GLOBAL ECONOMIC OUTLOOK – JANUARY

2011

Monetary and Statistics Department
External Economic Relations Division

CNB CZECH NATIONAL BANK

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Although all the regions under review are on the road to recovery, their growth outlooks differ substantially at the two-year horizon. The slowest growth is expected for the euro area, where annual **GDP** growth should not exceed 2% at the two-year horizon. By contrast, the German economy will grow at a rate of about 2.5%. According to the most optimistic forecast, GDP growth in the USA will be 3.3% in 2011. However, the fastest growth is expected in China, although the Chinese economy will slow slightly in 2011.

Inflation will not exceed 2% in any of the countries under review except China. Prices in the USA are expected to rise less quickly than in the euro area. The outlook for China ranges between 2.7% and 4.3%.

At the start of this year, the **leading indicators** point to an increase in economic growth in both the USA and the euro area, with continuing strong growth in industry and a slight weakening of household consumption. The indicators also signal slowing – but still high – economic growth in China.

3M and 1Y **EURIBOR** rates have been falling gradually since mid-November, but the market outlook is still rising and is virtually unchanged from the last prediction (6 December 2010). By contrast, the yield on the German ten-year government bond (10Y Bund) kept rising sharply in November. Although its growth halted in December, the CF outlook shifted upwards at the one-year horizon – to about 3.3%. In the USA, 3M and 1Y **LIBOR** dollar rates have been virtually flat since September owing to the Fed's easy monetary policy, but the market outlooks showed a marked change. Compared to the previous forecast, implied rates were up by 0.5 and 0.7 percentage point respectively at the end of 2012. The U.S. ten-year government bond yield again grew strongly in the first half of December but has held steady since then. The CF outlook expects the yield to accelerate gradually to above 4.0% in early 2012.

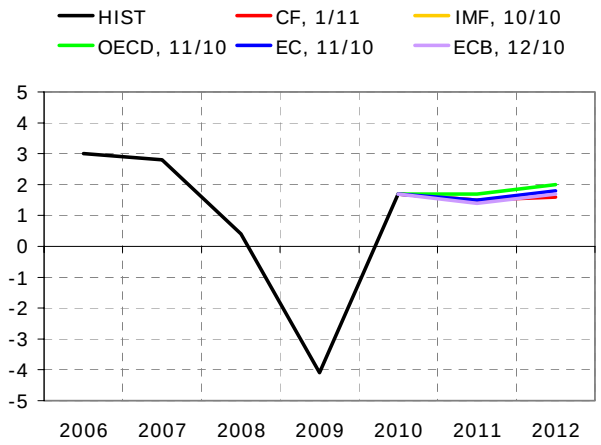
The outlook for the dollar-euro **exchange rate** indicates a slight depreciation of the U.S. currency at the one-year horizon. Optimism about a recovery in the USA is returning, although changes to the quantitative easing system cannot be expected in the short run. On the other hand, measures supporting the highly indebted euro area countries and a major recovery in Germany are bolstering the euro. The dollar is expected to weaken against the pound sterling but appreciate against the Japanese yen (by 9%) and the Swiss franc (by 6%) according to the latest forecasts.

Prices of energy commodities recorded strong growth in 2010 Q4. The price of **Brent** crude oil exceeded USD 90 a barrel at the start of December despite the dollar's strong appreciation at that time. In early January it fluctuated between USD 93 and USD 95 a barrel. According to market outlooks, it should stay just above this level until the end of 2012. The price of **natural gas** follows the oil price with a lag of roughly six months, so we expect it to rise throughout 2011 and be flat thereafter, like the price of oil. Sharp growth in prices of non-energy commodities was seen throughout the second half of last year. The futures-based market outlook expects prices of **industrial metals** to be broadly stable over the next two years. Prices of **food commodities** are expected to be flat until mid-2011 and then fall gradually with the new harvest. Movements in the dollar exchange rate may give rise to some volatility in these trends (commodity prices rise when the dollar depreciates and fall when it appreciates).

II.1 GDP

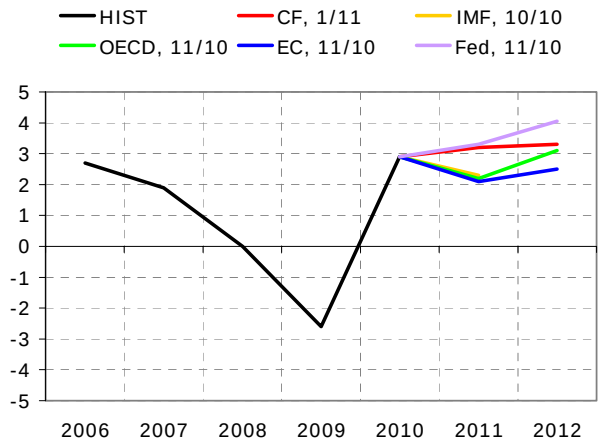
The euro area economic growth outlooks at the two-year horizon range between 1.5% and 2%. Slightly higher figures can be expected in Germany (1.5–2.5%). Growth in the euro area is expected to increase by a few tenths of a per cent in 2012 and thus return to the 2010 level. By contrast, German GDP growth is expected to be lower than last year. The relatively wide range of the forecasts for the USA reflects uncertainty regarding the U.S. economic recovery in the short run. All the monitored institutions expect higher GDP growth in 2012 than this year. According to the Fed forecast, economic growth may reach 4.1%, the highest level in a decade. Economic growth in China will slow again below 10% even according to the most optimistic forecasts.

EURO AREA



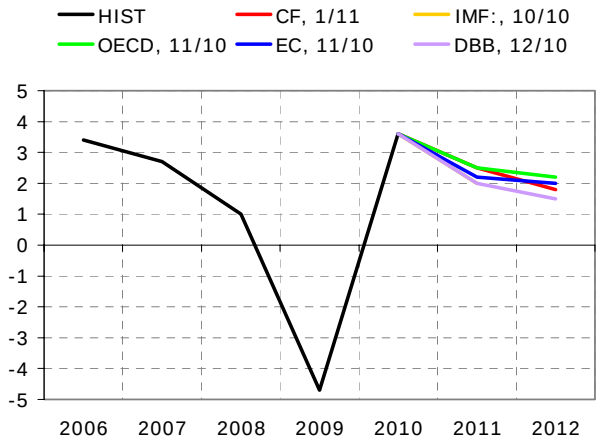
	HIST	CF	IMF	OECD	EC	ECB
2010	1.7					
2011		1.5	1.5	1.7	1.5	1.4
2012		1.6		2.0	1.8	1.7

USA



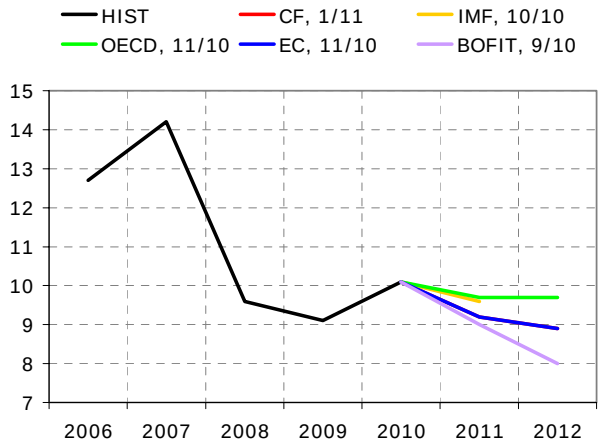
	HIST	CF	IMF	OECD	EC	Fed
2010	2.9					
2011		3.2	2.3	2.2	2.1	3.3
2012		3.3		3.1	2.5	4.1

GERMANY



	HIST	CF	IMF	OECD	EC	DBB
2010	3.6					
2011		2.5	2.0	2.5	2.2	2.0
2012		1.8		2.2	2.0	1.5

CHINA



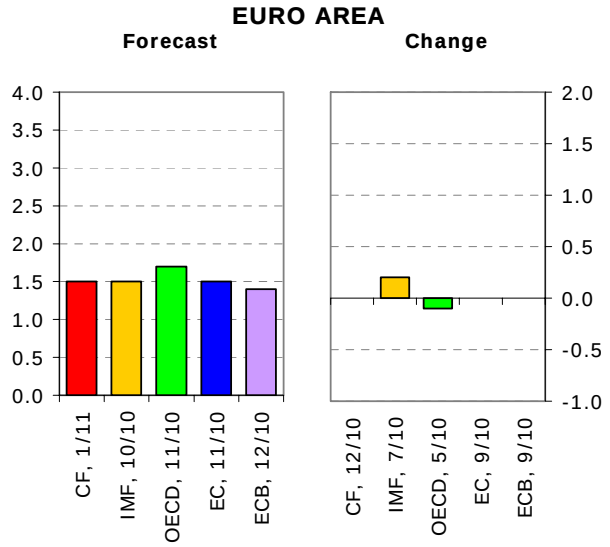
	HIST	CF	IMF	OECD	EC	BOFIT
2010	10.1					
2011		9.2	9.6	9.7	9.2	9.0
2012		8.9		9.7	8.9	8.0

