Economic Review

June 2017

National Bank OF BELGIUM
Eurosystem

ISSN 1780-664X

Contents

ECONOMIC PROJECTIONS FOR BELGIUM – SPRING 2017 7

PUBLIC SECTOR EFFICIENCY IN BELGIUM 31

LOW INTEREST RATES AND THEIR IMPACT ON BELGIAN HOUSEHOLDS 43

ANALYSIS OF THE DEVELOPMENTS IN RESIDENTIAL PROPERTY PRICES: IS THE BELGIAN MARKET OVERVALUED? 61

DIGITAL CURRENCIES: THREATS AND OPPORTUNITIES FOR MONETARY POLICY 79

SERVICES INFLATION: THE BELGIAN EXCEPTION 93

LOW INFLATION IN THE EURO AREA: CAUSES AND CONSEQUENCES 111

ABSTRACTS FROM THE WORKING PAPERS SERIES 127

CONVENTIONAL SIGNS 129

LIST OF ABBREVIATIONS 131

Economic projections for Belgium – Spring 2017

Introduction

As predicted in the autumn forecasts, the global economy bottomed out from the second half of last year. Despite the various – mainly political – uncertainties and shocks, it seems that growth in both the advanced and the emerging countries has at least stabilised. According to the latest statistics, world growth outside the euro area in 2016 actually slightly exceeded overall what was expected in the ECB's March 2017 forecasts. According to the first estimates, activity growth in the first quarter of 2017 in some major countries such as the United States, China and the United Kingdom fell somewhat short of expectations although – certainly in the case of the US – that could also be attributable to additional seasonal effects. However, those rather disappointing quarterly growth figures have little impact on the outlook for the medium term, as the short-term growth estimates remain favourable. As in the latest estimates by the leading international organisations, the common assumptions applied to these projections which were finalised on 17 May 2017 therefore also assume that global growth year-on-year will remain modest but continue to strengthen over the projection period.

The recent striking recovery of world trade is significant in that connection: at the end of 2016, import demand in the advanced and emerging countries recorded a marked increase which was stronger than expected. The initial figures for 2017 also indicate a continuing vigorous expansion of trade. Although recent trade statistics must always be interpreted with due caution, it is encouraging that estimates of world trade – which for a long time fell short of predictions – can now be revised upwards again. That may be due partly to a revival in investments, which are highly import-intensive, but may also indicate more generally that the improvement in world trade is accompanied by a recovery of the global production chains, making growth more robust and less dependent on the situation in some individual countries. Nevertheless, the common assumptions, the main ones being described in box 1, take account of a gradual decline in the trade intensity of growth to around 1, because some factors which have raised that intensity in the past – such as the progressive liberalisation of trade – are likely to have less influence during the projection period.

Calm has also been restored on the financial markets. Following the abrupt rise in interest rates at the time of the American presidential elections in November 2016, which mainly seemed to reflect rising inflation expectations against the backdrop of a probably more expansionary fiscal policy in the United States, but which also spread to other countries, market interest rates have ceased rising. In the past few weeks, they have also declined as market expectations concerning the future fiscal policy were gradually adjusted downwards. In the euro area, where the interest rate increase was more limited, rates remain close to the historical low. Share prices have risen more or less continuously since last year, bolstered partly by the still highly accommodative monetary policy, but also by the improving outlook for profits as economic activity gains momentum. Following the restrictions on production introduced by the oil-producing countries at the end of last year, after the autumn forecasts were finalised, oil prices surged but have since gradually subsided to a level that does not appear to be hampering global growth at present.

In the euro area, the economy also grew steadily at the beginning of 2017. While the German economy expanded

slightly more strongly, and growth in Spain remained high, the French and Dutch economies slowed down somewhat. Moreover, the short-term indicators – such as those concerning business sentiment – still point to a very favourable outlook for the euro area in the second quarter of this year. According to the latest Eurosystem estimates, which include the spring forecasts described in this article, and which were finalised on 23 May, activity in the euro area will therefore continue to expand at roughly the same rate and strengthen somewhat on an annual basis to around 2 % in 2017. After that, growth is expected to decline slightly in the following two years as employment and domestic demand gradually lose momentum, and even more so as labour market supply constraints in some countries are likely to weigh more on growth. Although the common assumptions have been revised upwards overall, the growth outlook remains fairly close to the ECB's March 2017 forecasts. Inflation in the euro area is forecast to surge in 2017 before remaining more or less unchanged. The increasing domestic cost pressure is likely to be offset to some extent by declining energy inflation since oil prices should no longer be rising in the second half of the projection period. However, like real inflation, core inflation is also expected to remain below 2 % at the end of 2019.

Regarding Belgium, estimates have barely been revised compared to the autumn forecasts. Growth for 2017 was upgraded slightly, primarily on account of the better-than-expected start of the year, but is still somewhat lower than in the euro area, the main reason being the rather less vigorous domestic demand which is not offset by a stronger export performance. As in the autumn forecasts, year-on-year growth is expected to remain broadly constant thereafter.

Employment growth in 2016 slightly exceeded our autumn forecasts. There is little doubt that this growth was driven by the recent policy measures, particularly wage cost moderation, that makes labour relatively cheaper, and certain structural labour market reforms that broaden the effective labour supply. As in the autumn estimates, however, the current forecasts assume that this additional stimulus will fade away and that the ratio between employment expansion and the growth of activity will revert to a level closer to the historical averages. Indeed, in the past two quarters, there has already been a sharp fall in employment expansion. Although it was still strengthening slightly from the beginning of 2017, according to the current forecasts it should be clearly more moderate this year than in 2016. All in all, over the three years from 2017 to 2019, more than 115 000 new jobs are expected to have been created. Despite the somewhat slower growth of labour costs, due partly to the integration of the new wage agreement for 2017 and 2018, that amounts to a small downward revision compared to the autumn forecasts. This would be due mainly to the growing impact of supply shortages on the labour market, as is already apparent from the rising number of unfilled vacancies, with firms finding it increasingly difficult to find suitable staff. However, employment expansion should be supported by an increase in the participation rate, especially among older workers, fostered by the recent measures to impose further restrictions on early departure from the labour market. The unemployment rate is set to fall further to 7.2 %, a level which is still slightly higher than before the great recession.

Although inflation has risen somewhat faster than expected as a result of the higher oil price, core inflation was actually somewhat lower than estimated from the end of 2016. Despite the volatility due to calendar effects related to the date of the Easter holidays, which had a significant impact on the monthly figures for March and April, it would have nevertheless recently reverted to a level close to the estimates in the autumn forecasts. The current forecasts also expect limited changes in core inflation during the projection period : as in the past, the strong rise in labour costs should not be entirely passed on in prices, but should instead tend to squeeze profit margins. In comparison with the autumn forecasts, there was still a slight downward adjustment in core inflation. That is due partly to the expected impact of some measures designed to encourage effective competition in certain services industries with persistently high inflation, but it also reflects the somewhat slower rise in labour costs. These estimates take account of the new collective wage agreement from the beginning of this year for 2017 and 2018, and incorporate a slight downward adjustment in negotiated wage growth for 2019.

Finally, as regards public finances, the budget deficit declined more steeply than expected in 2016. That improvement is largely structural, and the estimates for the deficit over the projection period are also now lower than in the autumn forecasts. The deficit is expected to fall further this year to around 2 % of GDP, but remain virtually unchanged after that. The additional gains in interest charges, estimated at 0.3 % of GDP in 2018 and 2019, and the favourable impact of the economic situation should be offset by a further structural easing of fiscal policy, the main reason being that the additional reductions in charges planned in 2018 and 2019 under the tax shift are not yet fully financed. At the end of the projection period, the deficit is expected to exceed 2.0 % again, which is still a long way from the target of a structurally balanced budget. Although the gross public debt in relation to GDP should gradually fall, it is still estimated

at around 104 % at the end of the projection period. In that connection, it should be borne in mind that, in accordance with the Eurosystem rules on the projection exercises, account is only taken of measures which, at the time of completion of the exercise, have been formally adopted by the government or which are very likely to be approved, and for which the details are sufficiently clear. Furthemore, the estimates of the budgetary impact of certain measures, such as those intended to combat fraud, may deviate from the amounts entered in the budget.

1. International environment and assumptions

1.1 World economy

Although the year-on-year growth of the world economy dipped a little further in 2016, during that year – as predicted by the autumn forecasts – there was a marked turnaround in global activity. From the second half of last year, world growth picked up slightly in what remains a highly uncertain environment. The still relatively limited improvement in economic activity is evident in both emerging and advanced economies, but masks divergent developments in individual countries.

The strengthening growth in the emerging countries is attributable mainly to the Russian and Brazilian economies, which are gradually recovering from a deep recession caused by the slump in commodity prices but further exacerbated by western economic sanctions in the case of Russia and political instability in the case of Brazil. In China, despite the ongoing process of rebalancing from a growth model centred mainly on exports towards stronger domestic demand, the economy maintained vigorous growth which, though moderating slightly, remained in line with the official target of a growth rate between 6.5 % and 7 %. Apart from expanding foreign demand, growth was also underpinned by the dynamism of the property market and the accommodative fiscal policy, reflected primarily in major infrastructure projects. However, in the first quarter of this year, quarterly activity growth seems to have slackened pace again, and the slowdown was actually somewhat sharper than predicted in the previous forecasts. Furthermore, the recent tightening of monetary policy and banking supervision, and various administrative measures to prevent another property market bubble, have yet to be fully reflected in the real economy. In India, too, economic growth continues apace, partly as a result of radical structural reforms. The temporary slowing of the growth rate since the end of last year is due partly to certain monetary policy measures which have a negative but temporary impact on private consumption.

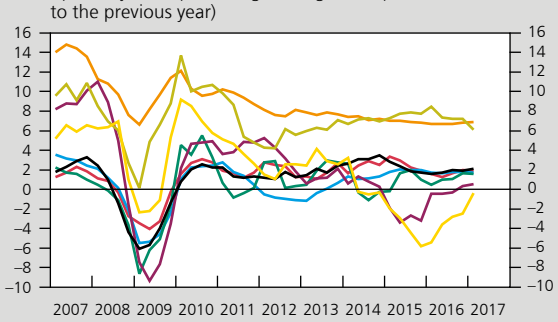
Turning to the advanced countries, from the third quarter of 2016, there was a surge in American economic activity, propelled by a strong export recovery, robust consumption growth and, primarily after the election of the new President, rising expectations of a more expansionary fiscal policy. Household consumption remains the principal engine of activity, and is in turn supported by the further improvement in the labour market situation. With unemployment at 4.3 % in May 2017, the labour market is close to full employment, curbing the prospects for further growth. The rise in hourly wages has also accelerated, and has already reached 2.5 % year-on-year. In those circumstances, the Federal Reserve continued to normalise its monetary policy. A year after the first interest rate hike since the crisis, the interest rate range was again increased by 25 basis points in December 2016, and that was followed by a further monetary tightening on the same scale in March 2017. According to current estimates, growth in the United States also declined more sharply than expected at the beginning of 2017, dropping to 0.3 % quarter-on-quarter. However, the American quarterly growth figures are rather volatile and are often lower in the first quarter. It is therefore possible that this low growth was due to an inadequately adjusted seasonal profile, or may be revised upwards later, as was already the case for the second estimate of the quarterly growth figures.

In contrast, in Japan, the economy achieved only sluggish growth in 2016, despite the supportive policy and the favourable financial conditions. Although the labour market situation is particularly tight, with unemployment currently at its lowest level since the 1990s, wage dynamics are still very weak and therefore insufficient to provide a significant stimulus for activity – and inflation. However, from the end of 2016, economic growth was increasingly buttressed by a strong export revival, due partly to the depreciation of the yen and the recovery of foreign demand.

In the United Kingdom, the outcome of the Brexit referendum did not immediately put the brakes on economic activity. In the third and fourth quarters of 2016, the economy continued to expand at the same pace as in the previous quarter, far exceeding the expectations of most institutions. Supportive policy measures, including the Bank of England's cut in interest rates in August and the easing of fiscal policy, were undoubtedly contributory factors. Nonetheless, the British economy clearly ran out of steam in the first quarter of this year. The depreciation of the pound sterling and higher inflation are beginning to dent household purchasing power in particular, and that has depressed private consumption. Exit from the

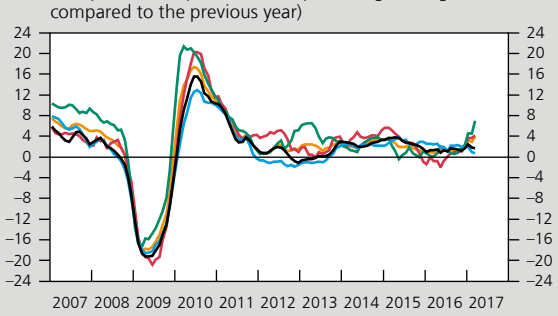
CHART 1 WORLD ECONOMY AND DEVELOPMENTS ON FINANCIAL AND COMMODITY MARKETS

REAL GDP
(quarterly data, percentage changes compared to the previous year)



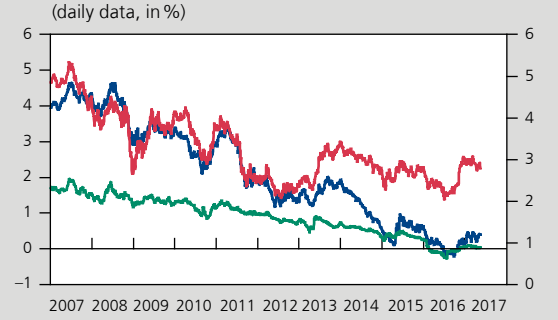
United States
Euro area
China
Japan
Russia
India
Brazil
UK

INTERNATIONAL TRADE
(seasonally adjusted three-month moving average of export and import volumes, percentage changes compared to the previous year)



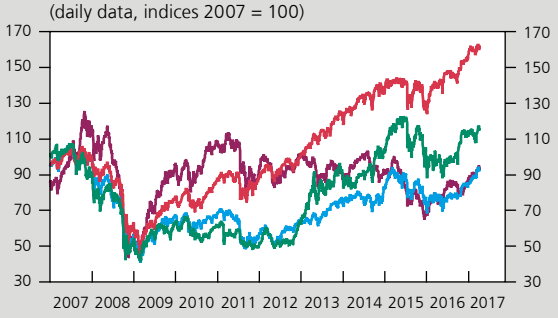
World
Euro area
US
Emerging countries
Advanced countries

TEN-YEAR GOVERNMENT BOND YIELDS
(daily data, in %)



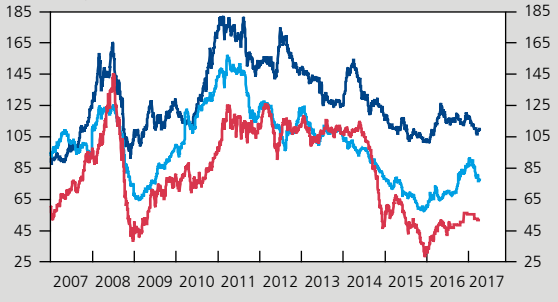
Germany
US
Japan

STOCK MARKET PRICES
(daily data, indices 2007 = 100)



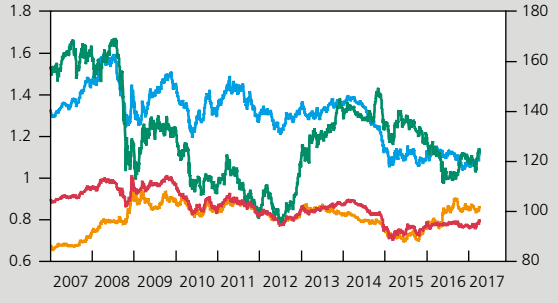
EURO STOXX (EA)
S&P 500 (US)
NIKKEI 225 (JP)
Emerging countries

COMMODITY PRICES
(daily data, in $)



Food commodities
Industrial commodities
(indices 2007 = 100)
Brent (per barrel)

EURO EXCHANGE RATES
(daily data)



USD/EUR (left-hand scale)
GBP/EUR (left-hand scale)
JPY/EUR (right-hand scale)
Nominal effective exchange rate (right-hand scale, indices 1st quarter of 1999 = 100)

Sources: CPB Wereldhandelsmonitor, OECD, Thomson Reuters Datastream.

European Union is still expected to cause a further decline in British growth in the medium term, although to a lesser extent than in earlier forecasts, as a result of more restrictions on exports and the impact on investment of the uncertainty over future relations with the European Union.

In all, the recent slowdown in some major countries such as the United States, China and the United Kingdom should not be seen as a break in the trend, and most forecasts still indicate that activity outside the euro area will continue to pick up gradually.

In the euro area itself, since the second half of last year, real GDP has been growing for the third consecutive quarter at a relatively constant rate of around 0.5 % per quarter. Private consumption remains the principal engine of growth, and is propelled mainly by a further improvement in the labour market. Although investment rebounded strongly at the end of last year after a weak third quarter, various factors such as uncertainty and corporate debt reduction are still curbing investment growth to some degree, despite the highly favourable financing conditions created by the accommodative monetary policy.

Last year, the recovery in the euro area clearly became stronger and more broadly based : growth differences between countries diminished though they have not yet disappeared. In the first quarter of this year, activity increased in all countries. Growth remained very vigorous in Spain, Portugal, and some smaller European countries, and gathered pace in Germany and especially in Finland. Conversely, the French and Dutch economies slowed down somewhat.

As in the other advanced countries, inflation in the euro area began rising steeply last year, reaching 1.4 % in May 2017 (first Eurostat flash estimate) compared to –0.1 % in the same month of last year. But that mainly reflects the rise in oil prices ; core inflation is still fairly flat overall, primarily as a result of the continuing modest wage growth.

Although global trade flows reached a low point in 2016, growing by around 2 % year-on-year, they nevertheless showed clear signs of recovery in the second half of the year. That was due not only to strengthening global demand but also to certain composition effects and, in particular, the gradual revival of investment, for example in the Chinese infrastructure projects mentioned earlier, but also in American energy production, because investment usually generates higher demand for imports. More generally, the sharp upturn in trade intensity which was also evident at the beginning of 2017 could also be attributable to a modest recovery in global production chains against the backdrop of the improving situation in the emerging countries. Nonetheless, various structural factors continue to depress the trade intensity of growth, so that the pre-crisis level may not be regained in the near future. Apart from China's transition to an economy geared more to consumption and services, which thus generates weaker import demand for commodities and machinery, the main factor is the marked lack of progress in the liberalisation of trade, with the policy intentions of some countries actually suggesting a return to protectionism.

The financial markets have been particularly calm in the past few months. Share prices climbed steeply throughout the world, particularly after the American presidential elections, and there have been few interim corrections as is evident from the current low level of the volatility indices. Although the American stock markets lost some of their momentum recently as expectations of an expansionary fiscal policy and more deregulation in the United States were adjusted downwards, share prices elsewhere, and notably in the euro area, are still rising, driven by fundamental determinants such as the continuing very flexible monetary policy and rising corporate profit expectations as the economy picks up. Following a sharp increase in the autumn, bond yields have subsided somewhat and remain close to their historical floor in the euro area. Furthermore, since the French presidential elections, spreads have clearly narrowed again.

While the pound sterling had fallen sharply against the euro following the Brexit referendum, the announcement of an early parliamentary election recently caused the British currency to strengthen slightly. After appreciating in the wake of the presidential elections, the dollar recently lost ground against the euro. Factors which may have played a role include the change in the growth differential in relation to the United States, reflected in stronger growth figures for the euro area, the renewed confidence in the European economy following the French presidential elections, and the mounting uncertainty over American policy.

Oil prices began rising again last year, supported by the revival in activity and the agreement of 30 November between OPEC members and a number of other countries on restricting oil production. Against that backdrop, other commodity prices also increased, particularly as a result of the growing demand from the emerging countries. During the initial months of 2017, however, prices of oil and industrial commodities lost some of the gains made. Higher oil production in the United States triggered a further decline in oil prices, while industrial commodity prices fell in view of expectations concerning lower future demand from China, following the measures taken by the Chinese authorities this year to avoid a property market bubble.

TABLE 1 PROJECTIONS FOR THE MAIN ECONOMIC REGIONS

(percentage changes compared to the previous year, unless otherwise stated)

	2015	2016	2017 e	2018 e
Real GDP				
World	3.2	3.0	3.4	3.6
of which:				
Advanced countries	2.4	1.8	2.1	2.0
United States	2.6	1.6	2.2	2.3
United Kingdom	2.2	1.8	1.8	1.3
Japan	1.2	1.0	1.2	0.6
Euro area	2.0	1.8	1.7	1.8
Emerging countries	4.0	4.1	4.5	4.8
China	6.9	6.7	6.6	6.3
India	7.5	7.1	7.2	7.5
Russia	–2.8	–0.2	1.2	1.4
Brazil	–3.8	–3.6	0.5	1.8
p.m. World imports	*2.5*	*1.9*	*3.5*	*4.0*
Inflation[1]				
United States	0.1	1.3	2.2	2.3
Japan	0.8	–0.1	0.4	1.0
Euro area	0.0	0.2	1.6	1.3
China	1.4	2.0	2.4	2.3
Unemployment[2]				
United States	5.3	4.9	4.6	4.5
Japan	3.4	3.1	3.1	3.0
Euro area	10.9	10.0	9.4	8.9

Sources: EC, IMF.
(1) Consumer price index.
(2) In % of the labour force.

Box 1 – Assumptions adopted for the projections

The macroeconomic projections for Belgium described in this article form part of the joint Eurosystem projections for the euro area. That projection exercise is based on a set of technical assumptions and forecasts for the international environment drawn up jointly by the participating institutions, namely the ECB and the national central banks of the euro area.

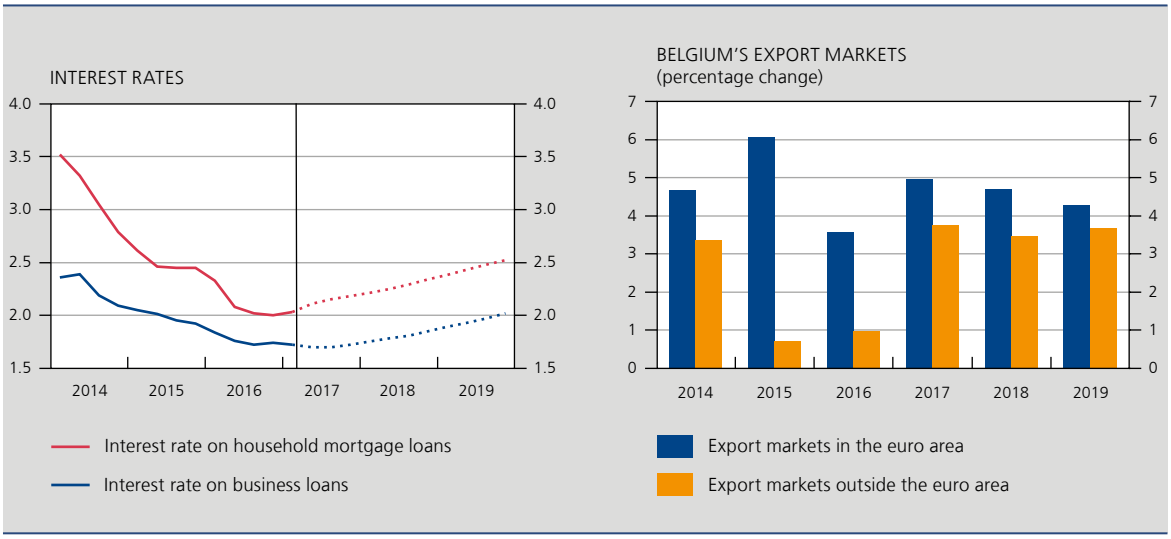
In the projections, it is assumed that future exchange rates will remain constant throughout the projection period at the average levels recorded in the last ten working days before the cut-off date of the assumptions, i.e. 17 May 2017. In the case of the US dollar, the exchange rate then stood at $ 1.09 to the euro.

As usual, the assumptions concerning oil prices take account of market expectations as reflected in forward contracts on the international markets. After the cut-off date for the autumn forecasts in November 2016, oil prices rose sharply as a result of the production restrictions announced by the oil-producing countries at the end of last year. Following widely fluctuating prices in recent years, the price of Brent crude is now set to become unusually stable: in mid-May 2017, the markets expected the Brent price to average roughly $ 51 on an annual basis over the projection period covering the years 2017 to 2019. That price implies an upward revision for 2017, but is still close to the assumptions made in the autumn forecasts for the end of the projection period.

The interest rate assumptions are likewise based on market expectations in mid-May 2017. In the first half of 2017, the three-month interbank deposit rate thus dropped below –30 basis points, but is expected to edge upwards very gradually and reach zero by the end of the projection period. The level of Belgian long-term interest rates is projected to rise more sharply from 0.8 % in the first quarter of 2017 to an average of 1.4 % in 2019.

INTEREST RATES AND VOLUME GROWTH OF EXPORT MARKETS

(in %)



Source: Eurosystem.

The predicted movement in bank interest rates on business investment loans and household mortgage loans may still diverge somewhat from the movement in market rates. For instance, the average mortgage interest rate is historically low, partly on account of the ECB's particularly accommodative monetary policy and the resulting abundant liquidity, and it is unlikely to keep entirely in line with the upward movement in the long-term market interest rate: that rate is only projected to increase from around 2.1 % in 2017 to 2.5 % by the end of the projection period. The average interest rate on business loans, which is closer to the short-term segment, is also expected to remain relatively constant over the projection period: in 2019, it is forecast at an average of 2 %, which is barely 0.3 percentage points more than the 2017 average.

As stated in chapter 1, the international environment seems to have improved a little further compared to the situation at the time of the autumn forecasts. Global economic growth excluding the euro area has only undergone a modest upward revision, but the trade intensity of growth has been much higher than 1, exceeding the predictions forming the basis of the common assumptions in the autumn forecasts. In itself, that strong end to the year generates a substantial spillover effect for 2017, even though for the projection period it was still expected that there would be a gradual return to a unitary elasticity of global import demand in relation to growth. For 2017, the year-on-year

growth of the Belgian export markets was revised upwards quite considerably compared to the autumn forecasts, but since that primarily concerns a spillover effect from the much larger-than-expected trade flows at the end of 2016, the impact on the actual estimates from 2017 onwards is rather limited. The upward revisions of the export markets for 2018 and 2019 are decidedly smaller. Overall, for the projection period as a whole, the growth of Belgium's export markets comes to at least 4 %, weakening slightly towards the end of the period.

The trend in Belgian exports is determined not only by the growth of those markets but also by the movement in market shares, and consequently by Belgium's competitiveness. The trend in prices that competitors charge on the export markets is a key factor in the cost aspects of that competitiveness. In 2017, those prices have risen steeply, but that mainly reflects the aforesaid increase in the oil price. In 2018 and 2019, they are set to rise at a more moderate pace : assuming that the exchange rate remains constant, rising inflation in the euro area – but also elsewhere – will gradually lead to renewed, albeit weak, upward pressure on the prices of Belgian exporters' competitors in the years ahead.

EUROSYSTEM PROJECTION ASSUMPTIONS

(in %, unless otherwise stated)

	2016	2017	2018	2019
		(annual averages)		
EUR/USD exchange rate	1.11	1.08	1.09	1.09
Oil price (US dollars per barrel)	44.0	51.6	51.4	51.5
Interest rate on three-month interbank deposits in euro	–0.3	–0.3	–0.2	0.0
Yield on ten-year Belgian government bonds	0.5	0.8	1.1	1.4
Business loan interest rate	1.8	1.7	1.8	2.0
Household mortgage interest rate	2.1	2.1	2.3	2.5
		(percentage changes)		
Belgium's relevant export markets	2.5	4.5	4.2	4.0
Export competitors' prices	–3.0	4.0	2.0	2.0

Source : Eurosystem.

Overall, the adjustment of the assumptions compared to the latest autumn forecasts has a small, positive impact on Belgium's growth prospects, as the favourable effect of the more rapid export market growth and the cheaper euro is only partly offset by the somewhat higher oil prices.

1.2 Estimates for the euro area

The current Eurosystem growth estimates for the euro area have been revised upwards slightly compared to the ECB's previous projections (March 2017). As a result of the strong growth at the beginning of the year and the favourable short-term outlook, activity in the euro area is forecast to expand by almost 2 % this year. But that growth rate is likely to shrink in the following two years. That is due to the slight decline in the trade elasticity of world growth and, in particular, import demand from countries outside the euro area, plus the fact that supply constraints on the labour market will increasingly tend to hold back growth in certain countries, such as Germany.

Growth is underpinned by the favourable framework conditions such as the relatively cheap euro and low interest rates, brought about partly by monetary policy. Although

TABLE 2 EUROSYSTEM PROJECTIONS FOR THE EURO AREA

(percentage changes compared to the previous year, unless otherwise stated)

	2016 e	2017 e	2018 e	2019 e
Real GDP	1.7	1.9	1.8	1.7
Private consumption	1.9	1.5	1.6	1.4
Public consumption	1.8	1.2	1.2	1.1
Gross fixed capital formation	3.6	3.7	3.4	3.0
Exports of goods and services	2.8	4.8	4.3	4.1
Imports of goods and services	4.0	5.2	4.6	4.3
Inflation (HICP)	0.2	1.5	1.3	1.6
Core inflation[1]	0.9	1.1	1.4	1.7
Domestic employment	1.4	1.4	1.0	0.9
Unemployment rate[2]	10.0	9.4	8.8	8.3
General government financing requirement (–) or capacity[3]	–1.5	–1.3	–1.2	–1.0

Source: ECB.
(1) Measured by the HICP excluding food and energy.
(2) In % of the labour force.
(3) In % of GDP.

the growth of private and public consumption, like that of total investment, slackens pace slightly over the projection period, domestic demand remains vigorous overall. That will also boost imports from the euro area, offsetting the strong but diminishing growth of exports, so that the growth contribution of net exports should be virtually neutral over the projection period as a whole.

Inflation surged in the first quarter of this year. Although that was due mainly to the rise in the oil price at the end of 2016, core inflation – i.e. inflation excluding the volatile components – has also risen somewhat already, and should continue to edge upwards over the projection period. That is due mainly to rising wage costs in tightening labour markets where the influence of recent measures to moderate those labour costs in various countries – including Belgium – is fading away. Nevertheless, in the last quarter of 2019, both total and core inflation are still likely to be well below 2 %.

In the recent period, the labour market recovery has gained momentum. The labour intensity of growth has risen sharply, perhaps partly as a result of the aforesaid labour cost moderation. As that influence wanes, the scarcity of suitable labour increases and activity slows down, and job creation in the euro area should weaken somewhat, although employment expansion will remain quite strong at around 1 % year-on-year in the last two years of the projection period. The unemployment rate, which had already declined to 10 % last year, is projected tofall further and by 2019 should be back to around the immediate pre-crisis level of 7.5 % seen in 2007.

According to the forecasts, the average budget deficit in the euro area is expected to fall further to 1 % of GDP in 2019. However, that improvement is due mainly to the upturn in business activity and the further decline in interest charges as a result of the unusually low interest rates. Conversely, over the projection period as a whole, there should be hardly any change in the structural primary balance, which indicates the underlying fiscal policy. The fall in the public debt ratio is forecast to continue, thanks to the low level of interest rates: by 2019, the debt ratio is projected to have dropped by more than 7 percentage points below its 2014 peak.

2. Activity and demand

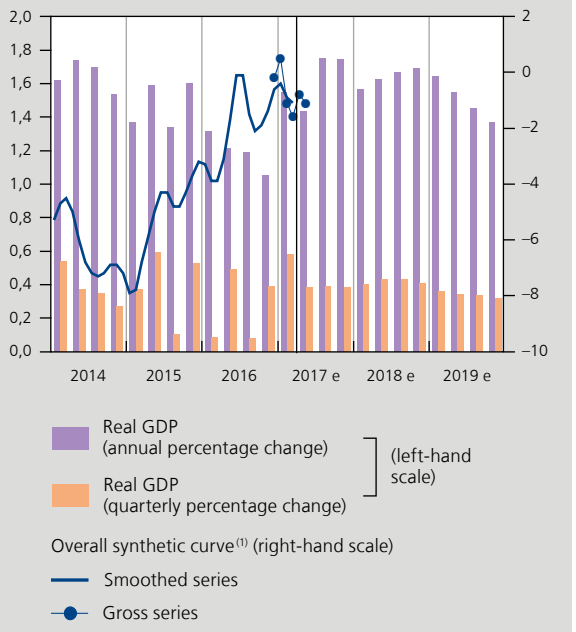
In 2016, activity expanded by 1.2 % as predicted in the autumn forecasts. It should be noted that in the latest NAI statistics, the quarterly profile and the contributions of the expenditure components were revised slightly in comparison with the available statistics and estimates in those autumn forecasts. In that regard, the NAI has made a small upward adjustment to the contribution of private consumption to the growth of activity, particularly at the beginning of the year. Nevertheless, that growth is still supported to a

significant degree – and more so than in other countries – by the expansion of investment, at least if an adjustment is made for the impact of specific major purchases of investment goods in other countries by large multinationals in the pharmaceuticals industry. On the production side, all the main branches contributed to the growth, although the principal factor was the expansion of activity in market services. The changed quarterly profile and, more specifically, the downward revision of growth in the third quarter compared to the previous NAI estimates, weakens the spillover effect for year-on-year growth in 2017.

Nevertheless, the impact of that is more than offset by the slight upward revision of the quarterly growth figures in the first half of the year. The autumn forecasts already assumed that the Belgian economy would accelerate considerably starting from the last quarter of 2016 to expand by around 0.5 % quarter-on-quarter, but according to the latest statistics, growth was even better in the first quarter: at the end of May, the NAI made a further upward adjustment to the first quarter's growth compared to the initial flash estimate, increasing it to 0.6 % quarter-on-quarter, slightly higher than the estimate in the autumn forecasts. The current short-term estimates of growth in the second quarter, based partly on specific nowcasting models, are also a little higher than those in the autumn forecasts. The higher model expectations are largely due to the confidence indicators, which have recently painted a very promising picture. Since the beginning of this year, Belgian producer and consumer confidence have both been close to or at their highest level in six years, and well above the long-term average. The sub-indicators particularly relevant for the nowcasting models – such as the section of the consumer survey that polls the respondents' expectations concerning unemployment, and the component of the producers' confidence relating to demand and employment expectations in manufacturing industry – also point to further strong growth. Conversely, the movement in certain factual indicators (hard data), such as industrial output and retail sales, looks less favourable for the moment. On the basis of the above factors, the current forecasts therefore take account of a small deceleration, putting growth at 0.4 % in the second quarter. That would mean that the Belgian economy's growth rate will then already have been relatively constant for three successive quarters at an average of 0.5 %. Mainly as a

CHART 2 GDP AND PRODUCER CONFIDENCE

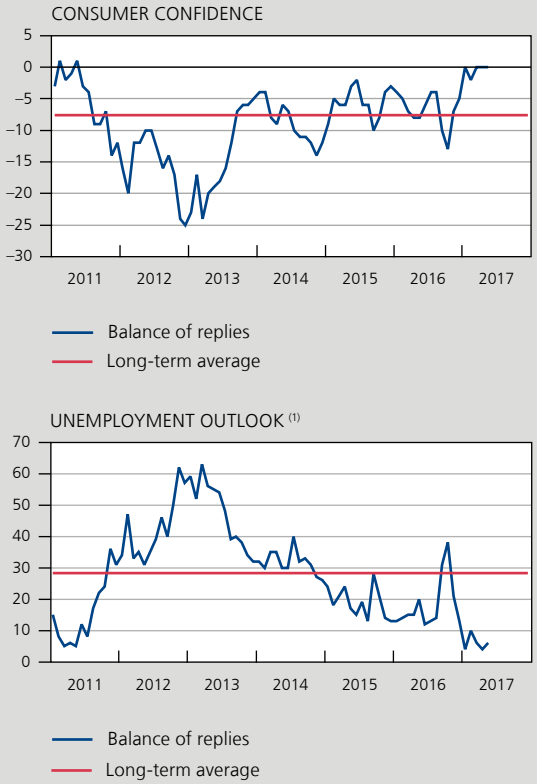
(data adjusted for seasonal and calendar effects, unless otherwise stated)



Sources: NAI, NBB.
(1) Non calendar adjusted data.

CHART 3 CONSUMER CONFIDENCE AND SUB-INDICATOR

(seasonally adjusted data)



Source: NBB.
(1) An increase indicates a less favourable trend, a decrease indicates a more favourable trend.

result of this stronger first half of the year, expectations for annual growth in 2017 are upgraded slightly to 1.6 %, despite the slightly weaker spillover effect resulting from the revision of the quarterly accounts for 2016.

Subsequently, year-on-year economic growth is expected to remain unchanged in 2018 and to dip to 1.5 % in 2019 as a result of the fairly flat profile of the growth of Belgium's export markets and the declining influence of the recent improvements in cost competitiveness, as labour costs begin rising faster again. In particular, towards the end of the projection period, economic growth could already be held back somewhat by supply constraints, notably on certain geographical or functional segments of the labour market. Nonetheless, compared to the autumn projections published in December, the current estimates for the last two years of the projection period remain unchanged. The impact of the revision of the assumptions, which is in principle slightly favourable, is largely negated by a somewhat lower estimate of the growth contribution of net exports during the projection period, based among other things on the latest statistics.

Over the projection period as a whole, just as in the recent past, domestic demand will be the main engine of growth. Over the next three years, the growth contribution of domestic demand (excluding changes in inventories) will average 1.6 percentage points. Conversely, net exports will make a negative contribution year-on-year averaging –0.1 percentage point.

Although exports were well up last year with a 6 % rise in volume, that was due largely to the reorganisation of the commercial activities of a multinational pharmaceutical company, which meant that more of its trade flows are imputed to its Belgium-based subsidiaries and which caused a roughly equivalent rise in imports. If adjusted for that statistical effect, export growth would have been much more in line with the expansion of the export markets, and the market share of Belgian exporters would have risen by 0.5 %. According to the forecasts, however, this small gain will be gradually eroded and will disappear altogether in 2018, since unit labour costs are expected to rise considerably from 2017 and cost competitiveness will then no longer improve (even though wages are also expected to rise strongly in other countries, such as Germany). In line with the relatively flat profile of world demand, quarterly export growth will decelerate slightly to average less than 1 % over the final two years of the projection period. Since imports rise a little faster, notably on account of the strong expansion of domestic demand, the growth contribution of net exports will remain slightly negative.

In 2017, stock-building is likely to continue making a positive contribution to growth, but that is due only to a spillover effect from the statistics up to the end of 2016. As usual, the technical assumptions for all the quarters in the projection period from the start of 2017 are based on a growth-neutral contribution from changes in inventories, particularly in view of the great statistical uncertainty surrounding that concept.

Among the domestic demand components, private consumption is the main growth engine. Although the latest NAI statistics imply a small upward adjustment to the 2016 figure, the growth is still relatively moderate in comparison with that in other countries. This relatively anaemic consumption growth is one of the main reasons why economic growth in Belgium has recently been weaker than the average in the neighbouring countries, and it primarily reflects the short-term negative impact of the wage moderation policy aimed at improving cost competitiveness.

Growth of household consumption is expected to pick up gradually to average around 0.5 % quarter-on-quarter from next year. The main factor stimulating the rise in consumption is income growth, and particularly the increase in earned incomes, which are going up significantly as a result of the substantial employment growth and the rise in real wages.

In the final two years of the projection period, incomes should also be supported by the additional tax cuts

CHART 4 EXPORTS AND EXPORT MARKETS

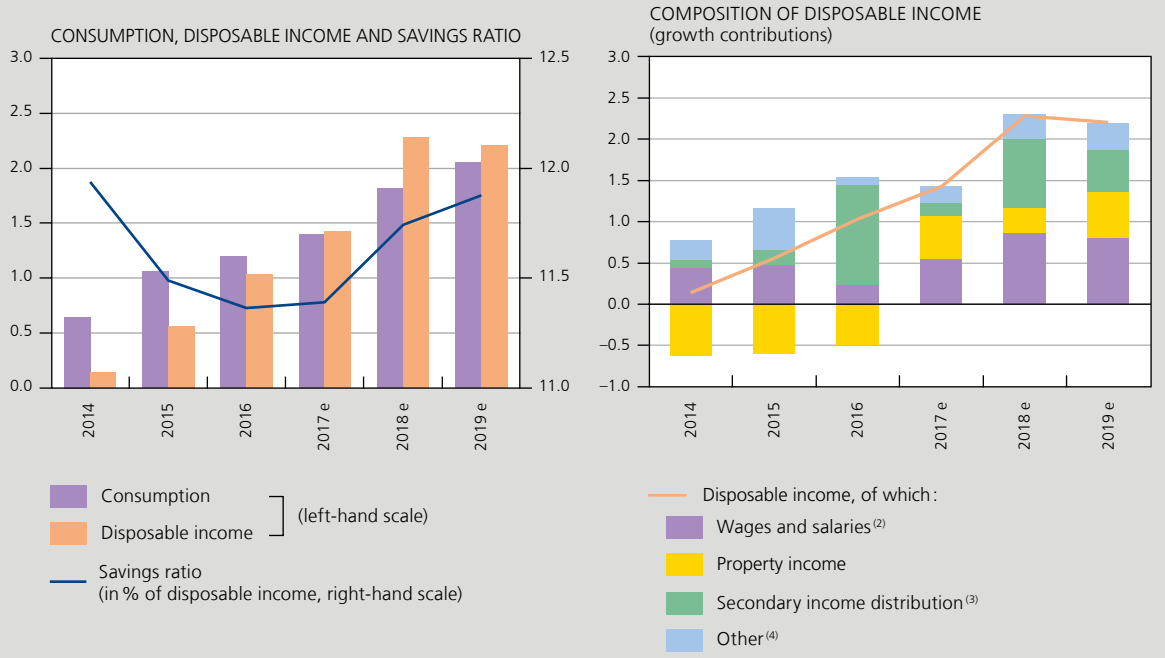
(volume data adjusted for seasonal and calendar effects, percentage changes compared to the previous year)

Sources: NAI, NBB.

(1) Export growth adjusted for expenditure resulting solely from the reorganisation of the commercial activities of a major pharmaceutical company.

CHART 5 HOUSEHOLD CONSUMPTION AND DISPOSABLE INCOME[1]

(volume data, percentage changes compared to the previous year, unless otherwise stated)



Sources: NAI, NBB.

(1) Data deflated by the household consumption expenditure deflator.

(2) Excluding employers' social contributions.

(3) Including employers' social contributions.

(4) 'Other' comprises the gross operating surplus and gross mixed income (of self-employed persons).

