

2 THE REAL ECONOMY AND FINANCIAL MARKETS

The growth of the world economy has slowed. The process of monetary policy normalisation by key central banks has almost come to a halt, owing to a worse economic outlook and weak inflation pressures, while global financial conditions remain easy. The prolonged period of low interest rates in most European economies is postponing the materialisation of the accumulated risks to financial stability and is simultaneously encouraging the taking on of new risks, associated with rising private and government debt and growth in financial asset prices above their fundamental levels. The domestic economy expanded by just under 3% in 2018. The CNB forecast expects continued growth of around 2.5% in 2019. Long-term Czech government bond yields stayed below their neutral levels. Prices of commercial and residential property increased further and remained overvalued. The profitability of non-financial corporations continued to decline due to rising wage costs. High credit activity was reflected in a substantial increase in corporate indebtedness. In the household sector, the debt-to-income ratio did not rise, but continued buoyant credit growth was observed in this sector as well.

Global repricing of risk premia and a related sudden increase in longer-term interest rates remained a significant risk to the stability of the domestic financial system. The materialisation of external risks in the shape of an economic slowdown in the euro area would also be reflected in lower growth of the domestic economy. A sizeable decrease in demand for goods and services would have a negative impact on firms' profitability and households' wages and would lead to higher default rates.

2.1 THE MACROECONOMIC AND FINANCIAL ENVIRONMENT

2.1.1 The External Environment

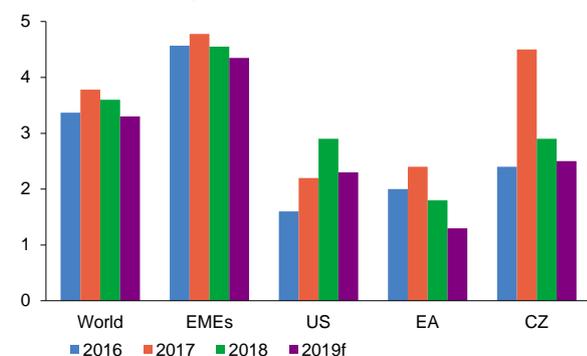
Global economic growth was favourable in 2018, but outlooks indicate a slowdown...

The world economy grew by a solid 3.6% in 2018 (as against 3.8% in 2017). The April IMF forecast expects a slowdown to 3.3% this year and a gradual recovery in the following years. Growth in advanced economies began to slow during 2018, and the outlooks for this year steadily worsened (see Chart II.1). The euro area recorded annual GDP growth of 1.8% in 2018. The April IMF forecast and the March ECB forecast indicate a slowdown in euro area growth to 1.3% and 1.1% respectively this year. Persisting high political uncertainty combined with protectionist US trade policy, the manner of Brexit and the slowdown of the Chinese economy were also reflected in a decline in leading indicators and the confidence of economic agents regarding future economic developments in the EU (see Chart II.1 CB). The 2019 economic growth outlooks for most EU countries were revised downwards (see Chart II.2 CB).

Chart II.1

Economic growth in selected countries

(annual real GDP growth in %)

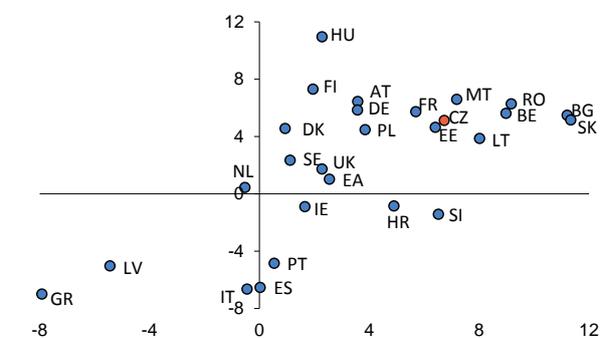


Source: IMF (World Economic Outlook, April 2019), CNB
 Note: f = forecast. The forecast for the Czech Republic is based on the CNB forecast published in Inflation Report II/2019.

Chart II.2

Credit growth in selected EU countries in 2018

(%; x-axis: households; y-axis: non-financial corporations)



Source: ECB, CNB calculation
 Note: Credit comprises loans provided by credit institutions and is expressed in EUR. For this reason, the data on credit growth in this chart may differ from those in other parts of this Report or those reported by other institutions. Year-end data.

...credit growth in the EU remains strong and some macroprudential authorities now view the private sector debt level as risky

Economic growth and sources of risks remain mixed across the EU countries. A number of economies are in a highly expansionary phase of the financial cycle accompanied by increased credit dynamics, rapid growth in residential property prices, rising private non-financial sector debt and investment optimism (see Table II.1). Twelve of the sixteen EU countries covered in the table considered the current rate of credit growth to be moderately or highly risky. The annual growth rate of loans to households was above 6% in 2018 Q4 in ten EU countries; in the case of loans to non-financial corporations, six EU countries exceeded this level (see Chart II.2). One-year growth in residential property prices exceeded 5% in twelve EU countries (see Chart II.3). In recent years, favourable financial conditions and solid economic growth have enabled a decline in the debt ratios of the government and non-financial corporations in some EU countries. In a few countries, however, debt ratios increased to all-time highs in 2018 (see Chart II.4). National authorities in one-half of the selected countries now viewed the risks associated with private sector debt as moderate or even as high in the case of the household sector (see Table II.1). In many countries, private sector debt is closely linked with general government debt and the country's liabilities to the rest of the world. A highly indebted government sector without sufficient room to increase fiscal expenditure cannot act in a countercyclical manner and help dampen the impact of the materialisation of private sector credit risk. Government debt increased in 18 EU countries in 2010–2018 and a debt-to-GDP ratio exceeding 60% was recorded in 15 EU countries in 2018 (see Chart II.3 CB).

Table II.1

Potential sources of risks to financial stability as perceived by selected national authorities

	IT	ES	PL	AT	DK	CZ	DE	HU	NL	UK	FR	FI	BE	SE	NO	SK
Excessive credit growth	Low	Low	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Low	Moderate	Moderate	Low	Moderate	Moderate	Moderate	Moderate
Residential property prices	Low	Low	Moderate	Low	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Low	Moderate	High	High	High	High
Household debt sustainability	Low	Moderate	Moderate	Moderate	Moderate	Moderate	High	High	High							
Macroeconomic environment	Moderate	Low	Moderate													
NFC debt sustainability	Moderate	Low	Low	Low	Low	Low	Low	Moderate	Moderate	Moderate	Moderate	Low	Moderate	Moderate	Moderate	Moderate
Bank loan portfolio quality	Moderate	Low	Low	Low	Low	Low	Moderate	Moderate	Low	Moderate						
Pension fund sector stability	Low	Low	Low	Low	Low	Moderate	Low	Low	Moderate	Low						
Insurance company sector stability	Low	Moderate	Low	Low	Low	Low	Moderate	Low	Moderate							
Sovereign risk	High	Moderate	Moderate	Low	Low	Low	Low	Low	Low	Moderate	Moderate	Low	Low	Low	Low	Low
Bank profitability	High	Moderate	Moderate	Moderate	Low	Low	Moderate	Low	Low	Moderate	Moderate	Moderate	Moderate	Low	Low	Moderate

Level of risk: ■ High ■ Moderate ■ Low

Source: The relevant countries' latest financial stability reports, ESRB Risk Dashboard, CNB

Note: The assessment is based on a qualitative evaluation of the relevant countries' latest financial stability reports. Where a risk is not mentioned in the report, the assessment is based on the CNB's interpretation of the indicators used in the ESRB Risk Dashboard. The ordering of countries and risks in the table is obtained using a visual contrast-optimising algorithm.

Highly indebted countries are more vulnerable to an increase in interest rates and risk premia

Countries with high debt in the private non-financial sector or government sector, or in both these sectors simultaneously, are more vulnerable to a rise in interest rates and risk premia and to a sharper economic downturn (see Box 2.1). The weakening economic activity is creating potential for growth in the credit losses of the European banking sector.¹ Concerns regarding contagion via direct or indirect channels from countries with high sovereign risk are also increasing.

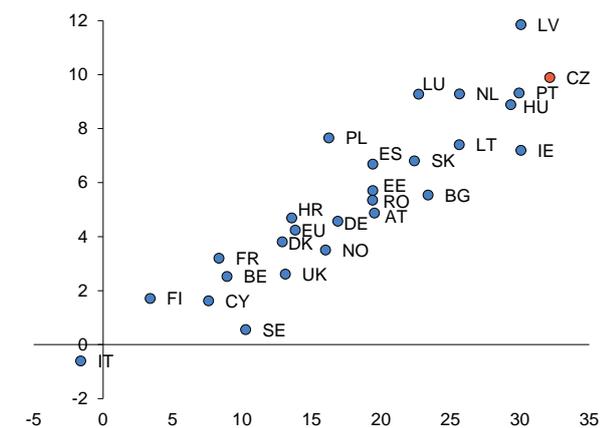
¹ The EU banking sector continues to face low profitability and a high degree of problem loans on balance sheets (EBA: [Report on risks and vulnerabilities in the EU financial system](#), March 2019). The ECB aims to reduce the level of NPLs – in March 2018 it issued guidance for banks stating that unsecured and secured loans should be 100% covered by provisions two years and seven years respectively after their classification as non-performing ([Addendum to the ECB Guidance to banks on non-performing loans: supervisory expectations for prudential provisioning of non-performing exposures](#), March 2018).

A sudden jump in credit premia in countries with highly indebted government sectors could lead not only to problems with refinancing the financial² and non-financial sectors in the country concerned, but also to contagion across EU countries.

Chart II.3

Property price growth in selected EU countries in 2018

(%; x-axis: three-year growth; y-axis: one-year growth)



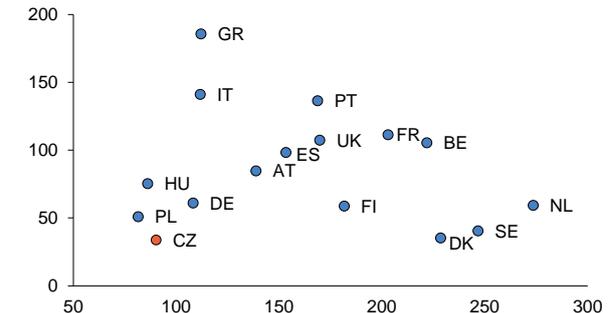
Source: Eurostat

Note: Due to high values, the chart does not show Slovenia (three-year and one-year growth of 38.95% and 18.20% respectively). Year-end data.

Chart II.4

Private and government debt in selected EU countries in 2018

(% of GDP; x-axis: private sector debt; y-axis: government debt)



Source: BIS, CNB

Note: Debt is the sum of all credit provided by domestic banks, non-banks and non-residents. The private sector comprises non-financial corporations, households and NPISHs. The BIS debt calculation methodology may differ from the methodologies used by national authorities. For this reason, the data in the chart may differ from those reported by other institutions. The debt figure is as of 2018 Q3.