Note: Legend shows latest forecast data in format "Source, month/year of forecast publication". HIST: historical value. ECB and Fed: midpoint of range. The 2010 figure is preliminary. [Cut-off date for data: 14 January 2011]

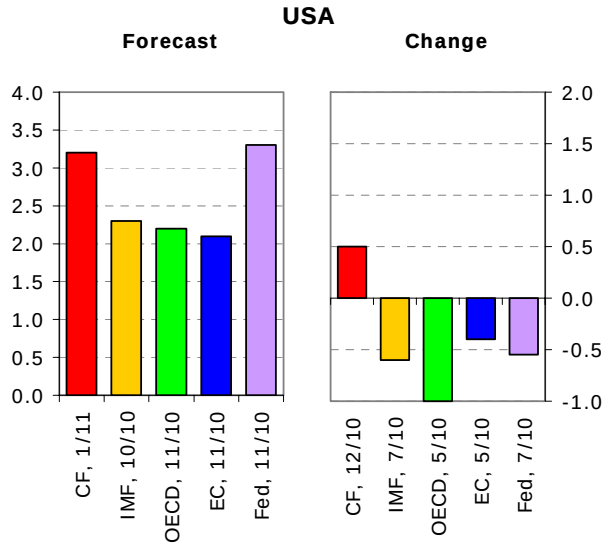
Source: CNB calculation using Eurostat, CF, IMF, OECD, EC, ECB, Fed, DBB and BOFIT databases.

II.2 GDP forecast comparison and change from the previous forecast

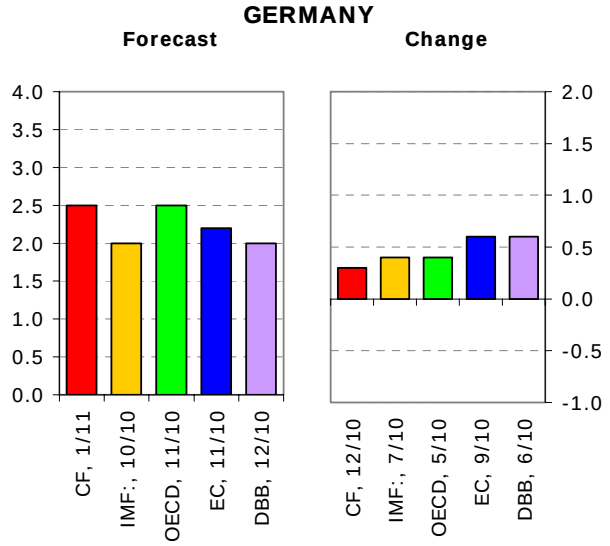
The latest outlooks for this year for Germany have been revised upwards compared to the previous forecast. By contrast, the estimates for U.S. GDP growth for 2011 have worsened, with the exception of CF, which expects 0.5% higher growth compared to the December forecast. The change in the growth estimates for the euro area and China is close to zero.



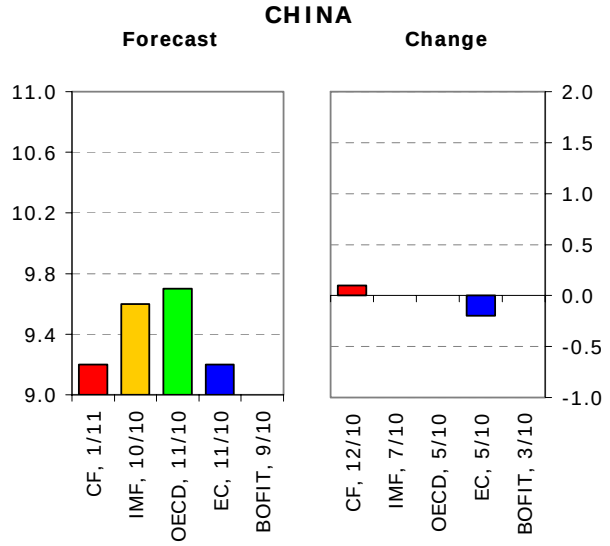
	2010	CF	IMF	OECD	EC	ECB
Forecast	1.7	1.5	1.5	1.7	1.5	1.4
Change		0.0	0.2	-0.1	0.0	0.0



	2010	CF	IMF	OECD	EC	Fed
Forecast	2.9	3.2	2.3	2.2	2.1	3.3
Change		0.5	-0.6	-1.0	-0.4	-0.6



	2010	CF	IMF	OECD	EC	DBB
Forecast	3.6	2.5	2.0	2.5	2.2	2.0
Change		0.3	0.4	0.4	0.6	0.6



	2010	CF	IMF	OECD	EC	BOFIT
Forecast	10.1	9.2	9.6	9.7	9.2	9.0
Change		0.1	0.0	0.0	-0.2	0.0

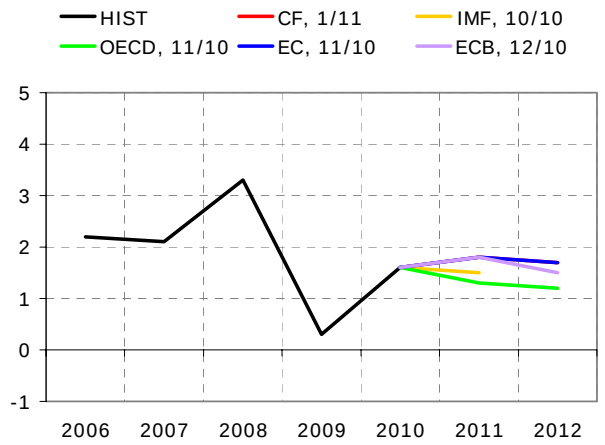
Note: Horizontal axis of left-hand (right-hand) chart shows latest (previous) forecast data in format "Source, month/year of forecast publication". HIST: historical value. ECB and Fed: midpoint of range. The 2010 figure is preliminary. [Cut-off date for data: 14 January 2011]

Source: CNB calculation using Eurostat, CF, IMF, OECD, EC, ECB, Fed, DBB and BOFIT databases.

II.3 Inflation

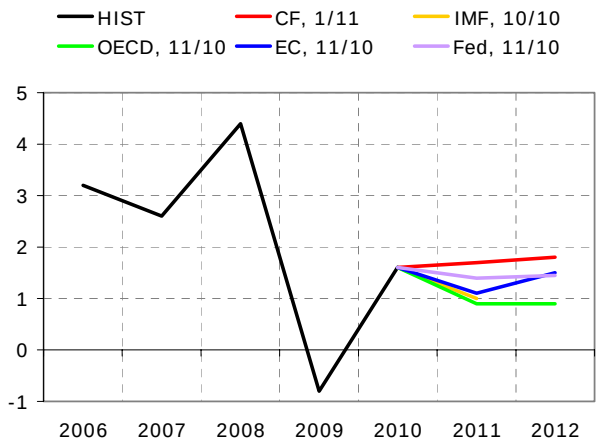
Inflation in the euro area is expected to remain below 2% in 2011. Moderate inflation of 1.0–1.7% is expected in the USA this year. Inflation in China will be the highest of all the regions under review in the coming two years. According to the latest estimates, it may rise as high as 4.3%.