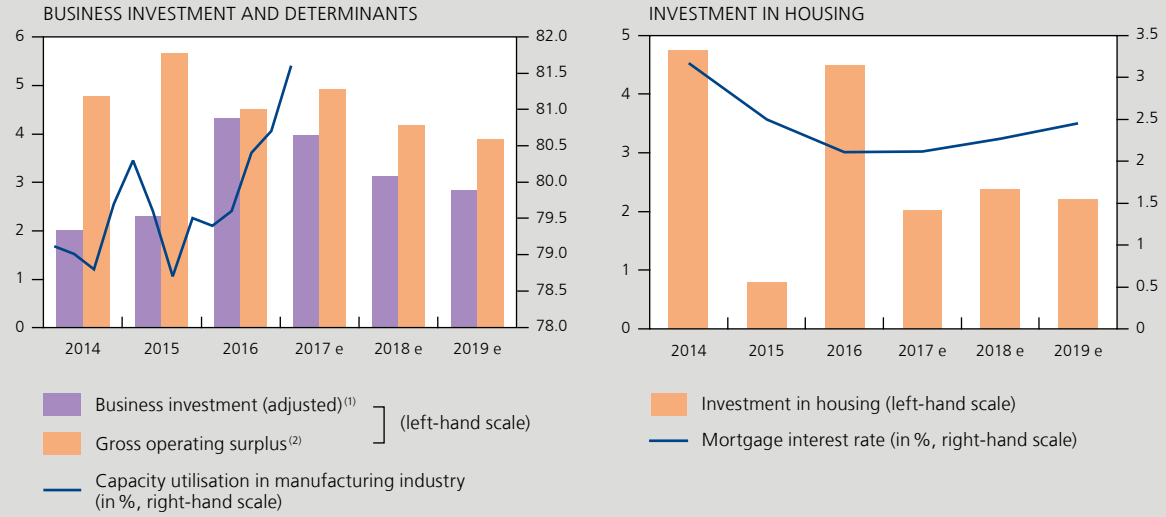
planned in those years as part of the tax shift, which would in turn boost household purchasing power. In that regard, it should be borne in mind that any additional consolidation measures designed to fund the tax shift over the next two years have not been taken into account in this analysis, in accordance with the rules on the Eurosystem forecasting exercises. Moreover, the fact that both wages and tax scales are indexed to inflation after a small time lag provides further support for real disposable incomes in 2018, since inflation should ease compared to 2017 and the indexation in 2018 is in fact likely to exceed inflation in that year. Finally, in the years ahead, and for the first time in a long while, property incomes should once again make a positive contribution to the growth of private incomes owing to the expected rise in the level of interest rates and the increase in dividends paid out by companies.

According to the forecasts, the quickening growth of private consumption should be slightly outpaced by the rise in incomes. This year, the savings ratio is predicted to remain stable as the growth of consumption remains in line with income growth, but it is expected to increase again from 2018. As usual, households will take time to adjust their consumption to the steep rise in earned incomes and the tax cuts. Moreover, the share of disposable income represented by property income, of which relatively more is saved, will increase again.

Private investment should also make a significant contribution to growth in the coming years. As regards business investment, the annual growth for 2017 is still slightly distorted by specific factors relating to substantial purchases of investment goods abroad which boosted investment (and imports) in the preceding years. If these specific factors are excluded, the volume of business investment increased strongly in 2016 by around 4.3 %. Although the underlying determinants remain favourable and increasing capacity utilisation will lead to further investment in expansion, the forecasts still predict that investment growth will gradually subside in the years ahead, reverting to a more normal growth rate. This notwithstanding the fact that business investment will continue to be supported by favourable financing conditions, and more specifically by the sizeable liquidity reserves, the rising gross operating surplus, and the persistently low interest rates. Investment of households

CHART 6 BUSINESS INVESTMENT AND INVESTMENT IN HOUSING

(volume data, percentage changes compared to the previous year, unless otherwise stated)



Sources: NAI, NBB.
(1) Adjusted to take account of exceptional, substantial purchases of investment goods abroad.
(2) In nominal terms.

in real estate – either in the form of new building or renovation projects – is likewise still being stimulated by the low interest rate environment. In that regard, there are clear signs that property is increasingly becoming an alternative form of investment for households in search of yield. Here, too, the forecasts suggest that the growth rate will gradually return to normal, in view of the expected rise in mortgage interest rates. While business

TABLE 3 GDP AND MAIN EXPENDITURE CATEGORIES

(seasonally adjusted volume data; percentage changes compared to the previous year, unless otherwise stated)

	2016	2017 e	2018 e	2019 e
Household and NPI final consumption expenditure	1.2	1.4	1.8	2.0
General government final consumption expenditure	–0.1	0.2	0.4	0.6
Gross fixed capital formation	1.9	2.5	3.2	2.3
general government	0.7	1.7	5.2	–1.2
housing	4.5	2.0	2.4	2.2
business	1.2	2.8	3.1	2.8
p.m. Domestic expenditure excluding change in inventories (1)	1.0	1.3	1.8	1.7
Change in inventories (1)	0.1	0.4	0.0	0.0
Net exports of goods and services (1)	0.1	–0.1	–0.1	–0.2
Exports of goods and services	6.0	5.8	4.1	3.7
Imports of goods and services	6.0	6.1	4.3	4.0
Gross domestic product	1.2	1.6	1.6	1.5

Sources: NAI, NBB.
(1) Contribution to the change in GDP compared to the previous year, in percentage points.

investment had already surpassed its pre-crisis level some time ago, investment in housing is still well below that level, and that gap will barely have been filled by the end of the projection period.

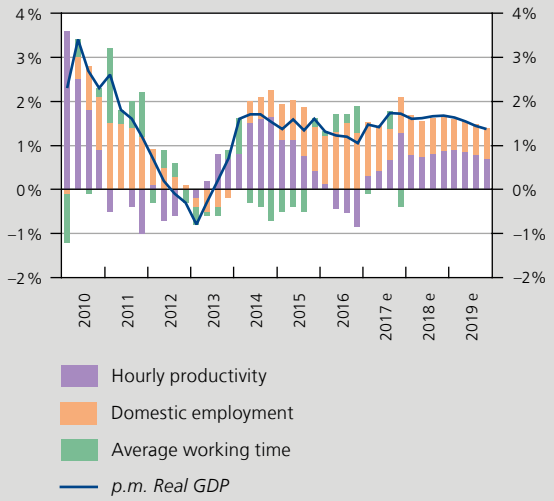
In regard to public investment, local authority expenditure was ultimately lower than expected so that there was only a very small rise in the volume of public investment in 2016, and the figure fell short of that projected in the autumn forecasts. Additionally, public investment follows the pattern of the electoral cycle, with a decline in 2019 following the strong growth in the run-up to the local elections in 2018. Growth of public consumption is set to remain extremely modest throughout the projection period.

3. Labour market

Despite the moderate activity growth in 2016, averaging 1.2 % over the year, net job creations came to 59 000 units, or considerably more than in previous years, when economic growth was actually higher. The greater job intensity of growth – roughly 1 in 2016 – is brought about by the wage moderation policy which makes labour relatively less expensive and boosts

CHART 7 DOMESTIC EMPLOYMENT, WORKING TIME AND PRODUCTIVITY

(contributions to GDP growth, in percentage points; data adjusted for seasonal and calendar effects)



Sources: NAI, NBB.

TABLE 4 LABOUR SUPPLY AND DEMAND

(seasonally adjusted data; change in thousands of persons, unless otherwise stated)

	2013	2014	2015	2016	2017 e	2018 e	2019 e
Total population	57	55	59	62	63	58	54
Working age population	12	9	16	21	17	8	4
Labour force	**9**	**32**	**22**	**33**	**28**	**29**	**30**
Domestic employment	**–15**	**19**	**42**	**59**	**43**	**39**	**33**
Employees	**–21**	**12**	**31**	**45**	**31**	**25**	**20**
Branches sensitive to the business cycle[1]	–25	–1	16	29	20	16	12
Public administration and education	3	6	1	2	–2	–3	–3
Other services[2]	1	7	14	14	13	12	11
Self-employed	**6**	**7**	**11**	**14**	**12**	**14**	**13**
Unemployed job-seekers	**25**	**14**	**–19**	**–26**	**–15**	**–10**	**–3**
p.m. Harmonised unemployment rate[3][4]	*8.5*	*8.6*	*8.6*	*7.9*	*7.5*	*7.3*	*7.2*
Harmonised employment rate[3][5]	*67.2*	*67.3*	*67.2*	*67.7*	*69.2*	*69.7*	*70.2*

Sources: DGS, FPB, NAI, NEO, NBB.
(1) Agriculture, industry, energy and water, construction, trade, hotels and restaurants, transport and communication, financial activities, real estate services and business services.
(2) Health, welfare, community, public social services, personal services and domestic services.
(3) On the basis of data from the labour force survey.
(4) Job-seekers in % of the labour force aged 15-64 years.
(5) Persons in work in % of the total population of working age (20-64 years).

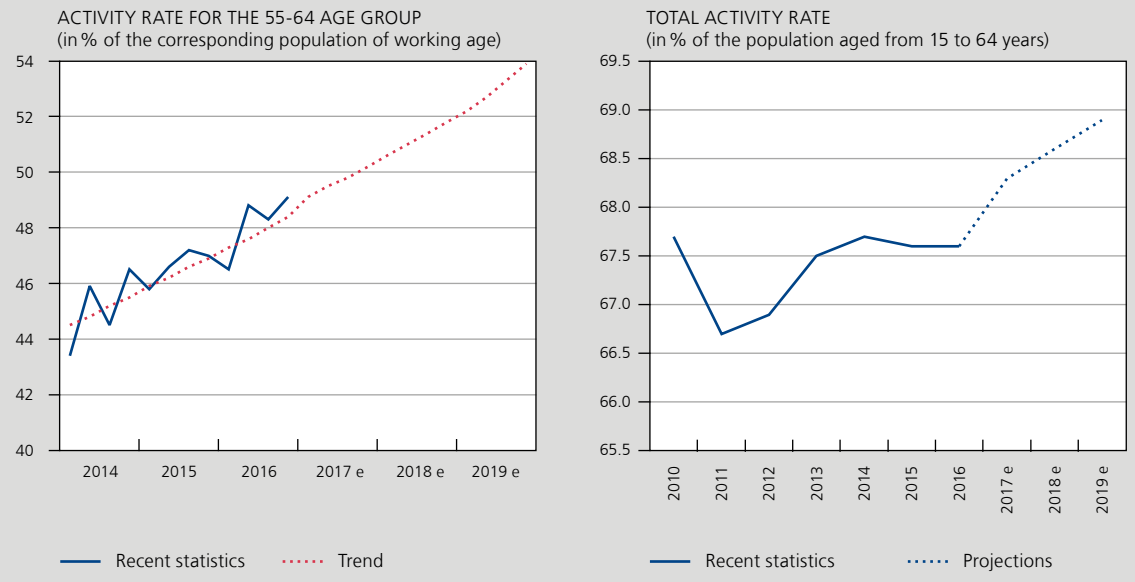
demand for labour, and by the various structural reforms which increase the actual labour supply. The strong expansion of employment against the backdrop of relatively modest activity growth has nevertheless held back the growth of labour productivity, which declined last year.

The expansion of employment slowed down from the last quarter of 2016 to reach an average of 0.15 % quarter-on-quarter. It should remain moderate throughout the projection period, as the policies introduced in recent years which greatly influenced net job creation should gradually have less impact. Moreover, the latest reforms such as the Law on Feasible and Manageable Work passed by Parliament in March 2017 are likely to have an impact on job quality indicators rather than on net job creation. All the same, the additional numbers of people in work will remain substantial at around 115 000 over the projection period.

This increase is expected to be accompanied by higher hourly productivity, which will begin rising again from 2017. Average working time, which is very volatile from one quarter to the next, should decline only slightly over the projection period. The increase in the proportion of part-time workers is causing a slight downward trend, but the average working time of part-time workers is tending to increase : the average number of hours worked per week by part-timers was up from 22.5 in 2000 to 24.1 in 2016. The switch to a services economy is also having a negative influence on average working time. In the short term, the increase in average working time in the fourth quarter of 2016 reflects the abolition of the allowances for time credit granted for no specific reason. That reform, which was announced in January 2015, had triggered an anticipation effect among many workers who were able to use the scheme up to 1 July 2015 to reduce their working time. The opposite effect applies now, since those workers are gradually leaving the non-specific time credit scheme. During the projection period, the average working time should revert to the long-term trend and remain virtually unchanged.

Employment growth in 2016 was particularly marked in the case of employees in branches sensitive to the business cycle, with an increase of 29 000 compared to 2015. The main factor here was a significant rise in the business services branch (+20 000) and in trade, transport and hotels and restaurants (+7 000). Compared to the preceding years, employment in industry and construction did not decline further. In the branches sensitive to the business cycle, only financial and insurance activities continued to record a fall, with 1 000 fewer jobs than in 2015. Over the projection period, salaried employment in the cyclical branches is likely to maintain its upward trend, albeit at

CHART 8 LABOUR MARKET PARTICIPATION



Sources : DGS, EC, FPB, NBB.

a more modest pace. As in previous years, non-market services also share in the expansion of employment, but only in the case of other services (+36 000 over the period 2017-2019). Over the projection period as a whole, employment in public administration and in education is expected to fall by 8 000 persons.

The number of self-employed workers continued rising, to reach 781 000 in 2016, or 14 000 more than a year earlier. In that regard, the growth of self-employment has clearly outpaced the increase in the number of employees recently (averaging 1.8 % year-on-year, compared to 1.2 % for employees). The projections assume that this trend will continue, and put the number of additional self-employed persons at 39 000 by 2019.

Although the latest demographic forecasts indicate that the population will continue to grow, that is increasingly less so in the case of the population of working age, which will virtually stop expanding in 2019 in view of ageing. On the other hand, the participation rate – especially in the case of older workers – has risen recently and will continue to do so according to the forecasts. Apart from cohort effects whereby the younger generations participate to a greater extent in the labour market, that mainly reflects the reforms aimed at discouraging older workers from taking early retirement. The rising participation rate is supporting the expansion of employment.

Following very dynamic job creation in 2016, the first signs of tension are beginning to emerge on the labour market, particularly in certain regions and for some occupations. Consequently, it is taking longer to find appropriate staff to fill vacancies – which have already risen significantly in recent months – and that will increasingly hamper employment growth in the final quarters of the projection period unless the current reforms aimed, in particular, at getting job-seekers back to work and seeing lifelong training produce results.

Against that backdrop, the unemployment rate – which fell sharply in 2016 by 0.7 percentage point to less than 8 % – will continue falling, albeit more slowly. According to the current forecasts, the unemployment rate is expected to be down to 7.2 % in 2019, corresponding to around 525 000 job-seekers. We are thus gradually approaching the unemployment levels of 2008, prior to the great recession, at around 500 000 people.

4. Prices and costs

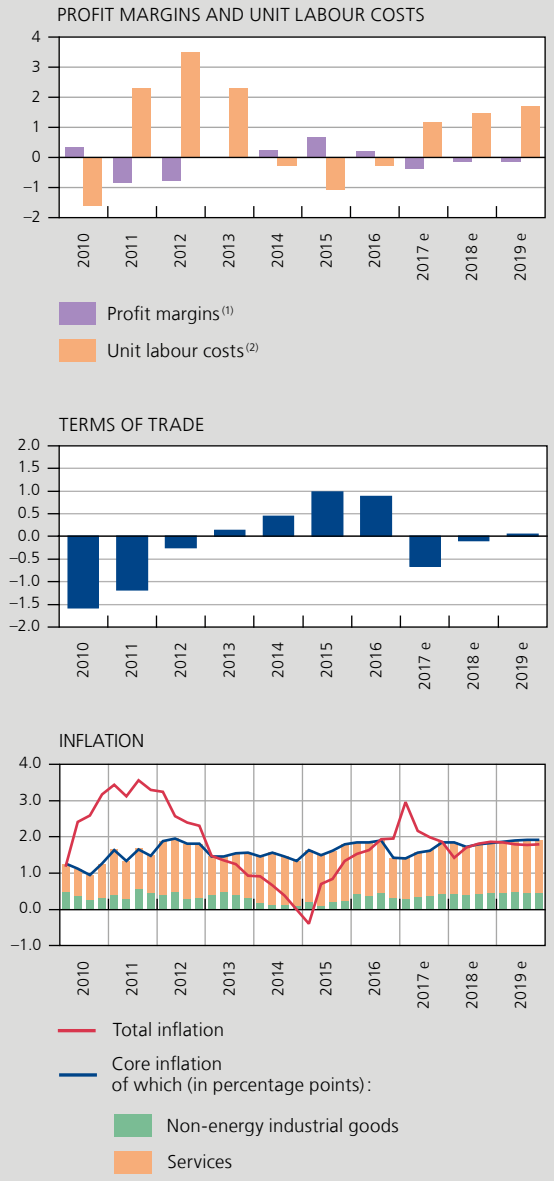
Since 2014, unit labour costs have fallen as a result of various measures to improve the cost competitiveness of Belgian firms. That was still the case in 2016, despite the above-mentioned drop in labour productivity, as hourly labour costs fell even more sharply than productivity. That was due primarily to the new reductions in employers' contributions which took effect on 1 January and 1 April. Also, April 2016 brought the end of the temporary suspension of the indexation mechanisms, but owing to the delays inherent in the indexation method of some sectors, the index jump continued to have an impact for the rest of the year. Finally, it is noticeable that collectively agreed wage increases also remained well below expectations, and below the permitted maximum (0.5 % of the gross wage bill including all charges, and 0.3 % of the net wage bill excluding additional expenses): on the basis of the data currently available, it seems that in reality virtually no sectoral negotiated wage increases were granted, while the wage drift was also very limited.

However, hourly labour costs are set to rise considerably from 2017 as the effect of the index jump has almost completely worn off this year. Furthermore, in contrast to the autumn forecasts, the current estimates take account of the wage norm set by the social partners at 1.1 % for real collectively agreed wage adjustments in 2017 and 2018. Those agreed wage increases are lower than the technical assumption made in the autumn forecast when the wage norm was still unknown. Moreover, this wage norm is based on a new method of calculating the maximum margin for the increase in labour costs set by the CEC following revision of the 1996 Law. Taking account of the very strong wage moderation in recent years, it is assumed that the permitted margin will be fully used in 2017 and 2018, and will drive up negotiated wages by 0.3 % this year and 0.8 % in 2018. The new collective labour agreements will only be concluded in the course of 2017 and will therefore comprise a bigger annual pay rise in 2018. For 2019, the margin for real negotiated adjustments will not be discussed until a collective agreement is negotiated at the end of 2018. In the absence of any official wage norm and in the context of the continuing recovery of the labour market and the decline in the unemployment rate, the technical assumption here is based on stabilisation of negotiated wage growth between 2018 and 2019. If, at the end of 2018, it emerges that labour costs are again rising faster than in the main neighbouring countries, that technical assumption could be adjusted downwards.

Taking account of a return to full wage indexation based on the health index, the growth of hourly labour costs for firms is already forecast to reach 1.9 % in 2017 and rise further to 2.6 % in 2019. Throughout the projection period, that labour cost growth is still tempered by the additional cuts in employers' contributions (as well as the

CHART 9 INFLATION AND DETERMINANTS

(percentage change compared to the previous year, unless otherwise stated)



Sources: EC, NAI, NBB.

(1) Difference between annual growth of unit selling prices and unit production costs.

(2) Including wage subsidies and reductions for target groups.

residual effect of the cuts introduced on 1 April 2016) as a result of the tax shift, but those cuts are much smaller than in 2016: overall, they are expected to reduce hourly labour costs by less than 0.2 % per annum on average between 2017 and 2019, compared to 0.9 % in 2016.

From 2017, labour productivity reverts to normal, slightly positive growth, so that the rise in unit labour costs is somewhat smaller than the rise in hourly labour costs. But unit labour costs are set to increase strongly again from 2017, rising by around 1.7 % at the end of the projection period.

Nonetheless, this increase in labour costs should have only a partial and delayed effect on inflation. In fact, what has happened in the past, when strong labour cost increases were often partially absorbed in the variation of business profit margins, indicates that pricing in Belgium exhibits some upward rigidities. According to the current forecasts, there should be no further steep increase in profit margins as a percentage of selling prices, as there was in past years when the decline in labour costs was not entirely passed on in those prices; instead, the share of profit margins is actually projected to diminish slightly.

Apart from the usual inertia in passing on costs in prices, some specific factors may also curb inflation. For instance, the last quarter of 2016 saw a marked fall in core inflation, and services inflation in particular, owing to the disappearance of the upward influence on year-on-year inflation of the substantial increase in higher education registration fees in the Flemish Community on 1 October 2015. That lower level of services inflation was maintained in the first quarter of 2017, mainly as a result of a calendar effect caused by the Easter holidays falling entirely in April, which was not the case in the previous year. Thus, in March, there was a year-on-year decline in the prices of package holidays and hotel rooms. At the same time, inflation in telecommunications also moderated. From the second quarter of 2017, services inflation begins rising again. The strong increase in April 2017 was still largely temporary since it was due mainly to the reversal of the said calendar effects, and particularly the steep increases in the prices of package holidays and hotel rooms during that year's Easter holidays. Overall, core inflation in 2017 is projected to be down slightly, as an annual average, compared to last year.

In the two ensuing years, core inflation is expected to rise again to 1.9 % in 2019, owing to the albeit limited impact of higher labour costs on prices. However, core inflation and especially the services inflation thus estimated is lower than in the autumn forecasts. The main reason for that is the downward adjustment to the movement in labour costs, but also the expected effects of the recent regulations concerning restaurants and cafés – in this case the end of the brewery contracts imposing strict sales conditions – and telecommunications, notably the opening up of the cable networks in 2016 and the greater ease of switching between fixed operators from July 2017. These changes should enhance

TABLE 5 PRICE AND COST INDICATORS

(percentage changes compared to the previous year, unless otherwise stated)

	2014	2015	2016	2017 e	2018 e	2019 e
Labour costs in the private sector[1]						
Labour costs per hour worked	1.0	0.0	–0.8	1.9	2.3	2.6
of which: indexation	0.8	0.1	0.6	1.5	1.7	1.6
Labour productivity[2]	1.3	1.1	–0.5	0.7	0.8	0.8
Unit labour costs	–0.3	–1.1	–0.3	1.2	1.5	1.7
p.m. Labour costs per hour worked according to the national accounts[3]	*1.1*	*0.0*	*–0.9*	*1.7*	*2.3*	*2.5*
Core inflation[4]	1.5	1.6	1.8	1.6	1.8	1.9
Energy	–6.0	–8.0	–0.6	9.1	0.9	1.0
Food	0.8	1.8	3.1	1.3	1.7	1.8
Total inflcation (HICP)	0.5	0.6	1.8	2.2	1.7	1.8
p.m. Inflation according to the national consumer price index (NCPI)	*0.3*	*0.6*	*2.0*	*2.1*	*1.6*	*1.8*
Health index[5]	0.4	1.0	2.1	1.9	1.5	1.7

Sources: EC, FPS Employment, Labour and Social Dialogue, NAI, NBB.

(1) Labour costs per hour worked are not shown here according to the national accounts concept but according to a broader concept that also includes reductions in contributions for target groups and wage subsidies. That concept gives a better idea of the true labour cost for firms.

(2) Value added in volume per hour worked by employees and the self-employed.

(3) Excluding wage subsidies and reductions in contributions for target groups.

(4) Measured by the HICP excluding food and energy.

(5) Measured by the national consumer price index excluding tobacco, alcohol and motor fuels.

competition and influence the prices charged. In view of the importance of these two sectors in household consumption, these measures are expected to have a moderating impact on inflation.

Apart from core inflation, energy and food also contribute to the movement in total inflation over the projection period. Thus, total inflation is forecast to rise to 2.2 % in 2017, notably on account of energy prices, which are expected to increase by 9.1 % whereas they had fallen by 0.6 % in 2016. The reason for this turnaround lies in the recent and expected movement in the Brent price expressed in euros, which is anticipated to be 19 % more expensive in 2017 than in 2016. The change in the price of gas should also become positive. The movement in imported energy prices is likewise a major determinant of the terms of trade which, after a marked improvement during recent years, are deteriorating again in 2017, thus driving up inflation. Conversely, the disappearance during the first half of 2017 of a number of base effects which had influenced the increase in electricity prices should keep that rise down to 7 % in 2017, whereas the increase came to 28 % in 2016. After that, energy prices should become relatively stable in 2018 and 2019, reflecting a fairly flat profile for petroleum products, gas and electricity.

In 2016, food prices had risen particularly steeply, partly as a result of increases in the excise duties on alcohol and tobacco, plus a methodological effect on alcoholic beverage prices due to the expanded use of scanner data from the beginning of 2016. In 2017, the level of increases should be much lower again with the rate of inflation in processed foods 'returning to normal', and inflation in unprocessed foods expected to be very low. An upward trend in inflation is subsequently predicted for both types of products.

Thus, as a result of the scale of the price fluctuations on the energy markets, the total inflation rate in Belgium is set to fall in 2018, in contrast to the expected movement in core inflation. The inflation gap in relation to the euro area which stood at 1.6 percentage points in 2016, should narrow substantially over the projection period.

The above analysis concerns the HICP, which permits comparison between the inflation rates of all European countries. Inflation measured according to the Belgian national consumer price index (NCPI) may deviate from the former, owing to methodological differences. The NCPI is used to calculate the health index, i.e. the national index which excludes tobacco, alcoholic beverages and motor fuels. The increase in the health index, which

forms the basis of wage indexation, is set to slow down somewhat in 2017 (1.9 %) compared to the previous year, and decelerate further in 2018 (1.5 %), ending at 1.7 % in 2019.

5. Public finances

5.1 General government balance

According to the data published by the NAI in April 2017, the Belgian government recorded a deficit of 2.6 % of GDP in 2016. In the macroeconomic context described above, the deficit should fall to 2 % of GDP in 2017. In 2018 and 2019, the budget deficit is set to remain fairly stable at 2.1 % of GDP.

The general government budget balance is expected to improve in 2017, since expenditure should fall sharply in relation to GDP while there will only be a small decline in revenue. Primary expenditure is projected to fall as a result of the budgetary policy aimed at curbing its growth. Interest charges should continue to fall since public loans maturing are refinanced at favourable interest rates for public authorities. In 2018 and 2019, primary expenditure and interest charges are likely to decline further, but the reduction in interest charges should diminish towards the end of the projection period. The favourable impact of the two factors on the budget balance should nevertheless be offset by the fall in revenues resulting from a reduction in the levies on labour under the tax shift.

The deficits are expected to be concentrated mainly at federal government level. Social security should record a balanced budget since it receives an appropriation from the federal government intended to achieve that. The Communities and Regions are expected to record small deficits during the projection period, while the local authorities' finances will be more or less in balance.

As usual, these projections assume that there will be no change in policy. They therefore only take account of budget measures which have already been announced and specified in sufficient detail. The estimates show that additional consolidation measures will be necessary to achieve a structurally balanced budget in 2019, that being the target set in the April 2017 stability programme.

5.2 Revenue

Public revenues are expected to contract by 0.1 percentage point of GDP in 2017 and to continue declining in 2018 and 2019 by 0.6 and 0.4 percentage point

TABLE 6 GENERAL GOVERNMENT ACCOUNTS
(in % of GDP)

	2016	2017 e	2018 e	2019 e
General government				
Revenue	50.8	50.7	50.1	49.6
Primary expenditure	50.5	50.1	49.8	49.5
Primary balance	0.2	0.6	0.2	0.1
Interest charges	2.9	2.5	2.3	2.2
Financing requirement (–) or capacity	**–2.6**	**–2.0**	**–2.1**	**–2.1**
Overall balance per sub-sector				
Federal government (1)	–2.7	–1.8	–1.8	–1.8
Social security	0.0	0.0	0.0	0.0
Communities and Regions (1)	–0.1	–0.2	–0.3	–0.3
Local authorities	0.2	0.0	0.0	0.1

Sources: NAI, NBB.

(1) These figures were produced in accordance with a budgetary approach. They include the advances on the regional additional percentages on personal income tax although, according to the methodology of the ESA 2010, those advances are regarded as purely financial transactions and the regional additional percentages are only taken into account at the time of collection. The adjustment for these advances was handled in accordance with the provisions of the Special Finance Act.

TABLE 7 PUBLIC REVENUES
(in % of GDP)

	2016	2017 e	2018 e	2019 e
Fiscal and parafiscal revenues	43.9	43.8	43.2	42.9
Levies applicable mainly to labour income	25.1	24.8	24.2	23.9
Personal income tax	11.1	11.0	10.5	10.3
Social contributions	14.0	13.8	13.7	13.6
Taxes on corporate profits	3.4	3.5	3.5	3.5
Levies on other incomes and on assets	4.2	4.2	4.2	4.1
Taxes on goods and services	11.2	11.3	11.3	11.4
of which:				
VAT	6.8	6.9	6.9	6.9
Excise duty	2.2	2.3	2.3	2.3
Non-fiscal and non-parafiscal revenues	6.9	6.9	6.8	6.8
Total revenues	50.8	50.7	50.1	49.6

Sources: NAI. NBB.

respectively. The reduction in the revenue ratio which began in 2014 is therefore set to continue over the projection period. It is mainly the levies on labour incomes that are likely to be down sharply, as a result of the measures introduced via the tax shift in order to enhance business competitiveness, encourage employment and boost household purchasing power.

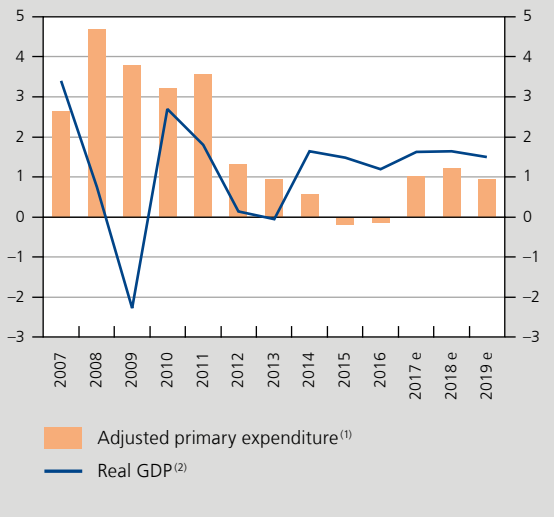
The slight fall in the revenue ratio projected in 2017 is due to the reduction in levies on labour incomes. Those incomes, which are relatively heavily taxed, should in fact rise more slowly than GDP. In addition, personal income tax is also expected to fall because the tax scales are index-linked on the basis of the previous year's consumer price index, and that exceeds the wage indexation planned for 2017, thus lessening the tax pressure. Social contributions will also decline since the full impact of the reduction in the rate of employers' contributions has been felt since 1 April 2016. However, the resulting fall in revenues is mostly offset by the higher taxes on goods and services, notably as a result of the rise in excise duties. Levies on other incomes and on assets should remain more or less stable in relation to GDP, although the withholding tax on income from movable property will rise as a result of the increase in the general rate from 27 % to 30 % with effect from 1 January 2017.

In 2018 and 2019, revenues are projected to contract further as a result of the measures under the tax shift. The reductions apply mainly to personal income tax, but social contributions are also expected to decline further.

5.3 Primary expenditure

The downward trend in primary expenditure as a ratio of GDP is set to continue in 2017 and in subsequent years.

CHART 10 PRIMARY EXPENDITURE OF GENERAL GOVERNMENT AND GDP
(percentage changes compared to the previous year)



Sources: NAI, NBB.
(1) Primary expenditure deflated by the GDP deflator and adjusted for cyclical, one-off and fiscally neutral factors, and for the effect of indexation. The latter is due to the difference between the actual indexation (or the theoretical figure for 2015 and 2016, as a result of the approved index jump) of civil service pay and social benefits and the increase in the GDP deflator.
(2) Calendar adjusted data.

In nominal terms, the increase in that expenditure may therefore be outpaced by the expansion of economic activity during the projection period.

The moderation of expenditure expected this year is likely to continue to reflect the federal government's aim of limiting its operating expenses and keeping social security spending under control. It should also benefit from the weakening effect or disappearance of a range of unexpected factors that had an adverse impact on the budget balance in 2016. They included substantial tax rebates resulting from court rulings, and the exceptional efforts involved in managing the influx of asylum-seekers.

Conversely, a new indexation of social benefits and public sector pay, coming exactly a year after the previous one, will drive up the corresponding expenditure in 2017. That concerns all levels of the State: the federal government, the Communities and Regions, local authorities and social security.

Following adjustment for temporary and cyclical factors, and the time lag between inflation and indexation, real primary expenditure is projected to rise by 1 % in 2017, which – as in previous years – is a modest increase outpaced by real GDP growth.

Control of primary expenditure will probably be less marked in 2018, notably on account of the usual public investment revival in the run-up to the local and provincial elections. However, it should be back on course in 2019.

5.4 Debt

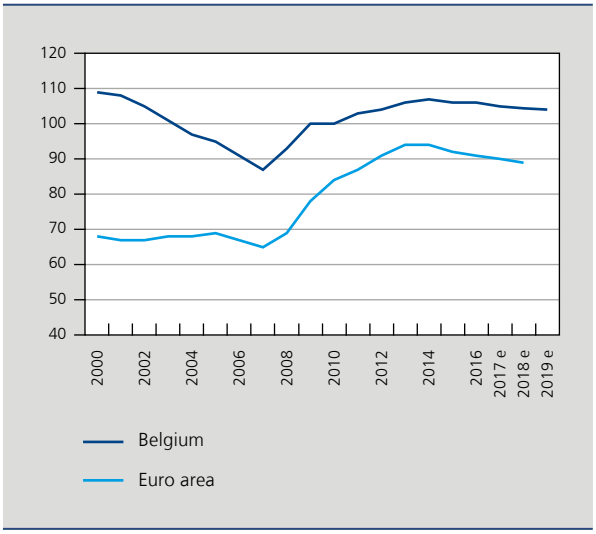
The debt ratio was stable in 2016, at 106 % of GDP. However, as a ratio of GDP, the public debt should gradually decline over the projection period.

In 2017, the debt is projected to be down to 105 % of GDP, despite the upward influence of exogenous factors. The sale of part of the federal government's stake in BNP Paribas will not outweigh the upward impact on the debt of the increased lending in connection with the social housing policy and a number of factors relating to debt management. The dip in the debt ratio will therefore be due solely to the downward influence of endogenous factors. Nominal GDP growth is expected to exceed the implicit interest rate on the public debt, and the primary budget balance should be slightly positive.

The debt ratio is subsequently set to continue falling, again as a result of endogenous factors, since nominal GDP growth is expected to be well above the implicit interest rate on the public debt. Thanks to this favourable interest rate/growth dynamic combined with a (small) primary budget surplus, the debt ratio should fall to 104.4 % of GDP in 2018 and 103.9 % in 2019.

CHART 11 CONSOLIDATED GROSS DEBT OF GENERAL GOVERNMENT

(in % of GDP)



Sources: EC, NAI, NBB.

6. Conclusion and risk factor assessment

The Eurosystem's spring projections for the period from 2017 to 2019 show slightly stronger growth than was expected in the December 2016 autumn projections and the ECB's March 2017 forecasts. In Belgium's case, the growth outlook was revised upwards to a smaller degree, and only on account of a slightly more favourable start to the year 2017, as indicated by the NAI's revised quarterly statistics for the first quarter and the current short-term forecasts for the second quarter. The short-term inflation forecast was also revised upwards compared to the December projections. However, that is due mainly to the recent steep increase in energy prices. The profile for core inflation was in fact adjusted downwards slightly.

Despite the differences in cut-off dates and the resulting differences in the statistics used, if the economic growth forecasts are compared with the latest estimates by other institutions, a relatively broad consensus emerges. For 2017, the latest estimates, such as those by the OECD, the FPB and the Bank, seem to be at the top of the range. However, that essentially reflects the fact that

TABLE 8 COMPARISON WITH ESTIMATES OF OTHER INSTITUTIONS

(in %)

Institution	Publication date	Real GDP growth			Inflation (HICP, unless otherwise stated)		
		2017	2018	2019	2017	2018	2019
Belgian Prime News	March 2017	1.4	1.5		2.3	1.8	
IMF	April 2017	1.6	1.5	1.5	2.0	1.7	1.7
Consensus Economics	May 2017	1.5	1.6		2.1	1.8	
EC	May 2017	1.5	1.7		2.3	1.5	
Federal Planning Bureau (1)	June 2017	1.6	1.6	1.5	2.1	1.5	1.7
OECD	June 2017	1.6	1.7		2.5	1.8	
NBB	June 2017	1.6	1.6	1.5	2.2	1.7	1.8

(1) Economic budget (June 2017) for 2017 and 2018. Medium-term projections (March 2017) for 2019. However, inflation corresponds to the HICP for 2017 and 2018.

those institutions have already been able to incorporate the upward revision of growth in the first quarter, published by the NAI on 31 May, whereas the earlier forecasts were still based on a slightly weaker "flash" estimate. Although the differences are still small, they appear to be somewhat greater for the inflation projections because the latter are greatly influenced by expectations concerning the oil price, and given its volatility, by the exact cut-off date.

Notwithstanding the high degree of convergence between the various macroeconomic estimates, there are still risks on both the upside and the downside which need to be taken into account. Externally, the risks concern among other things the level of vigour and sustainability of the recent revival of international trade. A more persistent return to more trade-intensive world growth could in fact strengthen the latter's fundamentals and also reinforce growth in Europe and in Belgium via increased import demand. On the other hand, the uncertainty over the policy stance in a number of countries such as the United States remains high. A more protectionist policy or a less expansionary fiscal policy than envisaged by the current Eurosystem forecasts could in fact put further restraints on growth.

At national level, the risks concerning growth, inflation and the labour market seem fairly evenly spread. In regard to the labour market, a higher-than-expected participation rate as a result of a stronger or speedier impact of the labour market reforms limiting the early retirement options is an upside risk which could nevertheless be offset by a possible scarcity of labour in certain labour market segments. Wage-setting in 2019 is another specific risk, since no wage norm has yet been defined for the year in question. If the current estimates imply the re-emergence of divergences in relation to the growth of labour costs in Belgium's three main neighbouring countries, according to the definition of that concept in the 1996 Law on the Promotion of Employment and the Preventive Safeguarding of Competitiveness, the increase in wages in 2019 could ultimately prove smaller than foreseen by these estimates. But that will depend on what happens in neighbouring countries, as the macroeconomic impact of perhaps lower labour costs could be fairly limited at the level of growth and inflation in 2019 since the repercussions are normally only felt after a certain time lag.

Annex

PROJECTIONS FOR THE BELGIAN ECONOMY: SUMMARY OF THE MAIN RESULTS

(percentage changes compared to the previous year, unless otherwise stated)

	2016	2017 e	2018 e	2019 e
Growth (calendar adjusted data)				
Real GDP	1.2	1.6	1.6	1.5
Contributions to growth:				
Domestic expenditure, excluding change in inventories	1.0	1.3	1.8	1.7
Net exports of goods and services	0.1	–0.1	–0.1	–0.2
Change in inventories	0.1	0.4	0.0	0.0
Prices and costs				
Harmonised index of consumer prices	1.8	2.2	1.7	1.8
Health index	2.1	1.9	1.5	1.7
GDP deflator	1.6	1.7	1.6	1.7
Terms of trade	0.9	–0.7	–0.1	0.0
Unit labour costs in the private sector[1]	–0.3	1.2	1.5	1.7
Hourly labour costs in the private sector[1]	–0.8	1.9	2.3	2.6
Hourly productivity in the private sector	–0.5	0.7	0.8	0.8
Labour market				
Domestic employment (annual average change in thousands of persons)	59.2	43.3	38.6	33.1
Total volume of labour[2]	1.6	0.9	0.8	0.7
Harmonised unemployment rate (in % of the labour force aged 15 years and over)	7.9	7.5	7.3	7.2
Incomes				
Real disposable income of individuals	1.0	1.4	2.3	2.2
Savings ratio of individuals (in % of disposable income)	11.4	11.4	11.7	11.9
Public finances				
Primary balance (in % of GDP)	0.2	0.6	0.2	0.1
Budget balance (in % of GDP)	–2.6	–2.0	–2.1	–2.1
Public debt (in % of GDP)	106.0	105.0	104.4	103.9
Current account (according to the balance of payments, in % of GDP)	–0.4	–0.3	–0.1	–0.1

Sources: EC, DGS, NAI, NBB.

(1) Including wage subsidies (mainly reductions in payroll tax) and targeted reductions in employers' contributions.

(2) Total number of hours worked in the economy.

Public sector efficiency in Belgium

D. Cornille
P. Stinglhamber
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Introduction

Efficiency is defined as the ability to obtain the best possible results using as few resources as possible. The constant quest for efficiency in public sector management is essential for all constituent parts of the State machinery. So, general government as a whole is expected to make a continued effort to improve services provided to the community or to reduce expenditure, or even pursue these two goals at the same time.

The theme of this article is an analysis, from a macroeconomic perspective, of the efficiency of public action in Belgium. It is split into three parts. The first part sets out a commonly used method for analysing how efficiently the government sector is run. The second part compares public expenditure in Belgium with spending in the other European countries. And in the third and final section, public spending levels are matched against the results obtained from a series of public action functions on the basis of the method presented at the beginning of the article. This approach makes it possible to compare efficiency between countries and identify reference countries that can provide inspiration for the Belgian government. The article winds up with a few conclusions.

1. How can public sector efficiency be measured ?

1.1 Efficiency frontier

Studies devoted to public sector efficiency are often based on a similar methodology, a simplified version of which is taken up for the purposes of this analysis.

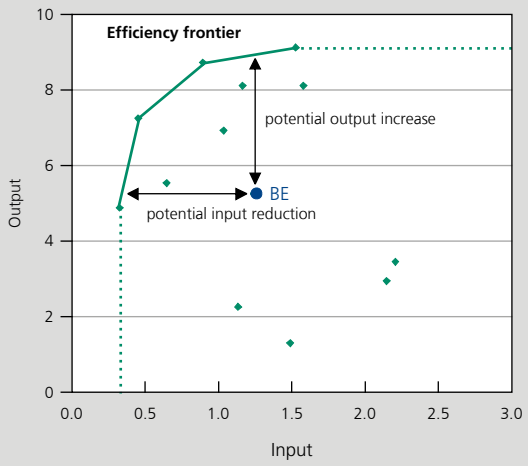
Firstly, each country from the sample under study is represented by a point, which measures the level of expenditure (input) on the horizontal axis and the results obtained (output) on the vertical axis, in each case for a well-defined function of public action.

The next step is to trace an 'efficiency frontier' linking up the countries with the best output-input combinations. In this case, the data envelopment analysis (DEA) method is used. This technique involves surrounding the data with an imaginary frontier demarcated by the most efficient countries from the sample. This line is not an absolute reference for efficiency ; it just links up countries from the sample that apply the best practices, from the country using the least resources to the country obtaining the best results. On this frontier, there is no better performance at the same level of input, nor any less costly input at the same level of performance. Obviously, the line traced by this frontier is influenced by the number and nature of the countries taken into consideration : the method therefore only measures relative efficiency compared with these countries and there is nothing to suggest that the nations lying along the efficiency frontier really are efficient.