BOX 2.1: CHANGES IN NON-FINANCIAL SECTOR DEBT AFTER THE GLOBAL FINANCIAL CRISIS

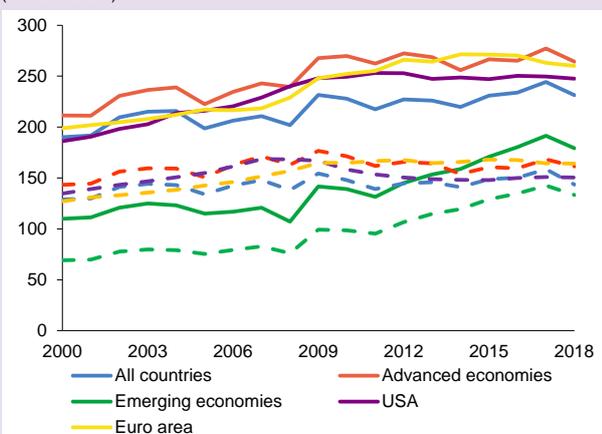
The global financial crisis generated strong disinflationary pressures, to which central banks naturally responded by pursuing a policy of exceptionally low interest rates and in some cases also quantitative easing. It was assumed that this policy would enable the private sector in particular to reduce its debt, which is regarded as one of the major causes of the crisis. Ten years on, we can say that no overall decrease in debt has been observed in advanced or emerging economies (see Chart II.1 Box). Advanced economies have mostly seen an increase in government debt, which in most of the countries under review has exceeded the stagnation or decline in private debt (see Chart II.2 Box). In emerging economies, private sector debt has increased significantly. A reversal of the rising debt trend has occurred in recent years owing to higher economic activity being reflected in faster nominal income growth.

The debt trends have differed substantially across the countries monitored and between the sectors of households and non-financial corporations. In many advanced countries, including the USA, write-offs of non-performing loans after the global crisis, falling property prices and macroprudential measures focused on mortgage loans have been reflected in a decline in household debt (see Chart II.3 Box). By contrast, cheap and available funding has motivated the corporate sectors in many countries to increase their leverage. However, the rise in private non-financial sector debt has often not been accompanied by a rise in debt service (see Chart II.4 Box). On the contrary, debt service has fallen significantly in some of these countries (see Chart II.4 Box, bottom-right quadrant). The main reason is

² In the second half of 2018, increasing political uncertainty in Italy caused government bond yields to rise sharply. The increase immediately passed through to the Italian banking sector through wider CDS spreads and a drop in the share prices of Italian banks (IMF, GFSR, *The euro area sovereign-financial sector nexus*, April 2019).

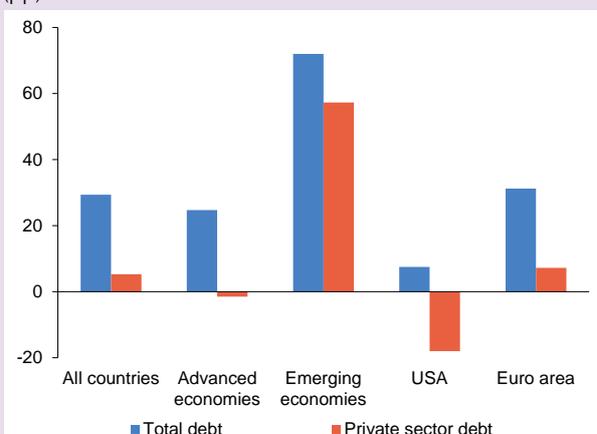
a decrease in global interest rates, due partly to key central banks maintaining their monetary policy rates at exceptionally low levels by historical standards (see Chart II.5). At the same time, however, this situation has become a source of relatively strong risk for some countries, as an increase in interest rates on loans would be reflected in a significant rise in debt service. Coupled with a larger decrease in economic growth, this would adversely affect demand for goods and services and lead to a higher default rate among households and non-financial corporations.

Chart II.1 Box
Non-financial sector debt after 2000
 (% of GDP)



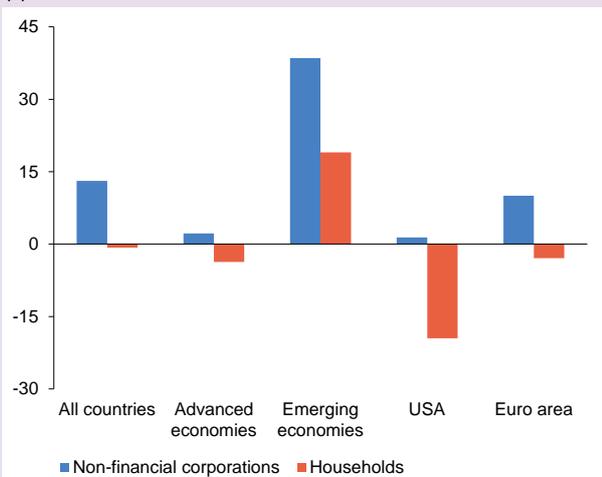
Source: BIS
 Note: The solid lines denote total debt (i.e. including the government sector) and the dashed lines private non-financial sector debt. The data are for 43 countries covered by credit statistics available on the BIS website.

Chart II.2 Box
Changes in non-financial sector debt (2008–2018)
 (pp)



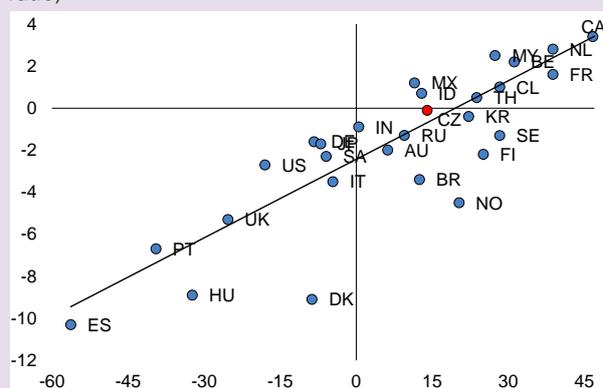
Source: BIS
 Note: The data are for 43 countries covered by credit statistics available on the BIS website.

Chart II.3 Box
Changes in the debt of households and non-financial corporations (2008–2018)
 (pp)



Source: BIS
 Note: The data are for 43 countries covered by credit statistics available on the BIS website.

Chart II.4 Box
Changes in the debt and debt service of the private non-financial sector (2008–2018)
 (pp; x-axis: change in debt; y-axis: change in debt service ratio)



Source: BIS
 Note: The data are for 32 countries covered by debt service statistics available on the BIS website. Debt and debt service are expressed as a percentage of GDP. The Czech Republic is plotted in red. Due to high values, the chart does not show Turkey (changes in debt and debt service of +48.1 pp and +16.6 pp respectively), China (+89.1 and +7.5 respectively) and Hong Kong (+112.6 and +7.9 respectively).

Global monetary conditions are tightening only very slowly and remain very easy in the euro area

Monetary policy normalisation is slowing or being postponed. With the exception of the US Fed, key central banks are keeping monetary policy rates very low (see Chart II.5). The Fed has emphasised that it will proceed patiently and gradually with its future interest rate increases. According to the median of its members' projections, rates can be expected to be stable until the end of 2019.³ The ECB expects its monetary policy rates to stay at the current levels at least until the end of this year. In December 2018, the ECB ended its asset purchase programme after four years.⁴ In March 2019, however, it decided to introduce a new round of operations to provide long-term liquidity to banks.⁵ Monetary conditions in the euro area will thus remain exceptionally easy for at least one year. However, the prolongation of the period of low interest rates by key central banks may postpone the materialisation of the accumulated risks to financial stability and additionally encourage the taking on of new risks, associated with increasing private and government debt (see Box 2.1) or growth in asset prices above their fundamental levels.

The expected slowdown in global growth is reflected in higher financial market uncertainty

Uncertainty regarding future economic developments is also visible on financial markets, where the volatility of the still relatively high asset prices has risen. This was apparent in December 2018, when a combination of worse macroeconomic data and the message of the Fed forecast caused panic among investors regarding an end of growth in financial asset prices, and led to a significant correction, especially on stock markets. The VIX volatility index jumped to double the previous level, the S&P 500 fell by 19% and the European MSCI Euro dropped by 7%. The increase in market uncertainty was also linked with an inversion of US yield curves, which is a traditional warning sign for the markets concerning a potential future weakening of the economy (see Chart II.5 CB). Since the publication of FSR 2017/2018 in June 2018, a global rise in the risk premium for corporate bonds has also occurred (see Chart II.6 CB). The global market situation calmed somewhat in January this year, owing mainly to the dovish tone of the Fed's communications, but the risk of a sizeable reaction of market prices in the event of additional bad news persists.

Chart II.5

Main monetary policy rates of selected central banks

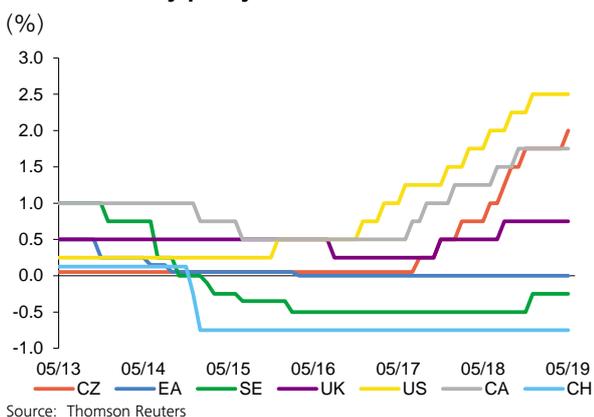
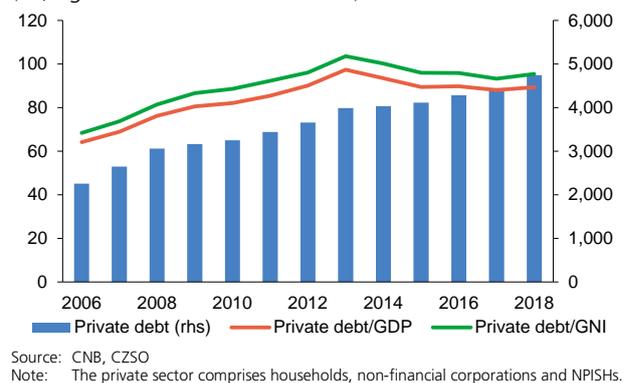


Chart II.6

Private non-financial sector debt in the Czech Republic

(%; right-hand scale: CZK billions)



³ Minutes of the Federal Open Market Committee, March 2019.

⁴ The asset purchase programme ended after four years. The ECB will continue to reinvest the principal payments from maturing securities purchased under the asset purchase programme. By February 2019, 27% of the outstanding amount of the euro-denominated government bonds of the euro area countries were held on ESCB balance sheets (ECB Asset purchase programmes).