EURO AREA



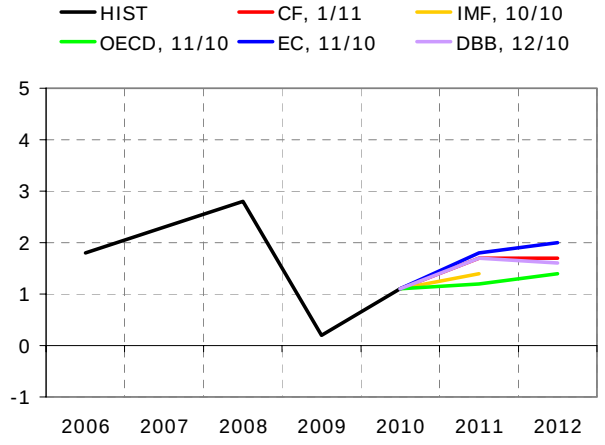
	HIST	CF	IMF	OECD	EC	ECB
2010	1.6					
2011		1.8	1.5	1.3	1.8	1.8
2012		1.7		1.2	1.7	1.5

USA



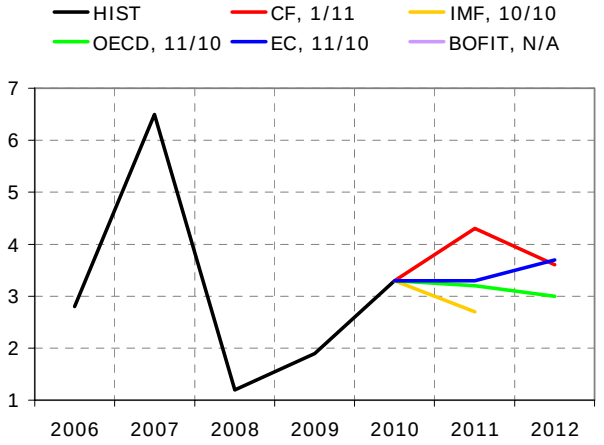
	HIST	CF	IMF	OECD	EC	Fed
2010	1.6					
2011		1.7	1.0	0.9	1.1	1.4
2012		1.8		0.9	1.5	1.5

GERMANY



	HIST	CF	IMF	OECD	EC	DBB
2010	1.1					
2011		1.7	1.4	1.2	1.8	1.7
2012		1.7		1.4	2.0	1.6

CHINA



	HIST	CF	IMF	OECD	EC	BOFIT
2010	3.3					
2011		4.3	2.7	3.2	3.3	
2012		3.6		3.0	3.7	

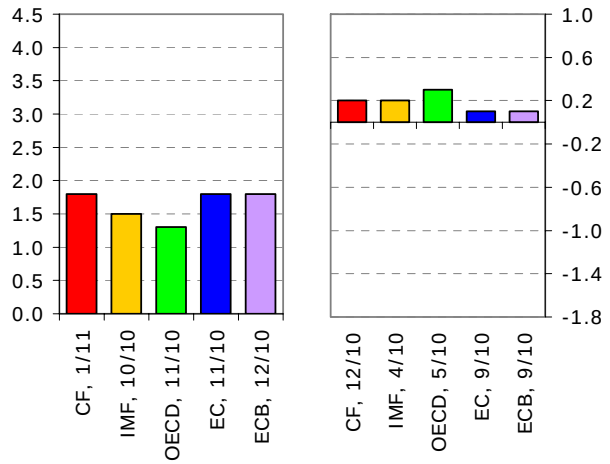
Note: Legend shows latest forecast data in format "Source, month/year of forecast publication". HIST: historical value. ECB and Fed: midpoint of range. The 2010 figure is preliminary. [Cut-off date for data: 14 January 2011]

Source: CNB calculation using Eurostat, CF, IMF, OECD, EC, ECB, Fed, DBB and BOFIT databases.

II.4 Inflation forecast comparison and change from the previous forecast

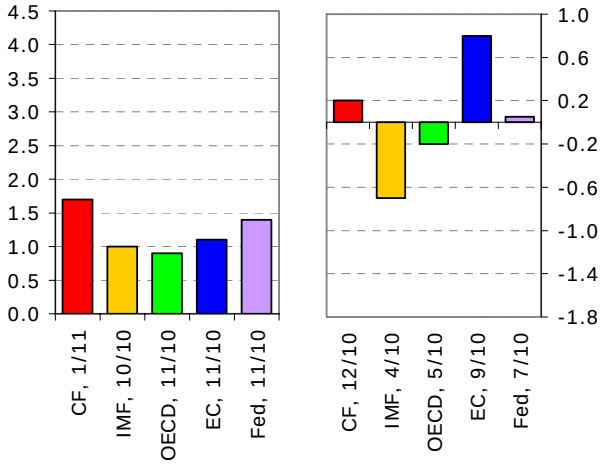
Compared to the previous forecast, the new outlooks indicate probably higher inflation in Europe in 2011. The changes in forecasts for the USA show no clear trend. Inflation in China in 2011 has been revised upwards, except in the case of the EC forecast.

EURO AREA



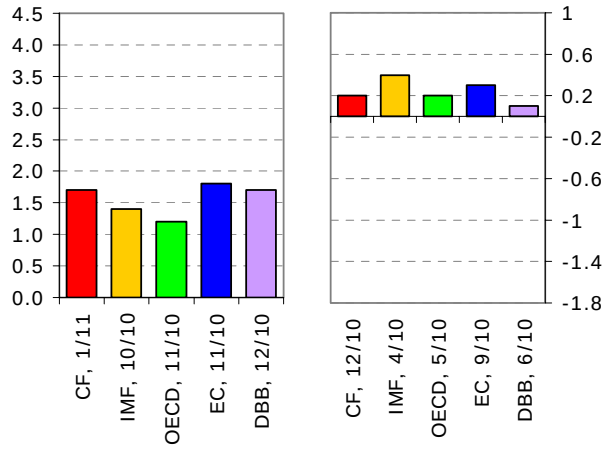
	2010	CF	IMF	OECD	EC	ECB
Forecast	1.6	1.8	1.5	1.3	1.8	1.8
Change		0.2	0.2	0.3	0.1	0.1

USA



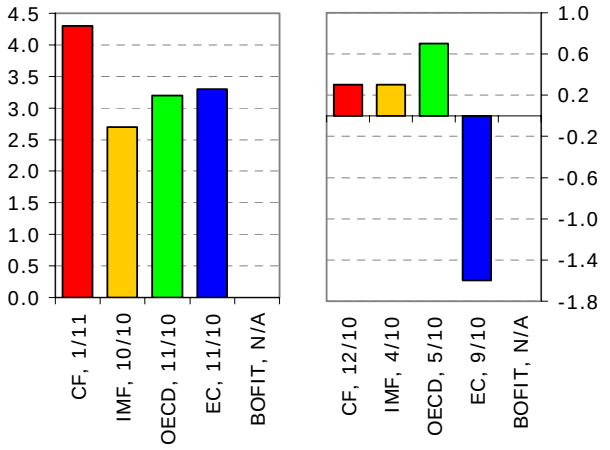
	2010	CF	IMF	OECD	EC	Fed
Forecast	1.6	1.7	1.0	0.9	1.1	1.4
Change		0.2	-0.7	-0.2	0.8	0.0

GERMANY



	2010	CF	IMF	OECD	EC	DBB
Forecast	1.1	1.7	1.4	1.2	1.8	1.7
Change		0.2	0.4	0.2	0.3	0.1

CHINA



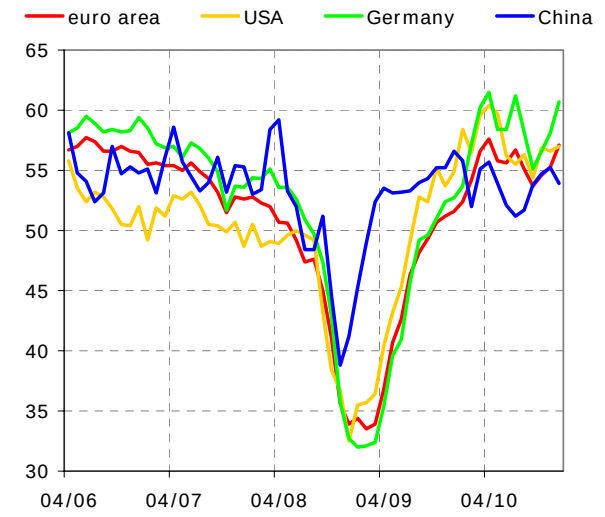
	2010	CF	IMF	OECD	EC	BOFIT
Forecast	3.3	4.3	2.7	3.2	3.3	
Change		0.3	0.3	0.7	1.6	

Note: Horizontal axis of left-hand (right-hand) chart shows latest (previous) forecast data in format "Source, month/year of forecast publication". HIST: historical value. ECB and Fed: midpoint of range. The 2010 figure is preliminary. [Cut-off date for data: 14 January 2011]

Source: CNB calculation using Eurostat, CF, IMF, OECD, EC, ECB, Fed, DBB and BOFIT databases.