Lastly, the graphic distribution of the surveyed countries is then examined. The most efficient countries are those that can be found in the upper left-hand section of the graph, with a high output and low input. Conversely, the countries that are in the lower right-hand part of the graph are relatively inefficient because they combine a comparatively large amount of resources and weak results. By definition, all countries that fall under the frontier still have some potential for efficiency gains. For each one of them, there is at least one other country that either performs better for the same cost or spends less

CHART 1 ESTIMATION OF AN EFFICIENCY FRONTIER

(theoretical example, DEA method)



Source : NBB.

to produce the same performance. The distance to the efficiency frontier as measured on the output axis corresponds to the potential for qualitative improvements. Between these two extremes, there is a multitude of combinations of potential efficiency gains consisting of both cost-cutting and performance-enhancing capabilities.

1.2 Evaluation of input and output

Analysing the efficiency of public sector performance is no easy task, especially when it comes to measuring output. The quality of services provided by general government is often hard to grasp. Besides, public services are by definition non-market services. So, their value cannot be quantified in terms of price. Relevant indicators can nevertheless be found for some functions, while that is obviously not possible for others. For instance, on what basis can output by the army or the diplomatic corps be estimated ? This limitation implies that any analysis of public sector efficiency from a macroeconomic perspective is confined to very specific functions, such as public action in the fields of health, education, security and mobility. This article attempts to assess just how efficient Belgium is in these four functions, in comparison to the other European Union countries.

Input, on the other hand, can quite simply be estimated on the basis of expenditure made. The data used to make this comparison come from the Classification of the Functions of Government (COFOG) drawn from the national accounts, which gives a breakdown of expenditure by function. However, in some areas, households also account for a good part of the expenditure, making it impossible to separate the respective share of public and private spending in the end result. This is notably the case for health and education, where private expenditure contributes to a greater or lesser extent to the final result, for instance in terms of life expectancy or level of education reached. So as not to distort the analysis, public expenditure is therefore supplemented by household spending figures taken from the Classification of Individual Consumption by Purpose (COICOP). For the rest, expenditure is examined on the basis of averages established over the last sixteen years (2000-2015 period), in view of the fact that current findings tend to be attributed to spending made over a relatively long period. Thus, it is the cumulative efficiency of the public authorities' action over a given period of time that is assessed, and not just a simple – and potentially distorted – reflection of the current situation. Also, each recent change in the expenditure trend – for example due to the great recession and sovereign debt crisis in Europe, as well as the measures taken by government in the wake of these events – is therefore weakened somewhat in the measured input.

Although the method chosen is widely used for analysing efficiency, it is nonetheless restrained by some limitations. It is effectively a purely macroeconomic approach that does not come with any magic formula for greater efficiency. However, a closer examination of the composition of the most efficient countries' input and output does give some indication.

As for the output figures, even where there are data available for all countries, they are not always given on a harmonised basis. Some of the indicators used are taken from surveys based on relatively small samples of business-type respondents, which tends to make them less representative. Even if it implies arbitrary choices, the use of composite indices nevertheless enables less weight to be given to these rather biased findings that are flawed by a margin of error. Ultimately, this can give a rather nuanced picture of a country's results for a given function.

On the input side, there are other factors than expenditure that are not taken into consideration in the analysis, even though they may have some potential impact on efficiency, such as the type of policy followed, regulations in force, features of the tax system, etc. Moreover, some factors that are beyond the public authorities' control affect the results without being taken into account as an input. For instance, it has been shown that life expectancy is also influenced by factors that are not very sensitive to health

care spending policies, such as eating habits, smoking, air quality or the socio-economic environment.

These limitations should be borne in mind when interpreting the findings of the analysis in part 3. Meanwhile, the second section gives a more general overview of total public spending, notably in order to gauge the relative importance of the functions under study.

2. Overview of public expenditure

While in the early 2000s, primary government expenditure – i.e. spending excluding interest charges – in Belgium stood at a fairly similar level to the average for the euro area and for the countries making up the EU15 (1), since then a gap has opened up. For instance, expenditure increased from 42.4 % of GDP in 2000 to 50.6 % in 2016. That is a rise of 8.2 percentage points of GDP, whereas the average increase in the other European countries was more moderate, at around 4 percentage points of GDP.

Up until 2008, Belgium's public expenditure did not grow very much and stayed in line with the European average. As a result of the economic and financial crisis, expenditure rose considerably and to a similar extent in Belgium and in Europe. While most of the other European countries managed to reverse the trend from 2011, Belgium's public expenditure continued to rise in 2013. It has since fallen a bit, but is still significantly higher than the European average.

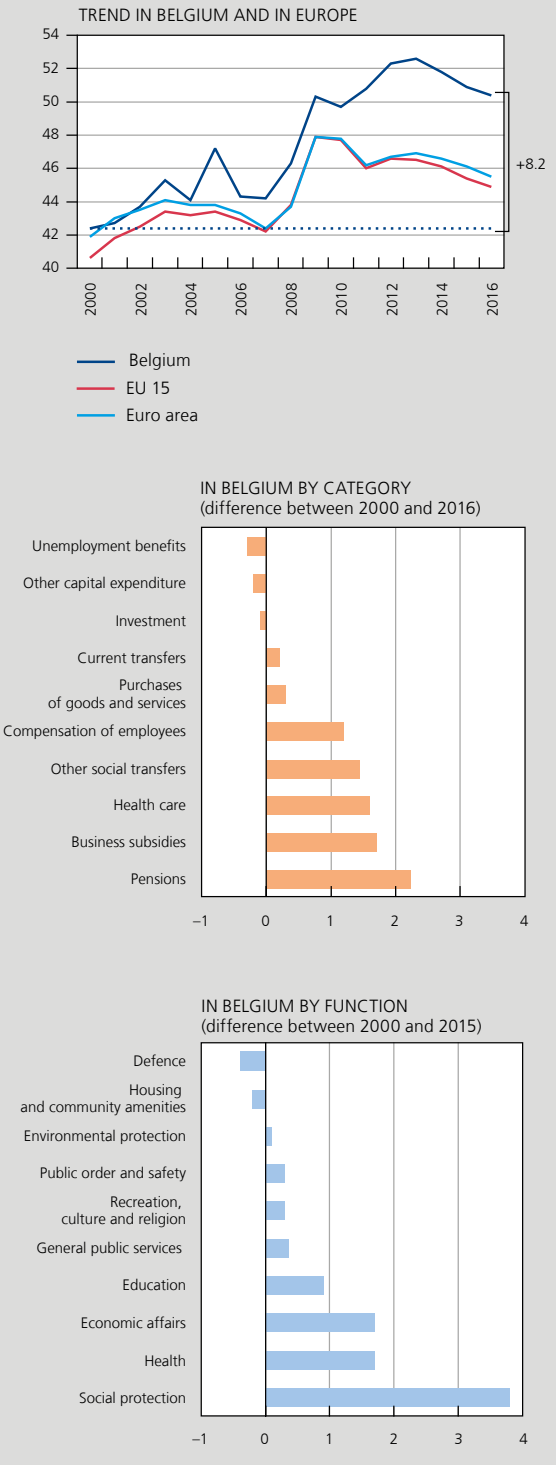
2.1 Trend and composition of primary expenditure in Belgium

The marked increase in spending observed in Belgium between 2000 and 2016 is mainly attributable to three categories of expenditure : social benefits, civil service pay and business subsidies.

Expenditure on social benefits rose by 4.9 percentage points of GDP, 2.2 points of which went on pensions and 1.6 for health care. Conversely, unemployment benefits contracted a little, notably because of the tightening up of conditions for granting them. As far as public sector pay is concerned, the rise of 1.2 percentage points of GDP is the result of a 1.6 point increase for the Communities and Regions and local authorities, partially offset by a 0.4 point reduction for the federal government. Over the same period, business subsidies rose by 1.7 percentage points of GDP. This is primarily spending to keep labour

CHART 2 PRIMARY EXPENDITURE

(in % of GDP, unless otherwise stated)



Source : NAI.

(1) Or the "European Union of the Fifteen" which refers to the group of countries that belonged to the European Union between 1995 and 2004. These are Austria, Belgium, France, Germany, Italy, Luxembourg, the Netherlands, Denmark, Ireland, the United Kingdom, Greece, Spain, Portugal, Finland and Sweden.

costs down through cuts in payroll tax, targeted reductions in social security contributions and activation programmes for getting people back to work. Expenditure on purchases of goods and services also increased by 0.3 of a percentage point, almost entirely due to the Communities and Regions and local authorities. Together with the above-mentioned unemployment benefits, capital expenditure is the only category of expenditure to record a global decline over the whole period under review, while investment, which forms part of this category, is generally regarded as productive public spending that boosts the economy's growth potential.

An alternative approach to analysing primary expenditure involves looking separately at public expenditure per function. Under this approach, which makes a distinction between ten principal functions and a series of sub-items, it is possible to pinpoint areas in which public spending increased the most over the period 2000-2015 (as the year 2016 is not yet available under the COFOG classification).

The four functions that pushed up expenditure the most are social protection (+3.8 percentage points of GDP), economic affairs[1] (+1.7 percentage points of GDP), health (+1.7 %) and education (+0.9 %). Spending on the "Recreation, culture and religion", "Public order and safety", "General public services excluding interest charges" and "Environmental protection" functions rose too, albeit to a lesser extent; they nevertheless jointly accounted for +1.1 percentage points of GDP. On the other hand, spending on defence and on housing and community amenities showed a decline – although quite small – over this period.

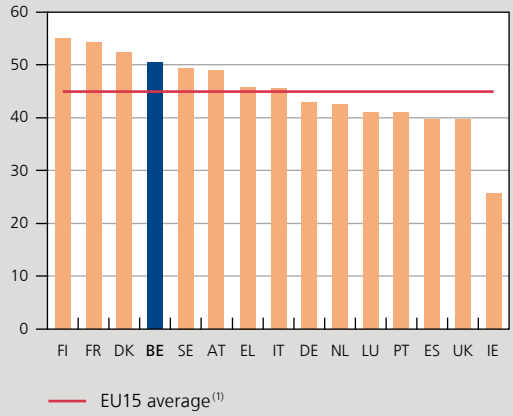
2.2 International comparison

For this analysis, the fifteen European countries that made up the old EU15 have been selected so as to position Belgium in relation to other sufficiently comparable countries, in terms of standard of living or availability of harmonised statistics, for example.

As for spending levels expressed as a percentage of GDP, Belgium lies in fourth place among the fifteen European countries selected. Along with the Nordic countries, France and Austria, it is one of the States with above-average public expenditure. Germany and the Netherlands, two other countries with which Belgium is often compared, record much lower expenditure, by about 8 percentage points of GDP.

(1) Category that encompasses the following sub-items: "General economic, commercial and labour affairs", "Transport", "Communication", "Fuel and energy", "Mining, manufacturing and construction" and "Agriculture, forestry, fishing and hunting".

CHART 3 LEVEL OF PRIMARY EXPENDITURE IN THE EU15
(in % of GDP, 2016)



Source: EC.
(1) Unweighted average.

As statistics on public expenditure per function are also available for the other European countries on a harmonised basis, it is possible to compare these figures for 2015 function by function. They show that Belgium's expenditure is above average for all functions, with the exception of spending on "defence" and "housing and community amenities".

With regard to spending on social protection, the function that weighs most heavily on Belgium's public coffers, this country fares slightly above average, about 4 percentage points of GDP lower than the top three, namely Finland, France and Denmark. In terms of health care too, spending is higher in Belgium, which comes in fifth place. Belgium is ahead of Germany for most functions.

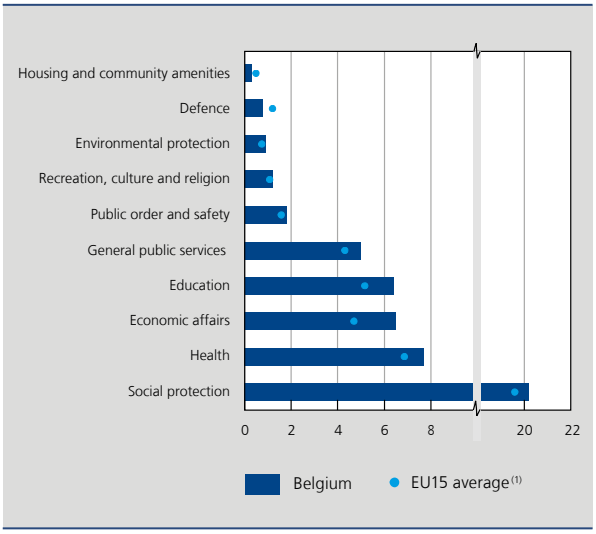
Expenditure on functions that fall under the "economic affairs" category, namely business subsidies in the context of employment policy as well as spending on the "communication" or "transport" sub-items, is relatively high in Belgium, which thus features in second place, just behind Greece and ahead of Austria.

As for the "education" function, Belgium lies in third place, behind Denmark and Sweden.

Expenditure on the "general public services" function covers operation of the legislative and executive organs, financial and fiscal affairs, external affairs, foreign

CHART 4 PRIMARY EXPENDITURE BY FUNCTION

(in % of GDP, 2015)



Source: EC.
(1) Unweighted average.

economic aid, general services, basic research, etc. For these functions, Belgium always pays out more than the average for the other countries, behind the Scandinavian countries and Greece, but ahead of neighbouring countries like France and Germany in spending terms. The same observation can be made for "public order and safety", although in the latter case Belgium is in front of the Scandinavian countries, with higher-than-average spending that is nearer the figures for the Southern European countries, the United Kingdom and the Netherlands.

As far as "recreation, culture and religion" and "environmental protection" are concerned, Belgium's spending patterns are systematically above average, while among the other countries, the positioning is more variable. The Nordic countries, for instance, come under the average for spending on the environment, while the opposite is true for spending on "recreation, culture and religion". The opposite generally holds true for the Southern European countries.

3. Efficiency of public action in Belgium compared with the other European countries

As already mentioned, it is tricky to estimate the efficiency of total public expenditure. Nevertheless, some organisations have come up with indicators, mainly based on survey findings, designed to assess the overall efficiency of public authorities. For instance, according to the World Economic Forum's 2016 survey, Belgium is given a similar score to France for efficiency levels, in front of the Southern European countries but behind the rest of the EU15.

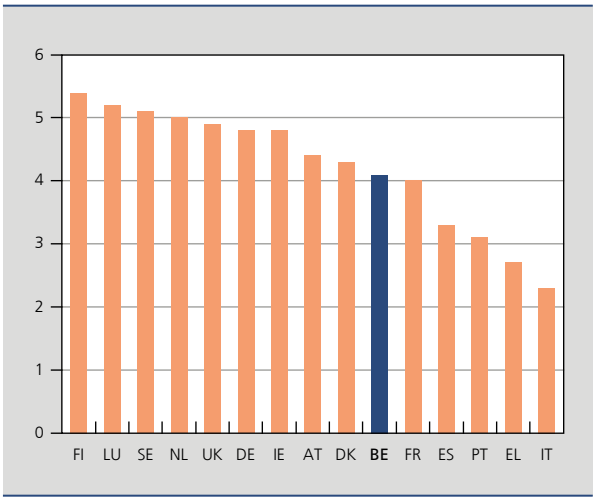
This third part of the article puts forward a more nuanced analysis of this observation, by applying the method described in the first section to several different public action functions: health, education, public order and safety, and mobility. The countries selected are once again those from the EU15, which tend to be more homogeneous and for which there are generally reliable and comparable data for each of these functions. Together, the selected categories account for 36 % of primary expenditure in Belgium. Functions that were not taken into consideration include social protection, economic affairs, general public services, defence, environmental protection, etc. Indeed, it is either hard to find any representative indicators for these functions or not very relevant to try and make a connection between the results obtained and the budgets allocated by public authorities.

3.1 Health

Seven indicators were selected to make up the composite index for measuring output on the health front: life expectancy, healthy life expectancy, child mortality, waiting times to get a doctor's appointment, perceived health, satisfaction with the health care system and quality of the health care infrastructure. As far as input is concerned,

CHART 5 GENERAL PUBLIC EFFICIENCY

(assessed by respondents on a scale of 1 to 7, survey conducted in 2016)



Source: WEF.

private expenditure is added to public spending on health, so as not to distort the comparisons.

Belgium registers fairly good results when it comes to health care. However, the high output comes at a very high cost too, with Portugal being the only country to spend as much as Belgium on health. Moreover, seven countries are more efficient than Belgium, posting better results despite using fewer resources. Luxembourg is a special case. Since its GDP per capita is artificially inflated by the large number of border workers, its level of expenditure expressed as a percentage of GDP is often low. This is notably the case for spending on health. It is therefore preferable to compare Belgium with other countries, such as Sweden, the Netherlands or Spain, which produce better results while spending less.

Belgium does quite well when it comes to the health indicators. It gets the highest score for three indicators: quality of the health care infrastructure, general satisfaction of beneficiaries with the health care system and waiting times to get a doctor's appointment. Conversely, its overall result is pulled down by poorer scores regarding child mortality and life expectancy. It should be noted that the latter indicator is probably determined by a whole host of factors, with health spending being just one among many, such as lifestyle and genetic predisposition. It is even possible that there is a negative correlation between the budget for health care and life expectancy. For example, factors like smoking or bad eating habits tend to reduce life expectancy and at the same time increase the risk of illnesses requiring costly treatment.

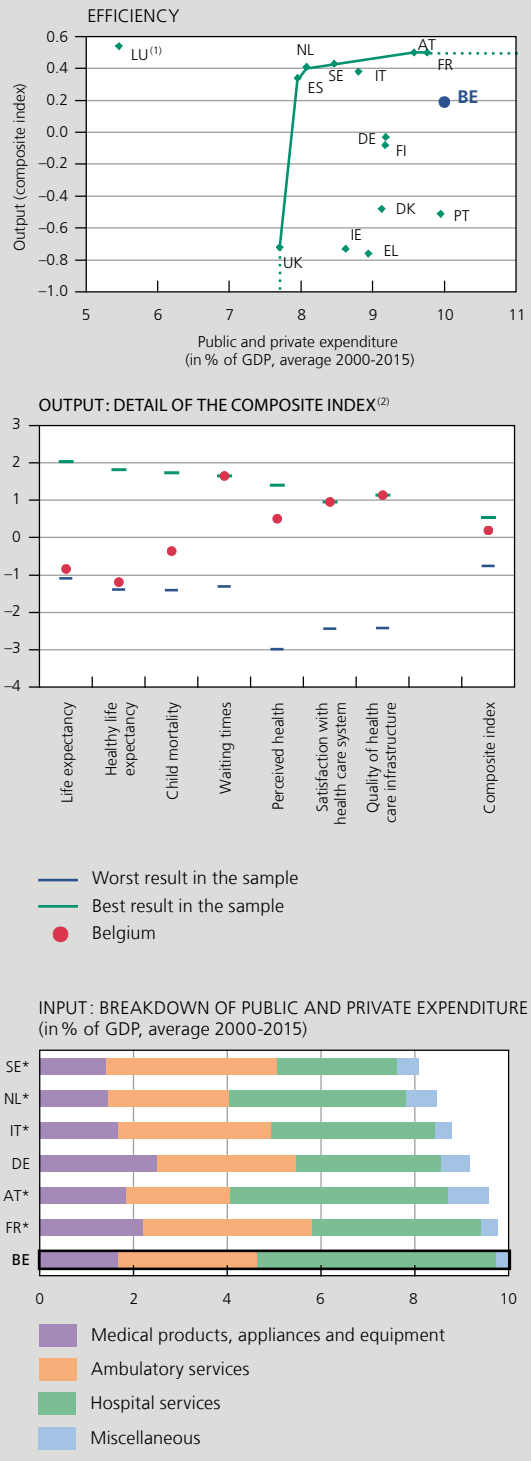
On the expenditure front, it is mainly for hospital services that Belgium stands out from the reference countries. The other categories of health spending, principally for outpatient consultations, as well as for medical products, appliances and equipment, put Belgium among the average of the most efficient countries.

So, there is potential for efficiency gains in the Belgian hospitals. More specifically, the challenge lies in curbing spending without affecting the high quality of the care. Here, Belgium could draw inspiration from the practices used in the most efficient countries. For instance, prevention or early screening campaigns could be reinforced in order to reduce the number and duration of hospital stays.

3.2 Education

To measure the input that goes into education, both public and private expenditure has to be taken into account. Output is then estimated on the basis of a composite

CHART 6 HEALTH



Sources: EC, other.

(*) The countries marked with a * are those pinpointed by the analysis as being very efficient.

(1) Luxembourg has been deliberately excluded from the delimination of efficiency frontier for the reasons mentioned above.

(2) The composite index has been calculated as the weighted average of the selected indicators. They were standardised beforehand by subtracting the average and dividing them by the standard deviation. Each indicator therefore has an average of 0 and standard deviation of 1.

index that contains the following indicators: school pupil scores in the OECD's PISA (Programme for International Student Assessment) tests (mathematics, reading and science), the share of the population with a secondary or higher education qualification, linguistic skills, citizens' satisfaction with the education system, the perceived quality of the education system and the availability of skilled labour.

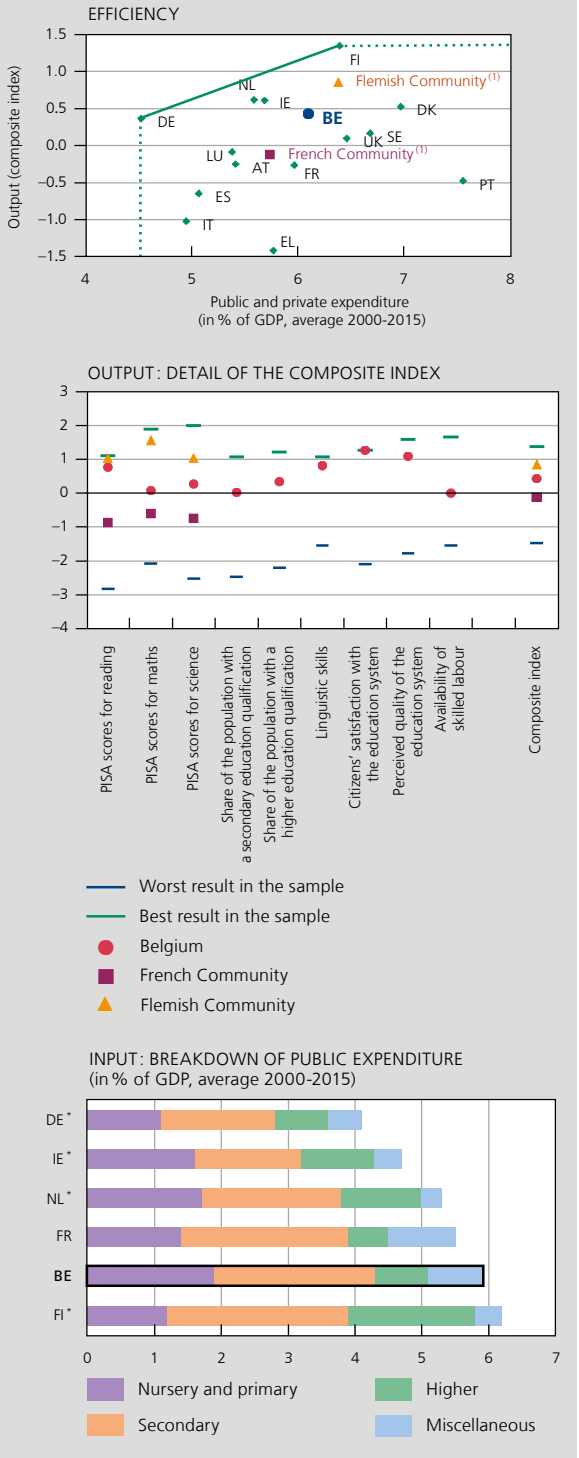
When it comes to education, the analysis shows Germany and Finland to be the most efficient countries. By contrast, the countries of Southern Europe report widely varying spending levels, but overall this region has the weakest results. Belgium occupies an intermediate position, aligning fairly closely with the comparatively efficient countries: its expenditure and results are below those of Finland but better than Germany's.

Belgium mainly scores better than average when it comes to citizens' satisfaction with the education system, perception of the quality of education and linguistic skills, as well as the share of the population with a higher education diploma, although to a lesser extent. It has an average score as far as the availability of skilled labour is concerned, as well as the share of the population with a secondary education qualification, even though it comes 11th out of 15 for this criterion. School pupils' results in the OECD's PISA tests for mathematics, reading and science (which account for half of the composite index weighting) lie above the EU15 average, but below those for Finland, Ireland, Germany, the Netherlands and Denmark.

Disparities in terms of performance and costs can also be observed even within the same country, as is the case in Belgium. The PISA survey in fact shows that scores for mathematics, reading and science are on average higher in the Flemish Community than in the French Community. Among the factors that generally tend to be mentioned to explain these divergences – apart from the limitations of the survey itself – are most notably the socio-economic standing of the parents, the proportion of pupils from an immigrant background (whose mother tongue is usually not French or Dutch) and spending levels per pupil. However, these elements probably do not explain the whole difference; some authors suggest that factors like programmes and teachers' and school management autonomy could also play a role. Incidentally, the French Community has taken these two aspects into account in drafting the *pacte d'excellence* for education that it intends to implement.

Compared with the reference countries, Belgium spends a lot of money on nursery and primary education. Conversely, the expenditure it devotes to higher education

CHART 7 EDUCATION



Sources: EC, WEF, OECD, NBB.

(*) The countries marked with a * are those countries pinpointed by the analysis as being very efficient.

(1) Not all the indicators used for the international comparison were available for the Flemish and French Communities. In terms of output, their results were therefore approximated on the basis of the results of the 2015 PISA survey, while the input measurement was based on an estimate of the spending per student in 2012 (Schmitz V. and R. Deschamps, 2014).

is relatively low. It would nevertheless be risky to recommend a simple trade-off between these two levels of education in order to improve the results, without raising expenditure too. A more in-depth analysis is needed, given the many different aspects to take into account. For instance, the relatively high cost of nursery, primary and secondary education in Belgium could be due to the language Community split, the coexistence of different networks, a high grade repeat rate or compulsory schooling until the age of eighteen.

An international comparison shows that the low cost of nursery and primary education in Germany may be explained by a system where child care in kindergartens – which is not free nor compulsory – does not always cover a whole day and is rationed in some regions where demand exceeds supply. In this kind of system, the parents probably bear a considerably large share of the costs, either by paying themselves or via unpaid hours worked by the parent who does not work (full time), on a voluntary basis or owing to a lack of places in nursery schools.

3.3 Public order and safety

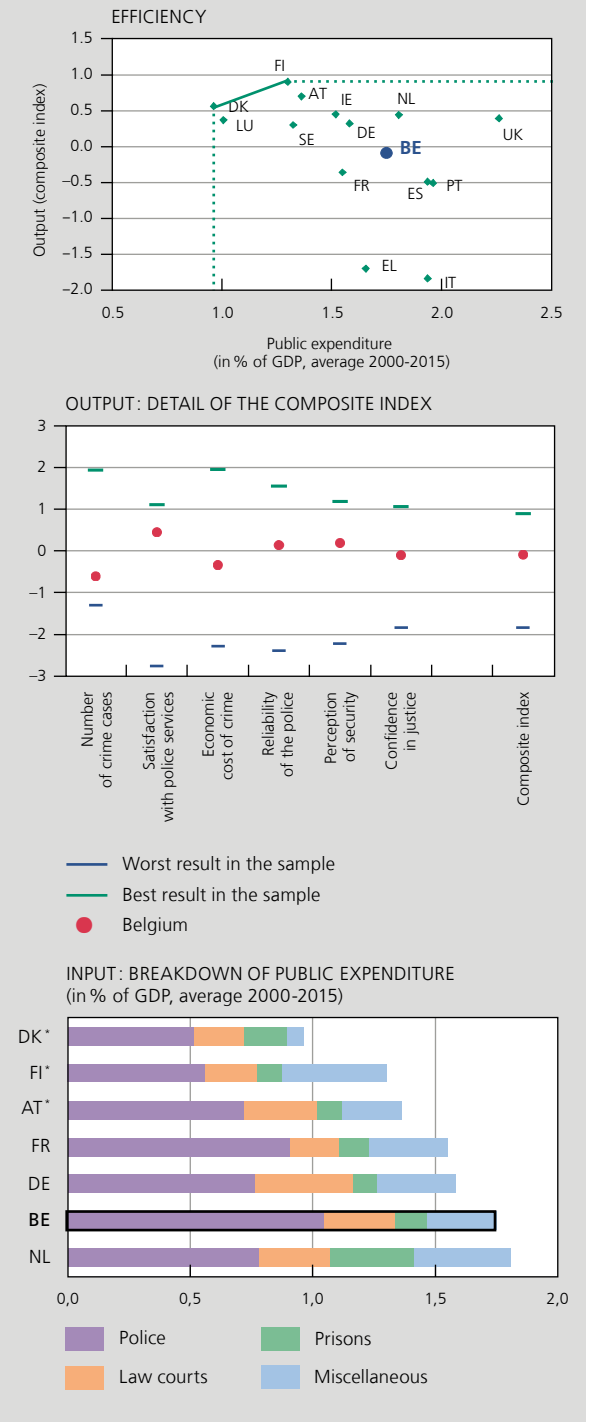
Six indicators were included in the composite index for measuring output regarding public order and safety: the number of crime cases, satisfaction with the police services, the economic cost of crime, reliability of the police, perception of security and confidence in justice.

Denmark and Finland feature among the most efficient countries when it comes to public order and safety, followed closely by Austria and Luxembourg. The countries of Southern Europe together lie at the bottom of the league. Here, too, Belgium lies in the middle of the rankings. Eight nations prove to be more efficient: they post better results with less expenditure. France and the United Kingdom are just about as efficient as Belgium, albeit with radically different choices: less spending and less good results in France's case, and more expenditure and better results in the United Kingdom's case.

A more in-depth analysis of the indicators used makes it possible to single out the areas where Belgium stands out in terms of results. For instance, Belgian citizens' satisfaction with the police services is higher than the European average. Conversely, Belgium fares relatively poorly on the number and economic cost of crime cases.

A breakdown of expenditure by sub-item reveals that Belgium spends a great deal of money on police services, while the budgets for the law courts and prisons are comparable to those of the reference countries.

CHART 8 PUBLIC ORDER AND SAFETY



Sources: EC, other.
(*) The countries marked with a * are those pinpointed by the analysis as being very efficient.

This observation nevertheless needs to be qualified. For instance, some regions in Europe, such as Scandinavia, enjoy a geographic location that distances them from international organised crime traffic. More generally

speaking, it would appear that the size of the budget allocated to public order constitutes a corollary of the level of insecurity observed, rather than its most important determinant. This assumption goes a long way towards explaining the apparent negative correlation noted in the Western European countries between the level of spending, on the one hand, and the results obtained, on the other hand. Therefore, a State would have relatively little room for manoeuvre to act sustainably on public order and safety plans simply via public spending. This expenditure, which is principally intended for repression (police, law courts, prisons), would just reflect the degree of insecurity, itself determined by a whole range of elements. Besides the economic, demographic or geographic context, there is also the government's prevention policy, something that is only partly taken into consideration in the public order and safety function, even though it is a potentially crucial explanatory factor behind the results obtained.

3.4 Mobility

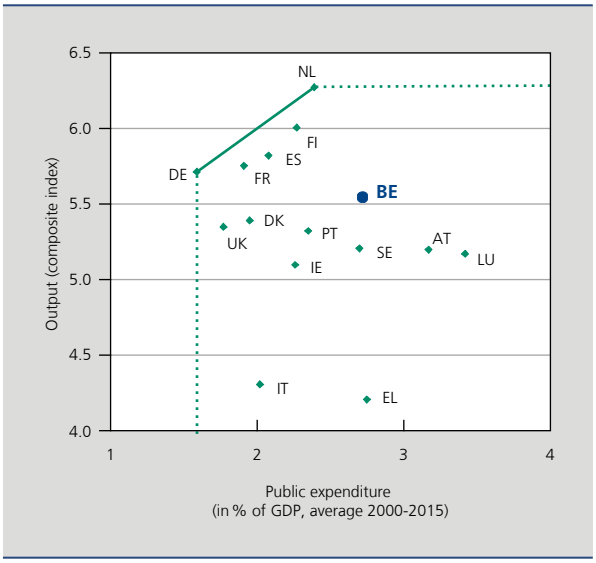
Efficiency of public spending on transport is relatively poor in Belgium (private expenditure is not taken into account here). A lot of resources are devoted to this function for mediocre results. These results are estimated on the basis of a composite index for transport infrastructure (road, rail, waterways, air), taken from the Global Competitiveness Report published by the World Economic Forum. Belgium does not score as well as – on both expenditure and quality – Germany, France, the Netherlands, Spain and Finland. Other countries spend less than Belgium, but they also have worse results. Only Austria and Luxembourg are even less efficient than Belgium.

Belgium's strengths are mainly its port and, to a lesser extent, its airport infrastructure. However, it does not perform so well on the railway infrastructure front and certainly not when it comes to the road network. One possible assumption that could explain Belgium's poor showing is the extremely tight-knit network of means of communication in comparison to other countries with similar – or even higher – population density (like the Netherlands, which also posts the best results for road networks). This element tends to pose complications for maintenance, which seems to be less frequent and/or more costly in Belgium. Moreover, Belgium suffers from endemic congestion problems, due to the predominance of the private car. These features are associated with the strong urban sprawl in Belgium, whereas urbanisation is more concentrated in other countries, which facilitates the organisation of transport and reduces costs, especially for public transport.

France's good results may partly be attributable to the privatisation of its road network, which seems to have helped the State make substantial savings. In Spain, efficiency of its infrastructure may well have benefited from European structural aid, that enabled major improvements in quality without generating expenditure on the same scale. Luxembourg's poor score is mainly due to its limited port and airport infrastructure.

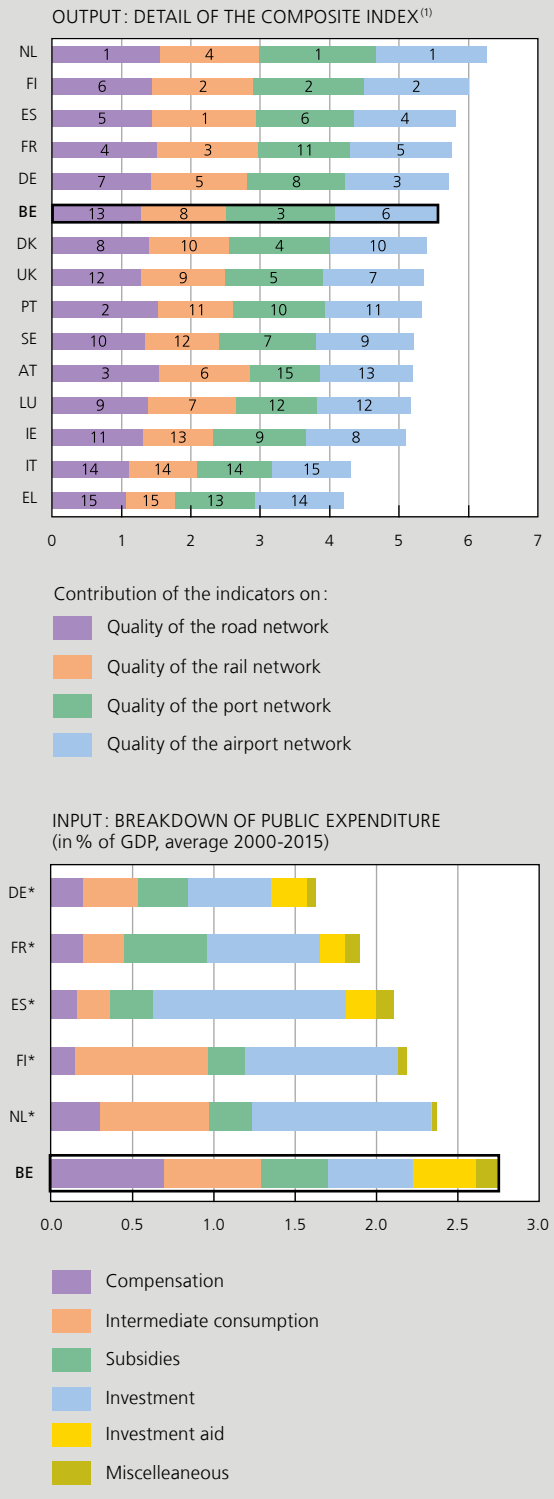
Spending on investment in transport appears to be systematically higher in the reference countries than in Belgium. On the other hand, this additional cost is largely offset by much lower staff costs in the efficient countries. Although, on the basis of this model, the budget currently devoted to transport should enable Belgium to improve its performance, by focusing more on targeted investment expenditure and less on operating costs, this assumption should nevertheless be qualified. The share of private expenditure going towards public transport operating costs, or its corollary, the subsidy percentage, can vary considerably. Although this limited analysis does not make it possible to put forward specific recommendations, the data suggest that, as far as mobility is concerned, it would perhaps be worthwhile envisaging extra investment in transport infrastructure to reduce congestion problems and maintain the quality of the existing infrastructure. Societal choices regarding land use and planning would undoubtedly benefit from greater attention, especially as regards the consequences in terms of costs incurred, and most notably for transport.

CHART 9 MOBILITY



Sources: EC, WEF, NBB.

CHART 10 MOBILITY: DETAILED ANALYSIS



Sources: WEF, NBB.

(*) The countries marked with a * are those pinpointed by the analysis as being very efficient.

(1) The figures given in the chart correspond to the country rankings on the criterion in question, with each country being ranked between 1 (best score) and 15 (worst score).

Conclusion

Belgium has a particularly high level of public spending. Public administrations nevertheless produce very average results in terms of efficiency. Public action therefore offers undeniable potential for efficiency gains. Guaranteeing more efficient public policies is thus an important task which requires constant efforts to keep down costs while improving the provision of services.

Over the next few years, greater efficiency of public action should in any case be a key objective for all levels of power in Belgium. First of all, in order to achieve this objective, it will be necessary to adopt a systematic approach enabling the whole range of public sector missions to be analysed and choices to be made. Then, it would be appropriate to look at which level of power is best placed to carry out these missions; any overlap should be avoided and economies of scale aimed for. And lastly, we have to work towards the most appropriate organisation of the way in which the various public services operate, notably by making the best use of IT applications and by simplifying procedures. Any reforms that may be needed must be envisaged from a long-term perspective and be rigourously enforced.

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Low interest rates and their impact on Belgian households

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Ph. Du Caju
M.-D. Zachary

Introduction

In response to the financial crisis and subsequent recession that hit the global economy from 2008, the ECB, like most other central banks in advanced economies, has been pursuing extremely accommodating monetary policies, reflected in unparallelled reductions in interest rates and liquidity injections on a massive scale. When the limits of conventional monetary policy instruments became apparent, the ECB bolstered its policy from early 2015 by embarking on large-scale asset purchase programmes. This environment of excessive liquidity also pushed up property and financial asset prices.

This article analyses the consequences of the low interest rate environment for households in Belgium, with a focus on the recent period. Have Belgian households seen their incomes eroded due to the dwindling returns on their savings ? Or have they benefited from the fall in their borrowing costs, combined with the increased value of their assets ? Have they changed their savings and consumption behaviour ? Has the general fall in financial returns forced them to seek riskier investments ? This article attempts to provide answers to these questions.

The aim here is not to explore the reasons for the low interest rate environment, which is not solely the result of accommodative monetary policies : weak overall demand, overcapacity and stubbornly high levels of debt in both the private and public sectors are equally cyclical elements which have characterised the European economy over the last decade and which have held down interest rates. Structural developments, such as population ageing and the slowdown in potential growth, generate imbalances between savings and investment – a situation that has been ongoing for some time and which also weighs on interest rates.

The impact of low interest rates on household accounts is difficult to quantify because it affects both the financial markets and the real economy, operating through various channels and mechanisms which interact with, reinforce or counterbalance each other and which cannot be completely isolated. It is not possible to determine what the macroeconomic conditions – growth, inflation, household income, etc. – would have been if interest rates had remained at higher levels, and particularly if no monetary policy measures had been taken. With this in mind, the influence of these different factors on household incomes, assets and behaviour will be referred to in general terms and no attempt will be made to quantify their relative importance with any precision.

Section 1 describes the recent macroeconomic environment in terms of nominal and real interest rates and financial asset and property prices. Section 2 presents a theoretical discussion of the impact of falling interest rates on household behaviour, with a particular focus on income, substitution and wealth effects. Section 3 traces developments in household income, wealth and behaviour since 2008 and describes the trade-offs between consumption and saving as well as the allocation of savings. Section 4 examines the redistributive effects of low interest rates, using microeconomic survey data that reflects on the differences in the debts and assets of different types of household.

1. Macroeconomic environment

1.1 Low interest rates

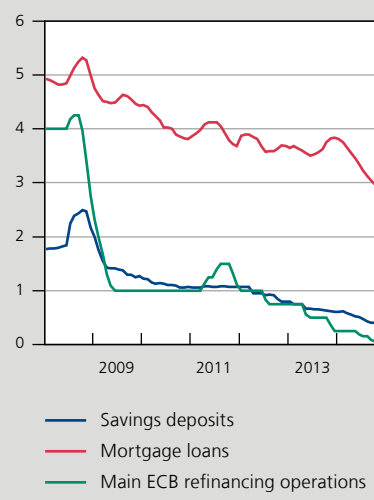
The fall in interest rates linked to the main ECB refinancing operations was largely priced into retail rates offered to clients by financial institutions, and particularly in two areas typically relevant for households, i.e. (regulated) savings accounts and mortgage loans with a fixed interest period of more than ten years[1]. While the ECB lowered its key rate from 4.25 % to 0 % between October 2008 and April 2016, the basic interest rate paid on savings in Belgium went down from 2.49 % to 0.08 % over the same period, and mortgage interest rates fell from 5.33 % to 2.16 %. Rates have remained broadly unchanged since then: the basic interest rate paid on savings in March 2017 was 0.04 %, while mortgage interest rates stood at 2.09 % – rates that are close to historic lows for these two product categories.

Until early 2014, interest rates on savings deposits and loans moved largely in parallel, but since the spring of 2014 lending rates have fallen more steeply than savings rates, narrowing the spread to around 200 basis points compared with its more usual level of around 300 basis points.