⁵ The new quarterly TLTRO III operations with a two-year maturity will run from September 2019 to March 2021. Under TLTRO III, banks will be entitled to borrow up to 30% of the stock of eligible loans as at 28 February 2019 at a rate indexed to the interest rate on the main refinancing operations over the life of each operation (Monetary policy decisions, March 2019).

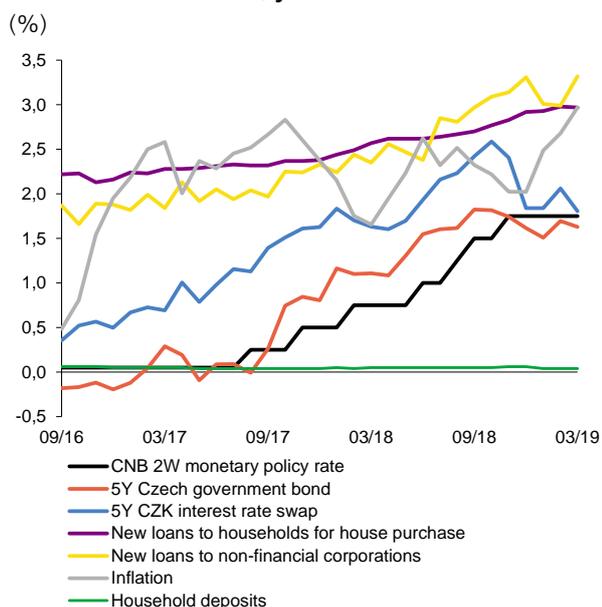
2.1.2 The Domestic Environment

The domestic economy continues to grow, with private non-financial sector debt also increasing

The growth of the domestic economy slowed to less than 3% in 2018. The CNB forecast contained in Inflation Report II/2019 expects year-on-year GDP growth of around 2.5% this year. The favourable development of the domestic economy was due to investment, government expenditure and robust household consumption. The last-mentioned reflected rapid growth in disposable income amid low unemployment. Total private sector debt increased in line with the observed growth of the domestic economy (see section 2.2). The absolute debt level of the private non-financial sector in the Czech Republic rose relatively rapidly, but relative debt remained virtually stable thanks to the buoyant income growth (see Chart II.6). The debt of the domestic private non-financial sector relative to GDP rose by more than 1 pp to almost 89% of GDP at the end of 2018. This represents an increase of 13 pp over the last ten years. However, the debt-to-GNI ratio is higher at almost 96%, although this ratio has not been rising in recent years. The gradual growth in the private sector debt in the Czech Republic could give rise to a structural risk in the medium or long term, particularly if national income was to grow insufficiently. In the event of an economic slowdown or recession (see Chart II.17A), the higher debt level could negatively affect the depth and duration of the recession. The materialisation of external risks, associated mainly with the repricing of global risk premia and with the high debt levels in euro area countries, can still be considered the most likely trigger of a deep recession at the moment.

Chart II.7

Selected interest rates, yields and inflation

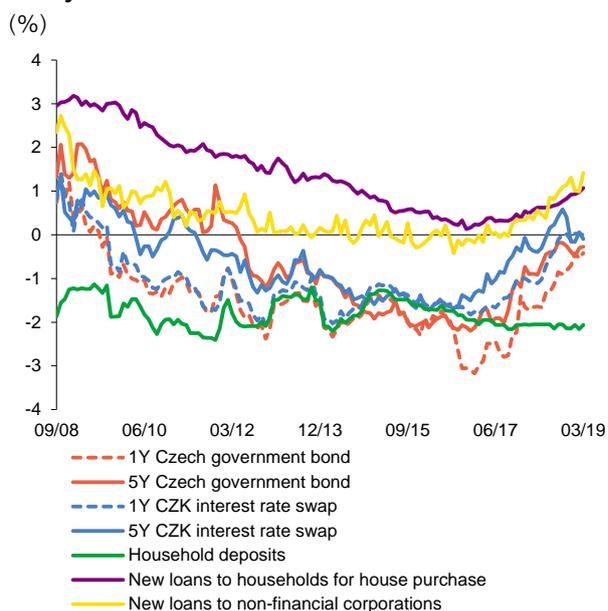


Source: CNB

Note: Month-end values are used, except for client rates, where monthly averages are used instead.

Chart II.8

Real yields and interest rates



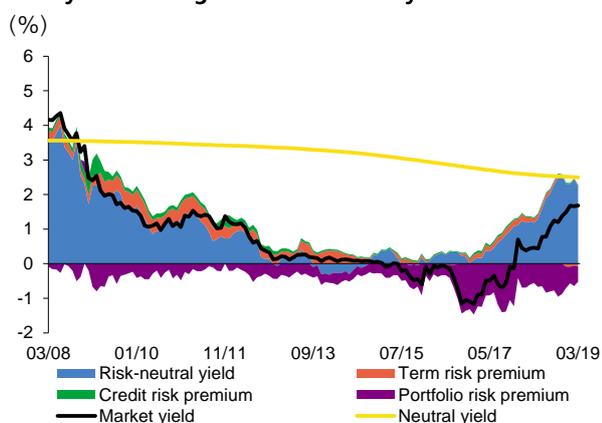
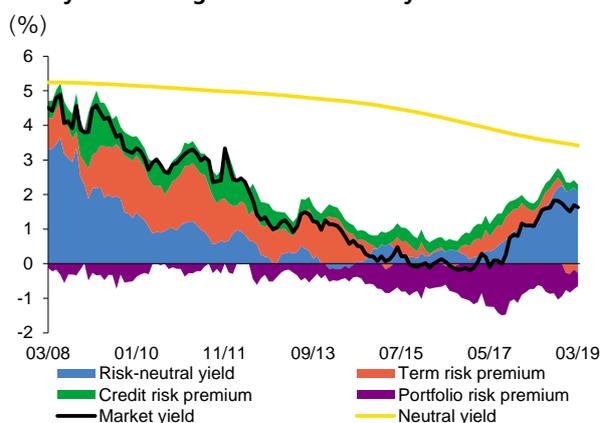
Source: CNB

Note: Real yields and interest rates are calculated as the difference between nominal yields/rates and expected inflation. Expectations one year ahead are considered for the 1Y Czech government bond, the 1Y CZK interest rate swap and household deposits. Expectations three years ahead are considered for the other yields and rates.

The monetary policy tightening by the CNB has been reflected in growth in market interest rates, while risk premia remain low

The CNB has raised its monetary policy rate four times since mid-2018. The rate has thus risen by 100 basis points to 2% (see Chart II.5). The growth in the monetary policy rate has been reflected in a rise in the five-year Czech government bond yield, the five-year koruna interest rate swap, the average interest rate on loans to households for house purchase and the average interest rate on loans to non-financial corporations (see Chart II.7), and has resulted in Czech government bond

yields nearing their neutral levels⁶ (see Chart II.9 and Chart II.10). However, a stronger rise in yields is being hindered by persisting low risk premia. The growth in nominal rates and yields was reflected in growth in real yields (calculated as the difference between nominal rates/yields and expected inflation; see Chart II.8) in 2018. They thus rebounded from the record lows they reached in 2017. By historical comparison, however, they remain below average. This is encouraging domestic institutional investors to allocate part of their portfolios to more profitable risky assets (shares and corporate bonds; see section 3.3). Negative real yields on deposit products are also motivating households to continue investing in higher-yield financial products – especially investment fund units (see Chart II.9 CB) – and to buy property on credit (see section 2.2, Chart II.17 CB and section 5.3.1).

Chart II.9**One-year Czech government bond yield****Chart II.10****Five-year Czech government bond yield**

A shift in expectations about global economic developments has led yield curves to flatten

The slopes of the yield curves for koruna interest rate swaps and Czech government bonds changed in December 2018 and the first few months of 2019. As of 31 March 2019, the bond curve was flat up to a maturity of five years and the interest rate swap curve was even inverted (see Chart II.7 CB). This was due to a combination of macroeconomic and financial factors affecting long-term yields in particular. Expectations of a further increase in the monetary policy rate weakened owing to growth in uncertainty regarding the future development of the global economy and to the major central banks' communications. This illustrates the domestic financial market's high sensitivity to global macroeconomic risks and foreign financial market developments. Risk premia meanwhile decreased at the end of 2018 due to technical effects.⁷ Given the persistence of these risks, including that of a sudden rise in risk premia, increased volatility can still be expected on domestic financial markets.

6 A detailed description of the method for constructing the neutral yield curve and the analytical use of the method can be found in the thematic article by Kučera, A., Szabo, M. (2019): *Estimating the Neutral Czech Government Bond Yield Curve*, Thematic Article on Financial Stability 3/2019, CNB. Together with the estimate of the neutral yield curve, the CNB also revised the method for decomposing the yield curve. This resulted in growth in volatility of the term risk premium in the decomposition compared with previous years. However, the underlying trends in the components and their economic rationale are unchanged. In its analytical use of the methods for decomposing the yield curve and estimating its neutral levels, the CNB continues to monitor the dynamics of its estimated levels rather than the absolute values.

7 Domestic banks reduced the interest paid on financial institutions' deposits to optimise their balance sheets for the calculation of contributions to the Resolution Fund. This increased the demand of depositors (insurance companies and funds) for government bonds, whose yields fell as a result. In the case of interest rate swaps, the decline was also due to speculative trades.

Domestic corporate bonds remain relatively expensive due to low risk premia

Corporate bonds also recorded low risk premia and hence relatively high prices in 2018. The average interest rate spread⁸ for corporate bonds issued by domestic companies and held by domestic financial institutions remained below the long-term average (see Chart II.8 CB). Holdings of corporate bonds by domestic financial institutions thus continued to contribute to the structural element of systemic risk, as corporate bonds may represent a link in the transmission of contagion between non-financial corporations and the financial sector. The importance of this risk increased in previous years as the amount of corporate bonds held by domestic financial institutions grew (see section 3.3). This growth halted in 2016 and the contribution of potential repricing of corporate bonds to systemic risk thus stopped rising.