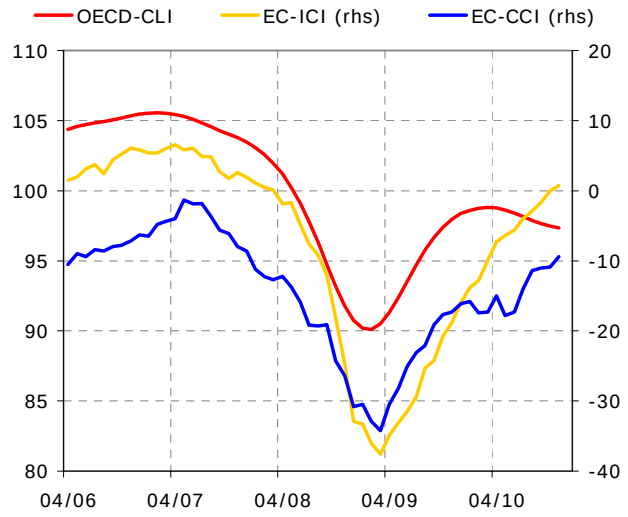
The PMI (Purchasing Managers' Index) leading indicators suggest that the growth rate of industrial production will increase in the USA and the euro area and slow (yet stay high) in China at the start of this year. These indicators also signal an upturn in economic growth in the USA, although the improvement in household consumption may not be pronounced. The leading indicators suggest similar patterns in the euro area. The overall economic situation, especially in industry, is expected to improve, while personal consumption may weaken. GDP in Germany, which was the fastest-growing euro area country last year, is expected to continue growing strongly, albeit at a rather lower level, amid a modest downturn in household consumption.

PMI IN MANUFACTURING



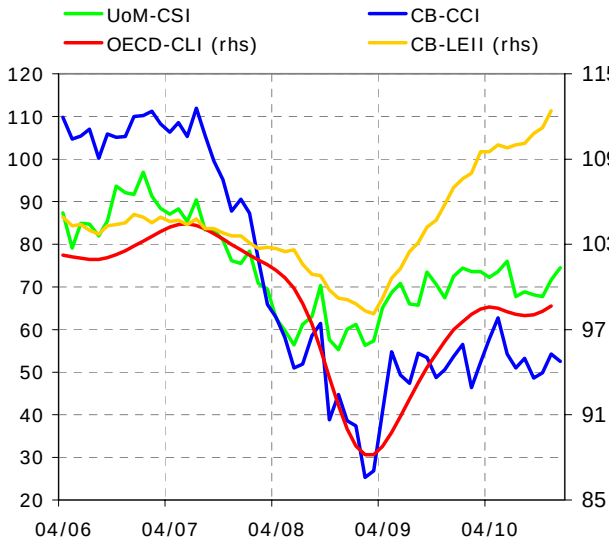
	EA	US	DE	CN
10/10	54.6	56.9	56.6	54.7
11/10	55.3	56.6	58.1	55.2
12/10	57.1	57.0	60.7	53.9

EURO AREA



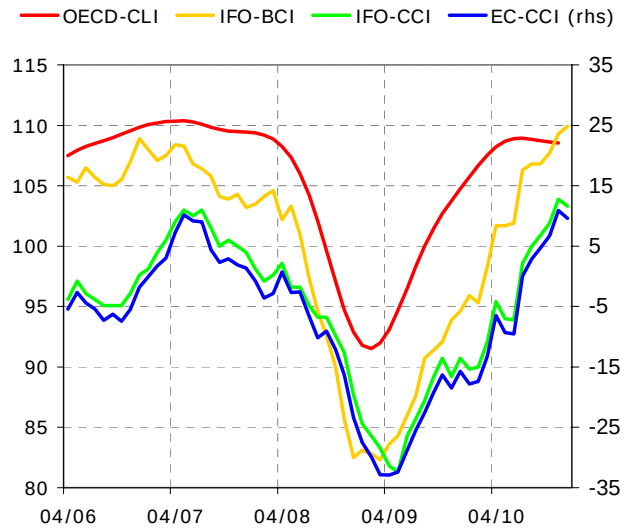
	OECD-CLI	EC-ICI	OECD-CCI
10/10	97.5	0.0	-10.9
11/10	97.3	0.7	-9.4
12/10		4.0	-10.9

USA



	OECD-CLI	CB-LEII	UoM-CSI	CB-CCI
10/10	98.3	111.2	67.7	49.9
11/10	61.0	112.4	71.6	54.3
12/10			74.5	52.5

GERMANY



	OECD-CLI	IFO-BCI	IFO-CCI	EC-CCI
10/10	108.6	107.7	101.9	6.7
11/10	108.5	109.3	103.9	10.9
12/10		109.9	103.3	9.6

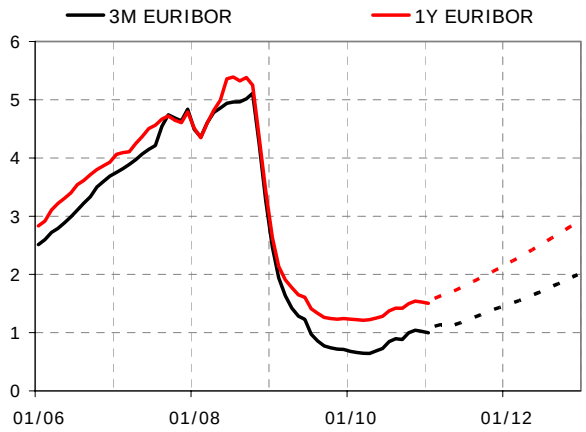
Note: OECD-CLI stands for OECD Composite Leading Indicator, EC-ICI (right-hand scale) for European Commission Industrial Confidence Indicator, EC-CCI (right-hand scale) for EC Consumer Confidence Indicator, CB-LEII for Conference Board Leading Economic Indicator Index, CB-CCI for CB Consumer Confidence Index, UoM-CSI for University of Michigan Consumer Sentiment Index, IFO-BCI for Institute for Economic Research – Business Climate Index, and IFO-CCI for IFO Consumer Confidence Index. [Cut-off date for data: 13 January 2011]

Source: CNB calculation using OECD, EC, IFO and UoM databases.

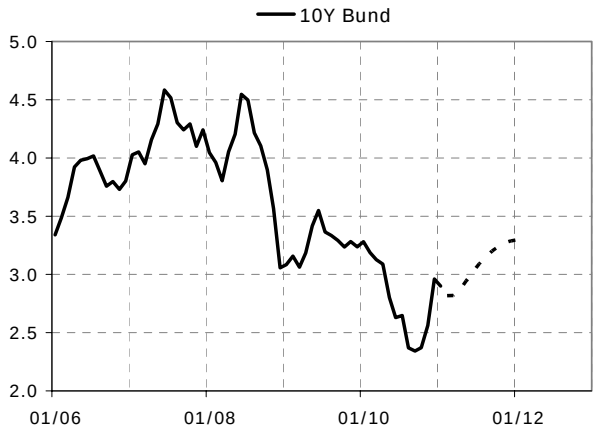
IV.1 Outlook for short-term and long-term interest rates: Euro area

3M and 1Y EURIBOR rates have been falling gradually since mid-November. However, the market outlook is still rising and is virtually unchanged at the two-year horizon from the 6 December prediction. The 10Y German government bond yield rose sharply in November and was flat around 3.0% in December. It dropped slightly in early January. CF expects a further drop in the three months ahead and then growth to 3.3% at the start of 2012.

EURIBOR



GOVERNMENT BOND YIELD



	12/10	01/11	06/11	12/11	06/12	12/12
3M EURIBOR	1.02	1.00	1.17	1.43	1.69	2.00
1Y EURIBOR	1.53	1.51	1.77	2.11	2.49	2.90

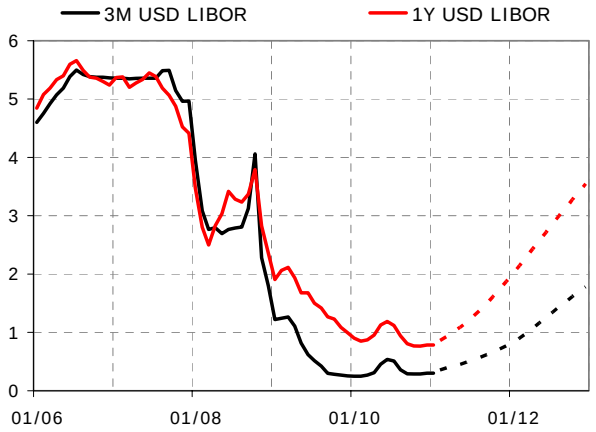
	12/10	01/11	06/11	12/11	06/12	12/12
10Y Bund	2.96	2.90	3.02	3.29		

Note: Forecast for EURIBOR rates is based on rates implied by interbank market yield curve (FRA rates are used from 4M to 15M and adjusted IRS rates for longer horizon). Forecast for German government bond yield (10Y Bund) is derived from CF forecast. Dashed line represents outlook. [Cut-off date for data: 10 January 2011]
Sources: Thomson Reuters (Datastream), Bloomberg, CNB calculations.