Savings deposit rates are based on short-term interest rates, whereas the mortgage loan rates discussed here depend on long-term interest rates, and this narrowing spread can therefore be largely attributed to a flattening yield curve. The unconventional monetary policy measures announced in early 2015 and subsequently implemented have depressed long-term rates further, while short-term rates have been constrained by the zero lower bound. Belgian law also imposes a minimum limit for interest rates on savings, which may not fall below 0.11 % (including fidelity premium).

CHART 1 ECB KEY INTEREST RATE AND RETAIL RATES FOR BELGIAN HOUSEHOLDS

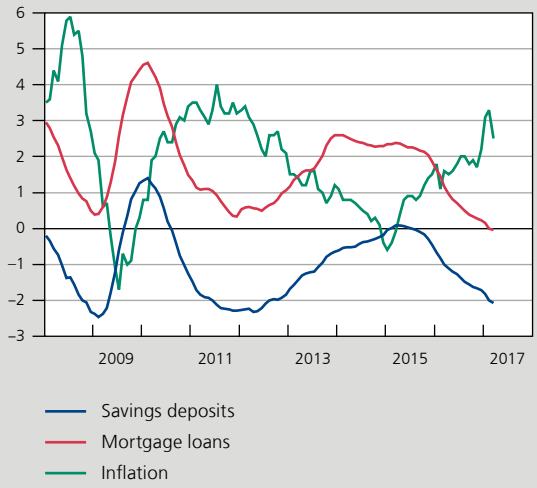
(in %)



Sources: ECB, NBB.

CHART 2 REAL INTEREST RATES[1] FOR HOUSEHOLDS AND INFLATION IN BELGIUM

(in %)



Sources: DGS, NBB.

(1) Interest rates here are deflated using the average HICP inflation rate over the past 12 months. Theoretically, nominal interest rates should be deflated using the expected rate of inflation rather than past inflation rates. However, apart from the fact that inflation expectations are by definition uncertain and impossible to measure, households are generally considered to be myopic when it comes to future price expectations; in other words, they regard past inflation rates as the best predictor of future inflation.

Theoretically, people's behaviour is determined more by real interest rates than by nominal rates, and households base their decisions on whether to consume now rather than in the future on an assessment of the future purchasing power of their savings, given their expectations regarding price developments.

Chart 2 shows the real interest rates available to households (adjusted for inflation). The historically low average level of real interest rates is more striking than their development over time. In the 2008-16 period, the real

(1) The MIR survey from which these rates are taken has been collecting this information from credit institutions on a monthly basis since 2003. To facilitate comparison between countries and enable aggregation at euro area level, harmonised categories of savings deposits and loans were created for the typical products offered by banks in the various countries. The savings deposits referred to here have a notice period of up to three months; mortgage loans represent a home loan with an initial fixed interest period of more than ten years.

interest rate payable on short-term deposits was generally negative (averaging –1 %); in other words, the interest paid on savings accounts was not enough to compensate for inflation and households which left their savings "dormant" lost purchasing power. The real costs of repaying a mortgage loan averaged 1.8 % over the same period – again, a historically very low level; by way of comparison, in the 1995-2007 period, the real mortgage interest rate averaged 3.8 % and the interest paid on savings 0.7 %.

1.2 Increase in financial asset and property prices

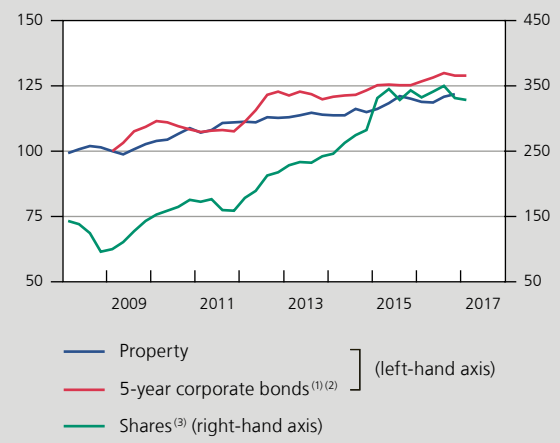
The historically low interest rates and the unconventional measures adopted by the ECB have impacted on the prices of both financial assets and property. The impact on asset prices can be largely ascribed to portfolio restructuring effects resulting from a search for yield, in which low-yielding assets are replaced by assets offering higher returns. This in turn makes those assets more expensive (valuation effect). The low interest rate environment has had a positive impact on bond and share prices as well as on property prices. But where the bond market is delivering relatively low returns, the property and equity markets have continued to deliver ever better returns thanks to their higher risk premiums (divergent risk profiles).

The ECB's introduction of unconventional monetary policy measures to address the risks of an excessively long period of low inflation, and in particular the outright monetary transactions (OMT) programme launched in 2012 and the asset purchase programme (APP) which began in 2015 and involves monthly purchases of both government paper (public sector purchase programme – PSPP) and corporate bonds (corporate sector purchase programme – CSPP), have helped boost government and corporate bond prices on the financial markets. This upward impetus clearly began in 2012, since when the purchase of securities by the ECB and the resultant strengthening of demand for those assets has driven up prices. The additional overall demand for assets created by the resultant portfolio restructuring has also pushed up prices, even for financial instruments not directly involved in the ECB purchase programmes. Against an index of 100 in 2009, the price of five-year corporate bonds in Belgium had risen to 129 by the end of February 2017, while share prices (listed shares of non-financial companies) rose to 329 over the same period.

Like financial asset prices, and partly driven by similar mechanisms, property prices have been boosted by the accommodative monetary policy. Residential property

CHART 3 FINANCIAL ASSETS AND PROPERTY PRICES IN BELGIUM

(indices: 2009 Q1 = 100)



Sources: DGS, Thomson Reuters Datastream.

(1) Bond prices were approximated based on their yield, assuming that they were zero-coupon bonds: 1/(1+ yield)/^term). Estimated prices were then standardised taking the first quarter of 2009 as a basis.

(2) Weighted average of 4/5-year and 5/6-year bonds.

(3) Relates to a basket of shares of non-financial companies.

prices on the secondary market rose by an average of 2.5 % in Belgium over the 2008-16 period, climbing to 122 by the end of 2016 on an index standing at 100 at the start of 2009. Although the average price increases mask periods of price falls, these have been minor and short-lived. Such dips occurred at the height of the recession in late 2008/early 2009, when prices fell by 3.5 % in cumulative terms and, more recently, from late 2015 to mid-2016, when prices slipped 2 %.

Compared with the situation prior to the financial crisis (an average rise of 6.8 % in the 1995-2007 period), recent property price inflation is very modest, suggesting that the impact of monetary policy on property prices is ultimately limited. Later in this article, it will become clear that the general macroeconomic climate, and more particularly the trend in disposable household income – which along with interest rates and demographic factors is a main determinant of property price growth – has been significantly less favourable in the recent period than before the crisis. While changes in the tax environment (deductibility of interest, gifting, regularisation of assets by the EBA, etc.) had propped up demand for – and therefore prices of – property in the pre-crisis period, this has no longer been the case in the past decade. On the contrary, the recent period has been characterised by macroprudential measures aimed at curtailing growth in property transactions.

2. The choice between saving and consumption : theory and survey results

2.1 Theoretical aspects

Changes in interest rates can influence the behaviour of households, and in particular their decisions on whether to consume or save, through a variety of mechanisms. Three such mechanisms are generally distinguished : the income effect, the substitution effect and the wealth effect.

Income effect, substitution effect and wealth effect

The income effect is the impact of falls in interest rates on the ability of existing or future savings income to achieve a future income level. When interest rates fall, households typically respond by consuming less in order to save more. This of course only applies for households with a positive capacity to save, i.e. whom incomes exceed their current consumption ; for borrowers, by contrast, a fall in interest rates makes their loan repayments cheaper, allowing them to consume more.

The substitution effect is measured as the opportunity costs of deferring consumption. When interest rates fall, saving becomes less appealing and credit is cheaper, prompting households to consume more. This is only possible if households can readily obtain credit to finance their spending, which is by no means always the case. In other words, the substitution effect is generally tempered by liquidity constraints.

The third mechanism is the wealth effect, whereby a fall (rise) in interest rates automatically leads to a positive (negative) change in the value of both financial and property assets. Households which hold assets may be prompted purely by the fact that they "feel" richer (poorer) to consume more (less), even if they do not actually sell any assets.

The impact of a change in interest rates on savings (and consumption) is thus ambiguous [1]. It depends on the relative importance of the three mechanisms (income effect, substitution effect and wealth effect) and whether the focus is on savers or borrowers.

Other motives for saving : precautionary saving, pension, wealth transfer

Of course, people's savings behaviour is not dictated solely by movements in interest rates, but is also determined by other factors. Households saving to create a buffer against unexpected fluctuations in income or expenditure – for example loss of income due to unemployment, unforeseen expenses, etc. – are more concerned about future risks in relation to income and consumption than the returns they achieve on their savings. The uncertainty about future income streams also relates to pensions, and households tend to save more as general government debt increases, in anticipation of possible tax rises to stabilise or reduce that debt or of the government no longer being able to meet its commitments, particularly as regards pensions or other replacement incomes. Other personal motives, such as the desire to leave assets to future generations, also reduce the sensitivity of savers to fluctuations in the return on savings. Factors such as the age profile of the population, their attitude to risk, degree of financial literacy and tax treatment also influence the savings decisions of households, as well as the way in which they save.

2.2 Household saving motives : survey results

To illustrate the relative importance of the different theoretical motives for household saving, we can draw on the results of household surveys, and specifically the Household Finance and Consumption Survey (HFCS). This representative survey was initiated by the Eurosystem, and is conducted in Belgium by the NBB. Some 2 300 households were interviewed in 2010 and 2014 about their financial behaviour, their incomes, their assets and their debts.

When asked about their motives for saving, the main reason given by households was to build a buffer for unexpected events (precautionary saving) ; the share of households citing this motive grew between 2010 and 2014, from 54.1 % to 58.8 %, possibly suggesting an increase in uncertainty.

Saving for old age (consumption smoothing within the life cycle) was another important saving motive, cited by 35 % of households – a figure that remained stable between 2010 and 2014.

The survey also showed that households save for major purchases (to buy their own home or for other big-ticket items), to pay for travel or holidays or to support children or grandchildren (e.g. to help them through their studies or to buy a home). These saving motives grew in importance between 2010 and 2014, perhaps illustrating the income effect described above.

Taken as a whole, the survey findings point to a firming up of the different saving motives between 2010 and 2014.

(1) The causal relationship between saving and interest rates also operates in the reverse direction : increasing life expectancy against a backdrop of a stable retirement age prompts people to save more for their old age, thus depressing interest rates.

TABLE 1 HOUSEHOLD SAVING MOTIVES[1]

(in % of households)

	HFCS I (2010)	HFCS II (2014)
Buffer against unexpected events	54.1	58.8
Provision for old age	35.6	35.5
Travel and holidays	23.6	28.3
Educational or other support for children/grandchildren	22.9	27.3
Other major purchases	15.9	26.9
To build up a legacy	14.2	13.8
To purchase own home	12.0	11.2
To pay off debts	5.0	5.9
Spending on items that are eligible for grants	10.5	5.7
Investment in own business	1.2	2.0
Investment in financial assets	2.1	2.0
Other	4.5	6.4

Source: NBB (HFCS 2010 and 2014).

(1) Reasons households save or would save (if they did not have sufficient funds at the time of the interview); more than one option per household possible.

This reflects the growing uncertainty about future income streams, leading to a concomitant rise in precautionary saving, though it could also be an illustration of an income effect caused by the low return on savings, prompting households to save more to cover their future expenses.

3. Impact on household income, wealth and behaviour

3.1 Decline in interest income and asset valuation effects

The sharp downturn in nominal interest rates has led to a substantial fall in net household interest income[1]. Since 2012, interest payments on loans have actually been higher than income from interest-bearing assets – an unprecedented situation for Belgian households, which have historically formed a net creditor sector as regards interest-bearing assets and which have therefore traditionally enjoyed net interest income. In 1995, net household interest income amounted to around € 10 billion, or 7.3 % of their disposable income; in 2008 this had fallen to € 3 billion, or 1.4 % of disposable income, and in 2016 it had turned negative to the tune of around € 7 billion, some 3 % of household disposable income.

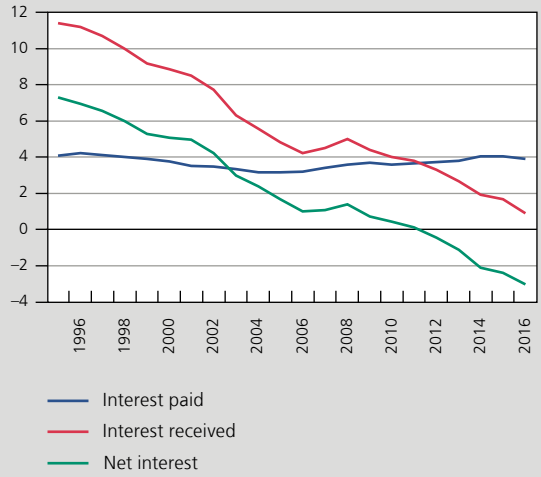
This situation is related to the steady fall in interest income over a period in which interest payments as a proportion of disposable income have effectively remained stable or even increased slightly – surprising at first sight, given the virtually parallel trend in bank debit and credit rates outlined above.

One explanation for this is that the amounts in household accounts to which the reduction in bank rates applies are much larger on the asset side (deposits) than the liabilities side (loans). At the onset of the crisis in late 2008, the value of interest-bearing assets held by households (€ 356 billion) was twice as high as their liabilities (€ 177 billion), automatically contributing to a reduction in the net interest volume.

A second factor is related to the characteristics of the financial deposits and liabilities of Belgian households, and in particular the fixed or variable interest rate that applies to them. Interest rates on savings and current accounts are adjusted regularly and almost automatically to market conditions, so that a fall in interest rates is applied directly

CHART 4 INTEREST PAID AND RECEIVED BY HOUSEHOLDS

(in % of disposable income)



Source: NBB.

(1) The figures presented here are taken from the Belgian financial accounts, and reflect the amounts actually spent or received by Belgian households. These figures differ from those in the national accounts, in which the effective interest flows are broken down into a theoretical flow, which is estimated by applying a reference rate to the corresponding outstanding loan amount, and a margin which represents the costs of providing the financial service, based on FISIM ('financial intermediation services indirectly measured') calculations. Only the theoretical flow is included in interest income/payments in the national accounts, whereas the margin is recorded as the consumption of financial services by households.

and virtually in full to both new and existing deposits. Although the rates payable on time deposits, which are generally fixed for a period of 1-2 years, are adjusted less quickly, this type of saving is less popular among Belgian households than traditional savings deposits, and moreover fell in popularity between 2008 and 2016, from 8 % to 4 % of total household financial deposits. By contrast, savings in the form of regulatory deposits rose from 17 % to 19 %.

A fall in rates is reflected much less directly in the interest charges paid on mortgage loans. New borrowers benefit immediately from more favourable credit terms, but new mortgage contracts account for only a limited fraction of the total loans outstanding. Existing borrowers wishing to benefit from falling interest rates must either have loans with variable interest rates or refinance those with a fixed or semi-fixed interest rate. Mortgage loans with a fixed interest rate are the norm in Belgium : in 2008, at the onset of the crisis, loans with fixed or semi-fixed interest rates (initial fixed-rate period of at least five years) accounted for 96 % of all new home mortgages, while variable-rate loans (rate adjusted annually) made up only 3 % ; mortgage loans with an initial fixed-rate period of between one and five years represent only 1 % of the total. Since remortgaging entails costs, it is not an automatic choice for households : around 11 % of mortgages were refinanced each year between 2008 and 2016, with wide fluctuations from year to year. The predominance of fixed-rate mortgages among Belgian households and the costs of refinancing those loans could therefore have curtailed the transmission of lower interest rates to the interest actually paid.

Finally, a third factor relates to the trend in household debt. The main reason why interest charges have not fallen in parallel with interest income is that household debt continued to rise steadily between 2008 and 2016, partially offsetting the fall in interest rates (see section 3.3).

The rise in other financial income – principally dividends, rental income and income from assets allocated to policy-holders – was not enough to offset the downturn in interest income ; overall, households' financial income showed an almost uninterrupted decline between 2009 and 2016. And although financial income represents only a limited proportion of household resources [1] – roughly 15 % at the onset of the crisis – the decline was large enough to seriously erode households' disposable income. On average, financial income made a negative contribution of –0.5 % to the increase in nominal disposable income between 2009 and 2016 : put differently, if financial income had not declined, nominal disposable household income would have increased by 2 % year-on-year, rather than the 1.5 % actually recorded. On the other hand, the growth in disposable household income is driven mainly by income from employment, which accounts for around 60 % of the total, but which was also hit by the crisis : wages grew very slowly in 2009 and 2010 due to the enormous surge in unemployment and, from 2013 onwards, to various wage moderation measures.

The increase in financial asset and property prices which automatically followed the downturn in interest rates also contributed to the growth in household wealth through valuation effects.

The impact of valuation effects on the financial portion of household assets has on balance been positive in recent years, despite two major reductions in the value of these assets, following the bursting of the dot.com

(1) In reality, financial income is not equally distributed across the different strata of the population (see section 4).

CHART 5 BREAKDOWN OF HOUSEHOLD DISPOSABLE INCOME

(contribution to the growth in nominal disposable income, unless otherwise stated)

Source : NAI.

(1) Excluding employers' social contributions.

(2) Other income comprises the gross mixed income of self-employed workers and households' gross operating surplus.

(3) Including employers' social contributions.

bubble and during the financial crisis in 2008. Since then, the value of household assets has risen year-on-year against the backdrop of a steady increase in financial asset prices. This has enabled households to make up for the value losses resulting from the crisis – from 2009 to 2012 – and subsequently to lock in new gains (from 2013 onwards).

The valuation effects can be broken down according to the financial instruments concerned – shares, debt instruments, investment fund units or insurance products. Analysis of the financial accounts shows that gains for households in the 2013-16 period were achieved mainly thanks to the valuation of their shareholdings and investment fund units.

Households have also benefited from positive valuation effects on their property assets thanks to the almost uninterrupted rise in house prices since 2008, though these effects have not been as marked as in the pre-crisis period (especially 2005-2007), when property values increased by between 8 % and 12 % every year. While still positive, these gains shrank in the wake of the 2008 crisis and have grown steadily smaller in the years since. Figures for 2014 (the last year for which figures are available) suggest that the valuation effect was less than 1 % of the value of property assets.

All in all, then, households have seen their assets increase substantially thanks to the continuing growth in asset prices. More than half of the 34 % increase in the value of household financial assets between 2008 and 2016 was caused by valuation effects, with the remainder being due to new inflows. Valuation effects represent almost two-thirds of the 21 % increase in the value of property assets.

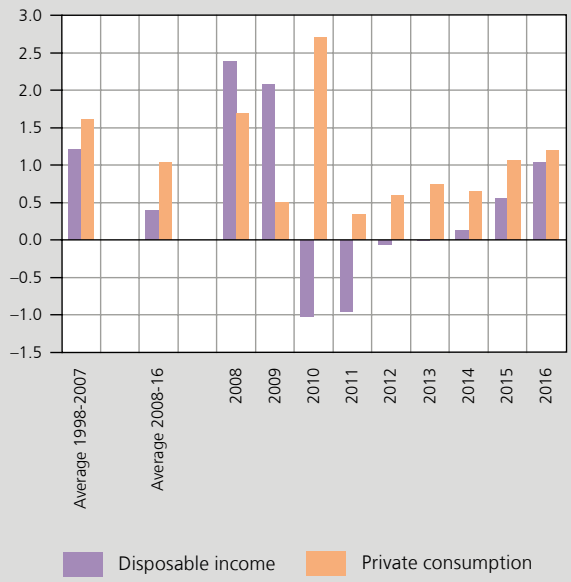
3.2 The choice between saving and consumption

To assess correctly the impact of the fall in financial income on households' consumption and saving behaviour, allowance needs to be made for the trend in financial income and, more broadly, disposable income, in real terms – in other words, taking into account the trend in prices – which is the best measure of household purchasing power.

The purchasing power of Belgian households remained in the doldrums for an unusually long period following the crisis, growing by an average of 0.4 % between 2008 and 2016, three times slower than in the pre-crisis decade. However, this average masks a diversity of trends throughout the period. Immediately after the

CHART 6 HOUSEHOLD DISPOSABLE INCOME AND CONSUMPTION

(annual percentage change, in real terms)



Source : NAI.

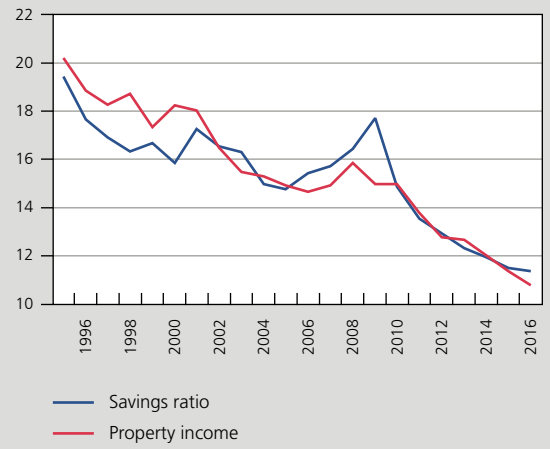
crisis (in 2008 and 2009), household purchasing power jumped by more than 2 %, thanks to the sharp fall in inflation and the automatic stabiliser mechanisms that supported workers' incomes. Purchasing power subsequently fell by 1 % per annum in 2010 and 2011, and remained completely flat over the next three years (2012-14), an unprecedented phenomenon. It was not until 2015 that purchasing power began to rise again, tentatively at first (0.6 %), then more robustly in 2016 (1.2 %).

In response to the erosion of their purchasing power, households cut their spending, but not enough to keep pace with the fall in their disposable income ; household spending on consumption continued to rise by 1 % in the 2008-16 period.

Consumption outstripping growth in disposable income year after year led to a gradual reduction in the savings ratio. This divergence between consumption and income is by no means exceptional, and in the first place reflects the traditional consumption smoothing over time. When households consider fluctuations in their income to be temporary, they are less likely to trim their spending. On balance, the fluctuations in household current income led to changes in savings. That can also be explained by the fact that certain components of household spending, such as housing costs and food, are irreducible and cannot be readily cut down when household income shrinks

CHART 7 HOUSEHOLD PROPERTY INCOME AND SAVINGS RATIO

(in % of disposable income)



Source: NAI.

(temporarily), prompting households to address their savings to restore the balance.

In this case, however, the steady year-on-year decline in the savings ratio appears to point more to an underlying trend than to a temporary differential between income and consumption. Additionally, the slide in the savings ratio corresponds almost exactly to the reductions in financial income: as a proportion of disposable income, household financial income fell from 15.8 % in 2008 to less than 10.8 % in 2016, a reduction of five percentage points; over the same period, the savings ratio declined to 11.4 % from 16.4 % [1]. At an aggregate level, therefore, the contraction of financial income does not appear to have resulted in lower consumption, but rather in less saving. This confirms the results of recent analyses [2] showing that households' saving capacity is closely linked to their financial income, while their labour income generally tends to be spent on consumption.

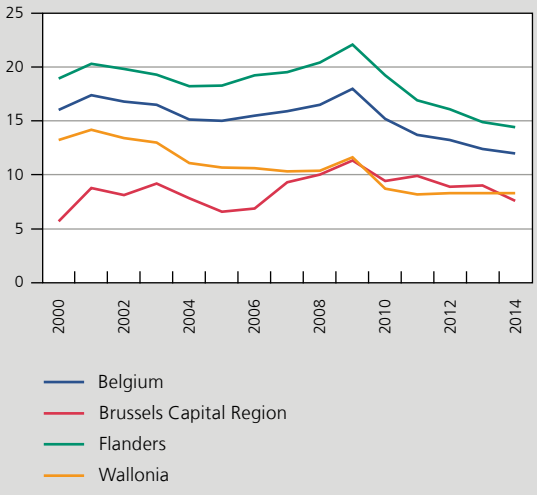
As lower interest rates eroded financial income, they also served as a redistribution mechanism at the expense of households with incomes largely derived from wealth and in favour of households with little or no financial income who mostly derive their financial resources from employment. This illustrates that the impact of lower interest rates is not the same for every household type; these redistribution effects are discussed in greater detail in section 4.

Studying the regional trend in the savings ratio sheds some light on the trend by income category, reflecting the wide variation in savings patterns closely linked to average or median income in the three Belgian Regions. The savings ratio is systematically higher in Flanders than in Wallonia and the Brussels Capital Region: 20.4 % versus 10.4 % and 10 %, respectively, in 2008. The income differential between the three Regions in that year (relative to the average for Belgium as a whole) was +6 % per inhabitant of Flanders, –5 % per inhabitant of Brussels and –10 % for inhabitants of Wallonia. The sharpest fall in the savings ratio in the wake of the crisis occurred in Flanders, where in 2014 it was almost 5 percentage points below the pre-crisis average. The savings ratio of Walloon households fell by less than 4 percentage points, though from a lower starting point. Finally, the savings ratio of Brussels households was unchanged in 2014 compared with the pre-crisis average. At regional level, therefore, the biggest fall in the savings ratio occurred in households in the most affluent Region.

The Bank's monthly consumer confidence survey also sheds light on the factors that determine households'

CHART 8 SAVINGS RATIO BY REGION

(in % of disposable income)



Source: NAI.

Note: The regional accounts are published later than the national accounts; the most recent available measurement of regional savings ratios dates from 2014.

(1) The savings ratio was exceptionally high in 2009 (17.7 %). This was the year in which uncertainty about the financial crisis was at its highest, sparking an increase in precautionary saving. In addition, at the onset of the crisis, Belgian households were still deriving full benefit from the automatic stabiliser mechanism (government transfers, pay indexation based on past inflation), while the current rate of inflation was falling very rapidly. This gave a very strong boost to household incomes in real terms, making it easy to save a proportion.

(2) See Basselier & Langenus (2014).

decisions. Respondents are asked to give opinions on their likely savings capacity, the general economic situation, the prospects for unemployment, their own personal situation, their planned major expenses and the trend in prices. A specific question also asks them to assess whether or not "now is a good time to save", providing an indirect indicator of the perceived return on savings.

The survey results have for some time indicated that the envisaged savings capacity depends much more on the individual financial situation – present, past and future – of households than on the general economic situation. Another factor found to reduce the propensity to save is the general trend in prices[1]: if households think inflation is set to rise, they expect to save less, confirming their concerns about the purchasing power of their savings in the future. Households to some extent also base their decisions on whether to save on the return on their savings, though this appears to play a lesser role than personal factors.

Households have expressed negative views on their savings capacity since 2008, signifying a lower propensity to save than the historical average and linked to a negative perception of their own personal financial situation which, apart from a brief interruption in the second half of 2014, has been consistently worse than average. This has been exacerbated since mid-2012 by a feeling that "now is not a good time to save", reflecting the perceived low returns on savings.

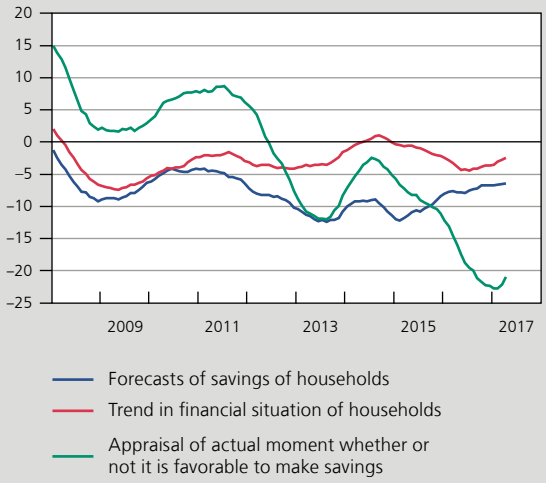
Since early 2015, however, there has been some evidence of a disconnect between the capacity to save and the perceived desirability of saving at that moment. Although households still think the return on savings is poor, this no longer appears to be affecting their decisions to save less – or consume more.

The findings of this survey suggest that while the "intertemporal substitution" of low interest rates may have played a role in the decline in the savings ratio in Belgium overall, it has been a relatively inefficient mechanism over the past two years. This confirms the analyses of the determinants of consumption, both in Belgium[2] and the euro area[3]: the level of interest rates has only a partial influence on the savings and consumption decisions of households, which are determined much more by factors relating to their personal situation, and in the first place by their income streams.

(1) It is interesting to note that the decision to save is influenced more by the present rate of inflation than by the inflation outlook, confirming that households do not have a clear idea of the forecast trend in prices.
(2) See Burggraeve & Jeanfils (2005).
(3) See ECB (2016).

CHART 9 DETERMINANTS OF SAVING ACCORDING TO HOUSEHOLD SURVEYS

(data standardised relative to the long-term average[1], moving average over the last 12 months)



Source: NBB.
(1) A positive (negative) value means that households displayed a more positive (negative) response than the historic average.

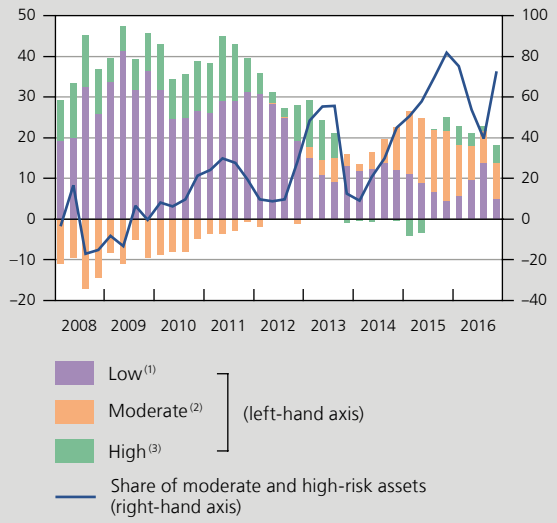
3.3 Portfolio changes and increase in household debt

If they are in a position to save, households can choose between a range of financial instruments (apart from their investment in property). Their preferences will depend on a series of factors, including the degree of uncertainty (when uncertainty increases so does the propensity to invest in precautionary saving, and households develop a preference for liquidity), the available return (search for yield when interest rates are generally low), their own situation (long-term saving for their pension), and so on.

In the period immediately after the 2008 financial crisis, individuals sought refuge in low-risk products (bank accounts and deposits, non-unit-linked insurance products), allowing them to engage in precautionary saving or await better investment opportunities. Consequently, households increased the low-risk component of their financial portfolios. If that was the situation that applied until 2012, from 2013 the continuing poor returns on low-risk products prompted households to begin gradually looking for higher returns by turning to riskier investment instruments (primarily investment fund units, but also shares and other equity). The share taken by moderately or very risky assets in new household investments consequently increased to reach a maximum of 82 % over the four quarters of 2015.

CHART 10 NEW FINANCIAL INVESTMENT BY HOUSEHOLDS: BREAKDOWN BY RISK CATEGORY

(€ billion, four-quarter moving sums)



Source: NBB.

(1) Low: bank accounts and deposits, debt instruments, non-unit-linked insurance products.

(2) Moderate: investment fund units.

(3) High: shares and unit-linked insurance products.

By the end of 2016, the share still stood at almost 73 %. Households were still paying considerable amounts into bank accounts and savings deposits, however, suggesting that they remained very uncertain, had a fundamental preference for liquidity or were awaiting better opportunities. Most of this money was placed in current accounts in 2015 and 2016, with less going into regulated savings accounts, no doubt influenced by the minor difference in interest paid on the two products and the greater liquidity of current accounts.

The macroeconomic sources used above tell us little or nothing about the distribution of household savings or about household debt. This requires data at household level, and the HFCS survey results can fill in some of these gaps in the macro data.

The microanalysis of household assets (and debts) examines a number of components, i.e. which households hold those assets and how much those assets are worth. The analysis looks in more detail at the following aspects:

- the participation rate: the share of households (as a percentage of the total) holding a particular asset, thus providing information on the distribution of assets across households;
- the conditional median value: this includes only those households which hold a certain asset and gives a median value of that asset in euros. The median is the value of a variable at which half of households hold fewer and half hold more than that value; it thus represents the value for a "typical" household, situated in the middle of the distribution;
- the error margin: this is equated to twice the standard error of the estimated parameter (median value), producing a reliability interval of approximately 95 %.

TABLE 2 PROPERTY OWNERSHIP AND MORTGAGE DEBT

(in € thousand, unless otherwise stated)

	Property ownership		Mortgage debt	
	Own home	Other property	Own home	Other property
HFCS I (2010)				
Participation in property market and mortgage loans (in % of households)	69.6	16.4	28.5	3.2
Conditional median value	248.3	173.3	66.7	56.9
Error margin (twice the standard error)	(9.5)	(29.4)	(10.3)	(24.6)
HFCS II (2014)				
Participation in property market and mortgage loans (in % of households)	70.3	18.5	31.9	4.7
Conditional median value	249.7	176.8	79.1	59.2
Error margin (twice the standard error)	(1.4)	(29.1)	(11.2)	(12.7)

Source: NBB (HFCS 2010 and 2014).

Property ownership by households consists in the first place of their main residence (for owner-occupiers) and secondly of other property – a second home, holiday home or let property, for example. According to the HFCS, 70.3 % of Belgian households owned their own home in 2014. The average value of owner-occupied homes in Belgium is € 249 700 (conditional median value), virtually unchanged since 2010 (€ 248 300). In 2014, 18.5 % of Belgian households owned a property in addition to their own home, up from 16.4 % in 2010. The error margins around the median value of this second property (€ 176 800) are relatively wide because of the great variation in the value and type of additional property (from a modest chalet to several income-generating properties) and the relatively small number of observations in the sample.

The survey of household debt also distinguishes between mortgage loans for a household's own home and loans for other property. The share of Belgian households taking out a mortgage to finance the purchase of their own home rose from 28.5 % in 2010 to 31.9 % in 2014, and the median outstanding mortgage loan rose from € 66 700 to € 79 100. The growth in ownership of additional property was also reflected in an increase in loans to finance its purchase, from 3.2 % of households in 2010 to 4.7 % in 2014, while the median outstanding loan amount rose from € 56 900 to € 59 200. The increase in the number of loans and the amounts outstanding explain why the overall interest paid by households has remained high (see section 3.1) despite the fall in interest rates.

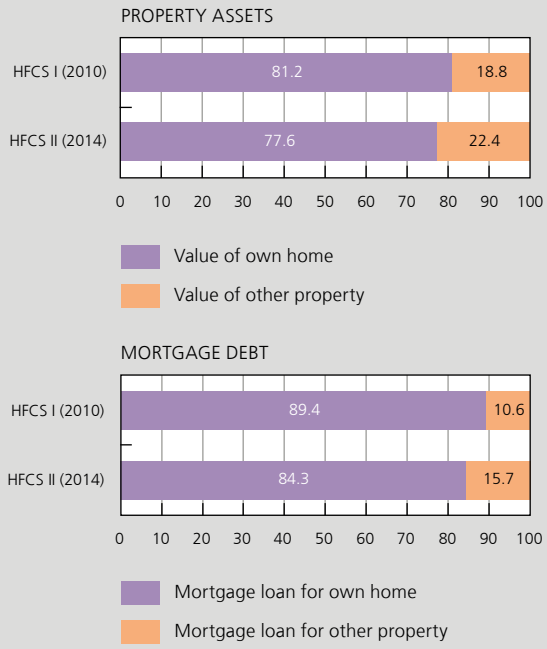
All in all, the HFCS findings suggest that home ownership remained stable between the two survey waves, but that there was an increase in the ownership of secondary property as well as in mortgage borrowing and the loan amounts outstanding. As well as the low level of interest rates, factors such as certainty and returns (search for yield) also play a role here. In the first wave of the survey, households reported that they had retained their faith in property as an investment, in contrast to other investments (see Du Caju, 2012).

The marked increase in households' propensity to invest in property other than their own home is also reflected in the composition of their real assets, with the share of secondary property increasing between 2010 and 2014 and rising from 18.8 % to 22.4 % of their total property assets.

Reflecting the trend in investment in other property and its increased share in the asset mix of households, the composition of household debt also changed somewhat

CHART 11 COMPOSITION OF HOUSEHOLD PROPERTY ASSETS AND MORTGAGE DEBT

(percentage share in total value of the assets and mortgage debt)



Source: NBB (HFCS 2010 and 2014).

between 2010 and 2014, with mortgage borrowing for property other than their own home taking a greater share in 2014 (15.7 %) than in 2010 (10.6 %).

The increase in the share taken by secondary property in household assets is parallelled by a rise in the share of mortgage borrowing to finance that property in households' total outstanding mortgage debt. The quest for certainty and search for yield underlying this trend could have been reinforced by the favourable tax regime, with funds freed up by tax changes and repatriation of funds from abroad flowing into these investments. The tax treatment of these investments is relatively favourable, being based on the imputed rental income of a second home or let property. Only if the property is let for business purposes is the actual rental income taxed. Moreover, the mortgage interest can be deducted from taxable income.

As the findings of the HFCS survey show, households have taken on more debt to finance their investments in the secondary property market. The trend in household debt as a proportion of GDP shows an almost uninterrupted rise since 2005, reaching almost 60 % of GDP in the third quarter of 2016. The increase in total household debt in Belgium is due mainly to property loans: other

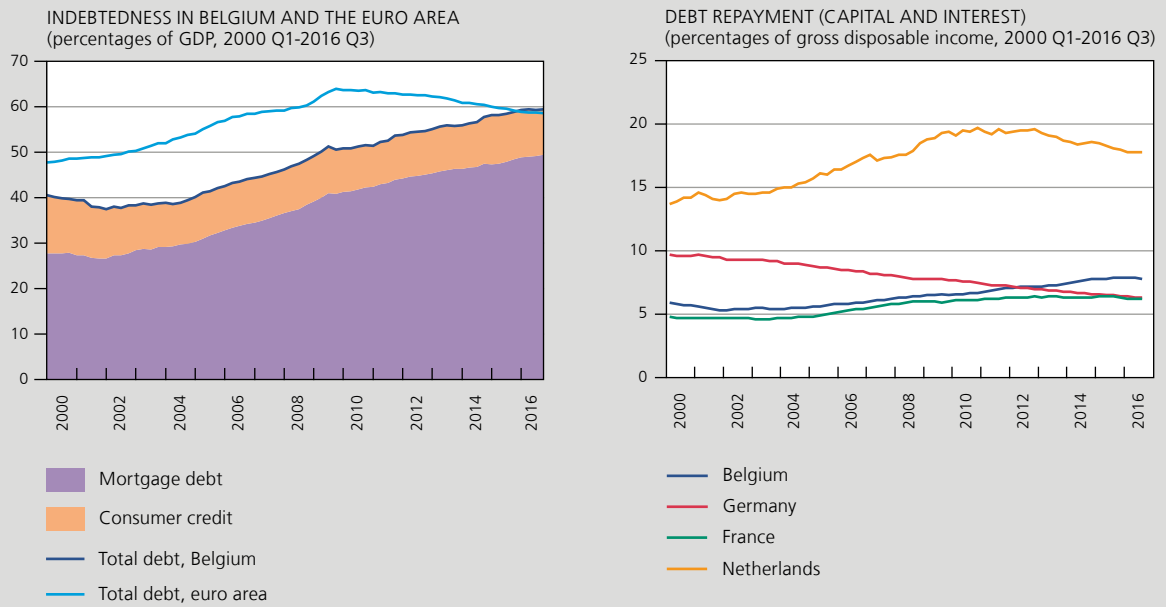
forms of debt remained virtually flat as a share of GDP between 2005 and 2016 and did not contribute to the increase in total indebtedness. At an aggregated level, this trend has not yet given rise to concerns about the sustainability of household debt in Belgium. At the macroeconomic level, Belgian households are still solvent (though susceptible to price changes) because the increase in the debt ratio (debts in relation to assets) has been accompanied by an – albeit a more modest – increase in their property and financial assets. In addition, the net financial assets (financial assets less debt) of Belgian households remain high (251 % of GDP at the end of 2016).

The decline in interest rates since 2008 has absorbed some of the increase in the repayment burden of Belgian households, which has risen continuously in recent years due to their increasing indebtedness. Since 2005, that can be ascribed to the increase in household debt (new loans), while low interest rates led to a reduction in interest payments from 2008 onwards. This contrasts starkly with the situation in Belgium's neighbouring countries, where for several years the household repayment burden as a share of GDP has been falling (Germany, the Netherlands) or stabilising (France). The average repayment burden in Belgium stood at 7.9 % of GDP in 2016, an historic high, compared with 6.3 % in Germany, 6.2 % in France and 17.8 % in the Netherlands (this high figure is explained by the fact that much of the mortgage borrowing in the Netherlands has a fixed term and takes the form of "bullet loans", where the capital portion of the loan is only repaid on the maturity date, rather than being included in the monthly payments).

Given the growing level of household debt, it is extremely important to monitor the trend in loan defaults in retail lending. This is measured mainly as the ratio between the number of loans in payment arrears and the total number of loans. The mortgage default rate has been stable at a relatively low level (around 1.1 %) for several months, and all in all does not present a specific risk at this point in time, though this does not rule out the possibility that certain categories of households may be under more pressure. The low rate of default reflects the fact that Belgian households in financial difficulties prioritise their mortgage repayments (which are often paid automatically) and if necessary defer repayments on other debts. It probably also reflects the cautious lending policies of banks, which take into account the repayment capacity of clients and seek to limit risk. Credit institutions adhere to NBB recommendations on mortgage lending policy, given the continuing vulnerabilities on the property market (the relatively high percentage of loans with a high risk profile).

The default rates in the year of allocation express the relationship between the number of loans in arrears after a given period (six months, one year, etc.) and the total

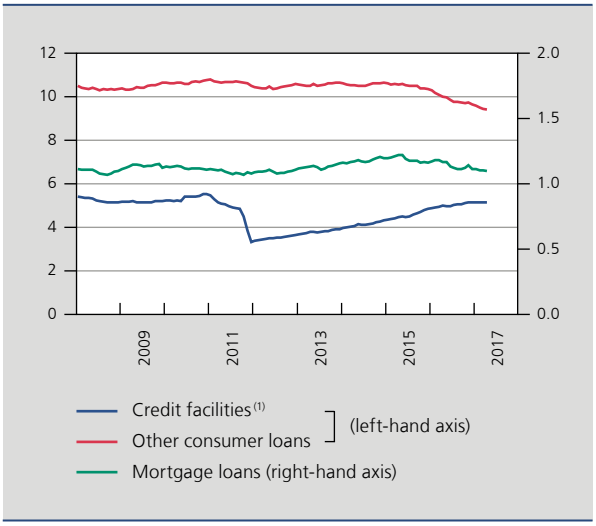
CHART 12 HOUSEHOLD DEBT



Sources: BIS, ECB, NBB.

CHART 13 DEFAULTS ON LOANS TO HOUSEHOLDS

(in % of the number of loans)



Source: NBB.