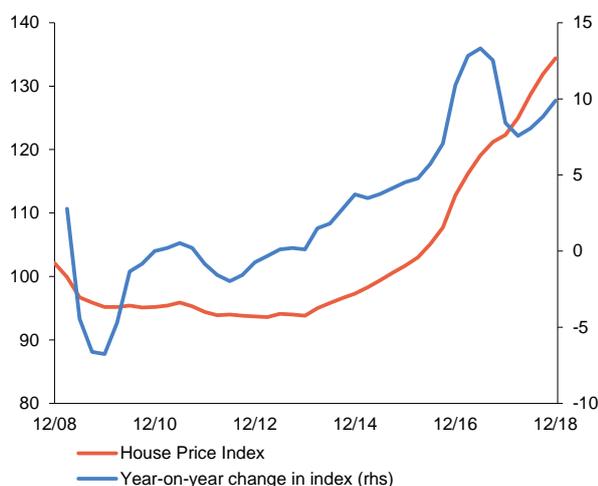
Growth in residential property prices remained high in 2018, accelerating to 10% again in 2018 H2

Transaction prices of residential property returned to rapid growth in Q4 (9.9%; see Chart II.11) following a temporary weakening of their growth in mid-2018. The current property price level exceeds the last cyclical peak in 2008 by more than 30%. The robust growth in transaction prices has long been driven mainly by high growth in apartment prices, although growth in house and land prices also accelerated (see Chart II.9 CB). Apartment prices recorded similar trends to the aggregate price index across the Czech Republic, though with slightly higher growth rates (see Chart II.10 CB). The highest growth was observed for new apartments in Prague. By contrast, growth in asking prices tended to weaken moderately in 2018 H2 (see Chart II.11 CB). This trend, along with the signs⁹ coming in during the initial months of 2019, may be signalling a gradual cooling of price growth and a calming of the tight property market situation.

Chart II.11

Transaction prices of residential property

(2015 = 100; right-hand scale: %)

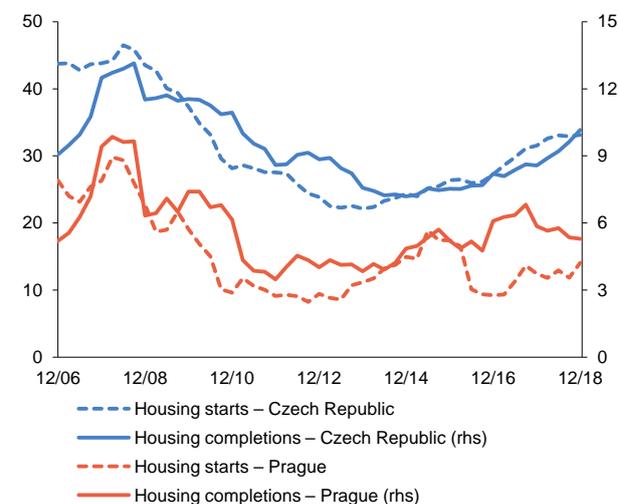


Source: CZSO

Chart II.12

Number of housing completions and housing starts

(thousands)



Source: CZSO

⁸ The interest rate spread is calculated as the difference between the market yield on corporate bonds and the rate for an interest rate swap of identical currency and maturity.

⁹ These signs include a decline in growth in asking prices and a halt in growth in transaction prices in some regions and for selected types of property. Households' borrowing capacity, indicating the maximum loan that households can safely repay, has also stopped rising.

Undersupply of apartments in cities remains a major factor of the rapid growth in property prices

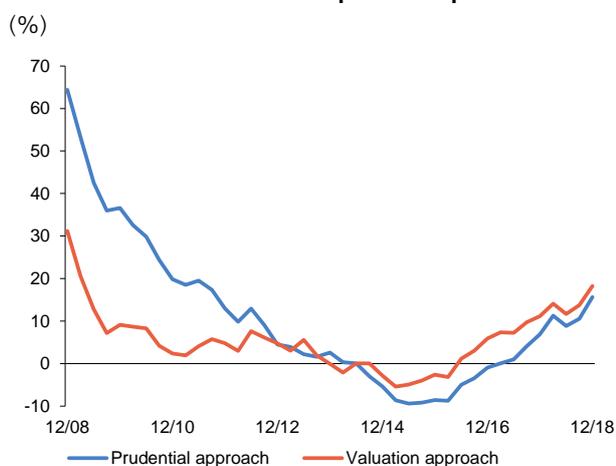
Prices in cities – particularly Prague and Brno – continue to be affected by supply-side constraints, reflecting insufficient construction of new apartments due to the lengthy building permit process. The number of apartment starts and completions is currently about one-half of that in 2008, with construction responding only very slowly to the increased demand for housing in recent years (see Chart II.12). The number of apartment completions in Prague fell slightly further in 2018 and is markedly disproportionate to the amount of transactions there. While sales of apartments in Prague have long accounted for about 65% of total apartment sales in the Czech Republic, the ratio of completed Prague apartments to the total number of apartments completed was less than 15% at the end of 2018 (see Chart II.12 CB).

Apartment price overvaluation has increased and the affordability of housing has deteriorated

The rapid growth in apartment prices was reflected in the affordability of housing. Both price overvaluation metrics used by the CNB¹⁰ are indicating an increasing mismatch between transaction and fundamental prices of apartments in 2018 H2 (see Chart II.13). The currently observed apartment prices thus may not be sustainable in the long run (see section 5.3.1). Despite its favourable trend, household income growth lagged behind apartment price growth without this difference being offset by a drop in interest rates on loans for house purchase (see Chart II.7). On the contrary, those rates went up slightly during the year, pushing attainable housing prices to lower levels. Other housing affordability indicators paint a similar picture. The price-to-income (PTI) and loan service-to-income (LSTI) ratios have been steadily rising over the last two years (see Chart II.14).

Chart II.13

Estimated overvaluation of apartment prices



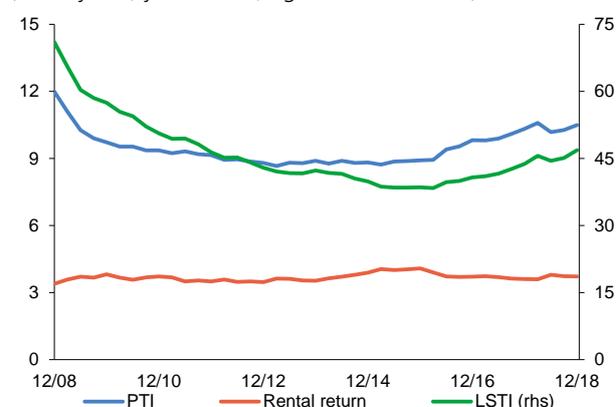
Source: CNB

Note: The methodology of the indicators is described in detail in Plašil, M., Andrlé, M. (2019): *Assessing House Price Sustainability*, Thematic Article on Financial Stability 1/2019, CNB.

Chart II.14

Selected apartment affordability indicators

(PTI in years; yields in %; right-hand scale: %)



Source: CNB, CZSO, IRI, Společnost pro cenové mapy ČR, s.r.o.

Note: PTI is the price-to-income ratio and LSTI the loan-to-income ratio. The apartment price is defined as the average price of a 68 m² apartment. Income is defined as the annual moving total of the gross monthly wage. A loan with an LTV of 80% and a repayment period of 25 years was considered for the LSTI calculation.

¹⁰ The prudential approach and the valuation approach are described in detail in the thematic article Plašil, M., Andrlé, M. (2019): *Assessing House Price Sustainability*, Thematic Article on Financial Stability 1/2019, CNB.

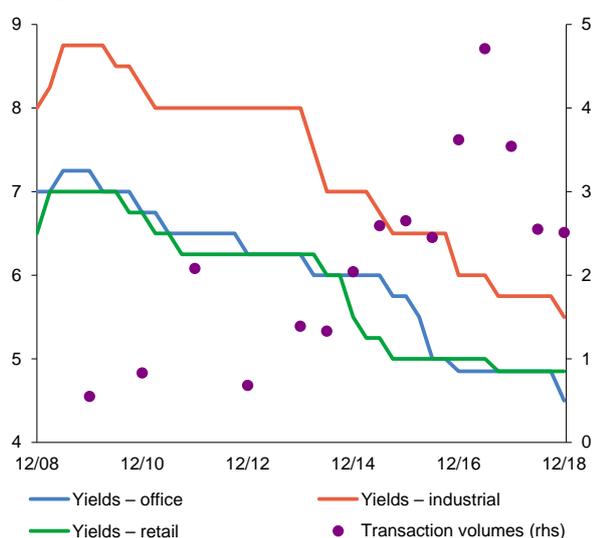
Yields on the monitored types of commercial property remained at historical lows or declined further

Prime commercial property prices stayed high in 2018. Yields demanded by investors remained at historical lows or – in the case of office and industrial property – even declined further in Q4 (see Chart II.15). By the CNB’s estimation, prices of these types of commercial property also remain the most overvalued (see Chart II.16). Rapid growth in overvaluation can be observed especially for office property. On the supply side, the strongest market response to the price growth was in the construction of new industrial property (see Chart II.13 CB). However, the total transaction activity on the commercial property market returned to the levels observed in previous years following sharp upswing in 2017 (see Chart II.15; for additional information see section 5.3.2).

Chart II.15

Yields on commercial property and transaction volumes

(%; right-hand scale: EUR billions)



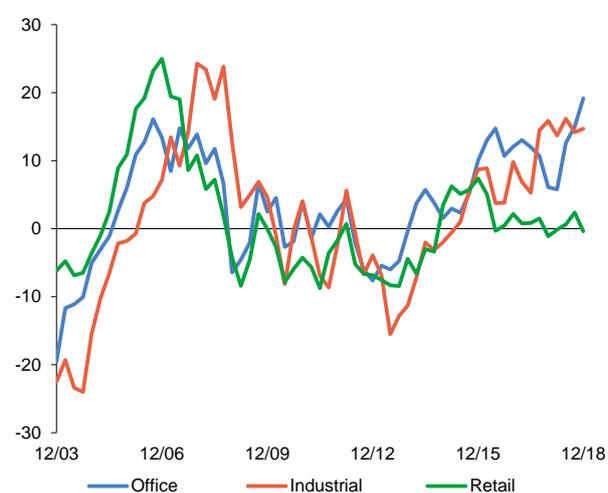
Source: Jones Lang LaSalle

Note: Prime yields. Transaction volumes are reported at annual frequency until 2013 and as annual moving totals at semi-annual frequency from 2014 onwards.

Chart II.16

Estimated overvaluation of commercial property prices

(%)



Source: Jones Lang LaSalle, CNB

Note: Overvaluation as estimated by panel regression on a sample of Central and Eastern European countries (CZ, SK, PL, HU and RO) and Germany. Final overvaluation estimate determined as the four-period average.

2.1.3 Alternative Economic Scenarios¹¹

In the *Baseline Scenario* the growth in domestic economic activity continues...

The *Baseline Scenario* assumes economic growth of 2.9% on average over the four quarters of this year. In the following two years, GDP growth will remain at 3% on average. Increasing investment and continued economic growth are accompanied by rising wages, and the general unemployment rate remains at its current low levels over the entire three-year scenario horizon. Inflation is around the 2% inflation target. Consistent with this scenario are market interest rates, whose average level is flat in the first two years and rises to 2.9% at the end of the third year.