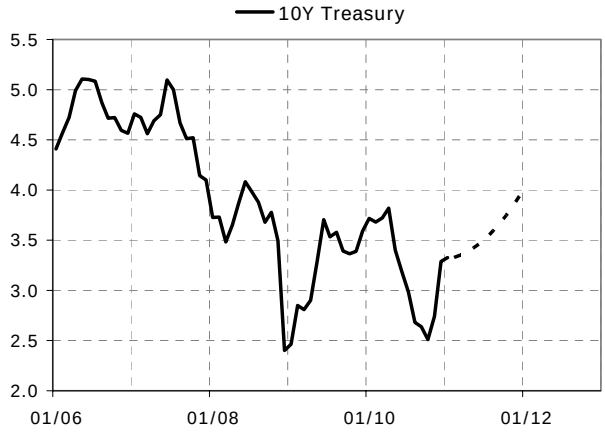
IV.2 Outlook for short-term and long-term interest rates: USA

LIBOR dollar rates have been flat since September at 0.3% for 3M and just under 0.8% for 1Y. However, the market outlook for both rates has changed markedly towards stronger growth. The differences are 0.5 and 0.7 percentage point respectively at the end of 2012. The 10Y government bond yield again grew strongly in the first half of December and has held steady just above 3.3% since then. The CF outlook expects the yield to accelerate gradually to above 4.0% in early 2012.

USD LIBOR



GOVERNMENT BOND YIELD



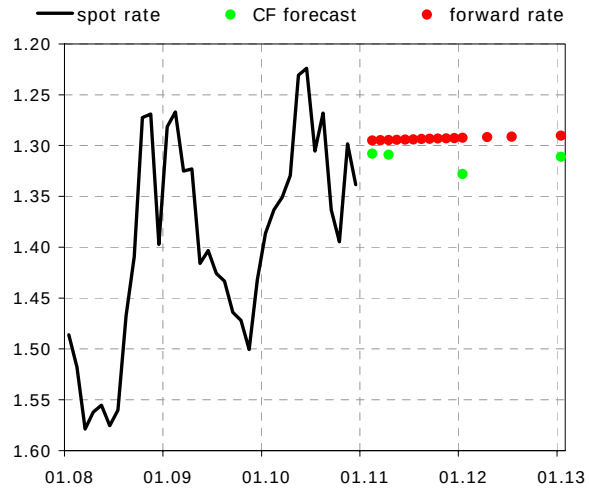
	12/10	01/11	06/11	12/11	06/12	12/12
3M USD LIBOR	0.30	0.30	0.49	0.77	1.26	1.78
1Y USD LIBOR	0.78	0.78	1.17	1.87	2.72	3.55

	12/10	01/11	06/11	12/11	06/12	12/12
10Y Treasury	3.29	3.33	3.47	3.94		

Note: Forecast for 3M and 1Y USD LIBOR rates is based on rates implied by London interbank market yield curve (USD LIBOR rates are used up to 3M, 3M FRA rates up to 15M, and adjusted IRS rates for longer horizon). Forecast for US government bond yield (10Y Treasury) is derived from CF forecast. Dashed line represents outlook. [Cut-off date for data: 10 January 2011]
Sources: Thomson Reuters (Datastream), Bloomberg, CNB calculations.

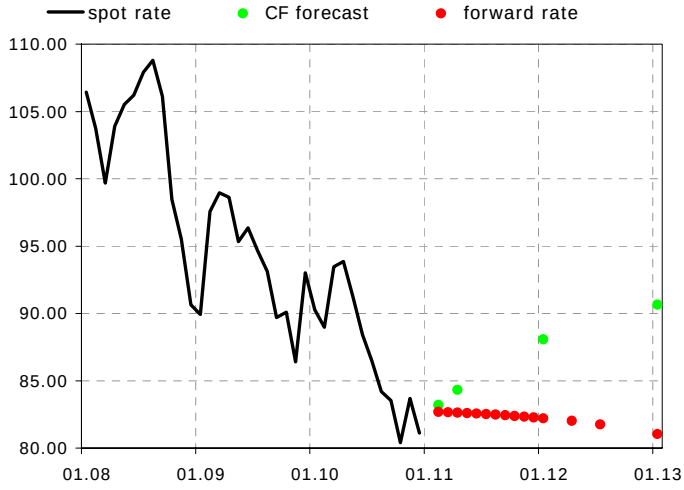
According to the new outlook, the dollar-euro exchange rate will depreciate slightly this year, but at the two-year horizon it should return to end-2010 level. The dollar is expected to weaken against the pound sterling as well. However, it should appreciate against the Japanese yen (by 9%) and the Swiss franc (by 6%) according to the latest forecasts. The forecast for JPY reflects uncertainty surrounding future economic developments in this Asian economy. As regards the Swiss franc, the rapid appreciation in the start of 2011 increased the risk of foreign exchange interventions by the central bank. By contrast, given the positive interest rate differential of USD vis-à-vis JPY and CHF, the forward rate indicates a slight depreciation of the dollar.

USD / EUR



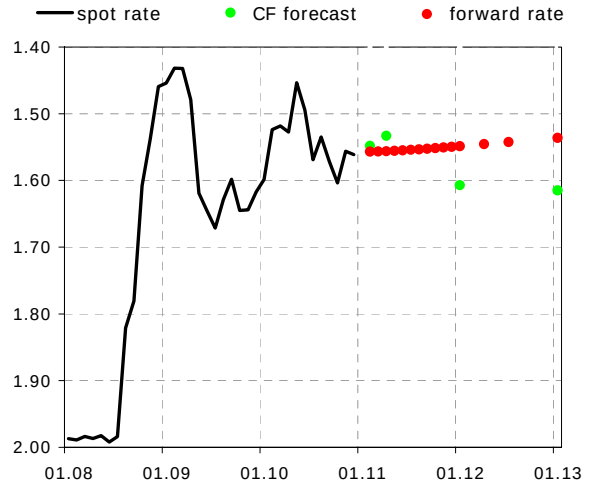
	10/1/11	02/11	04/11	01/12	01/13
spot rate	1.295				
CF forecast		1.308	1.309	1.328	1.311
forward rate		1.295	1.295	1.292	1.290

JPY / USD



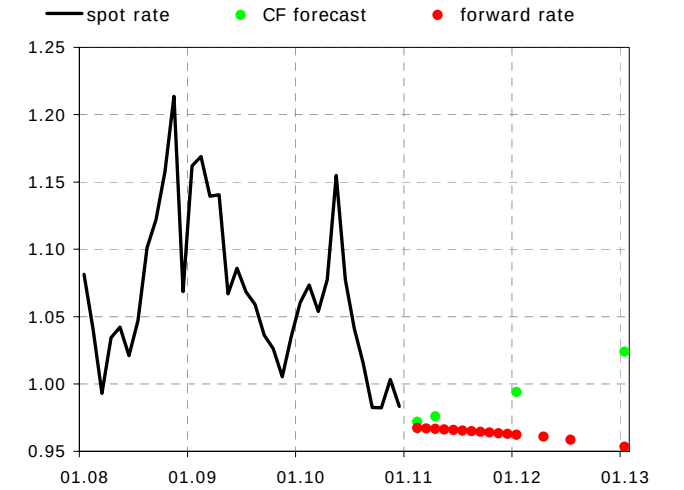
	10/1/11	02/11	04/11	01/12	01/13
spot rate	82.71				
CF forecast		83.20	84.33	88.07	90.66
forward rate		82.68	82.63	82.21	81.04

USD / GBP



	10.1.2011	02/11	04/11	01/12	01/13
spot rate	1.557				
CF forecast		1.548	1.533	1.607	1.615
forward rate		1.557	1.556	1.549	1.536

CHF / USD



	10.1.2011	02/11	04/11	01/12	01/13
spot rate	0.968				
CF forecast		0.972	0.976	0.994	1.024
forward rate		0.967	0.967	0.962	0.953

Note: Increase in currency pair represents appreciation of US dollar. Forward rate does not represent outlook; it is based on covered interest parity, i.e. currency of country with higher interest rate is depreciating. Forward rate represents current (as of cut-off date) possibilities for securing future exchange rate. [Cut-off date for data: 10 January 2011]

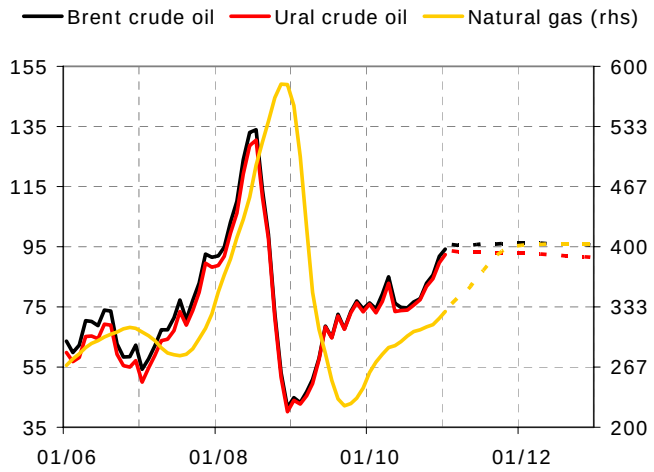
Source: CNB calculation using Bloomberg and Consensus Forecasts databases.