(1) There was a trend break in credit facilities at the end of 2011 due to a widening of the scope of the Central Individual Credit Register. Since that time, all permitted current account overdrafts must be registered, which was not the case previously.

amount of credit in the year in question. Unlike the previous indicator, they take no account of any loan regularisation. When broken down by lending type – mortgage loans, consumer credit, credit facilities – indicators suggest a stabilisation or fall in default rates in recent years, except for credit facilities, though the increase here is not large. This analysis is supported by the figures on collective debt rescheduling arrangements, which increased by only 0.6 % in 2015 and fell in 2016 (by 2.2 %) and 2017 (0.6 % in the first quarter), compared with an annual advance of over 10 % between 2009 and 2011.

Although the general default indicators give no cause for major concern, two specific caveats should be mentioned here.

The first concerns the possibility of a rise in interest rates, which would push up interest payable on household debt. From this perspective, the risk in the short term is relatively limited in Belgium, since the vast majority of new mortgage loans in the recent period (2012-16) were taken out with a fixed-rate period of ten years or over. Just under three-quarters of all mortgage loans taken out in the past two decades (January 1997 to December 2016) met this criterion, and between 2012 and 2016 it applied to almost 85 % of all new loans.

A second point is the possibility of a negative shock to household incomes (e.g. a new rise in the unemployment rate), something that would also reduce households' repayment capacity. Although the default risk is relatively small at macroeconomic level, this is not the case for certain categories of households with particularly high repayment burdens relative to their incomes. The recommendations of the macroprudential regulators are therefore directed more at loans with a higher risk of default.

4. Distribution effects of low interest rates

The low interest rate environment affects the financial position of households in several ways. To evaluate the differentiated impact of low interest rates, a very simplistic distinction is sometimes made between households which save and households which borrow, with the savers losing interest income and the borrowers finding it easier to repay their loans. In reality, however, the impact of low interest rates is so complex that an overly simplistic analysis can give a very distorted picture. For example, the current low interest rate policy can also contribute to a stable financial environment which supports growth and employment, and can therefore impact on the (protection of) household income from employment. The distinction between savers, borrowers and wage-earners is of limited relevance in any case, because households can belong to several categories at once.

The HFCS findings make it possible to illustrate this complexity. Households which derive an income from salaried employment or from financial assets (and so receive interest or dividends) or which are repaying debts (and therefore pay interest) represent nine out of ten of all households. At the same time, a third of households belong to all three categories at the same time: they earn a salary, receive financial income and are repaying debts. In addition, the vast majority of households which are repaying debts also receive income from financial assets, and conversely almost half of households which have an income from financial assets are also repaying debts. The majority of wage-earners also receive financial income. These findings illustrate that the population cannot simply be divided up into groups which do or do not benefit from a particular movement in interest rates. Many savers with an income from financial assets also earn a wage and/or are repaying debts. They therefore experience both unfavourable and favourable effects from low interest rates. It is not always easy to separate "winners" from "losers".

That said, lower interest rates do have negative income effects, by reducing the income from financial assets. At the same time, however, they increase the value of bonds and shares and therefore create positive valuation

effects. But this equation does not apply for deposits, as the value of short-term assets is not sensitive to interest rate changes. Low interest rates also tend to push up property prices, again generating asset gains. In this sense, property can be regarded as a long-term asset. The low interest rate policy also has certain positive income effects because it makes it easier to repay debt. New loans can be taken out more cheaply, and households with existing mortgage and other loans with variable interest rates also benefit directly, while fixed-rate loans can be refinanced at lower rates. The variation in the composition and the size of net wealth between (groups of) households is parallelled by the variation in the impact on those households of low interest income or payments and positive valuation effects.

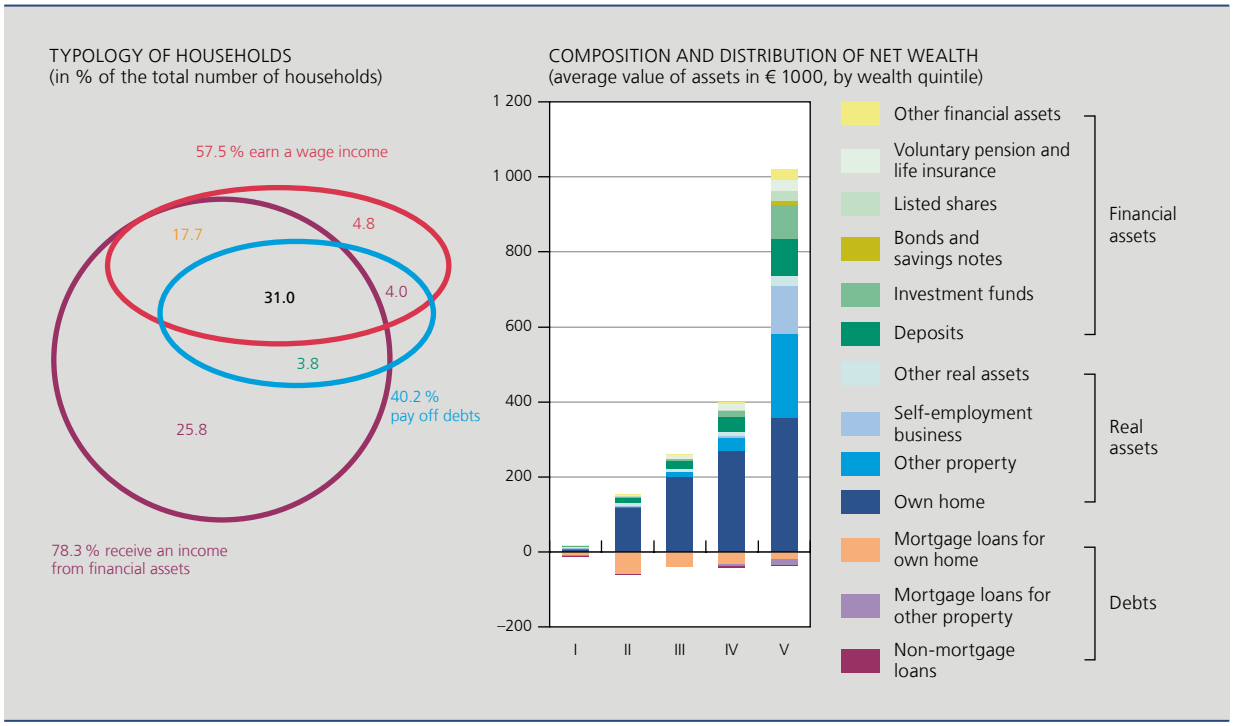
The HFCS enables the entire distribution of net household wealth to be analysed[1], making it possible to compare the composition of the net wealth of affluent and less affluent households. To do this, households are divided into quintiles based on their total net wealth. The size and composition of that wealth does indeed vary considerably between the quintiles. Households in the lowest quintile (the 20 % least affluent households) have little wealth, and what they do have consists mainly of deposits and other real assets (vehicles or other items of value). The wealth of the three middle quintiles, which could be termed the middle class, consists mainly of their own homes, primarily supplemented by deposits and – to a lesser extent – individual voluntary pensions and life insurance products. This middle class also has the highest outstanding mortgage debt. The more affluent households in the highest quintile own homes that are generally worth more than in the lower quintiles, but these homes account for a smaller share (less than half) of the total wealth of these better-off households. Their wealth also consists of additional property in addition to their own homes as well as various financial assets. Mortgage finance to purchase additional property is taken out mainly by households in the highest net wealth quintile.

Looking at the concentration of different assets in the wealthiest households, the HFCS shows that in 2014 an estimated 88.1 % of the value of listed shares held by Belgian households was in the hands of the 20 % of households with the highest total net wealth. Holdings in investment funds and bonds are also relatively highly

(1) For a description of the survey and an analysis of the results for 2010 and 2014, see Du Caju (2013, 2016).

CHART 14 COMPLEX DISTRIBUTION ASPECTS OF LOW INTEREST RATES

(typology of households and their net wealth in 2014)



Source: NBB (HFCS 2010 and 2014).

concentrated in the highest quintile, though the next quintile down is also represented here. When it comes to property, it is notable that secondary property is also heavily concentrated among the relatively wealthy households, with 81.3 % of the value of such property being held by households in the highest quintile. The high observed concentration of assets in the form of shares or secondary property in the top 20 % of households does not apply, or applies to a lesser extent, to (the value of) their own home or to deposits held and investments in individual voluntary pensions and life insurance. These asset classes are more evenly distributed, especially home ownership : only 37.5 % is held by the wealthiest 20 %. Deposits and individual voluntary pensions and life insurance are slightly more concentrated, but much less so than shares. They occur in all quintiles, though their value is on average less in the lowest quintile. An estimated 55 % of the total value of deposits is concentrated in the highest quintile. As surveys generally underestimate total financial wealth, the concentration of these assets is likely to be stronger in the real world.

The composition and distribution of wealth outlined above may shed some light on which groups of households are influenced in which direction by low interest rates and by the valuation effects on their assets. The results appear to show that the positive valuation effects mainly occur in the highest wealth quintile. Shares, bonds and investment funds are found almost exclusively in this quintile, and these are therefore virtually the only households to benefit from the gains on these securities. Individual supplementary pensions and life insurance products, which typically have a longer investment horizon and therefore increase in value when interest rates fall, are more uniformly distributed among the higher quintiles. Property, and in particular owner-occupied homes, is the biggest asset component in all quintiles. These households thus benefit from increases in the value of this asset, but in absolute terms those in the wealthiest quintile derive the most benefit because the value of their homes is highest. Low interest rates make borrowing to finance property purchase cheaper ; this mainly benefits the middle net wealth quintiles, since only a small proportion of households in the lowest quintile have a mortgage or own a house. Households in the middle quintiles have more mortgage debt than those in the wealthiest quintile, both in absolute terms and in relation to their assets.

All in all, the distribution effects of a low interest rate environment are difficult to assess. The wealthiest households lose income from financial assets but also benefit most from asset price gains. Households in the middle quintiles, in particular, are able to finance their homes more cheaply thanks to lower interest charges. Although the interest they receive on deposits falls, the value of their homes increases. The least affluent households lose interest income on their savings, if they have any ; only a few of them own their own homes, but those that do pay less interest on their mortgages.

Conclusion

In reaction to the financial crisis and subsequent recession that hit the global economy from 2008, the ECB has been pursuing extremely accommodating monetary policies, reflected in unparallelled reductions in interest rates and liquidity injections on a massive scale. Property and financial asset prices have also gone up as a result.

This rather unusual environment has impacted Belgian households' incomes, wealth and financial behaviour. For one thing, lower interest rates have heavily eroded net interest income, as interest revenues have plummeted while loan burdens have remained more or less stable relative to disposable income. At the same time, though, households did lock in positive valuation effects on their assets, which somewhat cushioned the adverse rate cut impact on income.

In macroeconomic terms, lower financial income has put a brake on households' disposable income in a virtually uninterrupted way between 2009 and 2016. However, this has not prompted households to pull in the reins and make concomitant cuts in their spending ; instead, they have saved less. As lower interest rates eroded financial income, they have served rather as a redistribution mechanism at the expense of households with incomes largely derived from wealth and in favour of households with little or no property income and mostly deriving their resources from labour.

Microeconomic surveys confirm that the low interest rate environment, coupled with revaluation of assets, has had diverging effects on different households depending on the level and the composition of their wealth. Although the most well-off households, which typically have a great deal of financial wealth, have been the hardest hit by falling returns, they have also benefited most strongly from positive valuation effects, i.e. gains on their asset portfolios. Middle-wealth households, often owner-occupiers, have mainly benefited from lower interest charges, which have amply made up for the loss in savings income. Lastly, households in the lower wealth quintiles, which typically do not own their own homes and have little or no financial savings resources, faced relatively few effects from the low interest environment, positive or negative.

The composition of savings reveals that new financial investment has typically focused on riskier products, reflecting households' search for yield. At the same time, net inflows into accounts and deposits remained positive, suggesting high levels of uncertainty. The latter category plays into private individuals' need for precautionary saving and may suggest that they are staying on the sidelines to await better opportunities.

Meanwhile, the low interest rate environment has stimulated property investment by households, with related spending on real estate other than the household main residence having also gone up. The funding of these investments has led to an increase of the household debts.

This confluence of trends may carry certain risks, such as a default risk on loans due to a negative income shock for households, or interest rate risks due to an uptick in rates increasing their repayment burdens. Some categories of households and types of loans – specifically those about which macroprudential authorities have issued specific recommendations – may be more affected by such risks.

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Analysis of the developments in residential property prices : Is the Belgian market overvalued ?

Ch. Warisse

Introduction

Close monitoring of the property market is a crucial element of both macroeconomic analysis and macroprudential policy. The emergence of tensions on the mortgage market can in fact undermine financial stability, as was the case in the United States during the subprime crisis, which was generally regarded as one of the factors leading to the global economic and financial crisis of 2008 and subsequent years. Moreover, the experience of some European countries – notably Spain and Ireland – shows that imbalances on the property market can trigger and propagate a slowdown in economic activity. The great recession that began in 2008 therefore highlighted the importance of property market developments, which have since been the focus of particular attention. For example, house price developments have formed an integral part of the scoreboard for the European Commission's macroeconomic imbalance procedure (MIP) ever since the procedure was set up in 2011.

Apart from the analysis of price developments, the constant monitoring of the property market also involves assessing the risks inherent in that market, particularly in the event of a slump in property prices. In that context, the detection of any property bubbles has become a key element in our analysis. In order to determine the extent to which property prices deviate from their equilibrium level, i.e. the degree to which the market is undervalued or overvalued, the empirical literature describes a number of methods of assessing property market valuations. Those methods can be divided into two main categories : statistical and econometric. Econometric methods, which we consider as preferable, consist more specifically in comparing property price developments with a number of their underlying determinants, such as household incomes, mortgage interest rates, or demographic developments.

The property market may constitute a risk factor for financial stability and the domestic economy, in the sense that the Belgian financial sector has significant exposure to those risks since mortgage loans and loans to Belgian non-financial firms operating in the construction industry and in real estate activities represent a substantial proportion of banks' assets, respectively at 18 % (or € 187 billion)[1] and 3 % (or € 34.5 billion) at the end of December 2016.

This article, which focuses solely on the housing market[2], presents a detailed analysis of property market developments, and particularly the price rises which have persisted over several decades. The first section, which is mainly descriptive, examines the trend in house prices in Belgium as well as in Europe, on the basis of the available statistics, while the second section reviews the various methods of assessing the valuation of property markets and the fundamental price determinants. Finally, the article ends with a summary of the main conclusions.

(1) That figure corresponds to the proportion of Belgian mortgage loans in the balance sheet of the nine banks using the IRB approach for that type of portfolio. Those banks account for over 90 % of the mortgage loan market in Belgium.

(2) Owing to the shortage of good quality data on the commercial property market, it is currently very difficult, if not impossible, to produce an analysis similar to that for the housing market.

1. House price developments in Belgium and in Europe

1.1 Developments in property prices in Europe

Before the 2008 economic and financial crisis, house prices had displayed a marked upward trend over several decades in almost all European countries. However, they also fluctuated repeatedly around that trend, so that a number of cycles emerged.

According to Baugnet *et al.* (2011), the upward phase recorded in the OECD countries between the second half of the 1990s and 2007 was noteworthy because it differed from the preceding average cycle in several respects [1]:

– it covered a period of ten years (from the end of 1996 to the beginning of 2007), whereas previously a complete cycle lasted only 6.5 years, with 3.5 years constituting the upward phase;
– despite some variations between countries, the rise was substantial since prices increased by 44 % on average, compared to the previous 15 %;
– the rise in property prices was more widespread and synchronised than in earlier cycles;
– it also seemed to be unconnected with the economic situation, in that prices continued to rise steadily despite the slowdown in economic activity in the early 2000s.

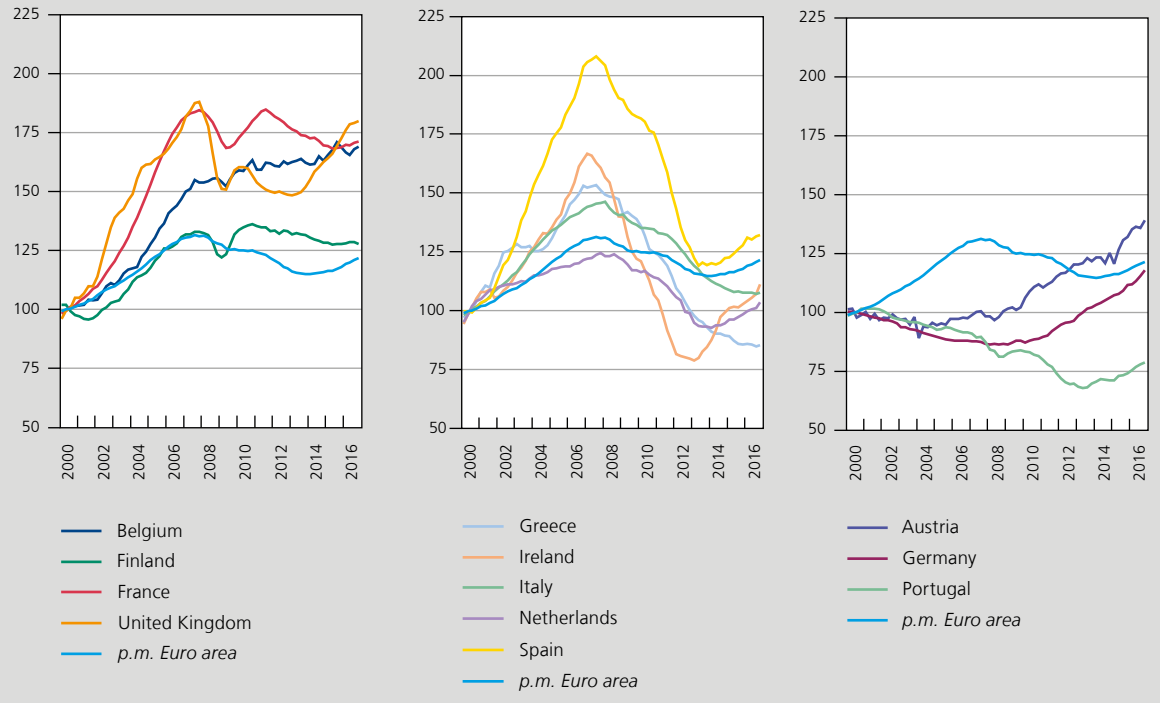
If we start the analysis in 2000, we find that real house prices in Belgium have risen by much more than the average in the euro area, especially from 2005 onwards. However, the euro area average conceals wide variations between countries because the property cycles were considerably less synchronised during the downward phase which began in 2007. It is thus possible to identify three main groups of countries (see chart 1):

– the first group, which includes Belgium and France, featured a strong rise in house prices over several decades, without that leading to a genuine downward correction at the time of the 2008 economic and financial crisis.

(1) Baugnet *et al.* (2011) base their analysis on the OECD's statistics on real prices, i.e. nominal prices deflated by the private consumption deflator from the national accounts, in order to neutralise the influence of the movement in the general price level.

CHART 1 REAL HOUSE PRICES IN A SELECTION OF EUROPEAN COUNTRIES

(indices 2000 = 100)



Sources: OECD, NBB.

The dip in real property prices in Belgium was indeed very limited compared to that seen in many other European countries, in terms of both scale (–1.2 %) and duration (only two consecutive quarters);

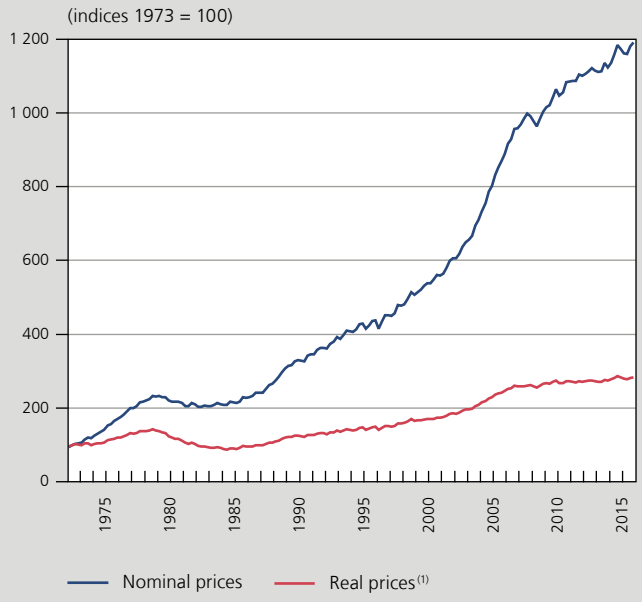
– the second group consists mainly of countries on the periphery of the euro area, where the steep increases in property prices prior to the great recession were followed by sharp and persistent falls;
– finally, in a few countries, the profile of the trend in house prices in the preceding decades clearly differed from that of the other two groups. Prices actually began rising later in Austria and Germany – from 2004 and 2009 respectively – while they took a downward turn from the second half of 2001 in Portugal.

House prices seem to have begun rising again in almost all European countries for several years now. While that was already the case from 2013 in the United Kingdom and in the periphery of the euro area (Spain, Ireland and Portugal), and from 2014 in the Netherlands, property prices in France and Finland have recorded positive growth over the past two years. Moreover, prices have continued rising in Belgium, and to a greater extent in Germany, and especially in Austria where strong increases were seen from 2015 onwards. In regard to Austria, Albacete *et al.* (2016) attribute the rise to the upper segment of the property market and to the increasing share of purchases concerning second homes or investment, due partly to strengthening foreign demand. In Germany, the rise in house prices appears to be located in major urban centres and to apply mainly to apartments (Kajuth *et al.*, 2013). Conversely, prices are still falling in Greece and Italy, though the pace has slackened.

1.2 Developments in property prices in Belgium

According to the indicator compiled by the National Bank (see box), nominal house prices have displayed a clear upward trend in Belgium since 1973. The annual average data indicate only two periods when prices declined: the first during the first half of the 1980s, when prices fell by an average of 2.7 % per annum, and the second – briefer – period at the time of the economic and financial crisis, when they dropped by 0.3 % in 2009. However, the scale of the fall in prices during those two periods remained far from the size of the increases seen since the 1970s. The rise in property prices was particularly marked during the 1970s, in the late 1980s and between

CHART 2 RESIDENTIAL PROPERTY PRICES IN BELGIUM



AVERAGE ANNUAL GROWTH RATE
(in %)

	Nominal	Real (1)
1974-1979	12.4	4.9
1980-1983	–2.7	–7.6
1984-2008	6.4	4.2
2009	–0.3	0.1
2010-2016	1.8	0.6

ANNUAL GROWTH RATE
(in %)

	Nominal	Real (1)
2011	3.1	0.1
2012	2.5	0.5
2013	1.7	0.9
2014	0.7	–0.1
2015	3.8	3.4
2016	0.9	–0.6

Source: NBB.
(1) Deflated by the private consumption deflator from the national accounts and by the national consumer price index for the period preceding 1980.

2005 and 2007, when growth rates reached 10 % or more[1]. Overall, nominal prices were multiplied by 12 between 1973 and 2016.

Real house prices have also been rising since the early 1970s. Nonetheless, taking account of inflation, the long-term dynamics of property prices are clearly more moderate. However, the price fall recorded in the early 1980s appears steeper in real terms owing to the high inflation rates during that period. Conversely, the reduction in property prices at the time of the 2008-2009 crisis, which was already modest in nominal terms, is significantly smaller owing to the decline in the private consumption deflator; over the year 2009, that deflator was down by 0.7 % so that the growth of real house prices remained positive in that year.

In regard to recent trends, the Bank's indicator shows that property price growth is slowing down. After a marked rebound in 2010 (+5.4 %), following a very slight drop in 2009, house price growth has steadily diminished. However, there was a marked upturn in 2015 amounting to 3.8 % over the year as a whole, despite the reduction in the housing bonus – mainly in the Flemish Region – which in principle was likely to depress price rises. In 2016, the increase in property prices slowdowned again with growth of barely 0.9 %.

In real terms, the profile of house price growth is slightly different since price increases strengthened overall between 2011 and 2015, following the decline in inflation. Conversely, the faster rise in the general price level led to a fall in real prices in 2016, amounting to a drop of 0.6 %.

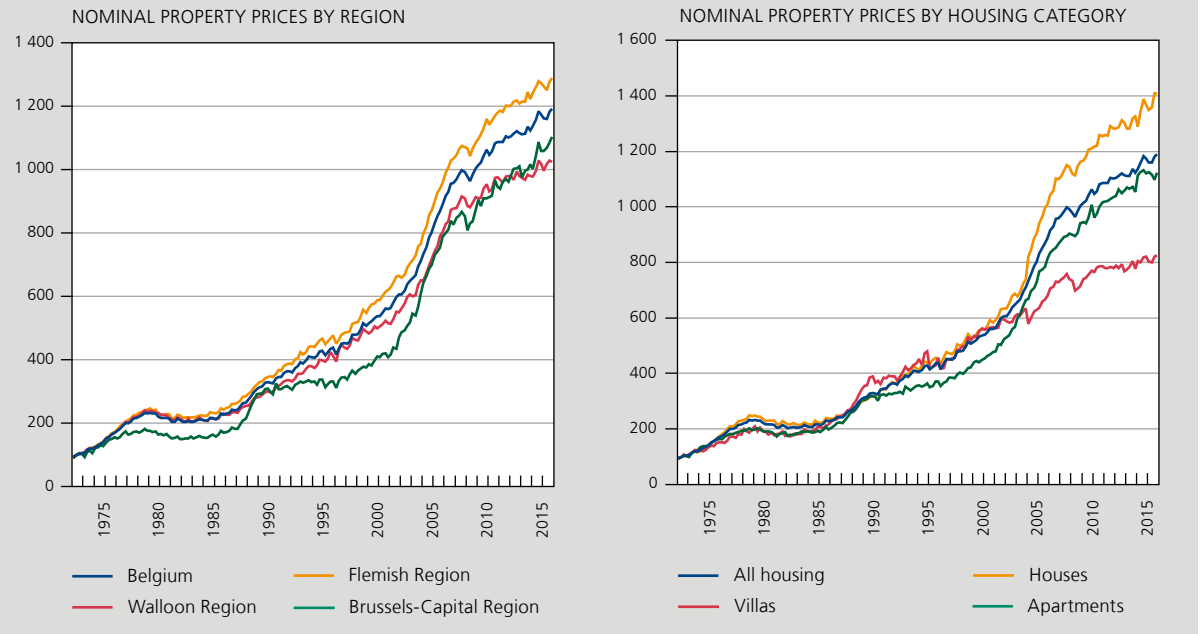
House prices exhibited a clear upward trend in all regions of the country. Moreover, apart from a few divergences as in 2009 at the time of the economic and financial crisis when prices virtually stabilised in the Flemish Region whereas they fell slightly in the other two Regions[2], price developments were broadly the same from one Region to another. However, the increase in prices over recent decades was more volatile in the Brussels-Capital Region. That peculiarity of the capital may be due in part to its almost exclusively urban character and its small size compared to the other two Regions, hence its greater sensitivity to certain changes, particularly demographic variations. In 2016,

(1) It should be noted that the statistics on property prices feature a break in the trend in 2005 (see box), so that the growth rate in that particular year may be distorted (upwards). However, the size of the impact cannot be measured owing to the lack of data.

(2) The Flemish Region also recorded a fall in prices between the last quarter of 2008 and mid-2009. However, that decline was smaller so that prices virtually stabilised (+0.2 %) over 2009 as a whole.

CHART 3 NOMINAL RESIDENTIAL PROPERTY PRICES BY REGION AND BY HOUSING CATEGORY

(indices, 1973 = 100)



Source: NBB.

house price growth weakened in all three Regions, but the slowdown was more marked in the Flemish Region.

The breakdown of property prices by housing category reveals greater heterogeneity in price movements. Ordinary houses and apartments are the two housing categories that have contributed the most to property price increases over almost two decades. Conversely, villa prices have risen at a more moderate pace over that period.

Box – House price indicators

There are several indicators which can be used to assess house price developments in Belgium. Those, which are published by various sources (central bank, international institutions, government, notaries, estate agencies, etc.), and regularly discussed in the press, sometimes present a (slightly) different picture or in some cases even opposing trends. That is due essentially to the databases and the methodologies used. We generally identify three main sources according to the characteristics (geographical coverage and period considered) and the statistical quality of the indicators.

1. Federal Public Service Economy

The first information source is a database updated on a quarterly basis by the Directorate General Statistics (DGS) of the FPS Economy. It is based on the land registry records and comprises a set of statistics relating to real estate transactions for which registration fees were payable. The data therefore relate only to the secondary market, i.e. existing properties.

The published statistics include the number of transactions, the total area of the plots and various measures of the prices of the homes sold, such as the average price and the median price, which can be used to estimate their distribution. In addition, the data are broken down into three broad categories of properties, namely "ordinary houses", "villas, bungalows and country houses" and "apartments, flats and studios[1]". The data cover a very large geographical area and a long period since they are available at municipal level from the first quarter of 1973.

It should be noted that there was a break in the trend between 2004 and 2005 following a significant change in the data processing.

2. National Bank of Belgium

However, using the average price of the transactions has the disadvantage that the indicator is sensitive to changes in the composition of the transactions. The Bank therefore opted to calculate a chained weighted index on the basis of the data published by the FPS Economy. The change in that indicator can then be interpreted as a "pure" price effect.

The Bank's residential property price indicator therefore takes the form of a Laspeyres chained index, such as:

$$PI_t = PI_{t-1} \cdot \frac{\sum_{geo,type} N_{geo,type,t-1} * AP_{geo,type,t}}{\sum_{geo,type} N_{geo,type,t-1} * AP_{geo,type,t-1}}$$

in which PI corresponds to the price index, N is the number of transactions on the secondary market, AP is the average price of the transactions, geo indicates the districts and $type$ indicates the housing categories.

(1) For convenience, in the rest of this article, the names of these three categories are shortened respectively to "houses", "villas" and "apartments".

The level of geographical breakdown of the property transactions used to compute the indices corresponds to the 43 administrative districts in Belgium, because that allows an adequately detailed breakdown without compromising the representativeness of the data.

Finally, the Bank's indicator is adjusted for any changes in the structure of the transactions. In practice, that permits the construction of several indices broken down by two dimensions, namely by geographical area and by the various housing categories[1].

3. European Commission

Eurostat also publishes an index of house prices in Belgium via the FPS Economy. That index differs in two main respects from the one produced by the Bank. First, it covers both the secondary and the primary market, i.e. new buildings. Also, in the case of existing properties, it tries to adjust for the change in housing quality over time.

The reason for the qualitative adjustment for the secondary market is that property market transactions are highly heterogeneous. The hedonic regression technique was therefore used to smooth out those differences. For that purpose, the DGS receives from the land registry a database comprising a set of characteristics of the property sold for each transaction. Those characteristics include notably the type of construction, number of rooms, surface area, and location of the building.

In the case of new housing, there are no price statistics as such. Up to 2013, the producer price index for construction was used as a proxy. Since then, movements in primary market prices have been estimated from sales of housing built in the past five years.

Finally, the Eurostat index takes the form of a Laspeyres chained index in which the weights are adjusted annually. However, that indicator covers a smaller geographical area and a shorter period of time since it is available only for Belgium as a whole, and only since 2005. Owing to the methodology used, entailing the collection of extensive data on property transactions, it is also based on a smaller sample.

(1) It should be noted that the Bank uses the same database to produce indices of price developments for building land. However, those prices are not included in the average for all dwellings.

2. Property market valuation measures

In Belgium, the developments in property prices over recent decades have given cause for concern, as prices have risen almost continuously and the drop recorded during the economic and financial crisis that began in 2008 was extremely small in comparison with that in many other European countries.

The empirical literature describes a number of methods of assessing whether prices deviate from their equilibrium level, i.e. whether the property market is overvalued or undervalued. Traditionally, market valuation indicators are divided into two main categories according to the approach used to determine the equilibrium value of property prices. The first method, the statistical approach, uses the long-term average of ratios of macroeconomic variables, such as price-to-income or price-to-rent, while the second is based on econometric techniques.

2.1 Statistical approach

The statistical approach generally consists in comparing house price developments with changes in other macroeconomic variables. Those indicators include price-to-rent and price-to-income ratios, which compare property price developments with changes in rents and household disposable income respectively. The price-to-income ratio is therefore considered to measure the housing affordability, while the underlying idea behind the price-to-rent ratio is that anyone looking for somewhere to live has to weigh up the cost of buying as opposed to renting a home.

The main advantage of this approach lies mainly in its simplicity of use and calculation. Nonetheless, it does have its limitations too. In particular, the use of a long-term average to approximate the equilibrium level of property prices is based on the implicit assumption that that value remains stable over time; that is a weighty assumption since the equilibrium value is necessarily influenced by changes in the fundamental determinants of property prices, such as demographic developments, preferences of economic agents, mortgage contract characteristics (loan-to-value ratio, duration, etc.) and the associated tax treatment, as well as the characteristics of the properties. Moreover, in this approach, the degree of the property market valuation is greatly affected by the choice of the period considered in order to define the long-term average.

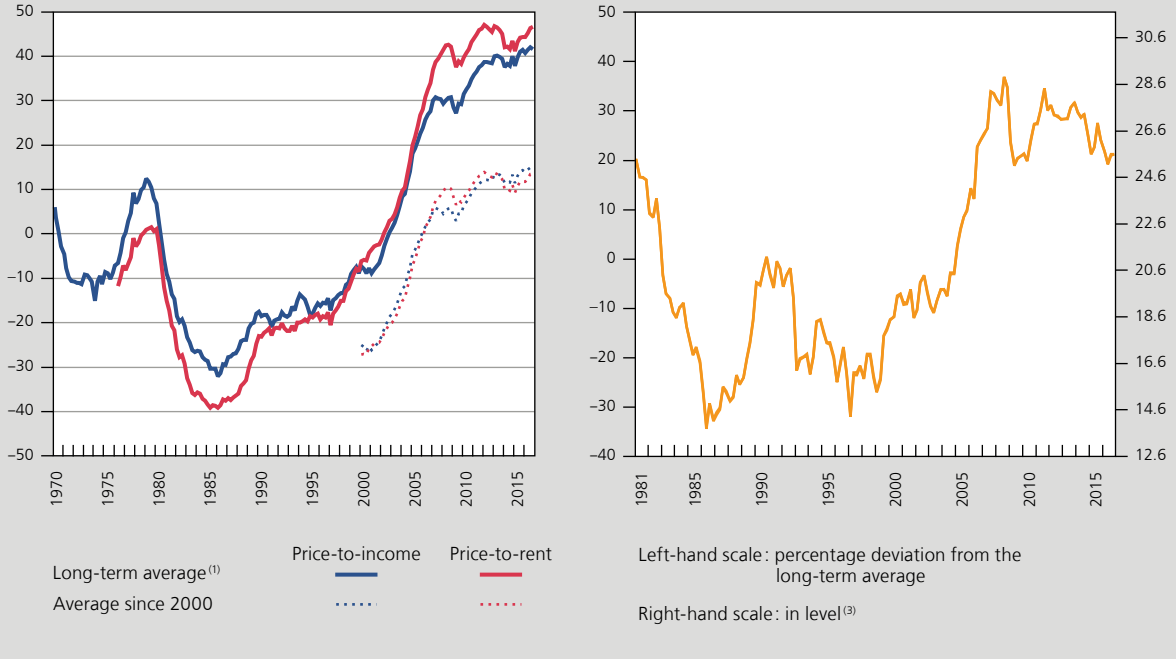
Price-to-rent and price-to-income ratios generally point to high levels of overvaluation of the residential property market in Belgium. More specifically, on the basis of the indicators published by the OECD, the overvaluation would amount in the fourth quarter of 2016 to 47 % and 42 % respectively. However, as already mentioned, that result depends on the period chosen to compute the long-term average. For example, if we consider only the data available between 2000 and 2016, the overvaluation drops to about 15 % for both ratios (see chart 4).

Apart from the more general considerations set out above, each ratio has its own specific defects. In the case of the price-to-rent ratio, Baugnet *et al.* (2011) show that there is a significant conceptual difference in that the house price (in the ratio's numerator) is calculated on the basis of new transactions on the secondary market and therefore reflects current market conditions, whereas rents (in the denominator) correspond in Belgium to the "rent" component of the consumer price index and usually reflect the movement in rents under existing leases rather than that under new leases. Moreover, the relatively small size of the rental market[1] limits the relevance of the price-to-rent ratio for Belgium.

As already stated, the price-to-income ratio is meant to assess the housing affordability. Since a property

(1) According to the OECD, the proportion of tenants was 32 % in Belgium in 2014.

CHART 4 STATISTICAL RATIOS AND HOUSING AFFORDABILITY



Sources: OECD, NBB.
(1) Average between 1970 and 2016 for the price-to-income ratio; average between 1976 and 2016 for the price-to-rent ratio.
(2) This measure is based on the technical assumption that a mortgage loan has an average maturity of 20 years and a loan-to-value ratio equivalent to 80 % of the property value.
(3) In level, this indicator corresponds to the average share of household disposable income devoted to the debt service of a mortgage loan.

purchase is generally financed by borrowing, such an analysis should take account of access to mortgage loans and, more particularly, the debt service burden incurred by the home owner. For that purpose, the price-to-income ratio can be adjusted to take account of fluctuations in mortgage interest rates (interest-adjusted-affordability), as the latter have a significant bearing on households' ability to borrow. The indicator developed for that purpose consists in comparing the debt service burden – capital repayments and interest – on a mortgage loan contracted to finance the purchase of a property valued at the average market price with the average household disposable income. This measure, based on a number of technical assumptions relating to such factors as the average loan maturity and the loan-to-value ratio, exhibited a marked upward trend during the 2000s, especially between 2003 and 2009, mainly on account of the sharp rise in property prices during that period. Housing affordability was subsequently affected by the outbreak of the economic and financial crisis, since the indicator declined until the spring of 2010 owing to the slight fall in house prices and the substantial decline in interest rates, before climbing back up until the end of 2011 as a result of the renewed rise in property prices and the sluggishness of household income. Since then, housing affordability has improved overall, with the slackening pace of house price rises and the continuous decline in mortgage interest rates. In 2016, the debt service burden related to a mortgage loan averaged around 25 % of household disposable income (see chart 4).

If the housing affordability indicator is expressed as a percentage deviation from its long-term average, in the same way as for the price-to-income and price-to-rent ratios, that suggests – with all the due caveats mentioned above – that the housing market is overvalued by around 21 %, i.e. lower than what is generally indicated by the price-to-income and price-to-rent ratios.

The housing affordability indicator is also subject to certain limits since it disregards not only changes in mortgage loan conditions (loan-to-value ratio, maturity, etc.) but also the related tax treatment. Moreover, movements in interest rates alone are not enough to measure the affordability of mortgage loans, even though they are a very significant factor. Financial institutions may indeed decide to tighten or, conversely, ease their mortgage lending conditions. According to the Bank Lending Survey, credit standards for house purchase were eased substantially between 2003 and 2007, in parallel with the improvement in housing affordability. Since then, banks have almost continuously tightened the criteria applied when granting mortgage loans.

In general, by taking account of only a limited number of property price determinants, the statistical indicators of market valuation cannot provide a structural assessment of house price developments in view of the range of factors likely to have a significant bearing on them.

2.2 Econometric approach

The second group of indicators that can be used to assess the valuation of the property market is based on econometric techniques. The aim is to estimate, on the basis of fundamental determinants, an equilibrium price which can be used as a benchmark for measuring any deviations in market prices. In practice, the residuals of an econometric regression are used to measure the market's undervaluation or overvaluation, since they correspond to the part of the dependent variable – in this case house prices – that cannot be imputed to the explanatory variables.

The main advantage of this method is that, unlike the statistical approach, it can take account of numerous house price determinants, both supply and demand factors. However, due to data availability and quality issues, empirical research has been largely limited to demand factors, the main ones being household income, mortgage interest rates and demographic developments.

Nevertheless, this method has its drawbacks too. As pointed out by Gallin (2003), Gurkaynak (2005), Girouard *et al.* (2006) and Klyuev (2008), the relationship econometrically estimated may be unstable and, instead of being a measure of the market valuation, the gap between recorded prices and the equilibrium price may result from the omission of one or more fundamental determinants. Moreover, even if that gap is zero, a latent risk may exist if the price determinants are not at their long-term equilibrium value, as in the case of historically low mortgage interest rates.

2.2.1 Existing approaches

Numerous indicators of the valuation of property markets have been developed according to an econometric approach. They generally differ in the explanatory variables incorporated in the model. That applies, for instance, to the models used by international institutions such as the European Central Bank (ECB), the European Commission (EC), and the International Monetary Fund (IMF).

Apart from the statistical ratios, namely price-to-rent and price-to-income, the ECB also uses two model-based indicators in its assessment of the European property markets. The first consists in regressing the price-to-rent ratio on a

measure of long-term interest rates (asset pricing), within the framework of a model where the return on a housing investment (approximated by the rent-to-price ratio) should be equal to the returns on alternative investment opportunities bearing the same risk (estimated by long-term interest rates). The second indicator corresponds to the residuals of the regression of property prices on the average disposable income of households, the average mortgage interest rate and the housing stock. However, the exact specification of the equation may vary according to the characteristics of the country considered and data availability[1]. For Belgium, for example, the equation does not include the housing stock; in a way, it is therefore an indicator of housing affordability since it only takes account of household incomes and mortgage interest rates. In the third quarter of 2016, that indicator pointed to a more or less neutral market valuation, namely –1 % deviation from the equilibrium price. It should be noted that the price-to-income and price-to-rent ratios indicate a greater degree of overvaluation, although that is still less than the overvaluation identified previously on the basis of the OECD data, the reason being that the ECB uses a shorter reference period to compute the long-term averages. Ultimately, the ECB considers the average of these four indicators to determine the property market valuation level; in the case of Belgium, that suggests an overvaluation of almost 12 % in the third quarter of 2016 (see chart 5).

The European Commission's valuation of the property markets is likewise based on the average of various indicators, namely the price-to-rent and price-to-income ratios and the results from an econometric model. The latter are obtained more specifically from the residuals of the regression of property prices on per capita household disposable income, mortgage interest rates, the number of inhabitants and housing investment. The model specification does not vary between countries, and panel estimation techniques are also used for countries which do not have sufficiently long time series for the aforementioned variables. In the case of Belgium, the price-to-income and price-to-rent ratios expressed as a percentage deviation from their respective average since 1995 indicate that the property market was overvalued by 22 % in 2015, while the model-based indicator puts the overvaluation at barely 2 %. Overall, the average of these three indicators suggests a 15 % overvaluation.