...while in the *Adverse Scenario* the economy gets into a V-shaped recession

The *Adverse Scenario* assumes a marked drop in economic activity around the world due to the materialisation of global risks. The export-oriented domestic economy falls into a recession owing to falling external demand. This causes pessimistic expectations about future economic developments, a downturn in household consumption and deferral of corporate investment. The combination of a downturn in external demand and then also in domestic demand causes a sizeable and long-lasting decline in domestic economic activity and results in a V-shaped recession. The recession – lasting nine quarters – leads to a drop in annual real GDP growth from 2.3% in 2018 Q4 to -5.8% in 2020. In this adverse economic situation, the funds of households and non-financial corporations are gradually exhausted. Coupled with a rise in real debt, this causes their debt servicing ability to worsen significantly. Property prices record a sharp correction and their year-on-year growth turns significantly negative and stays there until the end of the three-year test horizon. The problems in the real economy also affect the financial sector, which records considerable credit losses and a marked drop in profits. The growth rate of loans falls sharply (see Chart II.23). Monetary policy eases, the three-month PRIBOR rate decreases to low levels, where it stays over the entire test horizon, and the exchange rate weakens sharply. However, long-term bond yields increase as global risk aversion increases and the quality of some assets is re-assessed. At the same time, banks tighten their view of credit risk and increase their risk mark-ups on interest rates on new loans, which rise to a much higher level also due to an increase in long-term interest rates. The rise in debt service together with the other impacts of the recession increase the default rate on loans to both households and non-financial corporations (see Chart II.27).

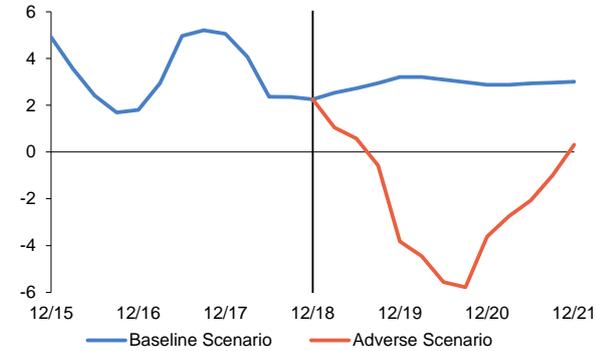
Charts II.17A–F show the evolution of the main macroeconomic indicators of the *Baseline Scenario* and the *Adverse Scenario*. The stress scenario represents very tough but still plausible adverse developments.

¹¹ The *Baseline Scenario* was created for stress testing purposes and is based on the CNB's official forecast published in Inflation Report I/2019, which was approved by the CNB Bank Board on 14 February 2019. The *Baseline Scenario* for the third year and the *Adverse Scenario* were created solely for the purposes of stress testing the financial sector. Therefore, neither the *Baseline Scenario* beyond the horizon of the forecast published in Inflation Report I/2019, nor the *Adverse Scenario* is an official forecast of the CNB.

Chart II.17A

Alternative scenarios: real GDP growth

(year on year in %)

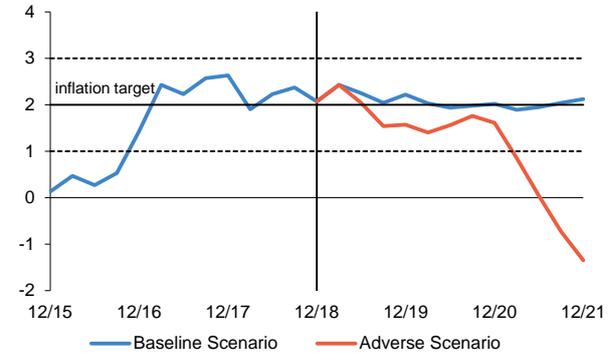


Source: CNB

Chart II.17B

Alternative scenarios: inflation

(year on year in %)

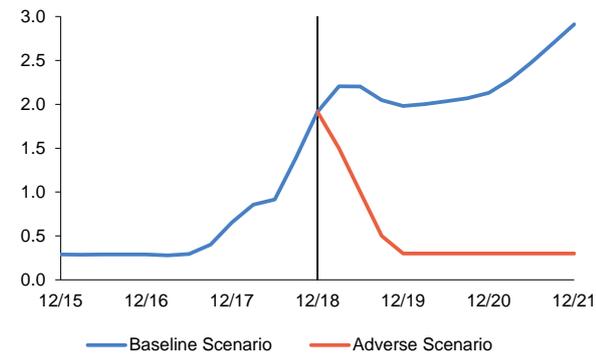


Source: CNB

Chart II.17C

Alternative scenarios: 3M PRIBOR

(%)

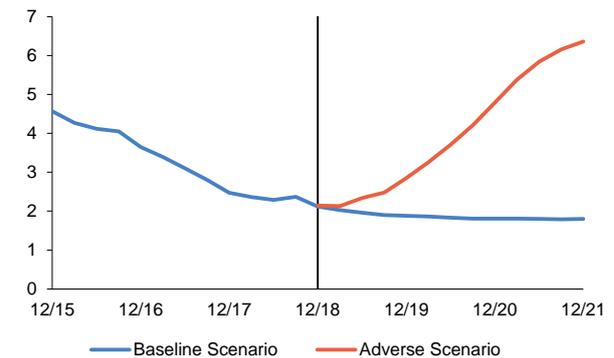


Source: CNB

Chart II.17D

Alternative scenarios: unemployment

(%)

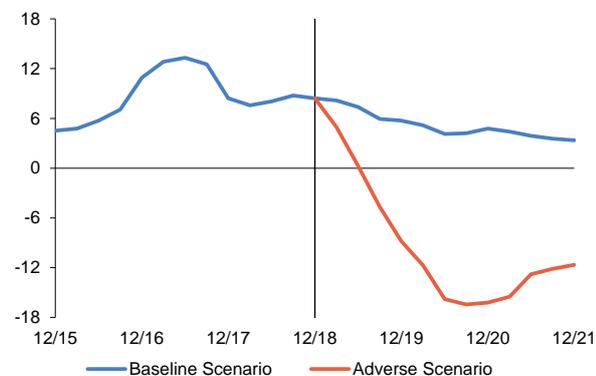


Source: CNB

Chart II.17E

Alternative scenarios: year-on-year property price growth

(%)

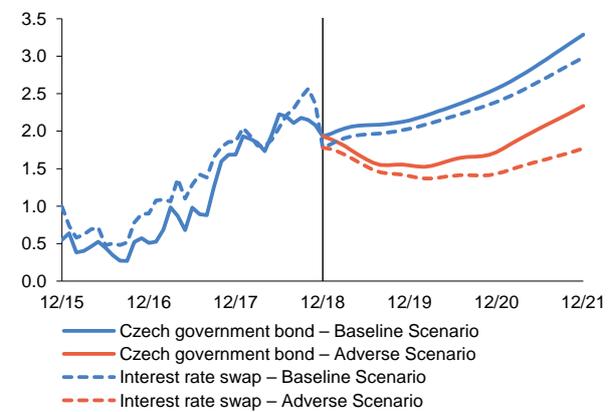


Source: CNB

Chart II.17F

Alternative scenarios: ten-year yields

(%)



Source: CNB

2.2 THE PRIVATE NON-FINANCIAL SECTOR

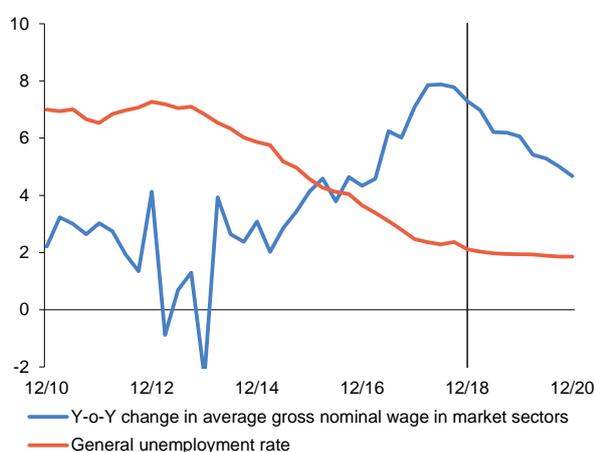
The labour market developed very favourably from the perspective of households, encouraging consumer optimism...

Unemployment continued to decline gradually in 2018. Wage growth remained robust, reaching its cyclical peak in 2018 Q2. The strong wage growth had a positive effect on households' purchasing power and was reflected in persisting optimistic expectations and consumer behaviour (see Chart II.14 CB). The CNB's macroeconomic forecast published in Inflation Report II/2019 expects wage growth to slow gradually to just below 5% in the second half of 2020 and does not expect any further major decline in unemployment (see Chart II.18).

Chart II.18

Labour market indicators

(%)



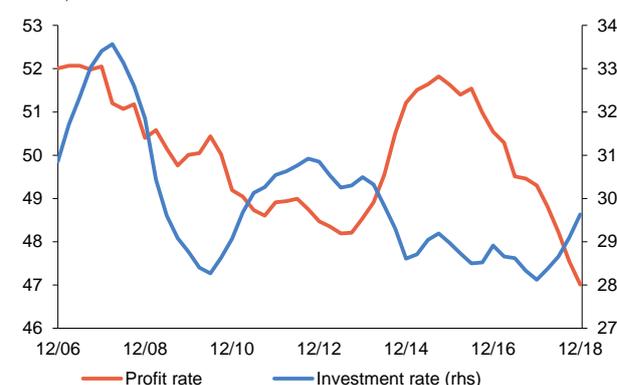
Source: CNB, CZSO

Note: The general unemployment rate is seasonally adjusted. The vertical line divides the observed values and the official macroeconomic forecast in Inflation Report II/2019.

Chart II.19

Profit rate and investment rate in the non-financial corporations sector

(% of gross value added; calculated from annual moving totals)



Source: CZSO

Note: The profit rate is the ratio of gross operating surplus to the gross value added of the sector. The investment rate is the ratio of gross fixed capital formation to the gross value added of the sector.

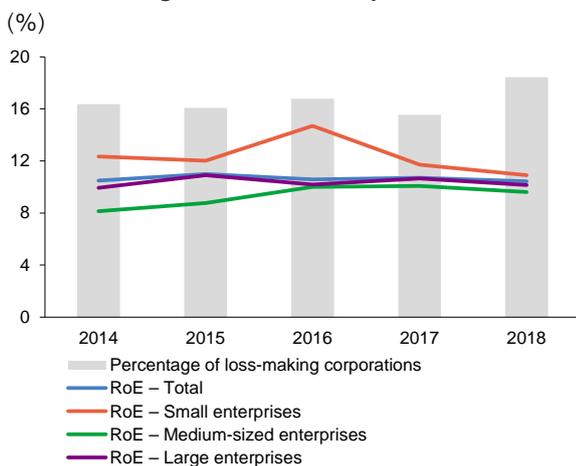
...but for non-financial corporations meant a decline in profitability...