VI.1 Oil and natural gas

The price of Brent crude oil has been rising since September. The fluctuations around the trend mainly reflect movements in the USD exchange rate, as a strengthening (weakening) dollar usually means a temporary fall (rise) in oil prices. Brent crude oil exceeded USD 90 a barrel at the start of December and fluctuated between USD 93 and USD 95 a barrel in early January. Futures-based market outlooks rose compared to the previous month, indicating that the Brent crude oil price should stagnate just above USD 95 a barrel until the end of 2012.

The price of natural gas follows the oil price with a lag of roughly six months, so it can be expected to rise throughout 2011 and be flat thereafter.

OUTLOOK FOR PRICES OF OIL AND NATURAL GAS



	01/11	06/11	12/11	06/12	12/12
Brent crude oil	94.2	95.7	96.1	96.0	95.7
Ural crude oil	92.4	93.2	92.9	92.3	91.6
Natural gas	328.2	364.9	400.9	402.9	402.4

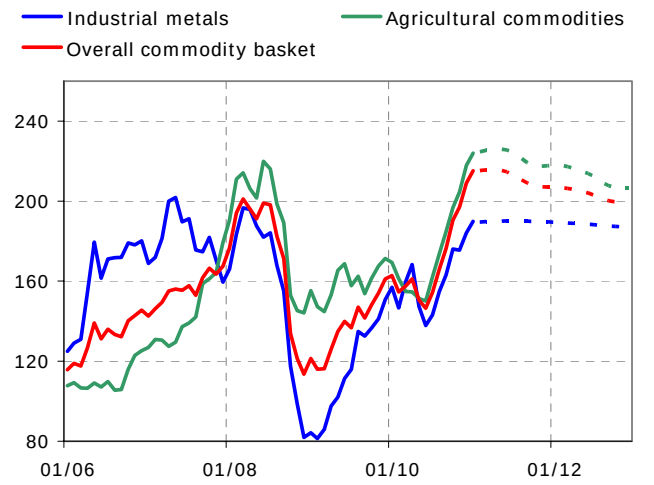
Note: Oil prices in USD/barrel are taken from listings on London-based ICE Futures Europe international exchange. Prices of Russian natural gas at border with Germany in USD/1000 cubic m are calculated using IMF data. Future oil prices are derived from oil futures. Dashed line represents outlook. [Cut-off date for data: 10 January 2011].

Source: Bloomberg, IMF, CNB calculations.

VI.2 Other commodities

Prices of non-energy commodities have been rising month on month since July 2010. In December, food commodity prices rose by 6.5% and industrial metals prices by 5.0%. Prices of wheat recorded the largest growth in December, followed by prices of coffee and sugar. As for industrial metals, copper – and to a lesser extent nickel – showed the highest growth. Prices of other metals rose only slightly. Month-on-month growth is expected in January as well, but thereafter industrial metal prices should be flat and food prices should stagnate initially and then fall gradually from mid-2011 onwards.

OUTLOOK FOR OTHER COMMODITY PRICES



	01/11	06/11	12/11	06/12	12/12
Industrial metals	189.9	190.1	189.6	188.4	186.9
Agricultural commodities	224.0	225.6	217.7	213.7	206.6
Overall commodity basket	215.1	214.6	207.1	204.1	199.5

Note: Chart shows indices, year 2005 = 100. Dashed line represents outlook. [Cut-off date for data: 10 January 2011].

Source: Bloomberg, outlooks based on futures.

INTERNATIONAL INTEGRATION OF THE CHINESE STOCK MARKET

This article[1] sets out to analyse – on both the theoretical and empirical levels – the phenomenon of financial integration of the Chinese stock market (the Shanghai Stock Exchange) with major world stock markets (in the USA, the euro area and Japan). The theoretical section first defines the phenomenon of financial integration and outlines the benefits and costs related to this process. Possible ways of measuring financial integration are then summarised. The empirical section tries to answer the following questions: (i) Is it possible to monitor convergence of stock markets at the national and sectoral levels between China and major world stock markets? (ii) If such convergence is observed, how fast is it? (iii) How does the degree of financial market convergence change over time, particularly from the perspective of the effects of the fading financial crisis at the national and sectoral levels?

1 Definition of financial integration

A financially integrated market is one where all current and potential market participants: (i) face a single set of rules when they decide to deal with financial instruments and/or services; (ii) have equal access to the above-mentioned set of financial instruments and/or services, and (iii) are treated equally when they are active[2] in the market – see Baele et al. (2004) and Weber (2006). This broader definition of financial integration contains two basic features. The first is that it is not deemed necessary for financial structures in the regions under review to be identical.[3] The second relates to the presence of frictions in the process of financial intermediation, which can persist even in a phase of a high degree of financial integration and should affect the integrating regions symmetrically.

Financial integration generates – directly or indirectly – both benefits and costs for individual entities. Numerous research papers[4] indicate the need to know these in order to maximise the benefits and minimise the costs related to the financial integration process. The experience of the financial crisis has heightened the significance of this debate. The most frequently mentioned benefits of financial market integration include: (i) consumption smoothing due to international risk diversification, (ii) the positive effect of capital flows on domestic investment and growth, (iii) increased financial system efficiency, and (iv) increased prudence of financial market agents and greater financial stability. The main costs of financial integration include: (i) insufficient access to funds at times of financial instability, including concentration and pro-cyclicality of capital, (ii) misallocation of capital flows, (iii) loss of macroeconomic stability, and (iv) herding among investors, financial contagion and high volatility of cross-border capital flows.

2 Measuring financial integration

In line with the definition of financial integration based on the law of one price of assets, financial integration can be measured using: (i) price-based measures – measuring deviations in prices or yields on assets generated by the geographical origin of the asset; and (ii) news-based measures – monitoring the intensity of the effect of local

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[2] Although the Chinese stock market is not fully open to foreign investors (see section 3), it is possible to test the hypothesis about its speed and degree of integration with world stock markets (in the USA, the euro area and Japan) and thereby get a general idea about the convergence potential of the Chinese economy.
[3] It is natural for individual countries (regions) to have their own financial architectures. This does not necessarily represent a barrier to financial integration.
[4] for example, Agénor (2003), Baele et al. (2004) or Komárková and Komárek (2009)

versus global (common to integrating entities) news about asset prices; (iii) quantity-based measures – containing various surveys of statistical information monitoring changes in investor behaviour in the integration process.

The empirical section applies measures based on price indicators using the concepts of beta-convergence and sigma-convergence – see Adam et al. (2002). Beta-convergence enables identification of the speed at which differences in yields are eliminated in individual financial markets. To quantify beta-convergence, one can use standard regression analysis, Kalman filter estimation or the panel estimation method, in the form of the equation:

$$\Delta R_{i,t} = \alpha_i + \beta R_{i,t-1} + \sum_{l=1}^{L} \gamma_l \Delta R_{i,t-l} + \varepsilon_{i,t}, \qquad (1)$$

where $R_{i,t} = Y_{i,t} - Y_{i,t}^{B}$ is the difference between asset yields (here the national and sectoral stock indices) of country *i* and a selected reference territory (a benchmark, i.e. the US, European and Japanese stock markets) at time *t*,[5] Δ s the difference operator, α is the dummy variable for the specific country, *L* is the maximum lag and ε is a random term. The magnitude of coefficient *β* can be interpreted as a direct measure of the convergence speed.[6] For a better understanding, coefficient *β* can be converted into the shock transmission half-life (H-L), i.e. 50% of its magnitude in days, according to the relationship: $H - L = \ln(0{,}5)/\ln(|\beta + 1|)$. A lower half-life means faster convergence.