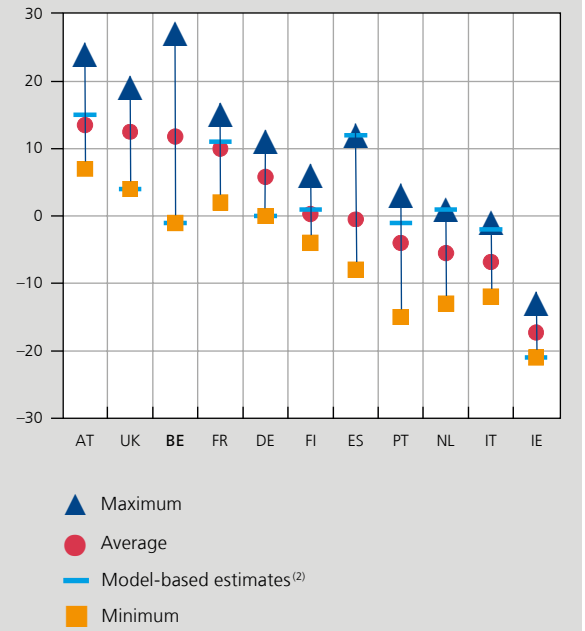
The IMF also uses econometric techniques to underpin its assessment of the Belgian property market (IMF, 2015). For that purpose, house prices are regressed on demand factors, namely per capita GDP (as a proxy for household income), long-term interest rates and the working-age population. Domestic credit to the private sector is also included to approximate financial developments. While the results show a substantial overvaluation of the Belgian property market in the 1970s, the indicator suggests that current prices are very close to the regression-implied equilibrium.

In Belgium, Smet and Van Gompel (2014) also developed a property market valuation indicator using econometric techniques. More specifically, house prices are regressed on the household disposable income, mortgage interest rates and the number of households. The authors indicate that supply variables such as housing investment or the number of building permits granted were also included in the model's specification but ultimately they proved not to be significant, so that house prices are determined entirely by demand factors. On the basis of that indicator, the

(1) This is therefore not a panel estimate which, owing to its fixed structure, might fail to take account of the heterogeneity inherent in European property markets.

CHART 5 RESIDENTIAL PROPERTY MARKET VALUATION ACCORDING TO THE ECB APPROACH[1]

(third quarter of 2016, in percentage deviation from the equilibrium price)



Source: ECB.

(1) These estimates are based on four different approaches, namely the price-to-rent ratio and the price-to-income ratio and two model-based indicators. The minima and maxima correspond respectively to the lowest and highest estimates using these four methods. For more information, see box 3 in the ECB Financial Stability Review of June 2011 and November 2015.

(2) This indicator corresponds to the residuals of the regression of property prices on the average household disposable income, the average mortgage interest rate and the housing stock. However, the number of variables included in the model may differ between countries

property market was overvalued by around 10 % between 2006 and 2009, essentially following the strengthening of the tax deductibility of mortgage loans in 2005.

2.2.2 The National Bank of Belgium's approach

The Bank also adopts an econometric approach as the basis of its assessment of the housing market in Belgium. Its indicator corresponds more specifically to the residuals of the regression of house prices on a series of fundamental determinants, namely the average disposable income of households, mortgage interest rates, the number of households, and some dummies intended to capture structural changes on the property and mortgage markets, particularly changes in the tax treatment of mortgage loans in 2005 and 2015. The nominal values of property prices, mortgage interest rates and household disposable income are deflated by the private consumption deflator from the national accounts in order to neutralise the influence of the movement in the general price level. In addition, all the variables except for mortgage interest rates and the dummies are taken in logarithmic form.

$$log(hp_t) = \alpha_0 + \beta_1.log(inc_t) + \beta_2.mir_t + \beta_3.log(hh_t) + \beta_4.d_t^{2005} + \varepsilon_t$$

The aforementioned explanatory variables are generally identified by the empirical literature as the main fundamental determinants of property prices. By analogy with Smet and Van Gompel (2014), the model only incorporates demand factors as the supply variables tested, such as gross fixed capital formation in housing, proved to be of little significance. Furthermore, as pointed out by Philiponnet (2016), the addition of a variable reflecting mortgage credit fluctuations does not seem appropriate for assessing the long-term trends in house prices owing to the two-way relationship between these variables, one being both the cause and the consequence of the other (Goodhart and Hofmann, 2008).

The regression results summarised in table 1 also appear to make these variables the fundamental determinants of house prices in Belgium, since the estimated coefficients are all significant and display the expected sign. Moreover, the Engle–Granger test (1987) indicates the existence of a cointegration relationship.

First, the relatively rapid increase in the real disposable income of households between 2005 and 2009 definitely bolstered demand for housing and hence the rise in property prices. Conversely, in the ensuing four years, the disposable income of households declined, mainly because of the marked fall in property incomes in a context of low interest rates, but also to a lesser extent because of the wage moderation policy. Since 2014, however, the growth of the real disposable income of households has been positive again and has also gained momentum, primarily in 2016 notably as a result of such factors as the strong labour market recovery. Overall, this enabled individuals to revise their income expectations upwards while downgrading their expectations regarding economic uncertainty. Our estimate of the elasticity of house prices to household disposable income stands at 1.1 (see table 1), indicating that a 1 % increase in the average disposable income of households leads to a 1.1 % rise in house prices. That tallies perfectly with the results found for the OECD countries, which generally range between 1 % and 2 % (see Girouard *et al.* (2006) for a review of the literature).

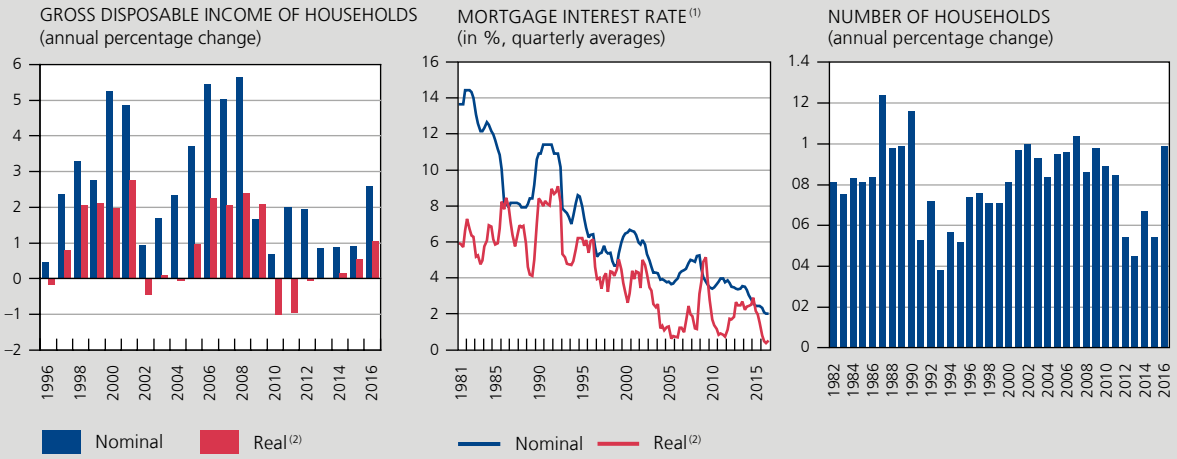
Second, the decline in mortgage interest rates over recent decades has certainly been a factor supporting the property market since, all other things being equal, a fall in interest rates leads to a reduction in the borrower's repayment burden, and hence an improvement in the housing affordability. Both nominal and real mortgage interest rates have in fact been declining since the early 1990s. In particular, nominal rates have fallen almost constantly since the economic and financial crisis that erupted in 2008, against the backdrop of an accommodative monetary policy. They are currently around 2 %, which is an all-time low. If inflation is taken into account, the movement in real interest rates has been somewhat different since they displayed an upward trend between the end of 2011 and the beginning of 2015. Conversely, the acceleration in inflation in the past two years has led to a sharper fall in real interest rates, which were close to 0 % at the end of 2016. The results of our model suggest that a 1 % fall in mortgage interest rates triggers a rise in house prices of around 2 % (see table 1). Once again, that is within the range generally found by the empirical

TABLE 1 VALUATION OF THE PROPERTY MARKET: THE NBB'S MODEL-BASED APPROACH

Explanatory variables	Coefficients	*t*-stat
Constant ..... α_0	–28.62***	–4.80
Average household disposable income ..... *inc*	1.13***	4.69
Mortgage interest rates .... *mir*	–0.02***	–2.67
Number of households .... *hh*	2.16***	5.53
Dummy from 2005 ..... d^{2005}	0.21***	5.06

Source: NBB.
Note: *** corresponds to a significance level of 1 %.

CHART 6 DISPOSABLE INCOME, MORTGAGE INTEREST RATES AND DEMOGRAPHIC DEVELOPMENTS



Sources: DGS, NAI, NBB and own calculations.
(1) Average interest rate on new contracts.
(2) Deflated by the private consumption deflator.

literature, although the results may vary widely depending on the interest rate definition used or the geographical areas considered. The semi-elasticity of house prices to interest rates generally ranges between 0.4 (Ott, 2014) and 7 % (Gattini and Hiebert, 2010). It should be noted that Smet and Van Gompel (2014), whose model is calibrated for Belgium, find a semi-elasticity of 2.8 %.

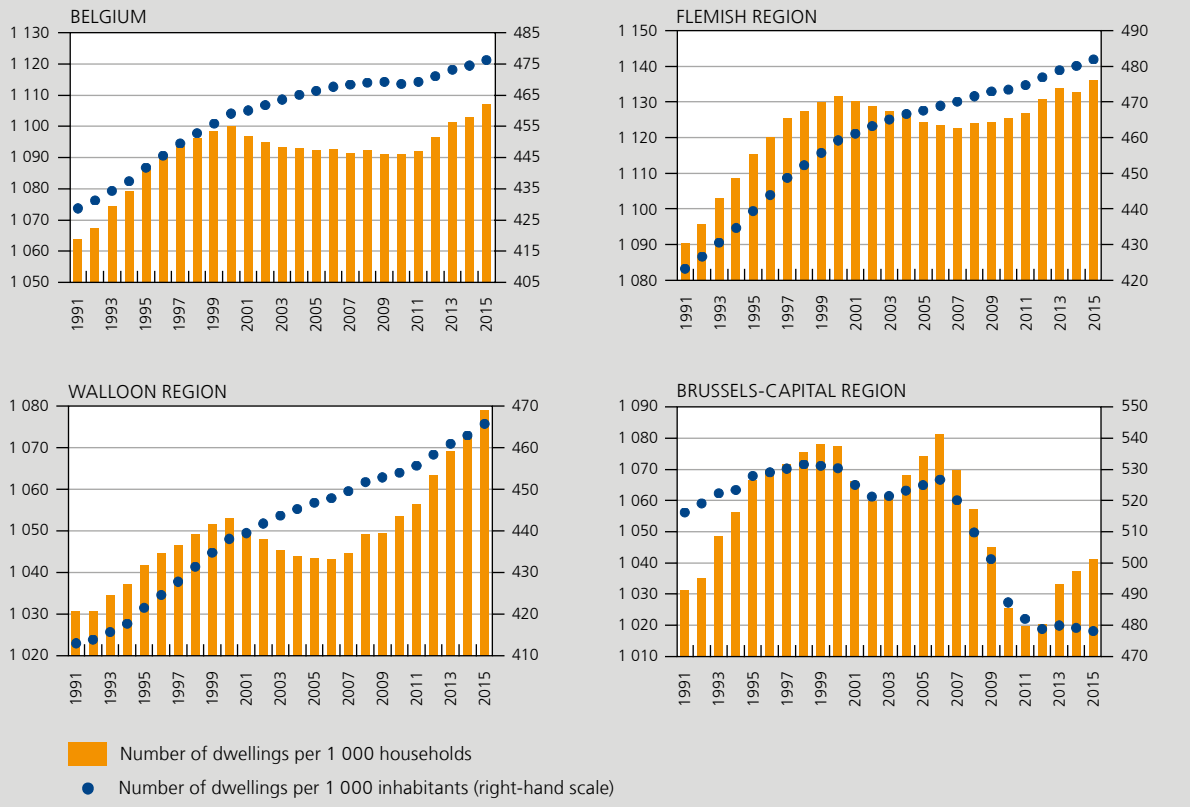
The constant expansion of the Belgian population over many decades has significantly increased demand for housing and is therefore a factor influencing property prices in the long term. However, changes in the number of inhabitants do not necessarily affect demand for housing to the same degree: in the case of births, families may indeed continue living in the same home if the space is sufficient, while a home remains unavailable in the event of a death if the surviving partner decides to continue living there (Noppe and Van Gompel, 2012). For these reasons, the change in the number of households is more relevant for assessing the impact of demographics on demand for housing. In that connection, average household size has declined considerably in recent decades, so that the rise in the number of households has outpaced the growth of the population. Between 1980 and 2016, the increase in the number of households is estimated at more than 1.2 million units in Belgium.

As pointed out by Manceaux (2011), the impact of demographics on house prices nevertheless depends on the speed with which the supply can be adjusted to these changes. If construction activity does not produce an adequate response (for example, if it takes too long to build new homes), that will increase the pressure on house prices.

The housing stock expanded by almost 25 % between 1991 and 2015, suggesting that, in general, the supply was amply adjusted to demographic developments, since the number of inhabitants and the number of households increased by 12.4 % and 20.1 % respectively over that same period (see chart 7). However, three sub-periods can be identified. First, between 1990 and 2000, the housing stock expanded strongly in relation to the number of households. Next, up to 2010, the trend reversed and stabilised, implying a reduction in the number of vacant homes, which was most likely one of the factors underlying the rise in property prices during that period, particularly between 2001 and 2007. Finally, however, the latest observations indicate that, since 2012, the housing stock has grown by more than demographics.

Nonetheless, these results concern Belgium as a whole. Although the supply seems suited overall to the increase in the number of households, the situation may vary considerably from one region to another. In that context, the Brussels-Capital Region is an interesting case, as the growth differential between the housing stock and the number of inhabitants or households became clearly negative there between 2007 and 2011. Although the latest observations since 2013 reveal

CHART 7 MATCHING OF DEMOGRAPHIC DEVELOPMENTS AND HOUSING SUPPLY



Sources: DGS and own calculations.

more favourable results, they do not offset past developments. This suggests that the construction of new homes is not necessarily taking place in the areas where the demographic pressure is greatest, notably in Brussels, which may be due partly to a lack of building land and more stringent planning regulations in those areas. In that connection, Albrecht and Van Hoofstat (2011) demonstrate the importance of scarcity premiums, i.e. the additional price to pay for a home available in a region or price bracket where the housing supply is outstripped by demand. The mismatch between supply and demand for housing therefore seems to play a role in property price developments.

In the other two Regions, the situation seems to be less of an issue. In the Flemish Region, the construction of new dwellings has outpaced the rise in the number of households. Between 2001 and 2007, the situation was reversed, but the growth differential remained limited. Finally, in the Walloon Region, it was only between 2001 and 2006 that the housing stock expanded more slowly than the number of households.

Our model suggests that demographic developments have a positive impact on property prices, since the elasticity of house prices to the number of households is estimated at 2.2, indicating that a 1 % rise in the number of households leads to a 2.2 % increase in property prices. That also coincides with the result obtained by Smet and Van Gompel (2014) for Belgium.

Apart from the points identified above, certain factors specific to the tax treatment of owner-occupied housing have also supported the rise in property prices in Belgium during the past few decades. Thus, until very recently, tax changes have tended to facilitate access to mortgage loans and to stimulate activity on the secondary market. That was particularly the case in 2005 in the context of the reform of the tax deductibility of mortgage loans for "own and sole home" (more commonly known in Belgium as the "housing bonus"), which increased the tax advantage already existing for home-owner households. According to Hoebeeck and Inghelbrecht (forthcoming), the strengthening of the housing bonus in 2005 significantly enhanced demand for mortgages and, hence, property prices and the

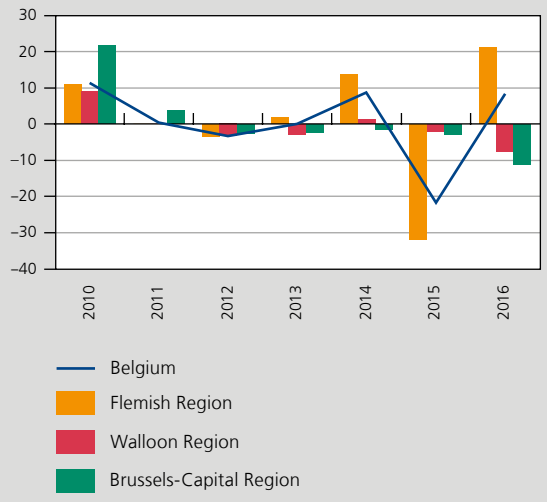
average loan maturity (since the tax advantage depends on it). Previously[1], registration fees had already been reduced and the Flemish Region had also made those fees portable, which tended to encourage (young) households to invest relatively early in their first property, even if they would later switch to buying a more expensive property as their income increases sufficiently to make it affordable.

However, under the Sixth State Reform, responsibility for mortgage loan deductibility was devolved to the Regions, and since 2015 the regional authorities have embarked on reforms in that respect. The details and the timing of the housing bonus reform vary from one Region to another, but, in order to ensure the sustainability of public finances, the overall aim was to reduce the tax advantage for home-owner households, particularly in the Flemish Region, so that in principle the contribution of this factor to property price growth should diminish, whichever Region is considered. However, it should be noted that the housing bonus reform in the Flemish Region greatly inflated the number of secondary market transactions recorded at the end of 2014, as many households brought forward the purchase of a property – if they could – in order to continue benefiting from the more favourable federal tax concession. This was the only Region where real estate activity markedly increased in 2014 (see chart 8).

(1) As this is a regional competence, the dates on which this tax change took place vary between the Regions. While this measure took effect in the Flemish Region and in the Brussels-Capital Region in 2002 and 2003 respectively, the Walloon Region did not adopt similar measures until 2009.

CHART 8 NUMBER OF TRANSACTIONS ON THE SECONDARY MARKET

(annual percentage change)



Source: DGS.

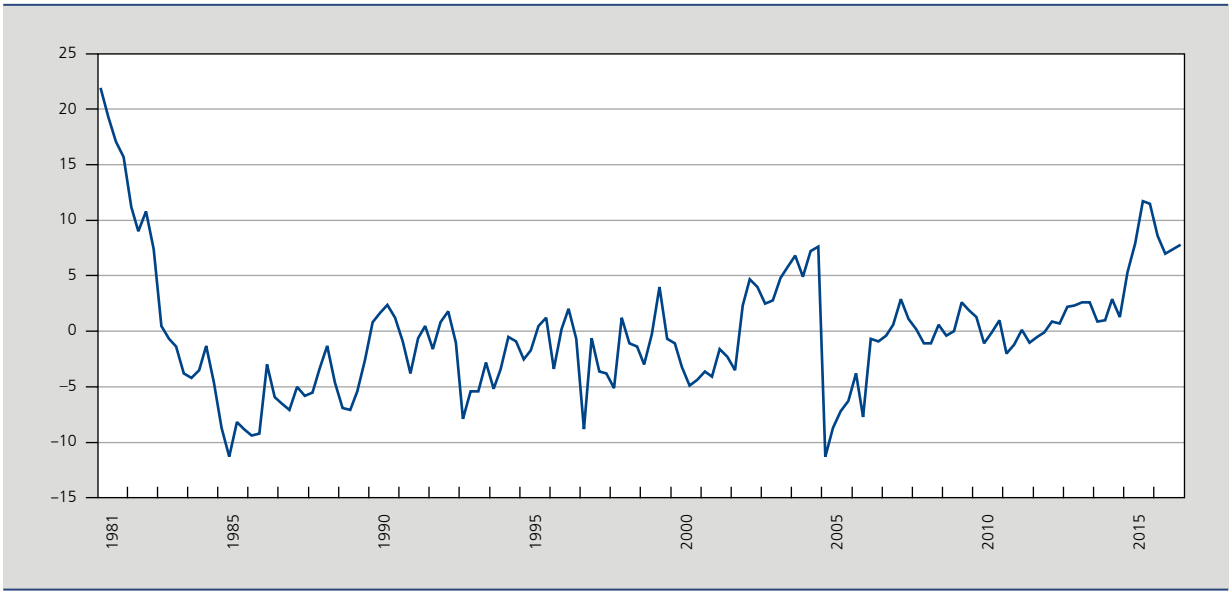
In the framework of an econometric model, it is technically difficult to take account of all the factors relating to the tax and regulatory environment of the mortgage market which could ultimately influence house price developments. That is why the Bank's indicator only considers the changes in the housing bonus, that factor being the one to which the literature attributes the most significant impact on house prices (Hoebeeck and Smolders, 2014; Hoebeeck and Inghelbrecht, forthcoming). For that purpose, dummies are added from 2005 and 2015, the years in which the tax deductions for mortgage loans were respectively increased and reduced. However, it should be noted that those variables also capture other structural changes in the property and mortgage markets, such as the trend break in the property price statistics in 2005 (see box).

Ultimately, the difference between recorded property prices and the equilibrium prices estimated by the model, i.e. the residuals from the regression, provides an indication of the valuation of the property market. According to the Bank's indicator, the property market has not had any long periods of overvaluation, contrary to what the price-to-income and price-to-rent ratios might suggest, especially if they are based on averages computed over a longer period. However, the market appears to have been particularly overvalued at certain times. That was notably the case in the first half of the 1980s and in the early 2000s, i.e. two periods when property prices were rising strongly or had recently done so without that being entirely explained by the fundamental determinants.

The third period of overvaluation identified by the indicator began in mid-2012 and is still continuing. However, it was in 2015 that the overvaluation of the property market increased significantly. That was due to the substantial reduction in the housing bonus in the Flemish Region in 2015, which, in principle, should have exerted downward pressure on house prices, as the opposite effect had been seen ten years previously when the tax deductibility of mortgage loans was strengthened. Yet property prices rose strongly in 2015, considerably increasing the overvaluation of the market as estimated by the model. That therefore implies that the rise in prices was not attributable entirely to the fundamental determinants incorporated in the model, including mortgage interest rates, which continued to decline. In that context, attention should be drawn to the indirect influence that the persistence of a generally low interest rate environment may have on the property market. The significant reduction in the yields on many financial investments may indeed make investment in real estate relatively more attractive, thereby stimulating demand for housing and driving up prices.

CHART 9 RESIDENTIAL PROPERTY MARKET VALUATION ACCORDING TO THE NBB'S APPROACH (1)

(percentage deviation from the equilibrium price)



Source : NBB.

(1) This indicator corresponds to the residuals of the regression of house prices on a series of fundamental determinants, namely the average household disposable income, the number of households, the average mortgage interest rate and various measures aimed at taking account of changes in the tax treatment of mortgage loans. The variables are expressed in real terms.

However, the estimates for 2016 suggest that the overvaluation of the property market has lowered, mainly as a result of the marked slowdown in price growth, and was down to 7.8 % in the fourth quarter.

It should be noted that a neutral valuation, i.e. a situation in which prices are totally in line with their fundamental determinants, provides no indication of future price developments and cannot imply that there is no risk for the property market. If one of the fundamental factors were to deteriorate significantly, that could trigger a slump in prices. That would be the case, for instance, if mortgage interest rates suddenly increased or if the general macroeconomic conditions worsened.

Conclusion

In Belgium, the housing market has been particularly dynamic in the past few decades. House prices increased strongly from the early 1970s, and there have been only two relatively brief periods of decline, namely in the first half of the 1980s and in 2009, at the time of the economic and financial crisis.

Since then, property prices have continued to rise, albeit more slowly than was generally the case before the great recession, so that – if inflation is taken into account – they have virtually stabilised. Nevertheless, the stronger price growth in 2015 surprised somewhat on the upside, despite the significant cut in the tax deduction for mortgage loans (housing bonus) in the Flemish Region. But, in 2016, the Bank's indicator pointed to a marked slowdown in nominal prices and a slight fall in real prices.

Owing to the absence of any downward correction such as that seen in many European countries a few years ago, house price developments became a cause of concern in Belgium since the emergence of imbalances on the property market can trigger and propagate a slowdown in economic activity and threaten financial stability. The question of the possible overvaluation of the property market therefore became a key point in both macroeconomic analysis and the conduct of macroprudential policy.

To determine the extent to which recorded market prices deviate from the equilibrium price in either direction, the empirical literature describes a number of indicators which can be divided into two main categories. However, the first category, which includes price-to-rent and price-to-income ratios, which generally point to high levels of overvaluation in Belgium, is subject to numerous limitations and fails to take account simultaneously of all the factors which may influence the property market. Even

if it may also have its drawbacks, the second category comprising the econometric approach overcomes some of those shortcomings since it consists in comparing house price developments with their fundamental determinants on both the supply and the demand side.

By following this approach, the Belgian property market is not significantly overvalued, contrary to what might be suggested by statistical indicators such as the price-to-income and price-to-rent ratios. Price movements are therefore largely attributable to changes in certain fundamental determinants. In particular, the increase in household incomes combined with the decline in interest rates over the preceding decades has made housing more affordable. Property prices were also supported by the marked rise in the number of households and by the tax treatment of owner-occupied housing, which has generally been adjusted in a way likely to facilitate access to mortgage loans. However, that has been less the case since 2015, with the devolution of more powers to the Regions and successive reforms of the housing bonus, especially in the Flemish Region. Yet, the increase in prices did not taper off during the course of that year, leading to an even higher overvaluation of the property market. Owing to the marked slowdown in price rises in 2016, that overvaluation is nevertheless estimated to have dropped back and stabilised around 7.8 %.

Apart from the fundamental determinants mentioned above, other factors – which cannot necessarily be taken into account in the econometric approach of the valuation of the property market – have apparently played a role in the recent trend in prices. That applies to the persistence of a low interest rates environment, which may indirectly influence the property market since it tends to make investment in property attractive compared to other financial investments on which returns have declined significantly, thus stimulating demand for housing and driving up house prices.

It should be pointed out that a neutral valuation, i.e. a situation in which property price movements are perfectly in line with market fundamental, does not in any way mean that there is no risk for the property market. If one of the property price determinants were to deteriorate significantly, the result could be a sharp fall in prices.

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Digital currencies : Threats and opportunities for monetary policy

A. Stevens (*)

Introduction

Ever since its introduction in 2009, bitcoin and its underlying technology have spurred interest in so-called digital currencies. At first sight, a digital currency is nothing more than an electronic variety of money, just like deposited money in bank accounts or in electronic wallets such as Apple Pay and PayPal. However, its central innovation compared with existing forms of electronic money is that it can be exchanged peer-to-peer, much like cash (Camera, 2017 ; Raskin and Yermack, 2016). The settlement of cash transactions is completed by the simple physical transfer of, for example, coins and banknotes. By contrast, electronic money instruments are non-tangible and thus do not permit such a physical transfer. As a result, a ledger must be in place to record property rights over and transactions in these instruments. Conventional electronic money systems rely on several layers of trusted institutions, such as central banks or credit card issuers, to process transactions and to update the ledger. The involvement of third parties implies that such systems are basically centralised and likely more expensive than systems that grant some decentralisation, such as cash systems (Camera, 2017). Digital currency schemes aim to avoid the involvement of middlemen and hence intermediation costs by managing their ledger through so-called "distributed ledger technology" (DLT). This technology offers the possibility of a decentralised book-keeping system – called a distributed ledger as it is shared among the users of the system – that works in a self-verifying fashion. In fact, all actions in the ledger need to be verified by users of the system. The settlement mechanism for digital currency transactions is therefore not intermediated but direct : the transaction is settled as soon as enough system participants agree that it is valid.

By granting, at the same time, peer-to-peer payment facilities and the convenience of electronic transactions, digital currencies could provide significant competition for traditional monetary instruments and, hence, may have important implications for central banks, the financial system and the economy more generally. This article focuses on both the challenges and opportunities that digital currencies present to a central bank's monetary policy. For instance, private digital currencies, if widely adopted, could lead to significant financial and monetary stability risks. For one thing, privately issued digital currencies are traditionally not denominated or tied to a sovereign currency, but rather denominated in their own units of value. Hence, exchange rate risks are inherent and might impair financial stability and monetary policy transmission. Moreover, by substituting for regular money – here defined as monetary instruments with legal tender status, such as coins, banknotes and transferable deposits –, widely adopted private digital currencies could significantly reduce a central bank's control over monetary conditions. This would not only restrict a central bank's ability to steer interest rates but also its capacity to act as a lender of last resort.

However, it has recently been increasingly suggested that digital currencies could also entail opportunities for monetary policy. More specifically, their underlying distributed ledger technology could provide central banks with a platform to develop and issue their own electronic form of banknotes – a so-called central bank

(*) This article partly reflects content that has appeared as NBB Governor Jan Smets' Annual SUERF Lecture on "FinTech and Central Banks", delivered on 9 December 2016 in Brussels (Smets, 2016). The author would like to thank Jef Boeckx as well as the members of the NBB FinTech task force for their valuable comments and suggestions.

digital currency (CBDC)[1]. Different arguments can be cited as to why a central bank might consider issuing such a CBDC. For instance, adopting a sovereign digital currency could be an appropriate policy response to curb the risks of private initiatives mentioned above; at least to the extent that there are reasons to presume that such risks would be relevant. Another often stated argument is that a CBDC could help to relax the effective lower bound constraint on nominal interest rates, permitting the central bank to implement negative policy rates if that were warranted by economic circumstances. Such arguments, however, should be set against the implications of sovereign digital currencies for the banking system – and these appear to be highly uncertain. On the one hand, by providing competition for bank deposits, the adoption of a CBDC could limit the practice of fractional reserve banking, making for a safer financial system, with less scope for impairment in monetary policy transmission. Yet on the other, too widespread a substitution of bank deposits by CBDC could lead to a significant de-funding of the banking sector, with negative spillover effects on credit creation and monetary policy.

The article proceeds as follows. Section 1 sets the stage, briefly sketching out the language we will use to describe non-physical types of money. Subsequently, section 2 discusses the potential challenges imposed by privately issued digital currencies for the conduct of monetary policy. The opportunities for monetary policy associated with a potential adoption of sovereign digital money are discussed in section 3. The final section sets out our conclusions.

1. Some definitions

As noted by Camera (2017), no clear consensus exists on the language used to describe money components that lack the physical structure of cash. For instance, throughout the literature, different interpretations are given to the concepts "e-money", "digital money", "cryptocurrency" and "virtual currency". Sometimes these terms are used interchangeably (as, for instance, in Fung and Halaburda, 2016). In other publications, they refer to rather distinct forms of money, depending on the criteria applied to classify non-physical types of money instruments.

In this article, we adopt the definitions proposed by Barrdear and Kumhof (2016), which largely correspond to the official terminology used by the Bank of England[2]. Their classification basically depends on the technology underpinning the currency instrument. Against this background, "electronic money" (e-money) is broadly defined as monetary value stored in an electronic device that can be used to make payments – much in line with the definition used by the Bank for International Settlements (BIS, 2015); in brief: any intangible type of money that is based on computer technology. Note that this definition is broader than the legal definition of e-money as specified in EU legislation[3]. The term "digital currency" is used to refer to any electronic form of money that features a distributed ledger and a decentralised payment system. "Cryptocurrencies" are defined as a separate sub-class of digital currencies, with their distinguishing feature depending on the consensus mechanism applied for updating the ledger (for more details, see Barrdear and Kumhof, 2016). To simplify matters, we ignore the role that specific technical modalities of the distributed ledger technology – such as the consensus mechanism – might play for the economics of digital currencies. In what follows, we therefore only make reference to the more general notion of digital currencies.

The above definitions are fairly broad: they are not necessarily linked to any legal terminology and do not depend on features other than the underlying technology, such as the denomination of the currency (sovereign or another reference unit) or its issuer (public or private entity). Any reference to such additional features will be spelled out clearly. For instance, the prefixes "private" and "central bank" serve to clarify the type of issuer of a digital currency.

2. Potential risks of privately issued digital currencies to monetary policy

The potential risks of private digital currencies for monetary policy have been well described in – amongst others – a recent article by Ali *et al.* (2014). Inspired by a policy brief by Lo and Wang (2014), assessing whether bitcoin can be regarded as a currency instrument, this chapter recasts many of the arguments of Ali *et al.* (2014) by thinking about the performance of a digital currency in serving the three traditional functions of money: first, money is considered as an instrument that facilitates trade by acting as a *medium of exchange* – i.e. money can be used for buying and selling goods and services. Second, money acts as a *store of value* in that it is a convenient way to store wealth – i.e. money can be used to transfer purchasing power from the present to the future. Finally, money serves quantification purposes as a *unit of account* – i.e. money is the common standard for measuring the relative worth of goods and services.

(1) The term "central bank digital currency" was first used by Broadbent (2016).
(2) The definitions applied by the Bank of England can be found at http://www.bankofengland.co.uk/research/Pages/onebank/cbdc.aspx.
(3) See https://www.ecb.europa.eu/stats/money_credit_banking/electronic_money/html/index.en.html.

In line with the literature, this section concludes that policy challenges are likely to be limited if private digital currencies only serve as a medium of exchange. In contrast, when these currencies are additionally regarded as a good store of value and – even more importantly – are also used as a unit of account, both monetary and financial stability risks may loom larger.

2.1 Low risks if private digital currencies only serve as a medium of exchange

As long as private digital currencies are merely used as a medium of exchange and are not considered as a unit of account or as a store of value, they should not pose significant threats to monetary policy. In principle, in this case, digital currencies work in a similar fashion to prepaid types of e-money instruments (e.g. electronic wallets such as Apple Pay and PayPal). More specifically, digital currencies are only put "into circulation" when regular money is exchanged by the user who intends to use it in a transaction, and, likewise, digital currency is absorbed (withdrawn from circulation) and exchanged back to traditional money as soon as the transaction is settled.

Consequently, in this scenario, a digital currency's net effect on the amount of money used for transactions should be limited, implying that the central bank maintains its ability to influence the money supply, short-term interest rates, and, hence, aggregate demand. In fact, the regular currency and the interest rate on it remain the dominant monetary guideposts, also when it comes to financing expenditure, whereas the digital currency only serves as a means of transaction. Moreover, when only used as a medium of exchange, a digital currency's price should, in theory, not be prone to too much volatility – precisely because its circulation depends on demand for it, and not on any speculation about its future price (which could be the case if the currency also served as a store of value).

The steadily growing list of merchants accepting payments in bitcoin (the most well-known private digital currency) suggests that private digital currencies have the potential to be widely accepted as payment for a sufficiently large set of goods or services[1]. A 2014 study by Lo and Wang shows that retailers accepting bitcoin payments do not charge a premium and may in fact offer a discount (albeit typically a small one) on purchases made with bitcoin. This finding suggests that the peer-to-peer payment services provided by digital currencies – avoiding the fees charged by traditional payment providers – might fulfil these currencies' potential to lower transaction costs. However, at the same time, this study also suggests that digital currencies serve (so far) poorly as a store of value or as a unit of account. In fact, because the value of private digital currencies is traditionally not tied to a sovereign currency, their prices can be very volatile, as illustrated in chart 1 for bitcoin. Consequently, to avoid price volatility and associated distorted price signals, most merchants accepting bitcoin payments post their official prices in sovereign reference units (e.g. euros, dollars, etc.). Moreover, to fully reap the potential benefits of reduced payment processing costs, merchants hedge against potential exchange rate volatility. For instance, the check-out price in bitcoin is frequently updated (e.g. every ten to fifteen minutes) so as to maintain a relatively stable price when expressed in euros, whereas bitcoins paid are immediately converted back into euros[2].

2.2 Financial stability risks if private digital currencies also serve as a store of value

Increased financial stability risks and associated impairments in monetary policy transmission could emerge if private digital currencies were widely perceived as good stores of value, as such perceptions are unfounded. In fact, private digital currencies lack the elements of traditional stores of value that would render them safe vehicles for transferring wealth from the present to the future. For instance, in contrast to commodities (such as oil and gold), private digital currencies have no intrinsic value: intrinsically, they are nothing more than lines of computer code. Neither do private digital currencies carry any legal value, in that they are not backed by a sovereign entity as is the

CHART 1 THE VALUE OF BITCOIN
(US dollar per bitcoin)

Source: www.blockchain.info

(1) See, for example, the website Coinmap for an interactive map showing all physical stores around the world accepting bitcoin as a payment instrument.
(2) Bitcoin intermediaries such as Coinbase offer such hedging services.

case for regular money. More specifically, they are not legal tender – which would give them value in terms of being accepted to, for instance, discharge tax obligations. Nor do they imply a legal right to a regular currency at par – which would grant them value in terms of future consumption.

All of this means that a private digital currency's value hinges entirely on an expectation of others' willingness to accept it later at a sufficiently greater value (Lo and Wang, 2014). Put differently, the equilibrium value of private digital currencies depends on self-fulfilling expectations. This characteristic renders private digital currencies conducive to speculation and, hence, subject to bubbles. Consequently, the price of digital currencies can be very volatile (see, for instance, the bitcoin dollar exchange rate in chart 1) and price crashes are not inconceivable. Importantly, when the effects of such crashes cannot be limited to the direct holders of the alternative currencies, they might erode financial stability, which, in turn, might impair monetary policy transmission. The financial system would be particularly prone to such contagion effects if investment in private digital currencies were to have been debt financed, or if systemically important financial institutions were to have built significant unhedged exposures to such currencies (Ali *et al.*, 2014).

So far, the total value of all digital currencies would seem to be too small to pose a systemic threat to financial stability and monetary policy in the way presented above[(1)]. Critical voices (e.g. Krugman, 2013) argue that the current high volatility of the exchange rate of private digital currencies (rendering them a poor store of value) prohibits their widespread adoption anyway, thereby limiting any potential financial stability concerns. However, recent theoretical model simulations by Bolt and van Oordt (2016) show that, in the long run, exchange rate risks are not likely to get in the way of widespread use of private digital currencies, because such risks would be mitigated as such currencies become more established. One interpretation is that the assessment of value is to a large extent based on subjective beliefs, which can evolve over time. For instance, if private digital currencies were to achieve increasing success as a medium of exchange, they would gain value in terms of practical utility. This source of value could render exchange rates less sensitive to the impact of shocks to speculators' beliefs. Financial stability risks would in any case be limited in this scenario, as widespread adoption of privately issued digital currencies would actually contain exchange rate volatility.

(1) See, for instance, the evidence on daily bitcoin transactions presented in Ali *et al.* (2014) or more recently in Bolt and van Oordt (2016), which show that – although growing – bitcoin is still a relatively small monetary phenomenon.

2.3 Monetary and financial stability risks if private digital currencies also serve as a unit of account

The greatest hypothetical risk to monetary policy that might be posed by private digital currencies would be if they grew to a point where they were generally accepted and used as units of account. In this case, private digital currencies would substitute for the bulk of sovereign currency-denominated regular money, including central bank money. In the most extreme scenario, the economy is "bitcoinised", meaning that the alternative money would be used as the predominant form of money in the economy and euros would only be used for interactions with the government (such as to pay taxes), or even – one step further – that the government would accept private digital currencies for payment of tax obligations.

A widespread substitution of regular money by privately issued digital currency would have a number of monetary policy implications. First, monetary policy might become less effective in managing aggregate demand in order to stabilise the economy around full employment. In fact, if sovereign money no longer served as the base money in the economy, the central bank would essentially lose control over monetary conditions. In such an environment, it would become harder for monetary policy to steer the relevant interest rates in order to respond to macroeconomic demand imbalances. Volatility in prices would then ensue, causing welfare-destroying volatility in economic activity. Additionally, monetary policy would lose any discretion to adjust monetary conditions on a tactical basis as part of a stabilisation policy – for instance, to react to changing supply conditions such as technological improvements or structural changes in product and labour markets.

Second, a drain on regular money could also erode a central bank's capacity to act as lender of last resort in the event of bank liquidity shortfalls. Such an effect would increase the likelihood of bank runs and, hence, financial impairments. This would be notably the case if a fractional reserve banking system were to emerge above a private digital currency. In fact, because so far no regulatory status has been granted to private digital currency systems, such a system would lack the support of a trusted authority to provide liquidity if access to liquidity from other sources were impaired; nor would it offer the protection of a deposit insurance scheme in the event of a bank failure.

Third, given that most existing private digital currency schemes incorporate strict rules that govern their creation and follow a pre-determined path to a fixed eventual total supply, large-scale adoption of such schemes might

contribute to deflation in prices of goods and services (and wages). Such deflation, when perfectly anticipated, is not problematic. However, in a rock-bottom interest rate environment, deflationary forces might induce a structural increase in real interest rates, plunging the economy into a secular stagnation trap featuring low growth and chronic deflation. Note, however, that there are no technical reasons why private digital currency schemes could not adopt "smarter" rules that seek to provide for structural inflation instead of deflation (for instance, a money supply rule tracking the number of transactions). Such alternative rules could help to curtail secular stagnation risks.

Finally, a substitution of sovereign money by private digital currencies would also lower a government's seigniorage income. This would have to be compensated by increased distortionary taxation, which in turn might impede economic activity.

There are reasons to doubt, however, that private sector digital currencies will ever become trusted units of account, rendering the monetary policy risks described above highly unlikely. Buiter (2009) remarks that, although authorities cannot regulate the unit of account, they can strongly encourage the use of a specific unit of account. For instance, seeking to minimise any loss of seigniorage income, sovereigns could insist that all contracts with the public sector are denominated in euros, and require taxes to be paid with the official currency. Importantly, such requirements would curb the use of private digital currencies not only in direct but also in indirect ways. More specifically, a refusal to grant private digital currencies either legal tender or regulatory status strips these types of currencies of any intrinsic value, which, in turn, makes them prone to speculative bubbles (see above). This is likely to reduce their attractiveness and limit the risk that they will become widely accepted.

A second reason why it is unlikely that private digital currencies will become widely used and substitute for regular money is that such currencies serve as a poor haven in a flight to safety. As stressed by Broadbent (2016), currency substitutions occur only in cases of profound distrust of authorities and deeply compromised sovereign currencies, for instance in the wake of a collapse in the banking sector or monetary policy failing to maintain price stability. In these cases, however, it is pretty unlikely that people will flee to entirely new currencies. Instead, it is more reasonable to assume that people will reach for an existing, trusted currency, such as established sovereign currencies. Moreover, as noted above, privately issued currencies have no intrinsic value and, therefore, serve as a bad store of value. Hence, it is very unlikely that a flight to safety would spark a drain to these types of currencies.

3. Opportunities of digital currencies for monetary policy

Digital currencies do not only present monetary policy with challenges. In fact, their underlying distributed ledger technology (DLT) includes some interesting features that might encourage central banks to co-opt this new technology.