The wage growth combined with growth in employment led to a year-on-year increase in compensation of employees of 9% at the end of 2018. This caused the sector's gross operating surplus to decline and its profitability to decrease further (see Chart II.19) across all firm sizes. The proportion of loss-making firms also increased considerably (see Chart II.20), especially in property development, manufacturing and energy generation and distribution. However, the average return on equity in manufacturing as a whole (particularly the automotive industry) remained well above that in other sub-sectors (see Chart II.21). If the *Baseline Scenario* were to materialise, most sub-sectors would maintain or slightly increase their current profitability in the years ahead (see the new stress test of the non-financial corporations sector in Box 2.2). Profitability in manufacturing, however, would drop. The sector's profit rate would be flat in 2019 and rise slowly in the following years due to weakening wage growth.

...and a shift to higher investment in an effort to substitute labour with capital

The shortage of labour and fast growing labour costs also affected corporate investment. Gross fixed capital formation in non-financial corporations rose at its fastest rate since 2008, the total volume being 9.7% higher year on year in 2018. However, investment bank loans tended to decline year on year (see Chart V.5), indicating that non-financial corporations financed investment partly using profits generated in the past or funds obtained outside the banking sector. Comparing the profit rate and the investment rate at the pan-European level, non-financial corporations in the Czech Republic have above-average levels (see Chart II.15 CB and Chart II.16 CB).

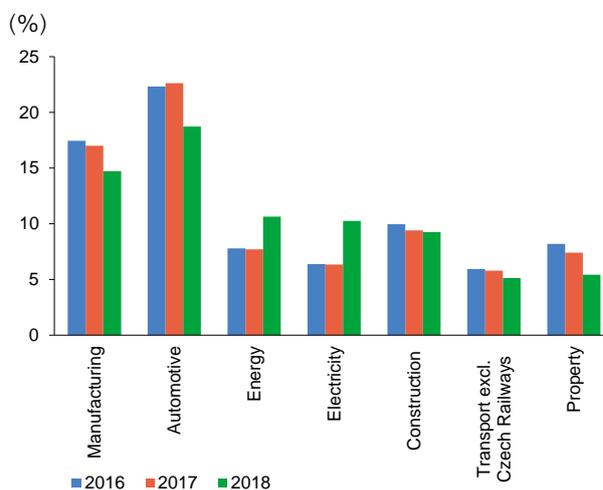
Chart II.20

After-tax RoE by enterprise size and percentage of loss-making non-financial corporations

Source: CZSO

Note: The results are based on a sample of non-financial corporations. The sample contains around 1,500 corporations accounting together for more than 40% of the sector's gross value added.

Chart II.21

After-tax RoE in selected sub-sectors

Source: CZSO

Note: Energy comprises electricity, gas, heat and air-conditioned air. The results are based on a sample of non-financial corporations. The property development sector is included under construction.

BOX 2.2: STRESS TESTING IN THE NON-FINANCIAL CORPORATIONS SECTOR

The non-financial corporations sector is the most important sector of the national economy in terms of size. It accounts for around 62% of gross value added formation in the whole economy. It is therefore regularly subjected to detailed analyses. However, no analytical tool taking into account the heterogeneity of the sector and modelling the importance of inter- and intra-sector links for the spread of negative shocks across sub-sectors has yet been fully developed for the domestic economy. Analysing these links is of crucial importance because the transmission of shocks between sub-sectors can exacerbate a decline in the output of the sector as a whole, worsen its profitability and subsequently spill over to other sectors (in the form, for example, of a reduction in demand for labour or a deterioration in debt servicing ability).

Stress-testing exercises are carried out by many central banks. The most frequently used approaches include sensitivity analysis of individual risk indicators (such as interest coverage or profitability) and aggregate risk characteristics (such as the Altman Z score¹²) and non-linear credit risk estimates for large corporations (the Merton model¹³). The advantages of these methods are that they are simple to construct, their results are easy to interpret and they have low data-intensity. Nevertheless, these approaches do not enable us to capture the above spread of economic shocks across sub-sectors and the potential reactions of sub-sectors to a drop in demand in other sub-sectors (the indirect effects of shocks).

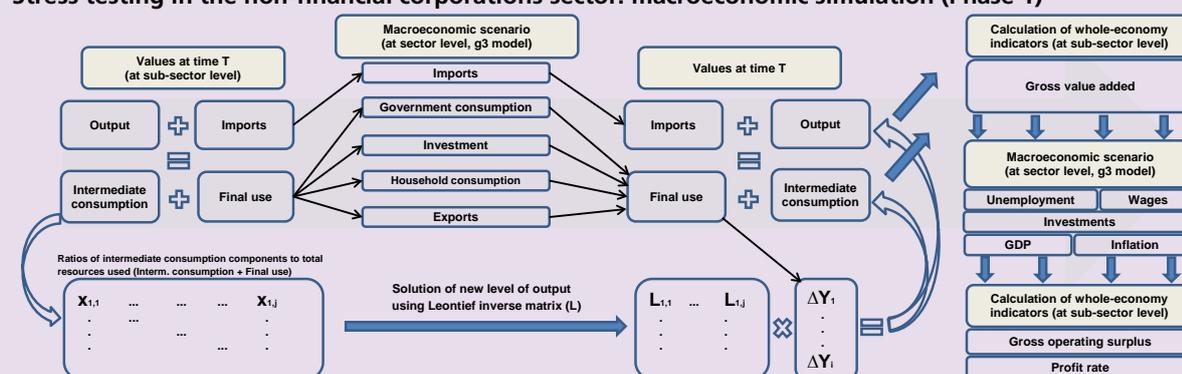
12 Altman, E. (1968): *Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy*, Journal of Finance, 23(4), pp. 189–209.

13 Merton, R. (1974): *On the Pricing of Corporate Debt: The Risk Structure of Interest Rates*, Journal of Finance, 29(2), pp. 449–470.

The CNB therefore started to develop a more realistic model for stress testing the non-financial corporations sector, one that captures the production linkages between sub-sectors. The model is based on the system of national accounts, which defines the main economic identities, and on input-output tables providing a detailed description of the linkages between sub-sectors. The model construction process involves two phases. In the first phase, the relationships in the production chain across sub-sectors are defined and the effect of the macroeconomic scenario on their profitability and risk characteristics is estimated. The first step of this phase is based on the economic identity¹⁴ that the sum of the total production and imports of each sub-sector equals the sum of intermediate consumption¹⁵ and end-use.¹⁶ Demand for end-use is based on the macroeconomic scenario. With knowledge of the end-use (a direct effect), the size of the indirect effects resulting from changes in intermediate consumption can be quantified and the resulting changes in total production can thus be modelled (see Figure II.1 Box). In the second step of this phase, the evolution of input costs is estimated on the basis of the underlying macroeconomic scenario, and gross value added and gross operating surplus are derived for each sub-sector.

Figure II.1 Box

Stress testing in the non-financial corporations sector: macroeconomic simulation (Phase 1)



Source: CNB

The first phase of the model was applied to the *Baseline Scenario* using the latest known (end-2017) input-output table. Chart II.5 Box and Chart II.6 Box show the future evolution of the whole-economy profitability ratios in the form of the gross operating surplus or the profit rate in the largest sub-sectors. Heterogeneity is observed in the growth rates of the gross operating surplus across sub-sectors in the first two years. This disappears in subsequent periods, owing to the assumption that each end-use component has the same effect on all sub-sectors and the overall impact is not differentiated for different sub-sectors. However, this assumption can be adjusted depending on the specific scenario simulated, enabling selected cyclical sub-sectors to be subjected to higher stress. In the case of the profit rate, the effect of above-average wage growth is reflected in the developments in the initial years.

The estimated whole-economy indicators represent the main input information for the second phase of the stress test, where the macroeconomic impacts are reflected in the performance of individual corporations and their default risk is assessed. In this phase, it is necessary to link the performance of the sub-sector with the balance sheets and profit and loss accounts of individual firms. This part of the stress test is currently being developed.

14 This description abstracts from taxes, subsidies, margins on goods and transport mark-ups, which transform production from basic prices to purchase prices. These items are taken into account in the model.

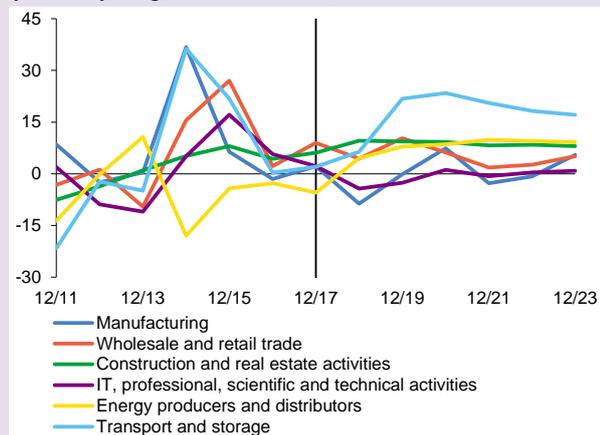
15 Intermediate consumption is the value of the goods and services consumed during the period in question by resident producers in the process of production of goods and services.

16 End-use consists of the consumption expenditure of households, non-profit institutions serving households and the government sector, gross fixed capital formation, changes in inventories and exports.

Chart II.5 Box

Growth rate of gross operating surplus in the largest sub-sectors

(year-on-year growth rate in %)



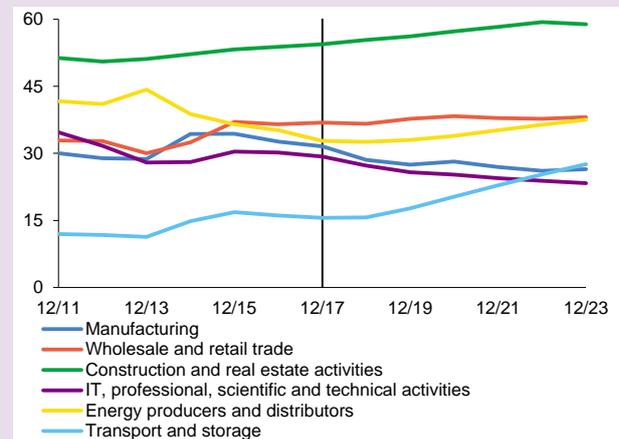
Source: CZSO, CNB

Note: The vertical line divides the observed values and the forecasted values. The forecast for each sub-sector is based on the macroeconomic forecast published in Inflation Report I/2019. The forecast threshold corresponds to 2017 in line with the latest known input-output table.

Chart II.6 Box

Profit rate in the largest sub-sectors

(%)



Source: CZSO, CNB

Note: The profit rate is the ratio of gross operating surplus to the gross value added of the sector. The vertical line divides the observed values and the forecasted values. The forecast for each sub-sector is based on the macroeconomic forecast published in Inflation Report I/2019. The forecast threshold corresponds to 2017 in line with the latest known input-output table.

External demand developments remain the primary risk to the non-financial corporations sector...