The concept of sigma-convergence captures the difference between yields on identical assets in different countries (sectors) at a particular moment in time and thus identifies the degree of integration vis-à-vis the reference market achieved at that moment in the individual financial market segments in the countries under review. To quantify sigma-convergence, the (cross-sectional) standard deviation (σ) is calculated according to the formula:

$$\sigma_t = \sqrt{\left(\frac{1}{N-1}\right)\sum_{i=1}^{N}\left[\log(y_{i,t}) - \log(\overline{y_t})\right]^2} \qquad (2)$$

where y is the asset yield, $\overline{y}$ is the mean value of the yield (average unweighted yield) at time *t* and *i* denotes the individual countries (*i* = 1, 2, …, N).[7] The lower is σ the higher is the level of convergence. In theory, full integration is achieved when the standard deviation is zero, while high (several digit) values of σ reflect a very low degree of integration. The existence of some degree of beta-convergence may be accompanied by sigma-convergence, so the two concepts must be tracked concurrently and considered as mutually complementary in order to assess financial integration.

[5] $Y_{i,t} = \ln(A_{i,t}) - \ln(A_{i,t-1})$, where Y denotes the yield on the relevant asset, *A* the basic price index of the relevant asset, i the individual country and *t* time.

[6] A negative beta coefficient signals the occurrence of convergence, while the absolute value of beta indicates the convergence speed, i.e. the speed of elimination of shocks to the yield differential vis-à-vis the benchmark territory β can take values ranging from 0 to -2. The closer the absolute value of β to 1, the higher the speed of convergence. If β=0 or β=-2, no convergence is observed. β values between 0 and (-1) indicate monotonous convergence, while fluctuating convergence occurs for values between -1 and -2.

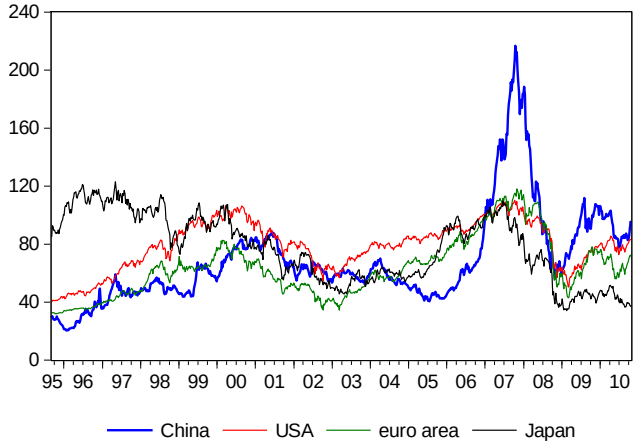
[7] For the purposes of this analysis, we use N = 2, i.e. we explore the evolution of sigma-convergence over time between China and one of the countries under review.

3 The Chinese stock market compared with the USA, the euro area and Japan

The Chinese stock market consists of the Shanghai Stock Exchange, the Shenzhen Stock Exchange and the Hong Kong Stock Exchange. The Shanghai Stock Exchange is the sixth largest stock market in the world (with market capitalization of around USD 2.5 trillion), although entry to this market is not fully free to foreign investors owing to strict capital controls. In the second half of the 1990s, the Chinese (Shanghai) stock market developed similarly to the US and euro area markets. The only exception was the period leading up to the start of the new millennium in comparison with Japan. This was linked with the effects of the "lost decade" of the Japanese economy. However, an evident overheating of the Chinese market relative to world capital markets can be observed at the beginning of 2007. This was replaced by a similarly sharp correction in 2008 (see Figure 1a). In terms of market capitalization, the Chinese stock market did not show significant values compared to the other territories under review until 2005. However, the market capitalization of the Chinese stock market (Shanghai, Shenzhen and Hong Kong) has surged over the last five years and has surpassed that of Japan. In relative terms (in relation to GDP) it has even exceeded the market capitalization of the euro area and has come very close to the figures for the USA.

Figure 1: The Chinese market compared to the USA, the euro area and Japan

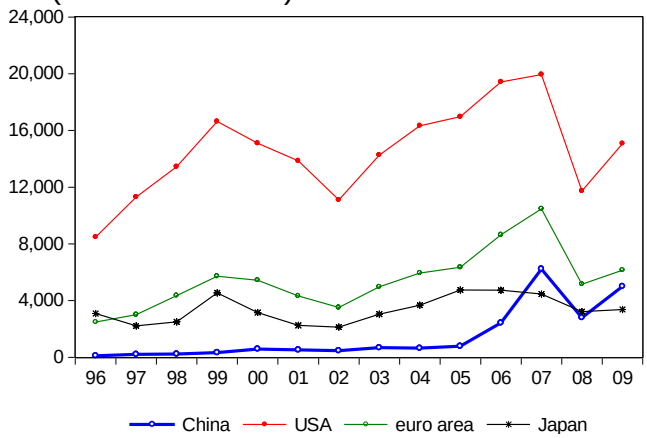
a) Stock indices



Note: Stock indices are expressed in USD (100=first observation in 2007). China = SHANGHAI SE A SHARE, USA = S&P 500 COMPOSITE, euro area = DJ EURO STOXX$, Japan = NIKKEI 225 STOCK.

Source: Thomson Reuters (Datastream).

b) Stock market capitalization (in USD trillions)



Source: World Development Indicators, World Bank.

The studies dealing with the integration of the "Chinese" stock market can be split into three subcategories: (i) those within mainland China (particularly the relationship between the Shanghai and Shenzhen markets), (ii) those within greater China (mainland China, Hong Kong and Taiwan) and (iii) those between mainland and greater China and world financial markets, including comparisons of the evolution of individual sectors of the economy.[8] This view is the subject of the empirical analysis below.

[8] For the results and conclusions of these studies, see Babecký, Komárek and Komárková and (2011).

4 Empirical results

The empirical analysis was performed on weekly data obtained by averaging daily data on the evolution of the national and sectoral stock indices. The results of the analysis of the beta-convergence (i.e. speed of convergence) of the Chinese stock market towards the world markets since 1995 at the national level as well as for six selected sectoral indices are shown in Table 1.[9]

Table 1: Beta-convergence of China's national and selected sectoral indices

Index	Ref. area	1995-1998	1999-2006	2007-2010	Index	Ref. area	1995-1998	1999-2006	2007-2010
AUTO	USA	-1.09	-1.00	-0.96	**FIN**	USA	-1.07	-1.08	-1.23
		(2.0)	(0.9)	(1.5)			(1.8)	(2.0)	(3.3)
	euro area	-0.98	-1.03	-1.20		euro area	-1.06	-1.07	-1.24
		(1.3)	(1.4)	(3.0)			(1.7)	(1.9)	(3.4)
	Japan	-1.05	-1.10	-1.02		Japan	-1.02	-1.05	-1.11
		(1.6)	(2.1)	(1.2)			(1.3)	(1.6)	(2.2)
ELEC	USA	-1.22	-1.05	-1.44	**TELE**	USA	-1.06	-0.96	-1.02
		(3.2)	(1.6)	(6.0)			(1.7)	(1.5)	(1.2)
	euro area	-1.25	-1.00	-1.11		euro area	-1.08	-1.00	-1.04
		(3.5)	(0.9)	(2.2)			(1.9)	(0.5)	(1.6)
	Japan	-1.28	-0.99	-0.98		Japan	-1.04	-0.98	-0.92
		(3.8)	(0.9)	(1.2)			(1.5)	(1.2)	(1.9)
OG	USA	-1.20	-1.18	-1.08	**NAT**	USA	-1.01	-1.02	-0.98
		(3.0)	(2.9)	(1.9)			(1.1)	(1.3)	(1.2)
	euro area	-1.19	-1.18	-1.08		euro area	-0.99	-1.10	-1.01
		(2.9)	(2.8)	(1.9)			(1.0)	(2.1)	(1.1)
	Japan	-0.76	-1.12	-1.00		Japan	-1.00	-1.00	-0.98
		(3.4)	(2.3)	(0.9)			(0.6)	(0.9)	(1.3)
BANK	USA	-0.81	-1.05	-1.10	*Note: The shock transmission half-life (H-L) in days, corresponding to* $H - L = \ln(0{,}5)/\ln(\lvert\beta+1\rvert)$, *is given in parentheses. Sectors: AUTO – automotive, ELEC – energy, BANK – banking, OG – oil and gas, FIN – financial, TELE – telecommunications, NAT – total national indices.*				
		(2.9)	(1.7)	(2.1)					
	euro area	-0.82	-1.01	-1.08					
		(2.9)	(1.0)	(1.9)					
	Japan	-0.83	-0.98	-1.03					
		(2.8)	(1.3)	(1.4)					

Source: Thomson Reuters (DataStream).

