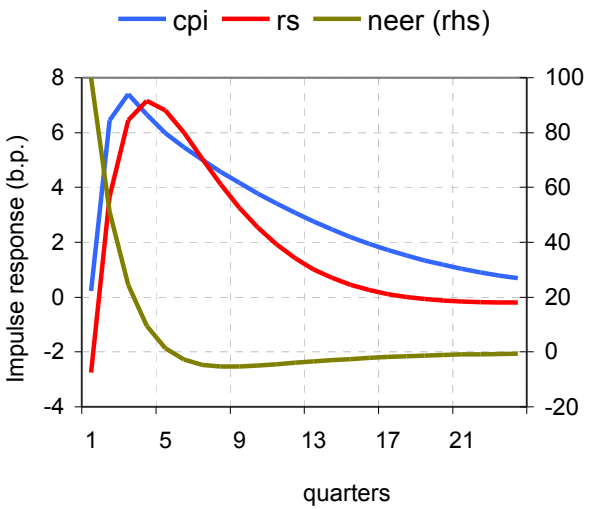
Note: The figure shows the reaction of consumer prices to an exchange rate shock of 1%. It summarizes 43 ERPT estimates for the Czech Republic collected from 22 papers and articles published in 2001–2012. Dark blue points represent time-invariant estimates. Light blue points are medians of time-varying estimates. Results based on the CNB RPN (forthcoming) are in dark red (VAR, VECM) or red (BVAR median and TVP-VAR for 2008Q1, 2009Q1 and 2010Q1).

Source: Hájková and Saxa (forthcoming 2013)

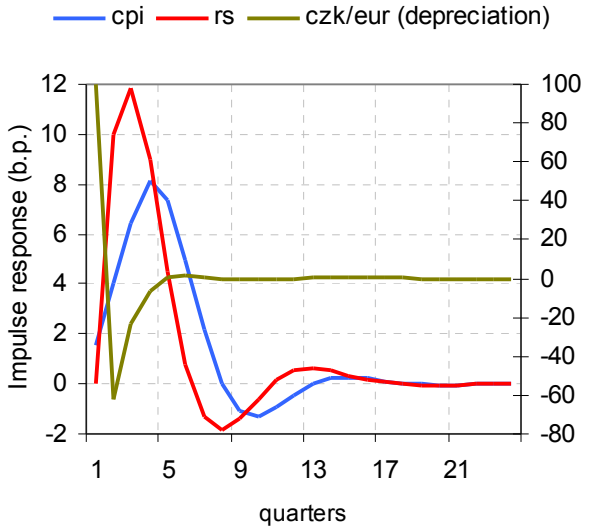
Exchange rate pass-through to consumer price inflation

- Impulse response based on a VAR model, quarterly data 1998Q1-2012Q3: pass-through of nearly 8%.
- Other recent estimates based on BVAR and TVP-VAR models lie between 13% and 26%.
- Impulse response based on the CNB's core DSGE forecasting model (g3) is similar to the empirical evidence.
- Reaction of consumer prices peak after about 4 quarters.
- Largest pass-through (over 50%) is observed for import prices; transmission to industrial producer prices and consumer inflation is an order of magnitude lower.

Impulse response of the CPI and the short-term interest rate to a Czech koruna depreciation of 1% (VAR model)



g3 model (CNB's core DSGE forecasting model)



Note: cpi = consumer price index; rs = 3M PRIBOR; neer = nominal effective exchange rate; czk/eur = nominal exchange rate

Source: Hájková and Saxa (forthcoming 2013); CNB

Influence of the zero lower bound on pass-through

- As rates approach the ZLB, the transmission of shocks to the economy may change.
- Bayesian fan charts (Franta et al. 2013):
  - Forecasts can be conditioned on shocks that lead to a non-negative nominal interest rate (Fig. 1).
  - Forecasts can be conditioned on the interest rate itself (regardless of shocks – influence on other vars).
  - ZLB can be ignored (Fig. 2): ex-post observed MP relevant inflation on the edge of the centered 95% of the distribution forecast; over-optimistic growth outlook.