Given that the domestic economy is strongly export-oriented, the largest risk to the non-financial corporations sector is a fall in external demand. This risk increased last year due to a heightened level of uncertainty regarding the increase in protectionism in international trade, the still incomplete Brexit negotiations (Inflation Report I/2019, section II.4 and Box) and the slowdown of the global economy. This uncertainty has been incorporated to a large extent into the *Adverse Scenario* (see section 2.1). Persisting strong growth in wage costs could also pose a risk to the financial health of the non-financial corporations sector, exerting downward pressure on their profitability or reducing their competitiveness on the international scale.

...while continued over-optimism in an environment of favourable financial conditions and high wage growth is the main risk to the household sector

A sustained combination of low interest rates and buoyant wage growth can cause households to succumb to the illusion of being able to service loans without any problem. As a result, they increase their debt levels and their consumption, which they are increasingly willing to finance on debt (see Chart V.3 and Chart II.14 CB). The accumulated risks then materialise when client interest rates suddenly increase, wage growth drops¹⁷ and unemployment rises. In these circumstances, a proportion of households with high levels of debt could get into financial difficulties and stop repaying their debts (see section 4.3). Another possible manifestation of a long period of low interest rates is a decrease in the saving rate (see Box 2.3). In the case of the Czech economy this is not confirmed for the time being, because the saving rate, after falling somewhat, started to rise again during 2018 according to the latest available data (see Chart II.8 Box). If household savings are invested in assets sensitive to developments on financial markets (see Chart II.17 CB), a sudden repricing of such assets can trigger a fall in their consumption and investment and indirectly also an economic slowdown and a deterioration in loan portfolio quality.

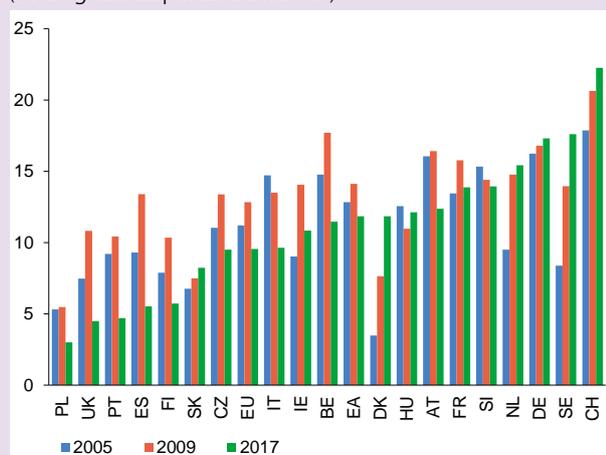
¹⁷ The fixed component of wages (base wages) is characterised by strong downward rigidity. Nonetheless, a significant portion of wage growth consists of a rise in the flexible component of wages (benefits and bonuses), which can be highly sensitive to changes in the business cycle. This portion can decrease considerably, causing overall wage growth even to turn negative.

BOX 2.3: HOUSEHOLDS' SAVING AND INVESTMENT BEHAVIOUR OVER THE CYCLE

Household saving and investment rates are useful indicators of the economy's position in the business and financial cycle. Czech households' gross rate of saving from disposable income¹⁸ (the portion of their disposable income that is not used for consumption) is not low in the long term by comparison with other European countries and is also quite stable (see Chart II.7 Box and Chart II.8 Box).¹⁹ Data from the last two decades also indicate that Czech households tend to behave procyclically and do not smooth consumption by changing their saving rates. In other words, they do not save more in good times in order to maintain their consumption level in bad times. This is because the precautionary motive plays a big role in households' behaviour. Once a recession or heightened economic uncertainty arrives, they prefer to rein in their consumption and attempt to save more in order to create reserves. With the onset of the global financial crisis in 2009, households in most EU countries reacted similarly (see Chart II.7 Box). The similarity of the reaction is probably due to the extraordinary intensity of the shock to which economies were exposed at the time. As the crisis faded, the saving rate in most countries decreased again, although large differences arose between countries. These are nothing unusual, as the saving rate generally differs across countries due to institutional, demographic and socio-economic differences.

Chart II.7 Box**Gross saving rates of households in EU countries**

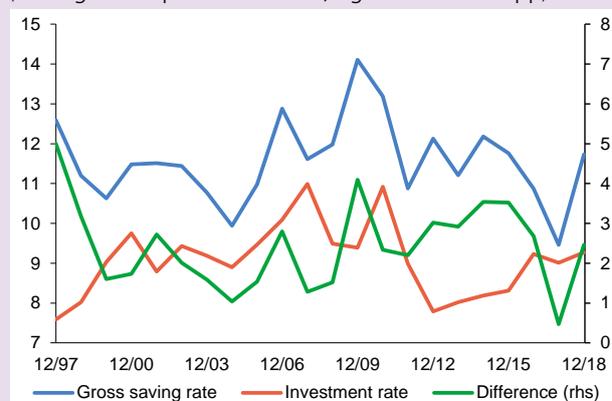
(% of gross disposable income)



Source: Eurostat

Chart II.8 Box**Gross saving and investment rates of households in the Czech Republic**

(% of gross disposable income; right-hand scale: pp)



Source: CZSO

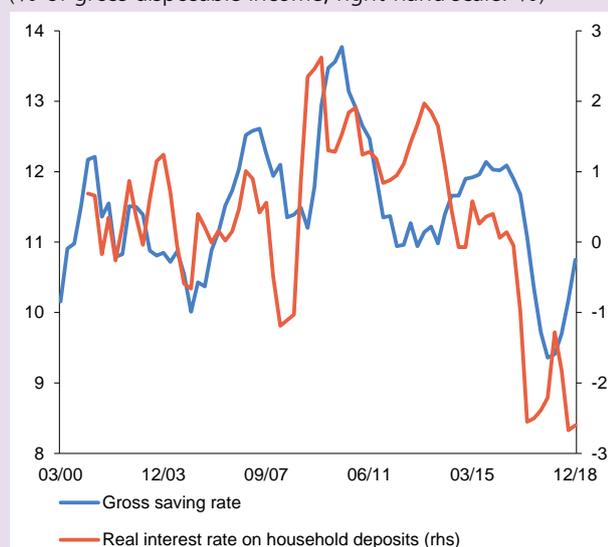
18 In the national accounts, "saving" means the difference between income and consumption expenditure in a given period (a flow variable). It differs from the term savings as commonly used to mean the accumulated stock of financial assets (a stock variable), which is referred to as financial wealth in the national accounts. This box discusses saving measured in terms of flows.

19 Gross saving and investment rates should be interpreted with considerable caution, as the saving rate is obtained indirectly and can therefore be subject to significant revisions. The cross-country comparability of the two indicators may be limited by, for example, differences in methodology or in pension systems.

According to prevailing theoretical approaches, the decrease in households' saving rates in many European countries in recent years can be explained by the low nominal and real interest rates on the products in which the savings are invested. These approaches assume that changes in (real) interest rates affect households' decisions via a substitution effect due to positive a time preference. A decrease in interest rates leads to an intertemporal substitution effect where households prefer current to future consumption (i.e. they increase their current consumption and reduce their current saving rate). Such behaviour is due to falling opportunity costs in the form of interest foregone. If the interest compensating for deferring consumption to the future is too low, consumers will prefer to increase their current consumption and reduce their saving. In the Czech Republic, there is quite a strong correlation between the gross saving rate and the real interest rate, testifying to the existence of a substitution effect (see Chart II.9 Box).

Chart II.9 Box

Gross saving rate of households and real interest rate
(% of gross disposable income; right-hand scale: %)

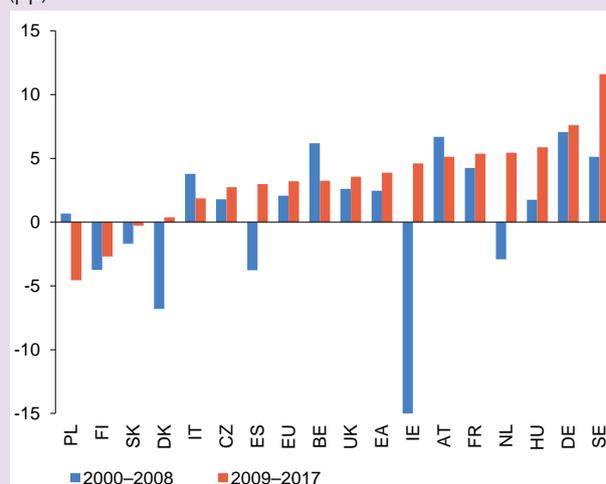


Source: CZSO, CNB

Note: The real interest rate is calculated as the difference between the average deposit interest rate and core inflation.

Chart II.10 Box

Difference between households' gross saving and investment rates in the pre-crisis and post-crisis decades
(pp)



Source: Eurostat

Note: Saving and investment rates are calculated as a percentage of gross disposable income.

However, the results of empirical studies on the relationship between the saving rate and interest rates do not show an unambiguous relationship in any country. This is because the reaction of the saving rate to a change in interest rates is also influenced by an income effect. It describes the situation where a decrease in interest rates leads to an increase in the saving rate. Households expect a lower future stream of income on their assets and attempt to save more in order to make up their intended future level of asset income. In other words, individuals try to reach a certain level of savings at lower interest rates in order to maintain their desired future standard of living. The resulting overall impact of changes in interest rates (the interest elasticity of the saving rate) thus depends on whether the substitution effect or the income effect prevails.

The majority of empirical studies tend to conclude that the substitution effect is dominant, especially for developed economies.²⁰ It can be assumed that the same is true for the “cultural environment” in which the Czech Republic is now. Some studies also suggest that the income effect may be strong or even dominant in countries with demographically uneven population distributions, minimal social systems, highly unstable economic activity or untrustworthy pension systems.

The decrease in saving rates in many countries in recent years can be considered risky from the long-term perspective. Household savings are one of the main sources of financial investment in the real economy, which is a key factor of economic growth. Besides their wealth, households generally use a substantial portion of their savings to buy and maintain owner-occupied housing. In particular, if house prices rise faster than households’ income, the investment rate in the household sector may exceed the saving rate for a time. In such a case, households draw on the savings they have accumulated in the past, the savings of other sectors, or foreign sources. This has not yet happened in the case of Czech households (see Chart II.8 Box), although in 2017²¹ the difference between the two indicators was almost zero. The situation is similar in most EU countries (see Chart II.10 Box). It is worth mentioning that some countries (DK, ES, IE, NL) recorded negative differences in the pre-crisis decade, differences which were completely eliminated in the post-crisis years. It is no coincidence that these countries recorded significant increases in household indebtedness in the pre-crisis years against a backdrop of strong growth in house prices. In cases where households invest largely in “overpriced” properties, inefficient utilisation of savings may occur. This, in turn, is usually reflected in sharp macroeconomic volatility and structural distortions in the economies concerned. Correctly conducted macroprudential policy helps to prevent such episodes from becoming excessive.