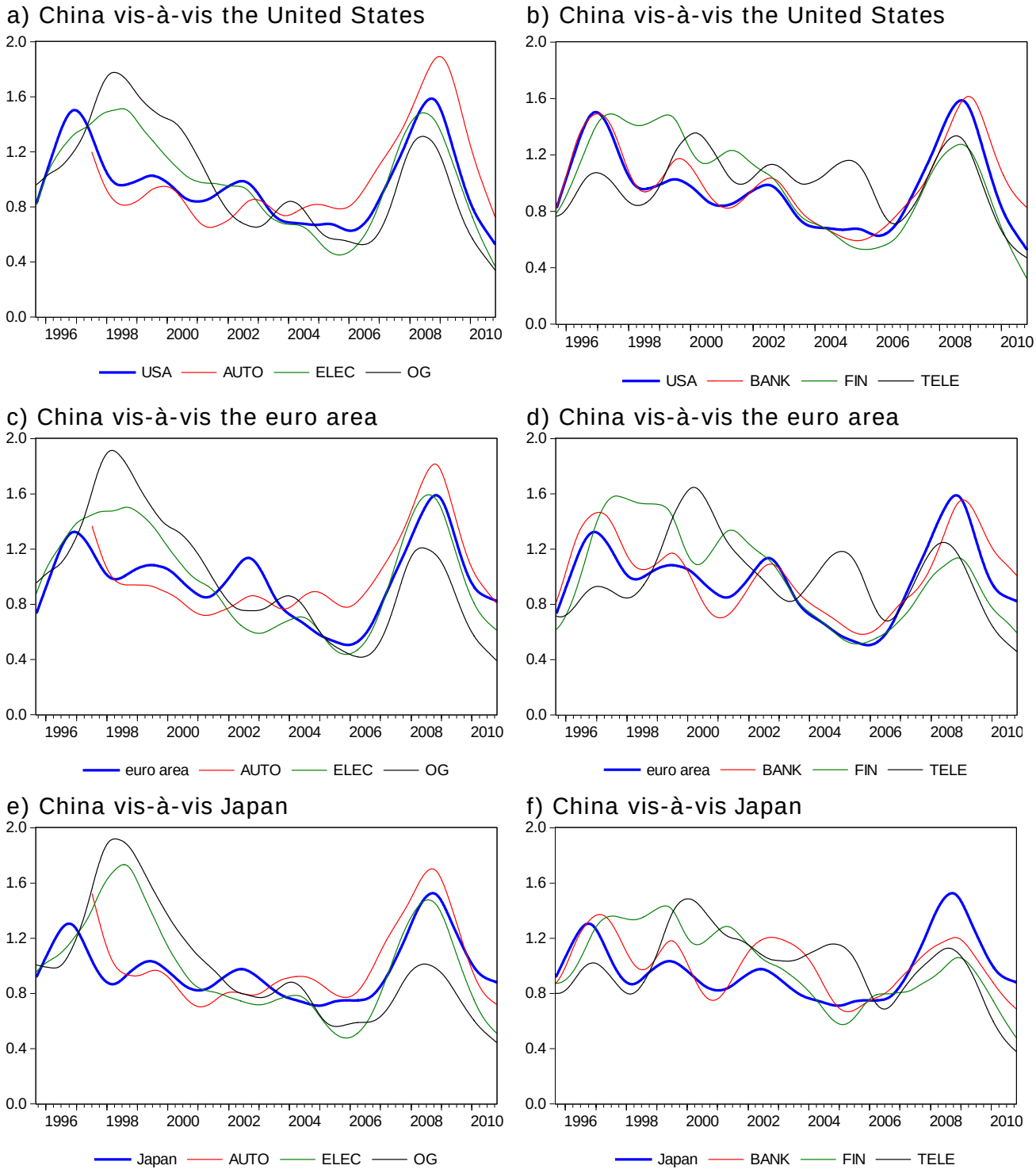
The figures in Table 1 indicate that on average the Chinese capital market showed the fastest convergence towards the Japanese market at both the national and sectoral level. However, the shock transmission half-life values are also low vis-à-vis the US and euro area markets.[10]

Figure 2 indicates the degree of convergence of the Chinese stock market with the US, euro area and Japanese markets at the national level as well as in selected sectors. The results for the national indices (Figure 2g) show considerable similarity in the convergence of the Chinese stock market for the individual reference areas; as of the end of 2010, however, convergence to the USA appears to be the highest.

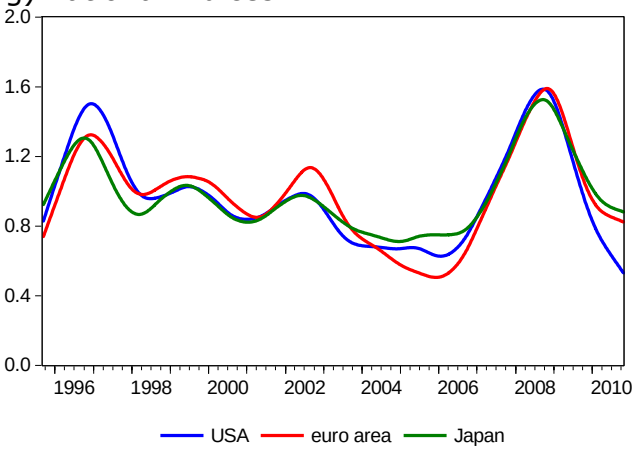
[9] The table contains results for the period up to the end of 1998 (covering the 1997 Asian crisis and 1998 Russian crisis), the period up to the end of 2006 (covering the 2000 dot-com crisis) and the period up to the end of 2010 (covering the now abating financial crisis).

[10] Similar shock transmission half-life values were found in the case of convergence of the financial markets of new EU Member States to the euro area – see Babecký, Frait, Komárek and Komárková (2010).

Figure 2: Sigma-convergence of China's national and sectoral indices



g) national indices



Note: Stock indices are expressed in USD (100=first observation in 2007). Sectors: AUTO – automotive, ELEC – energy, OG – oil and gas, BANK – banking, FIN – financial, TELE – telecommunications, NAT – total national indices. Lower standard deviation values (vertical axis) correspond to higher degrees of convergence. For presentation in the charts, the standard deviations were first normalised over their entire time period to facilitate comparison across markets and then filtered using the Hodrick-Prescott filter with the recommended weekly time series coefficient λ = 270,400.

Source: CNB calculations based on Thomson Reuters (DataStream).

Figures 2a to 2f allow us to compare the degree of convergence of China's national index and selected sectoral indices with the reference territories.[11] The results leave scope for discussion of whether the integration across sectors exceeds that across countries. The oil-gas and telecommunications sectors showed a higher degree of convergence than the national index, whereas the degree of convergence in the automotive and banking sectors was lower.[12]

5 Conclusion

The more integrated are the financial markets of a country (China) with those of a reference country/area (the USA, the euro area, Japan), the more their asset prices will be influenced by common (global) factors rather than local (national) factors. The beta-convergence results showed a solid pace of convergence (shock transmission half-lives ranging from 0.6 to 3.8 days). The complementary sigma-convergence calculations revealed a high degree of integration of China's capital market (the Shanghai Stock Exchange) at both the national and sectoral levels despite the fact that foreign investors do not have entirely free access to the Shanghai stock market. It was also shown that some sectors have a higher degree of integration than the national indices. This has important implications for investor risk diversification.

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[11] A lower/higher degree of sectoral integration than national integration means that the time series lies above/below the national series.
[12] Results for all 16 sectors on the Shanghai market are given in Babecký, Komárek and Komárková (2011).

BOFIT	Bank of Finland Institute for Economies in Transition
CB-CCI	Conference Board Consumer Confidence Index
CB-LEII	Conference Board Leading Economic Indicator Index
CBOT	Chicago Board of Trade
CF	Consensus Forecasts
CN	China
CNB	Czech National Bank
DBB	Deutsche Bundesbank
DE	Germany
EA	euro area
EC	European Commission
ECB	European Central Bank
EC-CCI	European Commission Consumer Confidence Indicator
EC-ICI	European Commission Industrial Confidence Indicator
EIU	The Economist Intelligence Unit database
EU	European Union
EUR	euro
EURIBOR	Euro Interbank Offered Rate
Fed	Federal Reserve System (the US central bank)
FRA	forward rate agreement
GBP	pound sterling
GDP	gross domestic product
CHF	Swiss franc
IFO	Institute for Economic Research
IFO-BCI	IFO – Business Climate Index
IFO-CCI	IFO – Consumer Confidence Index
IMF	International Monetary Fund
IRS	Interest rate swap
JPY	Japanese yen
LIBOR	London Interbank Offered Rate
N/A	not available
OECD	Organisation for Economic Co-operation and Development
OECD-CLI	OECD Composite Leading Indicator
UoM	University of Michigan
UoM-CSI	University of Michigan Consumer Sentiment Index
US	United States
USD	US dollar