First, according to some observers, DLT has the potential to improve the efficiency and security of existing payment systems (see, for instance, Bernanke, 2013; UK Government Office for Science, 2016). The efficiency argument relates to the direct settlement mechanism embedded in distributed ledgers: this has the potential to not only raise the speed of settlement but also to lower settlement costs compared with traditional payment systems. The security opportunity of the technology basically rests on the fact that distributed ledgers are shared among users of the system: this makes them hard to corrupt, as to do so would require deceiving all users [(1)]. From a monetary policy perspective, these potential efficiency and security benefits suggest that the distributed ledger technology could help to further underpin trust in the monetary system (see, for instance, Haldane, 2015; Raskin and Yermack, 2016). This is an important feature, as trust is the cornerstone on which a fiduciary money system is built. In fact, fiduciary money derives its intrinsic value solely from trust. Against this background, central banks may choose to permit interbank payment systems to run on a DLT network.

Central banks' interest in the distributed ledger technology, however, is not limited to investigating potential interbank applications. In fact, they are increasingly pondering the potential of this new technology to serve as a platform for the issuance of a digital form of banknotes – a so-called "central bank digital currency" (CBDC) [(2)]. Hence, from a broader economic perspective, the DLT offers a potential efficiency gain for central banks to expand their role by widening electronic access to their balance sheets – that is, beyond commercial banks [(3)].

(1) Note that the decentralised nature of distributed ledgers is not in itself enough to banish fraud altogether. In fact, anyone succeeding in taking control of the consensus mechanism verifying the validity of transactions could still commit fraud. To prevent such practices, digital currency schemes typically design their validation process to be computationally challenging – thereby preventing record falsification by minority coalitions.

(2) A couple of recent speeches by central bank officials testify to the growing interest in the idea of CBDC within policy circles. For instance, in March 2016, Ben Broadbent, the Bank of England's Deputy Governor for Monetary Policy, set out his views on the potential macroeconomic consequences of a CBDC (Broadbent, 2016). More recently, in January 2017, ECB Executive Board member Yves Mersch noted that these consequences depend on the exact design or modalities of what he calls "digital base money", e.g. the remuneration of sovereign digital money as well as its convertibility to traditional cash (Mersch, 2017). In Sweden, the Riksbank is pondering whether it should play a pioneering role in issuing an electronic means of payment – an "e-krona" – to complement physical cash (Skingsley, 2016).

(3) See also Broadbent (2016) on this point.

It remains a question, however, whether or not this is a desirable outcome. On the one hand, by (partially) substituting for cash, a CBDC could relax the so called "effective lower bound" constraint on nominal interest rates, which could promote macroeconomic stability. On the other hand, by providing competition for bank deposits, a CBDC could have profound implications, either positive or negative, for the banking sector. The following two sections elaborate in greater detail on these two issues.

3.1 Could a CBDC solve the problem of the effective lower bound on interest rates?

As articulated by Haldane (2015), the fact that nominal market interest rates cannot fall much below zero arises from the fact that technological constraints hinder paying interest (both positive and negative) on physical cash. Central banks have no problem whatsoever paying negative interest rates on reserve deposits held by banks with them[1]. However, the transmission of such negative policy rates to other interest rates – retail bank rates in particular – can get impaired as soon as banknotes cannot be charged the same negative rate. Indeed, in this case, there is an escape route from negative rates, in that deposits can be switched for banknotes. This practice impairs the effectiveness of monetary policy in that it imposes limits on central banks' capacity to implement negative rates as a strategy to re-launch the economy, and was originally known as the "zero lower bound problem" (Ball, 2014). Today, this issue is increasingly referred to as the "effective lower bound problem", or ELB for short. This is because the effective lower bound is somewhat below zero in that carry costs for cash (i.e. costs of storage, safekeeping and insurance) are typically higher than for bank and reserve deposits.

The ELB constraint is not new. In fact, it has existed for as long as banknotes have been in issue. So why should we now worry more about it than we did a decade ago? The key factor is that there are strong reasons to believe that the likelihood of this constraint becoming binding has increased in recent years. For one thing, current low interest rates tend to be not just cyclical in nature, in that they are not only the result of central banks' massive stimulus measures in the aftermath of the great recession. Instead, some of the deep roots of the ELB constraint may be structural and, therefore, long lasting (Buiter and Rahbari, 2015). For instance, lower trend growth, worsening demographics, rising inequality and savings gluts in emerging markets have all lowered average real interest rates over the past 30 years (Rachel and Smith, 2015). In tandem with central banks' success in bringing inflation down again from its too high levels in the 1970s and 1980s, nominal interest rates have also fallen. As a result, monetary policy currently has less room for manoeuvre to fight recessions than it did a generation ago. On top of this, macroeconomic volatility has increased since the financial crisis, bidding farewell to more than two decades of "Great Moderation". This means that monetary policy's dwindled room for manoeuvre is expected to be exploited more often[2]. As a result, central banks may in future find themselves repeatedly bumping up against the lower bound constraint. Policy options that would loosen the ELB constraint on a durable basis therefore deserve our attention.

Various proposals for circumventing the lower bound have been put forward, ranging from raising average nominal rates by revising the inflation target upwards, to finding means to levy negative interest rates on cash – such as a stamp tax on banknotes or a managed exchange rate between cash and deposits – through to abolishing cash entirely[3]. To date, however, no central bank has attempted to implement any of these schemes. This is because each of these potential solutions also brings particular challenges. For instance, the main objection against raising the inflation target is that it could jeopardise central bank credibility and, thereby, the anchoring of inflation expectations. Options to levy an implicit interest rate on cash, for their part, suffer from the problem that their practical implementation is not that straightforward or – at least – requires a costly infrastructure. Finally, a ban on cash would face some major social acceptance issues. For one thing, access to publicly issued money – such as banknotes – is regarded as a social convention (Haldane, 2015). Challenging this convention could spark intense public protest. Another often stated argument against eliminating cash is that it would infringe privacy rights, as only cash allows making anonymous transactions. Moreover, the abolition of cash implies a loss of seigniorage income for the central bank.

Recently, however, it has been increasingly suggested that the technical opportunity offered by distributed ledger technology to issue a CBDC could effectively relax the lower bound constraint on interest rates (see, for instance, Haldane, 2015; Raskin and Yermack, 2016; and Camera, 2017). The reason is that a CBDC could easily support negative interest rates while at the same time providing the option to not simply abolish cash,

(1) For instance, in the euro area, banks are currently charged 40 bps on excess liquidity that they hold with the central bank.

(2) Chung *et al.* (2012), for instance, show that a re-calibration of pre-crisis models that takes the higher levels of macroeconomic risk observed during the great recession into account raises the incidence and severity of ELB events.

(3) See Haldane (2015) for a comprehensive overview of concrete proposals put forward in the literature. More specifically, see e.g. Ball (2014) and Williams (2016) for a recent plea to increase the inflation target. Proposals for levying a stamp tax on banknotes date back to Gesell (1916). More recently, the idea has been re-introduced into the policy debate by, for instance, Goodfriend (2000) and Buiter and Panigirtzoglou (2003). The idea of installing a floating exchange rate between cash and deposits has been pitched by Eisler (1932) and recently revitalised and updated by, for instance, Buiter (2009) and Goodfriend (2016).

but instead to replace it with an electronic version. This approach would preserve the ability to hold direct claims on the central bank – even if banknotes were no longer available – and it would not need to affect seigniorage income. What is more, when running on a distributed ledger network, a CBDC could – in principle – provide anonymity to its users, just like banknotes. Indeed, as evidenced by the e-cash proposal made by Danezis and Meiklejohn (2016), which they call RSCoin, the distributed ledger technology permits the monetary supply to be centralised, without the need to centrally manage the transaction ledger. For instance, designated intermediaries (such as commercial banks) could be put in charge to collect and verify the validity of transactions, avoiding the need for central banks to process the personal details of CBDC holders. Importantly, a CBDC could reduce the lower bound constraint even if it would complement or at least only partially replace physical cash. In fact, by offering an alternative sovereign monetary instrument, widespread adoption of a CBDC would create the conditions to consider abandoning the largest banknote denominations. Since the largest denominations feature the lowest cost of carry, their discontinuation would increase the average carrying cost of holding cash and, thereby, enlarge the scope for negative policy rates (Rogoff, 2016).

All this renders CBDC an interesting policy option to remove the effective lower bound while still offering households and firms (i.e., non-bank economic agents) the possibility to hold claims on the central bank. The idea, however, is also subject to some caveats. Some studies suggest that there are reasons to doubt whether the effective lower bound actually reduces the effectiveness of monetary policy (see, for instance, Swanson and Williams, 2014), thereby rendering a search for solutions to the ELB problem irrelevant. The argument goes that the ELB restricts central banks' ability to cut short-term interest rates much below zero, but not their capacity to steer long-term interest rates. In fact, an array of non-standard policy instruments – among which forward guidance and asset purchases – exists to offset the effects of the ELB on long-term interest rates (on this point, see also Coeuré, 2015). Moreover, Raskin and Yermack (2016) note that imposing negative rates on households – even if justified by economic rationale – might provoke public protest and hence face political constraints. If that were the case, imposing negative interest rates on the general public as part of a strategy to support economic demand could end up undermining central bank independence and weakening monetary policy transmission. In response, one could argue that a central bank should make sure not to levy too negative an interest rate on a CBDC. However, in that case another difficulty arises: if a CBDC were to mimic too closely the uniform and zero remuneration rate of banknotes, it might actually raise rather than lower the effective lower bound. The reason is that digital banknotes are likely to have lower costs of carry than their physical counterparts. Finally, as a third potential caveat, an interest-bearing CBDC could compete not just with physical money but also with bank deposits. This competition could severely interfere with the traditional operation of the banking sector. It remains uncertain, however, what this would imply for financial stability and economic activity more generally. The next section offers some – still fairly speculative – thoughts on this.

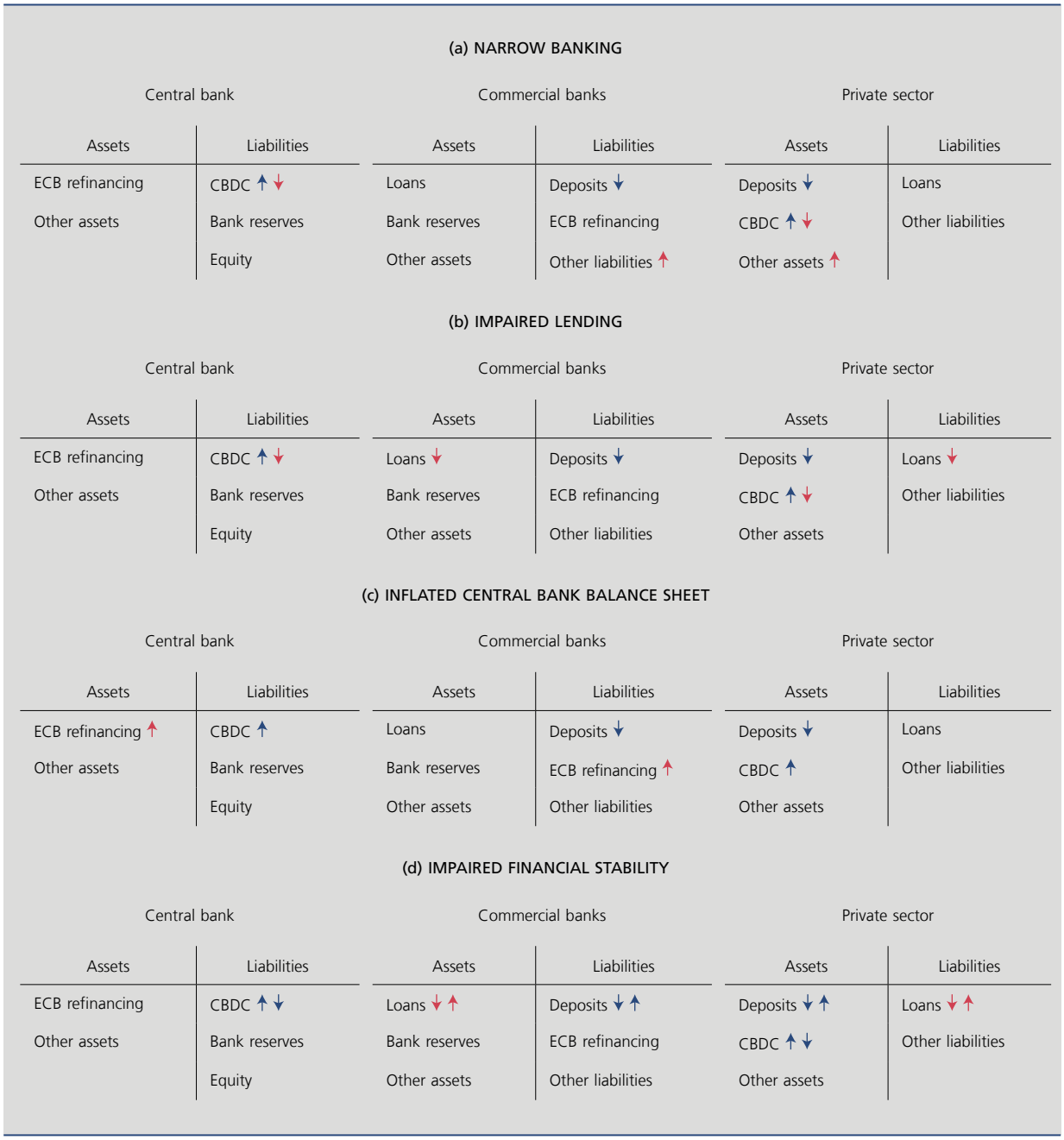
3.2 How would a CBDC affect the banking sector, financial stability and economic activity?

Under a central bank digital currency scheme, citizens and business would be permitted to open and hold accounts with the central bank. Especially if these accounts also paid interest, there would be little to distinguish them from traditional commercial bank accounts. A CBDC, therefore, would compete directly with commercial bank deposits, likely inducing a partial shift of deposits away from commercial banks towards the central bank.

Importantly, such a drain would not be without consequence. Under the prevailing order, banks are engaged in "fractional reserve banking". This is the practice whereby a bank accepts deposits, but holds as reserves with the central bank only a fraction of these deposits. The difference between bank and reserve deposits reflects the money created by banks when they engage in lending. In fact, whenever a bank extends a loan, it simultaneously creates a matching deposit in the borrower's bank account, thereby creating new money. In other words, in a fractional reserve banking system, bank deposits are only partially backed by central bank money, with the difference used to finance investment in the economy. Fractional reserve banking thus implies a maturity transformation: short-term deposits typically fund long-term loans. This maturity mismatch makes the banking system inherently vulnerable to funding liquidity risks and hence to bank runs sparked by fear that liquidity problems might turn into solvency problems.

The foregoing suggests that, by draining deposits from commercial banks, the adoption of a CBDC would limit the practice of fractional reserve banking and its associated liquidity and solvency risks. This could make for a safer financial system, with less scope for impairment in monetary policy transmission. Importantly, as a side effect, this also implies that there is less need for deposit guarantees or for lender-of-last-resort facilities.

CHART 2 ECONOMIC IMPACT OF A CENTRAL BANK DIGITAL CURRENCY: FOUR SCENARIOS



Note: Blue arrows indicate the initial impact of a CBDC introduction on the balance sheet items of the central bank, commercial banks and the private sector. Movements are judged against the counterfactual situation (no CBDC adoption), all other things being equal. For simplicity's sake, we do not include any impact of a CBDC on the number of banknotes in circulation, ignoring this factor altogether. Red arrows indicate the direction of the balance sheet items that need to adjust to preserve equilibrium under four different scenarios. "Narrow banking" refers to the scenario in which commercial banks succeed in attracting alternative funding in the private sector to help replace lost deposits. "Impaired lending" refers to the scenario in which a widespread substitution of deposits by central bank digital money leads to a de-funding of the banking sector with negative spillover effects on credit creation. "Inflated central bank balance sheet" denotes the situation in which the central bank steps in as provider of alternative bank funding. Finally, "impaired financial stability" refers to the scenario in which a CBDC acts as a vehicle for digital bank runs.

The potential economic and policy implications of curbing fractional reserve banking are not limited to this favourable outcome, however. In fact, account must be taken of the balance sheet effects that the adoption of a CBDC might induce. The initial impact of a shift of resources from deposits to CBDCs is clear: banks' liabilities would decline while those of the central bank would increase. It remains uncertain, however, which balance sheet items need to adjust in order to restore equilibrium. Different outcomes are conceivable, with different policy implications, but with no clear indication as to which is most likely (see chart 2 for a schematic overview).

Narrow banking : safer financial system

The most beneficial outcome would be the one that proponents of so-called "sovereign money systems" refer to as the "narrow banking" case (chart 2a). Under a narrower banking system, banks are indifferent as to whether they fund their investment by liquid deposits or less run-prone liabilities, such as equity and longer-term debt. In this case, if a CBDC dried up a bank's access to deposits, the bank would simply address private markets to step up its debt and equity financing. What makes a bank "narrow" in this case is the fact that the liquidity structure of its assets and liabilities are better matched. Under this scenario, the net impacts of a CBDC on the financial system, monetary policy and the economy more generally are positive : all that happens is that the banking sector becomes safer – strengthening the transmission of monetary policy – while credit supply is not affected as deposits are replaced by more stable funding.

Box – "Narrow banking" resembles but is not the same as "full reserve banking"

The case for narrow banking in order to ensure financial stability fits in with the long-standing idea of full reserve banking (FRB)[1]. After all, in both cases, the business of maturity transformation would be limited : under full reserve banking, banks would hold central bank reserves for the total amount of their deposits, whereas under narrow banking, banks would fund their loans mainly with long-term liabilities and retail clients would hold part of their deposits in accounts with the central bank. The first proposal for FRB can be traced back to David Ricardo. In his "Plan for the Establishment of a National Bank" (drafted in 1823) Ricardo (1951) argued that note issuance should be separated from commercial lending[2]. Because at that time paper money was the dominant means of payment, this plan essentially proposed separating money creation from lending activity, or, put another way, separating monetary policy from credit policy.

In the 1930s, and in search of policy answers to restore public confidence during the Great Depression, the FRB idea re-emerged in the famous Chicago Plan. This widely discussed academic proposal suggested extending the prohibition of private money creation to also include commercial bank deposits, thereby ending the practice of fractional reserve banking. The plan, however, did not survive legislation and the FRB idea was not included in the Banking Acts of 1933 (better known as the Glass-Steagall Act) and 1935[3].

Simply put, the CBDC proposal could provide the conditions for a revival of the Chicago Plan. A narrower banking sector, however, does not entail a strict prohibition of fractional reserve banking. In that sense, a narrow banking system (following the introduction of a CBDC) rather resembles James Tobin's watered-down FRB proposal. To reduce the need for deposit insurance, Tobin (1985, 1987) argued that the government should create what he called a "deposited currency". That currency would function according to the FRB principle and would be deposited in accounts with the central bank. At the same time, however, commercial banks would still be allowed to raise deposits of their own and to turn these into new loans. In other words, only a fraction of demand deposits would function according to the FRB principle, the size of which would be determined by the market.

(1) Extensive overviews of the literature on and history of full reserve banking proposals can be found in Bossone (2001), Lainà (2015) and Goodhart and Jensen (2015).
(2) According to Phillips (1992), Ricardo's plan served as a guideline for the US Bank Charter Act of 1844, which prohibited private money creation in the form of banknotes.
(3) Instead of preventing any form of private money creation, the Banking Acts separated commercial and investment banking, provided deposit insurance and improved government's control over monetary policy.

Impaired lending : safer financial system but with a structural brake on economic activity

The likelihood of this optimistic scenario depends on banks' actual willingness but also on their ability to raise the vast bulk of their funds from equity and long-term debt. Opinions differ on this. Deposits are often regarded as a cheap and reliable source of funding and therefore argued to be preferred by banks relative to alternative sources of funding. Defenders of the so-called

Modigliani-Miller (1958) theorem, on the other hand, would argue that this presumption is false. The fact that equity funding appears today as more expensive relative to deposits cannot be seen in isolation from banks' current funding structure (see, for instance, Cochrane, 2014). Indeed, the more a firm's assets are equity-funded, the more any potential losses can be spread over a greater number of shareholders, and the cheaper the average unit of capital becomes. However, market imperfections should not be disregarded : even if banks were willing to seek alternative funding, there is no guarantee that they would actually succeed. Households, for instance, might be reluctant to hold illiquid, non-deposit types of bank liabilities if they consider the practice of maturity transformation a means to solve informational asymmetries – concerning the riskiness of banks' assets and their loans, in particular (Diamond and Rajan, 2001). The argument goes that the risk of a run inherent in maturity transformation exerts a disciplinary effect on banks that discourages them from engaging in irresponsible lending.

All this implies that, instead of just narrowing the banking sector, a widespread substitution of bank deposits by CBDC might also impair banks' funding sources (chart 2b). Such an outcome would tighten the credit market, or at least increase lending rates, thereby likely putting a drag on investment and economic activity. After all, households as well as many small and young firms depend on the banking sector to satisfy their credit needs, since they barely have access to capital markets. In this second hypothetical scenario, the competition provided by CBDCs to bank deposits could come at the cost of a structural decline in economic activity due to tight credit supply.

Inflated central bank balance sheet : safer financial system but with a threat to central bank independence

It remains a question for discussion whether the central bank should step in to preserve the downward pressure on bank credit availability which CBDC may cause. It could do that as a provider of alternative bank funding (e.g. by stepping up its refinancing operations) or even by directly providing credit to the non-bank sector (chart 2c). In either case, the central bank balance sheet could be severely expanded – depending on the degree of competition that a CBDC might represent to bank deposits. Proponents might argue that such an expansion could induce significant seigniorage gains for the government [(1)]. Moreover, by expanding its balance sheets, the central bank would obtain greater discretion over broad financial conditions, allowing it to better safeguard macroeconomic stability. Critical voices, by contrast, might argue that an inflated central bank balance sheet threatens central bank independence, thereby damaging trust in the commitment of the central bank to its stated objectives. In fact, by expanding its assets to such large extent, the central bank could challenge the boundaries of its mandate by acting not only as a guardian of price stability, but also by playing an increasing role in allocating resources. Doing so might provoke both political and public protest, as such policies with clear distributional aspects pertain to elected politicians in democratic societies.

Impaired financial stability : increased risk of bank runs, volatile credit supply and a rise in shadow banking

The analysis so far shows that, by curbing fractional reserve banking, a substitution of bank deposits by CBDC could strengthen financial and macroeconomic stability but it could also weigh on growth prospects if it compromised bank lending activity. Moreover, there is also reason for concern that draining deposits from commercial banks might impose a threat to financial stability, hampering, rather than supporting, monetary policy transmission.

First, even if banks were both willing and able to attract alternative funding, the adoption of a CBDC could make credit supply more volatile. In fact, by offering the economy an additional and very easily accessible safe asset, a CBDC might facilitate flights to safety (as discussed by Broadbent, 2016, and Dommerholt and Van Tilburg, 2016) [(2)]. One would thus be likely to see resources flowing out of commercial banks during times of financial stress, and back towards them when risk aversion is low. In such an environment, the central bank would be forced more – rather than less – often to take up its role as lender of last resort.

Second, the de-funding risks of banks associated with a CBDC might push the private sector into shadow banking activities. This would specifically be the case when maturity transformation is considered as a necessary feature of a market economy (for instance, as discussed above, to discipline bank behaviour). More specifically, in this case, one could expect to find financial intermediaries developing so-called near-money instruments as alternative liquid sources of funding (see, for instance, Goodhart and Jensen, 2015). Such practice would mitigate any negative impact on

(1) Such seigniorage gains would in fact present a transfer of seigniorage income from the private to the public sector, addressing the claim of full-reserve-banking advocates that money creation should be a state monopoly (see, for instance, Goodhart and Jensen, 2015, and the references therein for a discussion of this claim).

(2) See also Goodhart (1987 and 1993) for an earlier discussion of this argument in the context of full reserve banking.

lending activity, but it would also lack the benefits of prudential supervision, thereby increasing risks to financial stability.

Conclusion

Technological innovations have opened the door to the development of cash-like instruments that permit electronic transactions, much like deposits but without the involvement of financial intermediaries to settle the transaction, similar to cash. Combining the best of two worlds, these so-called digital currencies could provide significant competition for traditional monetary instruments. Such competition would present monetary policy with challenges but also with opportunities.

Digital currencies have so far been issued by private players. Such private initiatives have been closely monitored as they carry the risk of impairing monetary policy transmission if they were to become generally accepted as a valuable monetary instrument not only serving as a medium of exchange but also as a store of value and a unit of account. For instance, by substituting for regular money, such as banknotes and transferable deposits, widely adopted private digital currencies could significantly reduce a central bank's control over monetary conditions. This would not only restrict a central bank's ability to steer interest rates, but also its capacity to act as a lender of last resort. Such monetary policy risks are likely to be limited, however, as there are reasons to doubt that privately issued digital currencies would ever become widespread: not only does the current high volatility of such currencies' exchange rates stand in the way of that happening, they also lack fundamental value as long as authorities do not grant them regulatory status.

Digital currencies do not just present monetary policy with challenges. In fact, the technology underlying private digital currencies is increasingly studied for possible application in the issuing of a digital cash substitute by central banks – a so-called central bank digital currency (CBDC). One promising opportunity for monetary policy is that a CBDC could help relax the effective lower bound constraint on nominal interest rates, which could promote macroeconomic stability. It remains uncertain, however, to what extent and in what direction a sovereign digital currency would impact the banking sector and financial stability. On the one hand, by providing competition for bank deposits, the adoption of a CBDC could limit the practice of fractional reserve banking, thereby strengthening financial stability. On the other, too widespread a substitution of bank deposits by CBDC could lead to a significant de-funding of the banking sector, with negative spillover effects on credit creation and economic activity. Moreover, by offering the economy an additional and very easily accessible safe asset, a CBDC might act as a vehicle for digital bank runs, undermining – rather than promoting – financial stability and the effectiveness of monetary policy. More research should hence be devoted to better understanding and assessing the opportunities and risks associated with the possibility of issuing a sovereign digital currency. Only then can balanced policy decisions be made.

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Services inflation : The Belgian exception

J. Jonckheere
H. Zimmer

Introduction

At the request of the Minister of the Economy, a joint survey of services sector inflation was conducted by the FPS Economy (Price Observatory and Directorate General Statistics – Statistics Belgium), the National Bank of Belgium and the Federal Planning Bureau, under the aegis of the National Accounts Institute.

During periods of widening inflation differentials between Belgium and its three main neighbouring countries (France, Germany and the Netherlands), energy prices were often the cause of the higher inflation rates in Belgium. In 2015 and 2016, Belgium diverged again but this time the size of the inflation gap was attributable to services prices.

This article sets out the main findings of the report submitted to the Minister and published on 7 March 2017, going into certain aspects in more detail. The article is structured as follows: the first section assesses the extent of total inflation and services inflation rates in Belgium, comparing them with those in the three main neighbouring countries. The second part focuses on the breakdown of services sector inflation in order to identify the sub-components of services that have contributed the most to the inflation gap between Belgium and the three main neighbouring countries. The third "transversal" part examines various mainly cyclical and institutional factors (regulated prices, market functioning, etc.). Finally, the fourth and last part of the article sums up the detailed analysis of the "restaurants and cafés" and "telecommunications" branches conducted by the FPS Economy – i.e. the categories accounting for most of the inflation gap in services between Belgium and the three main neighbouring countries in recent years.

1. Inflation in Belgium and in the three main neighbouring countries

Inflation gaps between Belgium and the three main neighbouring countries – like inflation gaps between the other euro area countries, generally speaking – are nothing new and nothing exceptional. They have already been subjected to analysis by the Bank [1].

The average of the three main neighbouring countries is calculated via weighting, i.e. taking account of the weight of each country in the harmonised index of consumer prices (HICP), based on the final consumption expenditure of households taken from the national accounts [2].

Between 1998 and 2016 (i.e. the longest period available for calculating the inflation rate in the three main neighbouring countries on an aggregate basis), total inflation in Belgium averaged 1.9 %, with a standard deviation of 1.2 percentage points. In the three main neighbouring countries it averaged 1.5 % (1.4 % in Germany, 1.5 % in France and 1.9 % in the Netherlands) with a smaller standard deviation of around 0.8 point (0.9 point in Germany and France, but 1.3 points in the Netherlands).

During periods of widening inflation gaps (2000, 2008, 2010 and 2011), energy prices were often the cause of the higher inflation rates in Belgium. Following a period in which inflation rates were relatively similar (broadly speaking from mid-2012 to mid-2015), Belgium again diverged from its neighbours, but this time the size of the inflation gap was attributable to services prices.

(1) See for example Aucremanne *et al.* (2010).
(2) The relative weights of the three countries in the group in 2016 were 52 % for Germany, 39 % for France and almost 10 % for the Netherlands.

TABLE 1 HISTORICAL TREND AND VARIABILITY OF INFLATION RATES

	Annual average growth rate 1998-2016 (year-on-year change in the price index, in %)		Standard deviation January 1998-December 2016 [1]	
	Belgium	Three main neighbouring countries	Belgium	Three main neighbouring countries
Total	**1.9**	**1.5**	**1.2**	**0.8**
Services	2.1	1.7	0.5	0.5
Energy	2.7	2.9	10.1	6.4

Source: EC.
(1) On the basis of the year-on-year change in the monthly index.

In Belgium, the relative importance of the components making the biggest contribution to inflation has varied over time. However, (since the HICP index became available) services have always driven up inflation. For one thing, of the five main categories of goods and services making up the standard consumption basket, services have the highest weight. Moreover, that weight has steadily increased, representing 42.4 % in 2016 (compared to 31.2 % in 1998). Also, at no time during the period considered was there a year-on-year fall in services prices, and the inflation rate in services is much less variable than in other categories of the price index.

Over the period from 1998 to 2016, the annual average inflation rate in services in Belgium came to 2.1 %, or 0.4 percentage point higher than the average in the three main neighbouring countries. Moreover, prices in this category display low volatility (historical standard deviation of 0.5 percentage point, in line with the average for neighbouring countries). In the detailed picture per country, the Netherlands stands out with an average inflation rate in services of 2.4 % and a standard deviation that is bigger than elsewhere, at 1.2 percentage points.

In 2015 and 2016, the latest period with a widening differential between Belgium and the three main neighbouring countries, the inflation gap in services averaged 1.2 percentage points.

Inevitably, these findings require supplementary analysis in order to understand the low level of inflation in neighbouring countries and in the euro area. Although some of the factors are examined here, such a detailed study is beyond the scope of this article [1].

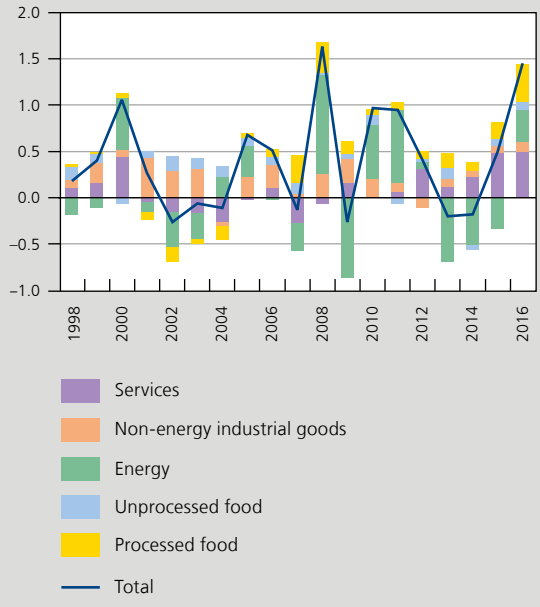
(1) Conversely, the Bank took part in a working group studying the causes of the low inflation in the euro area. See Ciccarelli and Osbat (2017).

2. Breakdown of the inflation gap in services

Calculation of the contribution of the goods and services categories composing the price index on the basis of their weightings reveals the ones that have the most influence on the inflation gap between Belgium and the neighbouring countries. In this regard, it should be noted that the share of services in Belgium's consumption basket is similar to the figure in the neighbouring countries,

CHART 1 BREAKDOWN OF THE INFLATION GAP BETWEEN BELGIUM AND THE THREE MAIN NEIGHBOURING COUNTRIES

(contribution in percentage points)



Source: EC.

and was in 2016, i.e. 42 %, even slightly lower (44 % in France, 45 % in the Netherlands and 46 % in Germany).

Since 2009, services have systematically made a positive contribution to the inflation gap, though without – in conjunction with food and non-energy industrial goods – always offsetting the sometimes strongly negative contributions made by energy. The inflation gap between Belgium and the three neighbouring countries was in fact negative in 2009, 2013 and 2014. In 2010, services made a very small positive contribution. In that year, services inflation in Belgium had been fairly weak from a historical perspective (averaging 1.4 % over the year), essentially owing to a fall in telecommunications prices which began at the end of 2009 (1).

Over the period 2009-2016, average annual services inflation came to 2.2 % in Belgium, against 1.4 % in the neighbouring countries.

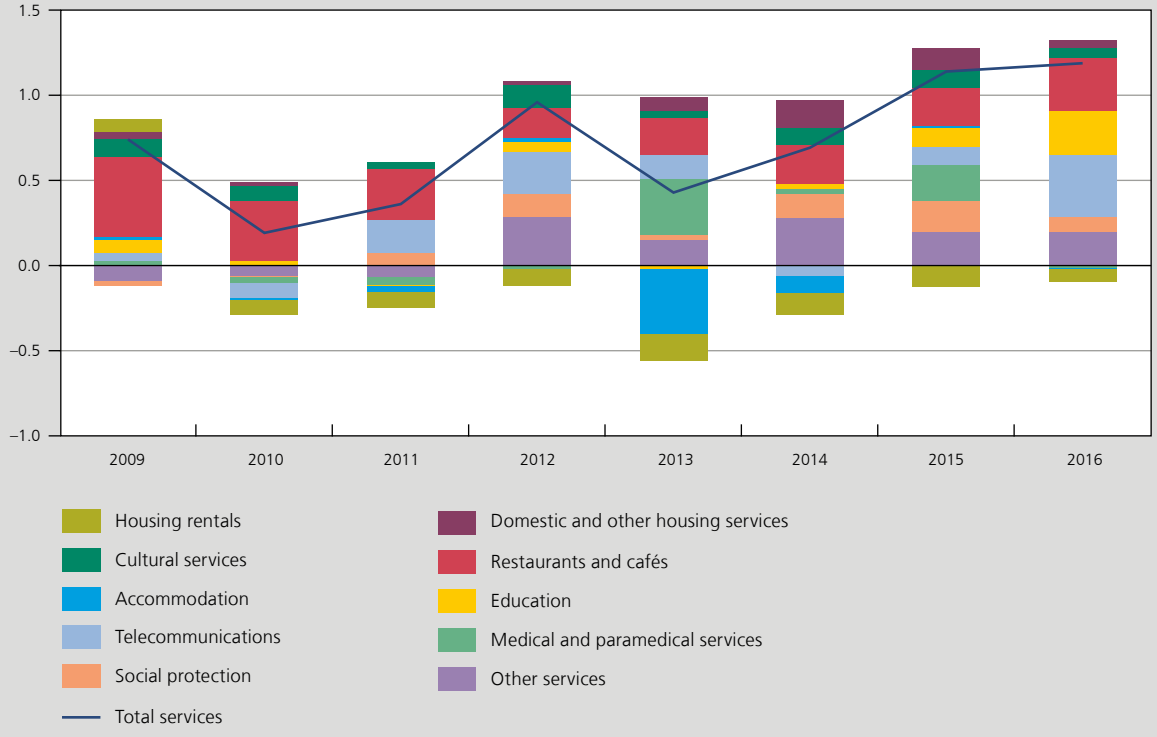
To identify the factors behind the services sector's substantial contribution to the inflation gap in recent years, services are broken down in more detail, giving nine main categories and one residual category comprising "other services". It is evident that, in every year, the "restaurants and cafés" component made a positive contribution to the inflation gap in services between Belgium and the neighbouring countries (between 0.2 and 0.5 of a percentage point, depending on the year). The "telecommunications" component made a substantial positive contribution in 2011, 2012 and 2016 (between 0.2 and 0.4 of a percentage point).

In 2013 and in 2015, medical and paramedical services were an important factor in the services inflation gap (0.3 and 0.2 of a percentage point respectively). That is due to two specific events. January 2013 saw the abolition of a special medical fee in Germany (the *Praxisgebühr*, consisting of a quarterly € 10 payment per insured person towards the funding of sickness insurance). Abolition of that fee significantly reduced the inflation rate in medical services in Germany, and hence the average inflation rate of that component for the

(1) The decline in mobile telephone tariffs resulted from the significant price reduction offered by one of the major mobile telephony operators in November 2009.

CHART 2 BREAKDOWN OF THE INFLATION GAP IN SERVICES BETWEEN BELGIUM AND THE THREE MAIN NEIGHBOURING COUNTRIES

(in percentage points)



Sources: EC, FPS Economy.

average of the three neighbouring countries (taking account of Germany's weight), thus having an adverse impact on the inflation gap for Belgium in 2013. In 2015, the contribution of medical services to the inflation gap was due to a Belgian measure: harmonisation of the user charge for specialist consultations, which on average had the effect of increasing fees for medical services.

The "education" component stood out in 2016 on account of the steep rise in higher education registration fees in the Flemish Community, introduced in October 2015[1], causing a jump in services inflation. In 2016, this measure contributed 0.3 of a percentage point to the inflation gap in services between Belgium and the neighbouring countries. We shall come back to that later in this article.

In the case of "restaurants and cafés" and "telecommunications", it is not possible to identify any specific event and we need to examine more structural factors, which will be analysed later[2].

3. Factors explaining the continuing high inflation in services in Belgium

This part begins by illustrating the link between services inflation and the business cycle. The special character of the recent period is examined from various angles, including the importance of the regulations governing certain services prices. As that does not entirely account for the inflation gap in services between Belgium and the other countries analysed, certain aspects concerning how the market functions will be examined, such as the degree of regulation, the level of profitability and a set of aggregate measures of concentration in the "horizontal" screening of the services branches.

3.1 Link between services inflation and the business cycle

In the services sector, unit labour costs represent a larger proportion of the production costs – and hence of the price formation process – than in industry. Calculations based on the 2010 input-output tables show that labour costs in the sector make up 34 % of the total production cost, whereas in manufacturing industry the figure is just 13 %. In non-market services, labour costs actually account for over half of the total production costs, compared to 28 % in market services.

In recent years, wage restraint has influenced the rise in labour costs in all branches of activity. As regards the business sector as a whole, unit labour costs were rising at an annual average rate of 1.3 % between 1997 and 2008, compared to 0.4 % between 2009 and 2016. In market services, the figures were 2.3 % and 1.1 % respectively. While the pace has clearly slackened, the average annual growth rate has remained significantly higher in services. That difference is due to a considerably weaker increase in productivity.

However, the slower growth of labour costs does not appear to have been passed on in services prices, although account must be taken of a certain time lapse between wage adjustments and any price changes.

In fact, since 2014, other factors appear to have blurred the link between the business cycle and the prices charged in the service branches. To formalise that theoretical link, we model Phillips curves which reflect the relationship between various macroeconomic cyclical variables and prices[3].

In each instance, services inflation is estimated on the basis of a model featuring a combination of three macroeconomic variables taken from a total of twelve variables[4]. The resulting conditional forecasts of services inflation from 2012 – i.e. the year when services inflation in Belgium began to diverge again from the rate in the neighbouring countries and in the euro area – indicate that, since the end of 2014, the actual inflation seen in the Belgian services sector has considerably exceeded the forecasts based on the macroeconomic context. The determinants which explained a major part of the services inflation in the past have therefore lost their predictive capability in the meantime. That conclusion is also valid if the conditional forecast begins in 2009, at the start of the wage moderation phase. Factors other than the macroeconomic context have therefore triggered a particularly sharp acceleration of services inflation in recent years: those factors include a range of government measures. The next section will examine that point in more detail.

The inflation gap in services between Belgium and the three neighbouring countries is not attributable solely to the "excessive" price rises recorded in Belgium. In fact, a similar analysis conducted for the neighbouring countries suggests that actual services inflation there

(1) Registration fees went up by € 270, to € 890.

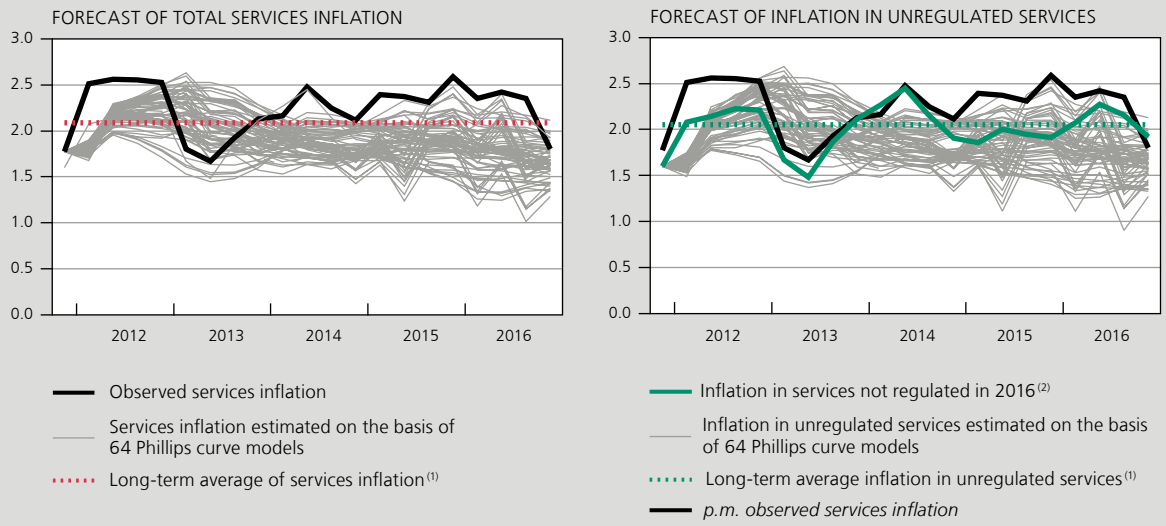
(2) In view of the size of their contribution to the inflation gap in services between Belgium and the three main neighbouring countries, these branches of activity were analysed in depth by the FPS Economy in the report to the Minister.

(3) The Phillips curve is a macroeconomic model that generally describes an inverse relationship between the unemployment rate and inflation. In this case, other than the unemployment rate, more cyclical variables were added, such as real GDP, unit labour costs, competitors' import prices, oil prices, etc.

(4) The variables are unit labour costs (which, apart from hourly labour costs, also take account of productivity) in the service branches, real GDP, import prices of competitors inside and outside the euro area, past services inflation, oil prices, the unemployment rate, investment by volume, the interest rate for non-financial corporations, and from the narrow to the broad money supply.
The data relate to the period from the first quarter of 1998 to the last quarter of 2016. In all, 64 combinations were estimated.

CHART 3 FORECAST OF SERVICES INFLATION IN BELGIUM ON THE BASIS OF MACROECONOMIC VARIABLES

(year-on-year change, in %)



Sources: EC, ECB, NBB.