Borrowing by non-financial corporations picked up pace in 2018 and their ratio of debt to gross operating surplus rose...

Year-on-year growth in bank loans to non-financial corporations reached 6.2% in March 2019 (see Chart V.3) and remained above-average in the context of the last ten years (see Chart V.4). Financing by non-bank financial corporations engaged in lending rose at the same rate, while the volume of bonds issued recorded somewhat weaker growth (4.4% year on year in 2018 Q4). Despite a temporary decrease, the rate of growth of foreign currency bank loans to non-financial corporations remains higher in the long run than that of total loans. Accordingly, the share of foreign currency loans rose by 2.3 pp to 31.6% of bank loans provided to this sector (see Chart II.22). In accordance with the observed credit dynamics, the ratio of non-financial corporations’ total debt²² to gross operating surplus increased to 218%. However, it remains the second lowest in the OECD. The *Baseline Scenario* assumes that growth in the stock of loans will slow slightly to around 4% (see Chart II.23). If the *Adverse Scenario* materialises, the economy will experience a strong credit contraction and the growth rate of loans to non-financial corporations will quickly turn negative. Year-on-year growth in new koruna bank loans in the non-financial corporations sector was highly volatile during the year (see Chart II.24). Nonetheless, the total volume of new koruna loans as of March 2019 had increased over the past 12 months by a solid 8.1% compared with the preceding 12 months.

20 Aizenman, J., Cheung, Yin-Wong and Hiro Ito (2016): *The Interest Rate Effect on Private Saving: Alternative Perspectives*, NBER Working Paper, No. 22872. Lehrer, E., and Bar Light (2018): *The Effect of Interest Rates on Consumption in an Income Fluctuation Problem*, *Journal of Economic Dynamics and Control*, 94, pp. 63–71.

21 The latest available data are for 2017.

22 Total debt here encompasses bank loans, bonds, loans from non-bank lenders and intra-company loans.

Chart II.22

Selected characteristics of foreign currency loans in the non-financial corporations sector

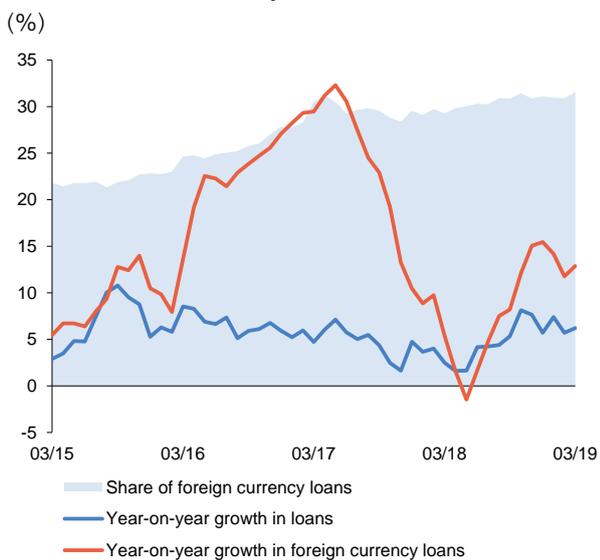
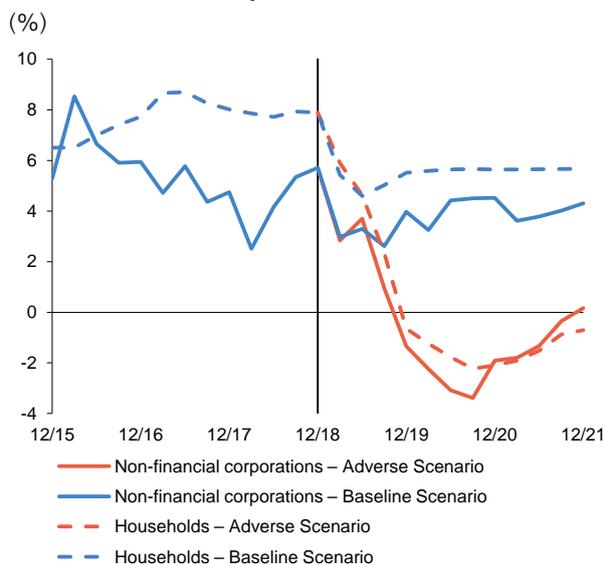


Chart II.23

Year-on-year growth in bank loans to households and non-financial corporations



...the volume of loans drawn by the household sector remained elevated

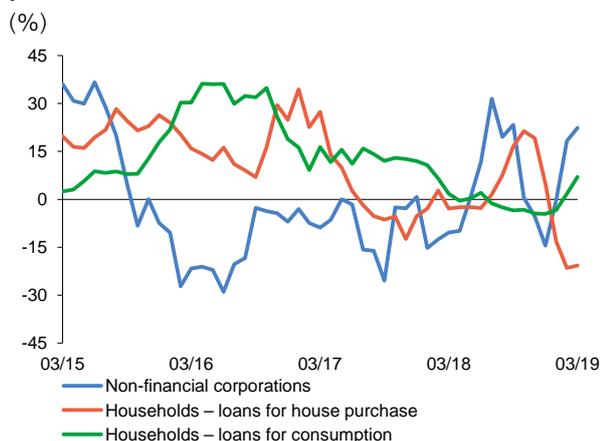
In March 2019, the rate of growth of loans for house purchase decreased by 0.7 pp year on year to 8.0%, whereas that of loans to households for consumption increased by 1.6 pp year on year to 6.2% (see Chart V.3). Despite having slowed slightly, the growth in the stock of loans for house purchase remains high and is contributing to high growth in prices of residential property (see sections 2.1 and 5.3.1). In addition to optimistic expectations (see Chart II.14 CB), the credit activity of households was supported by persisting low loans rates, which have so far only partly reflected the monetary policy tightening in 2018 (see Chart II.7 and section 2.1). Taking into account wage growth, the perceived real costs of loans for house purchase remain highly negative. Growth in new bank loans provided to households for house purchase showed a high degree of volatility (see section 5.3.1). The total volume of loans granted in the past 12 months compared with the preceding 12 months did not rise further in March 2019, but is still above the historical average (see Chart II.24). In the *Baseline Scenario*, the rate of growth of loans to households will drop to 5.5% in 2019 and remain stable in the following years (see Chart II.23). In the *Adverse Scenario*, by contrast, the growth rate of loans will fall rapidly.

Household debt remained flat in relation to disposable income

The debt-to-income ratio of households was flat at 60.8% in 2018 (see Chart II.25). It is still relatively low in the European context and does not currently represent an immediate source of systemic risk. However, the pace of growth of disposable income observed in 2017 and 2018 is probably unsustainable in the long run. Assuming that income growth returns to lower levels and credit growth stays unchanged, the debt ratio could thus start to rise more markedly.

Chart II.24

Year-on-year growth in new koruna loans to the private non-financial sector



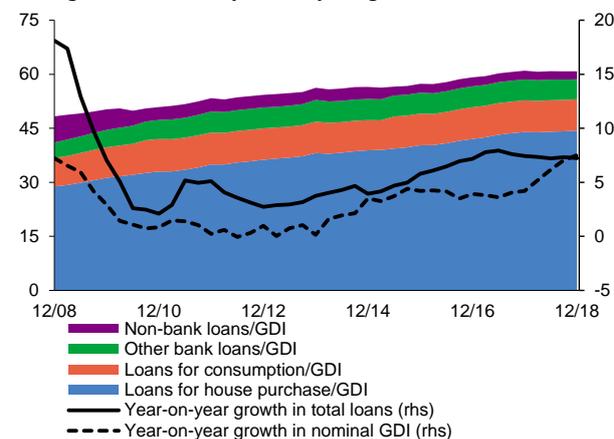
Source: CNB

Note: The household sector also includes data for NPISHs. The year-on-year growth rates are smoothed by the 3-month moving average.

Chart II.25

Household indebtedness and income indicators

(%; right-hand scale: year-on-year growth in %)



Source: CNB, CZSO

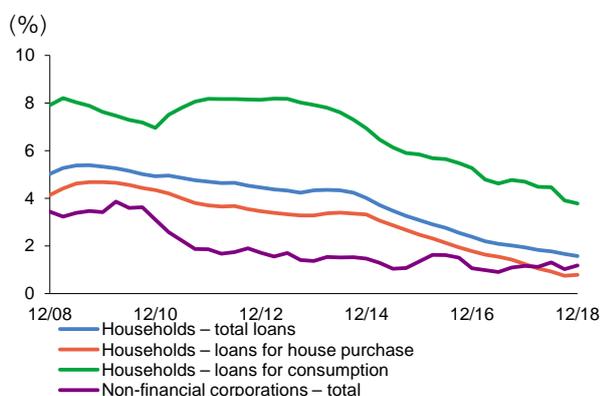
Note: Non-bank loans are loans provided by other financial institutions. GDI stands for gross disposable income. The household sector also includes data for NPISHs.

Credit risk continued to follow a downward trend

Credit risk in the non-financial corporations sector, as measured by the 12-month default rate, fluctuated between 1.0% and 1.5% and has probably reached its cyclical trough (see Chart II.26). A decrease in credit risk was seen in the household sector, due to income growth and currently low debt servicing costs. Neither sector is likely to see any significant decrease in credit risk in the next few years. The *Baseline Scenario* expects the 12-month default rate for corporations and households to decrease only very slowly. If the *Adverse Scenario* were to materialise, credit risk would increase sharply to almost 5% in the first two years. Subsequently, the default rate would remain high or start to fall slowly (see Chart II.27). The non-performing loan ratio, measuring the materialisation of risks taken on in the past, followed the same pattern as credit risk, being flat in the case of non-financial corporations and decreasing slightly in the household sector (see Chart II.19 CB). This decrease was due not only to positive economic developments, but also to strong credit growth, which contributed to an increase in the denominator of the indicator.

Chart II.26

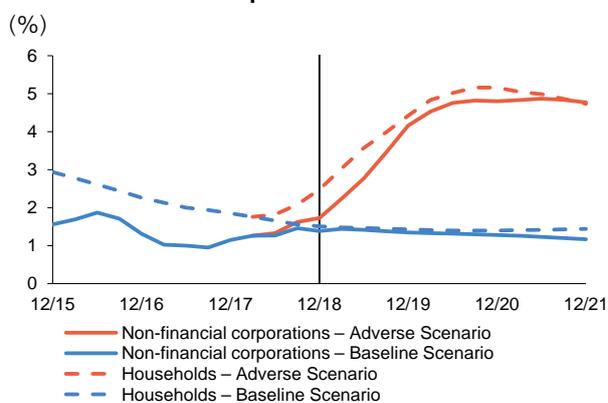
12-month default rate in the private non-financial sector



Source: CNB, CIBR

Chart II.27

12M default rate on bank loans to households and non-financial corporations



Source: CNB