Fig. 1: Shocks filtered (ZLB active)

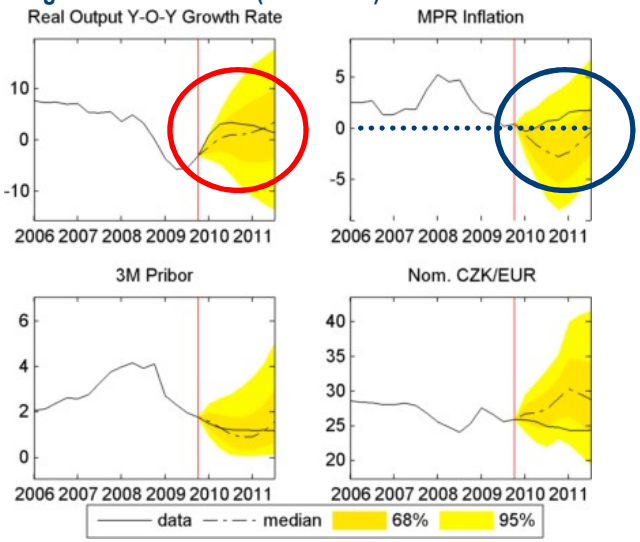
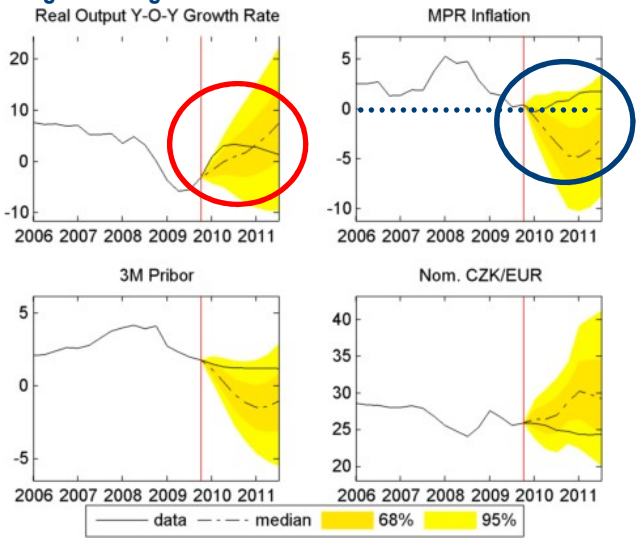


Fig. 2: ZLB ignored



Source: Franta et al. (2013)

Influence of the zero lower bound on pass-through

- In general, fixing one input or binding constraint leads to higher responsiveness (volatility) of the remaining variables.
- That is, when MP reacts transparently to an exchange rate shock, the pass-through to inflation is relatively small.
- But as the CB approaches the ZLB and interest rates can't counteract the shock, the transmission increases sizably depending on how long economic agents expect MP to operate in the ZLB regime:
  - Direct channel through import prices is stronger.
  - Indirectly through real interest rates and expectations about their future development: longer-term fixed nominal interest rates and increasing inflation push real interest rates down.
- Analogously, fiscal multipliers are higher in a ZLB regime (Gerchert & Will, 2012).

Concluding remarks

- Existing estimates of pass-through are not applicable in a situation of zero rates.
  - Pass-through at the ZLB can be several times larger than past estimates.
- FX interventions do not reduce the transparency and credibility of inflation targeting.
  - Targeted inflation remains unchanged and is still publicly known in advance.
  - The prediction of the market interest rate path, despite reflecting the zero level, remains publicly announced, too.
  - Exchange rate is still not the target, but rather a new tool for achieving the target.

Concluding remarks

- FX interventions used only when the standard tool is no longer available.
- Power of the CB when intervening against its own currency is not limited by the size of the reserves.
- Depreciation helps net exports, which is a good side-effect stimulating the economy.

➢ **The use of FX interventions to ease the monetary conditions in an open economy is a rational choice at ZLB.**

Thank you for your attention

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Part of the lecture is forthcoming as BIS publication:

Lízal, L., and J. Schwarz: Foreign Exchange Interventions As An (Un)conventional Monetary Policy Tool

Czech economic outlook based on:

CNB Inflation Report III/2013