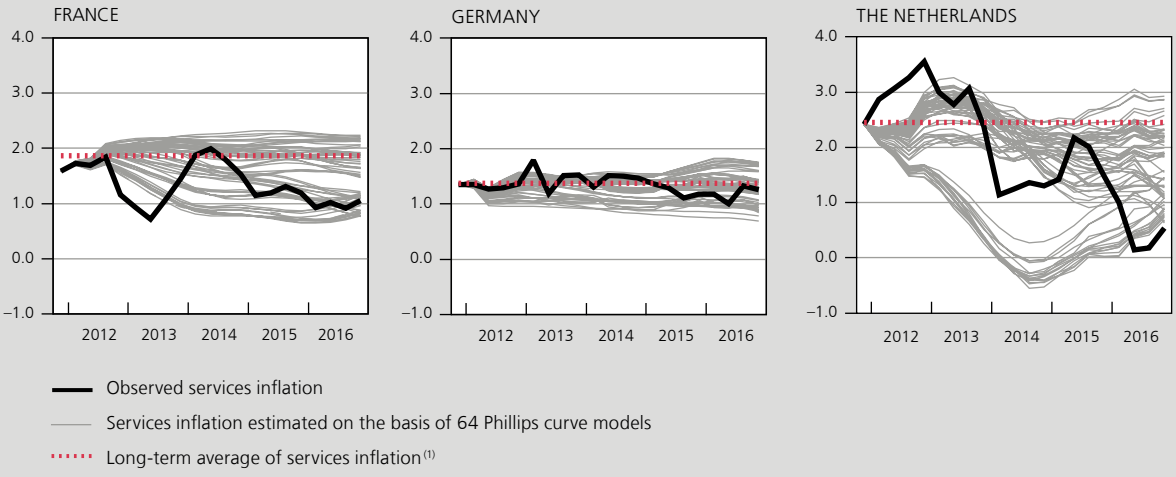
(1) Average year-on-year increase in prices over the period 1998-2016.

(2) Inflation in services excluding regulated services according to the Eurostat definition in 2016.

has been rather low recently, compared to the forecasts based on Phillips curves, especially in the past few years. That is the case in France from the end of 2014 and in the Netherlands from 2016, where the downward trend in services inflation is not (entirely) explained by the usual macroeconomic determinants.

CHART 4 FORECAST OF SERVICES INFLATION IN THE THREE MAIN NEIGHBOURING COUNTRIES ON THE BASIS OF MACROECONOMIC VARIABLES

(year-on-year change, in %)



Sources: EC, ECB, NBB.

(1) Average year-on-year inflation over the period 1998-2016.

3.2 Government measures affecting services prices

If the government decides to implement a (parafiscal) measure or to influence or (partially) determine the prices of goods or services, that has an impact on final consumption prices and hence on the consumer price index. Prices of certain services may be subject to government regulation.

First, the government – at federal, regional or local level – may influence or even fix prices directly. For instance, in October 2015 there was a sharp rise in services inflation following the increase in higher education registration fees in the Flemish Community. Prices of certain service categories, such as waste water and household refuse collection, are also fixed by the government, i.e. by the local authorities. This form of regulation has had a major impact on services inflation in Belgium.

On the basis of a list obtained from the national statistical institutes, Eurostat publishes an "administered prices indicator" covering the goods and services which are either largely regulated or fully regulated [1], i.e. their price is (partly) determined by the federal and regional authorities. In the remainder of this article, services will be referred to as "regulated" or "unregulated" according to whether or not they are on the Eurostat list of administered prices. According to this Eurostat indicator, regulated services represented 28 % of the total basket of services in Belgium in 2016, compared to 26 %, 22 % and 42 % respectively in Germany, France and the Netherlands [2].

(1) It should be noted that the Eurostat list is therefore not confined to services but also includes certain non-energy industrial goods, food products and energy. For the purposes of this article, only regulated services are taken into account.

(2) Since 2016, regulated services in the Netherlands have included "telephone and telefax equipment and services" (COICOP 08.2/3). This group, with a considerable weight of 8 % in the basket of services in the Netherlands, was not considered to be regulated in the other countries in 2016. This category was considered to be regulated in Belgium until 2005, and in Germany until 2006.

TABLE 2 SERVICES SUBJECT TO PRICE REGULATION

	Weight, in % of services, in 2016	Services for which prices are government-regulated, according to Eurostat, in 2016 (28 % of services)	Services for which prices are indexed, according to the NBB and FPS economy (24 % of services)
Rents	14.5		X
Household refuse collection	1.0	X	
Waste water collection	1.1	X	
Medical and paramedical services	2.9	X	
Dental services	1.0	X	
Hospital services	8.9	X	
Vehicle testing	0.2		X
Road tax	0.0		X
Passenger transport by rail	1.2	X	X
Passenger transport by road	1.1	X	
Passenger transport by bus or coach	0.9	X	X
Passenger transport by taxi	0.2	X	
Postal services	0.2	X	X
Education	1.5	X	X
Social protection	5.3	X	
Retirement homes	3.6	X	X
Home insurance	0.8		X
Health insurance	2.6	X	
Other services	1.5	X	
Notaries' fees	0.5	X	X

Sources: EC, FPS Economy, NBB.

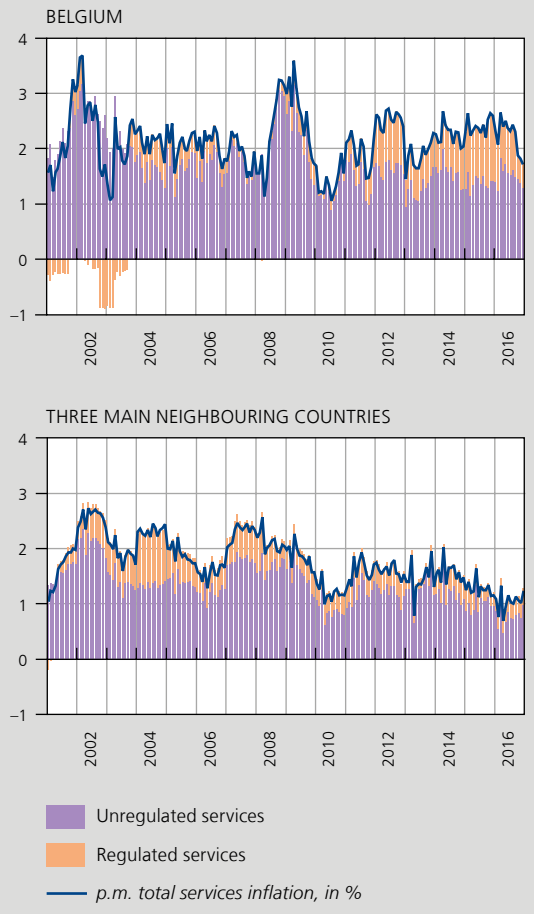
Next, there is also a more indirect form of services price regulation, applicable mainly to public services, namely the option of formalised automatic price indexation. That form of regulation will be examined in detail later in the article.

Direct form of regulation influencing services inflation

Before 2012, apart from a few exceptions, inflation in regulated services was consistently higher in the three neighbouring countries than in Belgium. Since 2012, the opposite has been the case: price rises for regulated services have accelerated in Belgium, whereas they have slowed down, on average, in the three main neighbouring countries.

CHART 5 CONTRIBUTION OF REGULATED AND UNREGULATED SERVICES TO TOTAL SERVICES INFLATION IN BELGIUM AND IN THE THREE MAIN NEIGHBOURING COUNTRIES

(in percentage points, unless otherwise stated)



Sources: EC, NBB.

In 2001, regulated services made a negative contribution to total services inflation in Belgium, partly as a result of the substantial reduction in telephony tariffs (a category considered regulated up to 2005) in October 2000 (1).

In 2002 and 2003, regulated services also made a negative contribution to services inflation which was due mainly to the abolition of the radio and television licence fee in Flanders and Brussels, and the 30 % reduction in that fee in Wallonia.

It was decided to impose 21 % VAT on notaries' services with effect from 1 January 2012. That move was part of the fiscal measures aimed at increasing certain indirect taxes (2), adopted in 2012 in the wake of an EU Directive obliging the Member States to impose VAT on certain services.

Since 2015, the contribution of regulated services to total services inflation has increased again, mainly as a result of the price rises in the categories "waste water collection", "household refuse collection", "medical services", "hospital services", "social protection" and "education". In October 2016, inflation in regulated services declined sharply, owing to a base effect, as the previous year's increase in higher education registration fees in the Flemish Community ceased to have an impact on year-on-year inflation.

It should be noted that the increase in services inflation resulting from government measures led to an acceleration in the health index, and hence in the smoothed health index (3) forming the basis of wage indexation. Some firms can pass on this rise in labour costs in their final selling prices. Consequently, government measures may generate second-round effects, and the price-wage spiral may damage Belgium's competitiveness. Other firms which are more exposed to competition find it harder to pass on these pay increases in their final selling prices, so that their profit margins shrink.

Since 2012, the "social protection" category has also made a substantial contribution to services inflation (averaging 0.2 of a percentage point a year). That is attributable mainly to retirement homes (which represented 69 % of the category in 2016), but also nurseries (28 %) and home care services (3 %). Price increases in this sector beyond those resulting from indexation based

(1) In recent years, the price cuts in this category have often led to a negative contribution to total inflation (except in 2015-2016), but that was no longer apparent in regulated services.

(2) Another measure concerned increasing the rate of VAT on cable television subscriptions from 12 % to 21 %, but this only affected inflation in the cultural services category (COICOP 09.4.2), which ceased to be included in regulated services in 2006. The effect of the 2012 measure is therefore not apparent in this chart.

(3) The health index is calculated on the basis of the national consumer price index excluding products deemed harmful to health, namely alcohol, tobacco and road fuel. The smoothed health index was redefined by the Law of 23 April 2015 on employment promotion (*Moniteur belge/Belgisch Staatsblad* of 27/04/2015).

on the national consumer price index (NCPI) have to be approved by the regional governments[1]. It was mainly in 2015 that prices went up significantly, contributing 0.3 percentage point to service inflation, primarily in the "retirement homes" category. It should be noted that this category[2] helped to drive up inflation in regulated services, but the price adjustments were initiated by the service providers and were merely approved by the government.

Over the period from 2012 to 2016, inflation in regulated services according to the Eurostat definition averaged 2.9 % in Belgium, compared to just 1.4 % in the neighbouring countries. Regulated services contributed 0.8 percentage point to the average services inflation, which came to 2.3 %. In the preceding period, from 2001 to 2011, services inflation averaged 2.1 %, and regulated services contributed only 0.1 percentage point to that figure. The difference between these two periods is therefore considerable. In the neighbouring countries, over the period from 2012 to 2016, regulated services contributed 0.3 percentage point, on average, to total services inflation, which averaged 1.4 % : from 2001 to 2011, they contributed 0.5 percentage point to the services inflation figure of 1.9 %.

If we estimate inflation in unregulated services in 2016 on the basis of macroeconomic variables in a Phillips curve setting, the observed inflation in those services is more similar to the estimates than the observed inflation for total services (see chart 3). However, since 2014, most specifications still generate estimates which are lower than inflation in unregulated services, particularly in 2014 and 2016. Inflation in unregulated services in Belgium appears to hover constantly around 2 %.

Indirect form of regulation with an impact on services inflation

Wage-setting in Belgium features automatic indexation. This mechanism allows wages to be adjusted relatively quickly and automatically to price rises : as a result, firms are confronted by higher production costs. That may lead them to raise their selling prices, thus creating a price-wage spiral. It is primarily in firms operating in the services sector, where wages account for a substantial share of production costs and where some firms are less exposed to competition, that upward pressure on prices may ensue if firms wish to preserve their profit margins. However, wage indexation is not the sole source of price changes resulting from the link to an index.

There is in fact a second – indirect – form of price regulation : the prices of certain services track the movement in an index. This mechanism is generally specified in a management contract. In the case of services regarded as index-linked, prices are linked in one way or another, once or several times a year, generally at fixed times, to the NCPI (e.g. bus fares in Flanders and Wallonia), the health index (e.g. train fares and rents) or the ABEX (e.g. notaries' fees and fire insurance) : this last index reflects the movement in construction costs. All other things being equal, that results in an additional automatic source of inflation owing to indexation rules, thus

(1) In regard to nurseries, this statement needs to be qualified : private nurseries are entirely free to set their own prices.

(2) In this connection, it should be noted that the weight of the retirement homes category is negligible in the NCPI in comparison with the HICP (1.1 against 15.4 ‰) and the same therefore applies to its influence on wage indexation. The divergence of the relative weights may be due to the use of a different primary source to determine those weights in the NCPI and the HICP (the household budget survey and the national accounts respectively). Following the Eurostat recommendations, institutional households are, by definition, excluded from the household budget survey and hence from the NCPI weighting scheme, whereas they are included in the national accounts and hence in the HICP weighting scheme in accordance with the European regulations.

TABLE 3 AVERAGE ANNUAL INFLATION IN REGULATED AND UNREGULATED SERVICES IN BELGIUM AND IN THE THREE MAIN NEIGHBOURING COUNTRIES, AND CONTRIBUTION TO TOTAL SERVICES INFLATION

(in % and percentage points respectively)

	Belgium		Three main neighbouring countries	
	2001-2011	2012-2016	2001-2011	2012-2016
Inflation in unregulated services	2.5	2.0	1.9	1.4
Inflation in regulated services	1.0	2.9	2.1	1.4
Contribution of unregulated services to services inflation	1.9	1.5	1.5	1.1
Contribution of regulated services to services inflation	0.1	0.8	0.5	0.3
Average services inflation (in %)	**2.1**	**2.3**	**1.9**	**1.4**

Sources : EC, NBB.

reinforcing the price-wage spiral effect. Consequently, the pricing does not necessarily reflect the operating expenses of these service providers (labour costs, commodity prices, etc.) that dictate the price charged by firms exposed to competition. These mechanisms also form a source of inflation persistence. However, they need to be qualified slightly. Price increases based on indexation are hardly ever applied purely mechanically: in most cases, indexation is only one of the factors determining the price.

Owing to the heavy weighting of the "rents" category – 14.5 % of services in Belgium in 2016 – and since the indexation of rents is clearly defined in legislation, it was decided to examine rents separately here. Before 2010, rent increases in Belgium outpaced the average increases in the three main neighbouring countries (2.1 compared to 1.6 %), but since then the inflation figures have been similar. Between 2010 and 2016, the average year-on-year rent increase in the neighbouring countries (1.4 %) was even slightly higher than in Belgium (1.3 %). Taking account of this category's weighting, which is considerably lower in Belgium in view of the relatively high number of owner-occupiers[1], rents make a much smaller contribution to services inflation in Belgium than in the neighbouring countries. Consequently, despite rent indexation in Belgium, this category has not disadvantaged Belgium in terms of inflation compared to the three neighbouring countries since 2010.

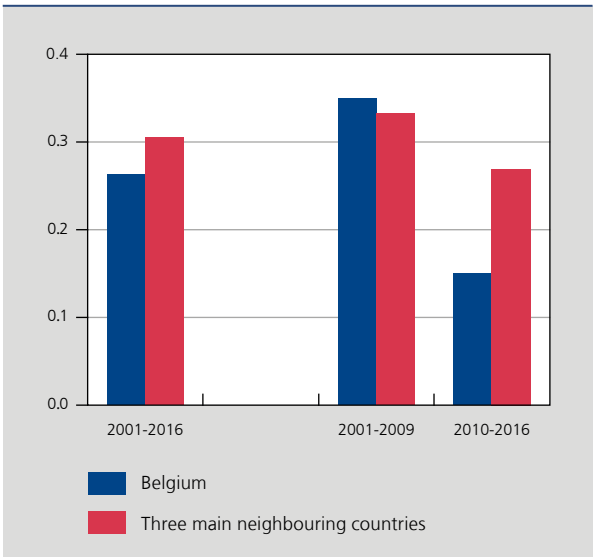
In 2016, index-linked services excluding rents (see table 2) accounted for 9 % of the basket of services. For the purpose of interpreting chart 7, the "notaries' fees" and "education" categories, where price rises peaked in 2012 and 2015 respectively, were both excluded from the index-linked services. The imposition of VAT on notaries and the steep rise in higher education registration fees in the Flemish Community resulted from one-off government decisions and are therefore not due to the indexation mechanisms.

First, despite their low weight, index-linked services have often contributed to the persistence of services inflation. In the past, the observed prices of index-linked services and prices expected on the basis of their theoretical indexation mechanism[2] often increased faster than the prices of the total services package. Next, since 2014, the observed inflation in index-linked services has differed from that expected on the basis of the NCPI, the health index and the ABEX. In other words, the actual price movements were disconnected from the theoretical indexation mechanism. For example, retirement home charges rose faster, especially in 2015, than expected on the basis of the indexation mechanism.

(1) In 2016, rents represented 15 % of the basket of services consumed in Belgium, compared to 20 % in the neighbouring countries.
(2) The theoretical indexation indicator reflects how index-linked services prices would move if they only followed their set indexation mechanism.

CHART 6 CONTRIBUTION OF RENTS TO SERVICES INFLATION IN BELGIUM AND IN THE THREE MAIN NEIGHBOURING COUNTRIES

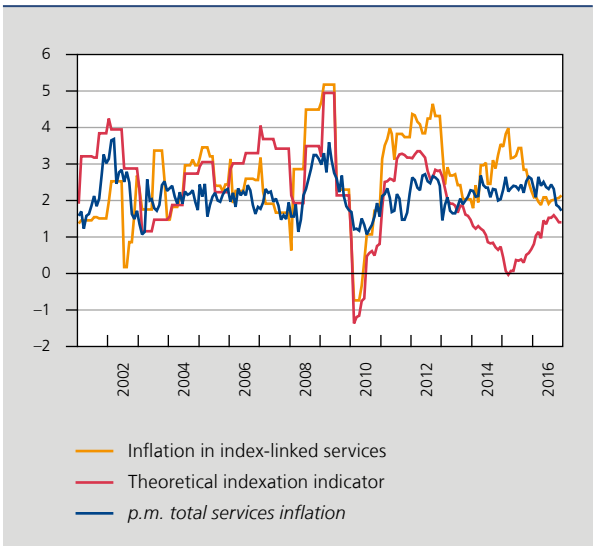
(in percentage points)



Source: EC.

CHART 7 INFLATION IN INDEX-LINKED SERVICES EXCLUDING RENTS, NOTARIES' FEES AND EDUCATION

(year-on-year change, in %)



Sources: EC, NBB.

3.3 Market functioning

The services inflation differential between Belgium and the neighbouring countries cannot be attributed entirely to government measures, so that the question arises of the competitive environment in which Belgian service companies operate. According to the theory, firms operating in highly competitive markets adjust their prices more often in response to cost and demand factors. A lack of competition and/or over-burdensome regulation could be behind excessive price increases in some services, such as telecommunications. Conversely, in the case of restaurants and cafés, competition can be considered fierce at local level, particularly in view of the large number of establishments (1 per 245 residents in Belgium, representing a greater supply than in the neighbouring countries).

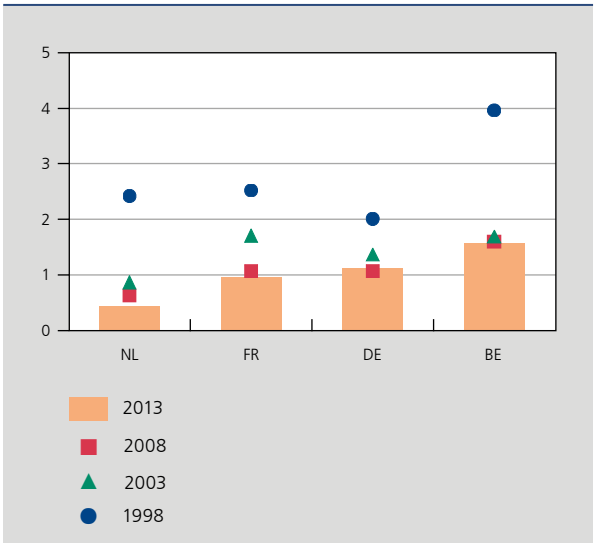
Various indicators can be used to assess market operating conditions. However, they are imperfect and should be taken as a guide for identifying problem sectors.

OECD indicators

One way of ascertaining the degree of regulation in an economy or sector is to refer to synthetic indicators such as those of the OECD. These aim to convert the main aspects of current regulations into "scores" for assessing the relative restrictiveness of the rules. Although the criteria used sometimes need refining, and the literature cannot link the indicators beyond doubt to the quality of the market's functioning, they do have the merit of permitting international comparison, and possibly comparison over time. For the network services, the main components assessed are entry regulation, the proportion of public ownership, and the market structure. Belgium has the highest index compared to the neighbouring countries for telecommunications (indicating weaker competition). Since 2003, there has been hardly any change in Belgium's score. However, according to that indicator – for which the latest data relate to 2013 – it is not possible to show any change in the regulations which might explain the recent increased inflation in telecommunications. Belgium's position is due primarily to the size of the government's shareholding, which is measured in such things by the proportion of the shares held by the government in the main telecommunications company.

CHART 8 INDICATOR OF REGULATION IN TELECOMMUNICATIONS SERVICES

(from 0 to 6, from the lowest to the highest degree of regulation)



Source: OECD.

Profit margins

Other indicators for assessing a possible lack of competition concern profit margin. At microeconomic level, that amounts to estimating profitability in the branches of activity. For that purpose, the annual accounts of firms are the most direct source. In order to try to understand the inflation differentials between Belgium and the neighbouring countries, we use the BACH (Bank for the Accounts of Companies Harmonised) database[1]. Since the coverage is more limited for the neighbouring countries than for Belgium, comparisons between countries and over time need to be interpreted with caution.

The ratio between the net operating results and the turnover (also known as the net sales margin) expresses the commercial performance of an activity unit, independently of financial, exceptional and fiscal elements. The branches analysed correspond roughly to the market services mentioned earlier: hotels, restaurants and cafés[2], information and communication[3].

The hotels and catering branch features very low net margins which are usually below the average for the economy, at around 2.5 % in Belgium. Conversely, the information and communication branch has relatively high profitability averaging around 9 % over the period 2000-2014 in Belgium. Profitability remained fairly stable for a number of years (from 2004 to 2012). That was not the case in France and Germany.

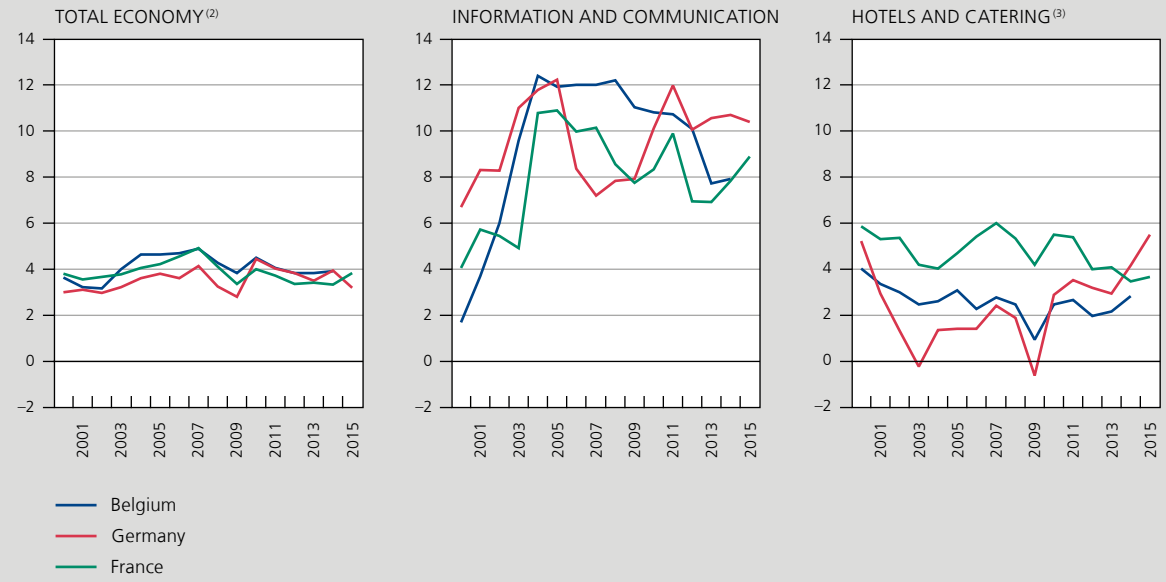
(1) As far as we know, this is the only databank available to the public free of charge. It currently covers ten European countries, including Belgium, Germany and France. However, the data are aggregated and available at the NACE 2-digit level over the period 2000-2014 (sometimes 2015). The proportion of firms covered varies greatly from one country to another: almost 100 % of firms filing annual accounts in Belgium, compared to 28 % in France (but 81 % of turnover) and barely 9 % in Germany (but 70 % of turnover). The sample of firms may also vary from year to year.

(2) Details for restaurants and cafés only are not available for France.

(3) Details for telecommunications only are not available for France.

CHART 9 NET OPERATING PROFIT[1]

(in % of turnover)



Sources: BACH databank, Banque de France, Deutsche Bundesbank, ECCBSO, NBB.

(1) Ratio before tax. Data not available for the Netherlands. Data not available for Belgium in 2015.

(2) All non-financial branches of activity.

(3) We have information on the turnover figure for only a small number of firms in the hotels and catering sector (14 % in 2015). The sector consists mainly of self-employed workers who do not have to submit annual accounts. Furthermore, among the companies that have to meet the obligation, only those that submit full-format accounts are obliged to state the turnover figure. In the hotels and catering sector, 99 % of those submitting annual accounts use an abridged format.

However, high profitability is not automatically due to a lack of competition: it may also be attributable to the need to remunerate the capital in highly capital-intensive production processes, or to great efficiency in a competitive sector, leading to productivity gains which could ultimately benefit consumers.

Owing to the limitations of the indicators used so far (not only conceptual limitations but also those due to the sources used), those indicators cannot detect pricing behaviour which could be termed excessive in certain branches.

Horizontal screening of the branches

The results of the "horizontal screening" of branches of activity conducted by the Price Observatory complete this analysis. Every year, over 600 market branches of activity (NACE nomenclature at a detailed level) are subjected to horizontal screening, which can detect the branches at greater risk of market dysfunction.

The horizontal screening is based on various dimensions of market functioning concerning both the structure and the dynamics. For instance, for the analysis of the service branches, eight indicators are used[1]:

- the Herfindahl-Hirschman index (sum of the squares of the market shares of all firms in a given branch)[2];
- the number of firms;
- capital intensity (the ratio of the total capital stock to the total operating result);
- the price-cost margin (the ratio between the gross operating surplus and the turnover);
- the volatility of the market shares of various firms in the branch (which measures the market shares transferred from declining firms to expanding firms)[3];
- the churn or the attrition rate of firms (which measures the market shares of incoming and outgoing firms in the branch)[4];
- the survival rate (which assesses the proportion of firms already active in the branch for at least five years);
- the rotation rate of firms (which calculates the rotation of the eight firms with the largest turnover in a given branch between 2009 and 2013)[5].

(1) Various data sources are used: the annual accounts, VAT returns, structural surveys of firms (from the DGS).

(2) The value of the HHI is between 1/N and 1, where N is the number of firms in the branch. In the case of a monopoly, the value of HHI is 1.

(3) More specifically: $Volatility_s^t = \sum_{i \in s} \frac{|m_i^t - m_i^{t-1}|}{2}$, where m is the market share of firm i at time t (s is the sector).

(4) Or more specifically the sum of the market shares in year t-1 of firms leaving the market during year t and the market shares of firms entering the market during year t.

(5) If the branch comprises at least eight firms, the values of the indicator range between 8 (status quo, the same firms remain) and 40 (total change of firms in the "top 8").

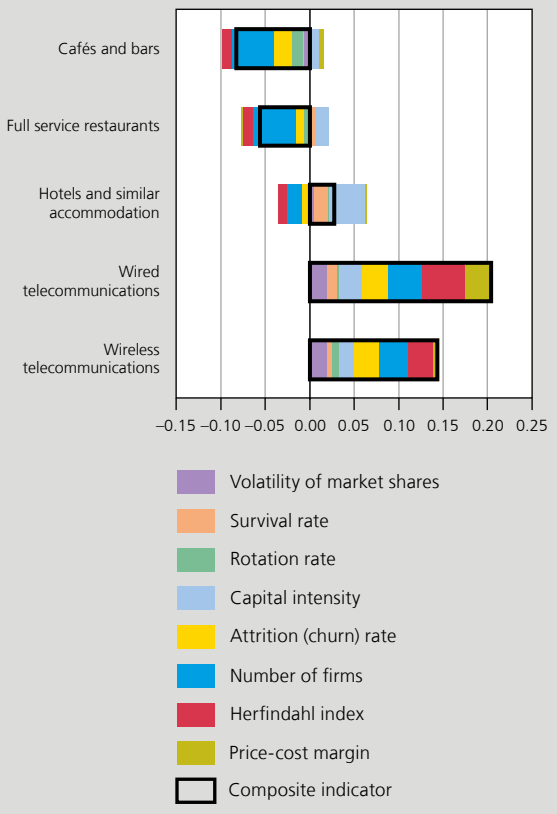
The reasons for using a particular indicator concern the increased risks of price cartels (e.g. the number of firms, the survival rate), the existence of entry barriers (such as low volatility of market shares, a low firm rotation rate) and, more generally, an environment less conducive to competition. In an attempt to be exhaustive, the indicators sometimes overlap. They are normalised (1) and aggregated to give a composite indicator of the market's functioning.

Chart 10 shows, for the main telecommunications and hotel and catering services, the contribution of each indicator to the gap between the final score for the branch and the average score for all services (outlined in black).

(1) Normalisation permits comparison of variables which may be measured on very different scales. Following normalisation, the values of each indicator range between 0 and 1, with a value close to 1 indicating a higher risk of dysfunction.

CHART 10 SCREENING OF BRANCHES OF ACTIVITY IN BELGIUM: CONTRIBUTION OF THE INDICATORS TO THE DIFFERENCE IN RELATION TO THE AVERAGE FOR SERVICES (1)

(2014)



Source: FPS Economy

(1) The contribution of each indicator corresponds to the difference between the (normalised) score of each indicator for the branch and the average score for all services. The area outlined in black indicates the difference between the composite indicator for the branch and the average of the composite indicators for services.

The indicators with a positive (negative) contribution are the ones for which the sector scores worse (better) than the average.

Wired telecommunications have a total score which is 0.2 above the average, of which 0.05 is due to the Herfindahl index (high degree of concentration of firms), 0.04 is due to the small number of firms and 0.03 respectively to the capital intensity, the attrition rate and the price-cost margin. Wireless telecommunications also record for all the indicators more problematic values than the average for services. Those branches comprise a small number of firms with a high degree of concentration and a very stable distribution of market shares. Conversely, the scores for cafés, bars and restaurants are below the average for all services, the main reason being the large number of establishments.

4. Analysis of restaurants and cafés and telecommunications

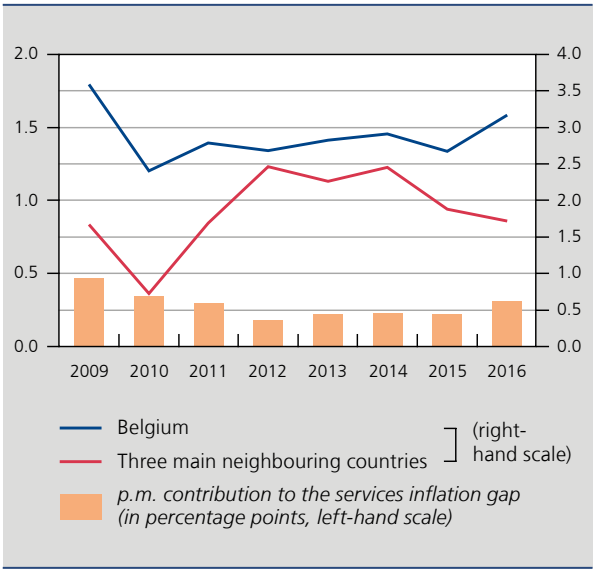
This part is based largely on the analysis conducted by the FPS Economy. First, it analyses the movement in consumer prices in restaurants and cafés and the characteristics of this branch of activity as regards supply costs and labour costs in particular. After that, it examines the detailed movement in telecommunications prices in Belgium and in the neighbouring countries, and a number of factors which may influence pricing on this market.

4.1 Restaurants and cafés

During the analysis period (2009-2016), inflation averaged 2.9 % in restaurants and cafés in Belgium and 1.9 % in the neighbouring countries. That steeper rise also had a greater impact on inflation in Belgium owing to the larger weight of restaurants and cafés in the consumption basket. In 2016, the weight of this category in services came to 15.2 % in Belgium, compared to 8.1 % in Germany, 11.6 % in France and 14.2 % in the Netherlands, or 10 % on average in the neighbouring countries. That is due not only to local consumption patterns but also to methodological differences in the determination of the weight. In Belgium, the Netherlands and France, the national accounts are the primary source used for the HICP weightings. Only Germany uses the household budget survey as the principal source, and makes an adjustment to take account of tourists' expenditure. In addition, since the rental market is larger in Germany than in the other neighbouring countries, the relative weights of all other service categories in the index are smaller in Germany.

CHART 11 PRICE MOVEMENTS IN RESTAURANTS AND CAFÉS

(year-on-year change in the price index, in %, unless otherwise stated)



Source: EC.

According to the FPS Economy, the steeper increase in prices in restaurants and cafés in Belgium between 2009 and 2016 is attributable to the adverse movement in their two main cost items, which together account for 90 % of the total costs, namely purchase costs for food and beverages, and labour costs. Between 2008 and 2016, purchase costs for restaurants and cafés increased faster in Belgium than in the neighbouring countries (by 11.7 %, compared to 11 % in the Netherlands, 8.1 % in Germany and 6.3 % in France). It also appears that unit staff costs in restaurants and cafés increased faster than in the neighbouring countries between 2008 and 2014 (1), rising by 15.9 %, compared to figures of between –0.2 % and +7 % in the neighbouring countries.

Together with the decline in consumer spending since 2008 (2), the relatively ample supply of restaurants and cafés in Belgium could have a negative influence on profit margins which, as we have already seen, are very small. Consequently, the margins cannot absorb the increase in costs, or only to a very meagre extent. Market players in the sector therefore consider that the only way to maintain profitability is to make systematic adjustments to selling prices.

Apart from purchase costs and labour costs, some government measures have also had an impact on consumer prices. For instance, excise duties on beverages have risen more steeply in Belgium than in the neighbouring countries since 2008 (except for the excise duty on beer). However, owing to the relatively low weight of alcoholic beverages in the "restaurants and cafés" category, that rise had a limited effect over the period considered as a whole. In addition, the NAI estimated the proportion of undeclared business at 15 % in the hotels and catering trade. Thus, it is assumed that the compulsory introduction of the "white box" electronic cash register in 2016 – with a system for monitoring sales and the presence of staff – is influencing consumer prices, to make up for the lost profit margins (3).

On 21 December 2015, the brewers, hotels and catering federations and the Belgian federation of beverage suppliers signed a code of conduct ending "brewery contracts". Many of those contracts specified a minimum quantity to be purchased at fixed prices (4). This new code includes a rule prohibiting brewers or beverage suppliers from imposing selling prices, among other things. They can also no longer stipulate that selling prices must be approved. This could boost competition between establishments.

4.2 Telecommunications

On average over the period 2009-2016, telecommunications prices fell by 0.8 % in Belgium, whereas the decline averaged 2.4 % in the neighbouring countries. France recorded the biggest fall, on average, at 3.3 % (compared to a 1.9 % fall in Germany and the Netherlands). The weight of telecommunications in the total index for Belgium (6.5 %) is similar to that in the three neighbouring countries (6.7 %).

While prices of mobile telephony services in Belgium fell more sharply (–7.5 %) than in the main neighbouring countries, the prices of fixed telephony services (+3.9 %), internet access (+1.1 %) and – recently – packages in particular (+6.8 % in Belgium in 2016 compared to the previous year (5)) recorded bigger increases. In the Belgian index basket, packages represented 60 % of the telecommunications category in 2016, followed by mobile telephony (21 %). The inflation gap in telecommunications between Belgium and the three main neighbouring countries in 2016 is therefore attributable primarily to package prices.

(1) Cumulative growth of unit staff costs on the basis of the EC's structural business survey; restaurants only.

(2) Between 2008 and 2014, average expenditure per household in Belgian restaurants and cafés increased by only 11.1 %, while consumer prices in restaurants and cafés rose by 18.5 % (in cumulative terms).

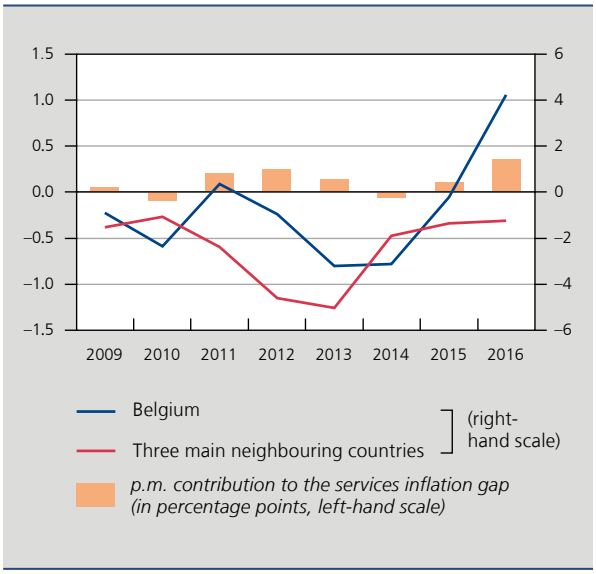
(3) This cash register was introduced in response to the measure in favour of this sector, which is susceptible to fraud, namely the reduction in VAT from 21 % to 12 % on 1 January 2010. This VAT reduction resulted in increased income for the sector, since the cut was not passed on to consumers, whereas the State's revenues declined at a time of crisis.

(4) Not only for alcohol but also for other beverages and biscuits.

(5) Packages have been included in the consumption basket since 2014 in Belgium, 2015 in Germany and the Netherlands and 2016 in France.

CHART 12 PRICE MOVEMENTS IN TELECOMMUNICATIONS

(year-on-year change in the price index, in %, unless otherwise stated)



Source: EC.

The FPS Economy and the Federal Planning Bureau estimated that telecommunications inputs come mainly from the services of the branch itself (68 % of total inputs in Belgium, compared to 65 % in the Netherlands, 56 % in France and 52 % in Germany). The cost of these telecommunications supplies was calculated using the branch's domestic value added deflator[1]: in cumulative terms, that cost fell by 32.7 % in Belgium between 2008 and 2014. That deflator declined less steeply than in France (–42.2 %) but more sharply than in Germany (–28.9 %) and especially the Netherlands (–5.9 %). The movement in input prices thus tended to be to Belgium's advantage.

Unit labour costs calculated for the telecommunications branch on the basis of the national accounts[2] have fallen by a cumulative figure of 24.2 % in Belgium since 2008. Only Germany recorded a larger fall (–30.8 %). The reduction is less marked in France, while unit labour costs in the Netherlands actually increased. Once again, the movement in costs has tended to favour Belgium.

Various characteristics specific to the telecommunications branch may have played a role in the movement in prices of those services in Belgium.

Even if inflation rates are calculated according to the European harmonised index of consumer prices (permitting comparisons between countries), there are still significant differences from one country to another in the methods of calculating the index.

Belgium and Germany record the tariffs of the most frequently consumed products per profile and per provider, for instance in terms of quantity of calls (which Eurostat considers the "A" method, i.e. the most appropriate). Belgium also takes account of migration percentages from old to new tariffs. If tariff structures change, with a new, cheaper formula meeting a particular consumer profile in the index, that tariff is taken into account and the price index in Belgium therefore declines[3]. France and the

(1) On the basis of unpublished provisional estimates by the NAI, taking account of a new series of producer prices for deflating value added in telecommunications.
(2) In the case of Belgium, based on the new, still unpublished, estimate of the value added deflator in telecommunications for obtaining the volume of value added.
(3) In that way, quality improvements are taken into account in the index.

TABLE 4 BREAKDOWN OF THE TELECOMMUNICATIONS PRICE INDEX, 2009-2016

(year-on-year change in the price index[1], in %)

	Belgium	Germany	France	Netherlands
Telecommunications[2]	–0.8	–1.9	–3.3	–1.9
Fixed telephony services	3.9	–	0.3[3]	2.7[3]
Mobile telephony services	–7.5	–	–4.9[3]	–4.1[3]
Internet access	1.1	–	0.2[3]	0.5[3]
Packages (2015-2016)[4]	6.8	–1.1	–	0.6

Sources: CBS, DGS, EC, FPS Economy, INSEE.
(1) Annual average growth over the period 2009-2016.
(2) Includes devices and services.
(3) Movement calculated on the basis of the national price index.
(4) Change between 2015 and 2016. Packages have been included in the consumption basket since 2014 in Belgium, 2015 in Germany and the Netherlands and 2016 in France.

Netherlands take the cheapest tariffs per profile and per supplier ("B" method, i.e. the method that can be used if the "A" method is not feasible), which assumes a very high degree of consumer mobility towards the cheaper options. It is therefore possible that the adverse movement in prices is attributable partly to a difference of method in calculating the index.

Next to this, it is difficult to compare the levels of tariffs for telecommunications products between countries because they often include various additional services (e.g. cloud data storage or the provision of Wi-Fi home spots). In addition, according to the service providers, the quality of the fixed networks is not the same in Belgium as in the three main neighbouring countries, and that could also account for the price differences[1].

The telecommunications sector is highly capital-intensive and requires substantial investment in capital goods in order to remain operational, innovative and competitive. Between 2013 and 2015, investment in tangible and intangible fixed assets accounted for around 20 % of the sector's total turnover in Belgium[2], while the European average was 16.6 % in 2015[3]. This high level of investment could be part of the reason for the less favourable movement in the prices of telecommunications services in Belgium, as these costs – aimed at improving the quality of the service[4] – are passed on to consumers.

There is greater competition on the mobile telephony market (where the market share of the virtual operators has risen sharply[5]). In that regard, the 2012 Law on telecommunications (concerning the internet, television, fixed telephony and mobile telephony) made numerous changes for consumers, aimed at facilitating the switch from one operator to another. The changes mainly concerned abolition of the fees payable for terminating a permanent contract or terminating a fixed-term contract after the sixth month following its entry into effect. The Belgian market in fixed telecommunications (telephony, internet and television sold as separate products) looks rather like a duopoly, with Proximus on the one hand, and the cable operators (VOO, SFR and Telenet) on the other. The opening up of the cable networks in 2016 and access to the Proximus copper network were both intended to promote competition on that market. The number of providers is particularly small for triple play packages (internet, fixed telephony and digital television). Among the leading Belgian operators[6], Proximus and Telenet are the two biggest players on the residential market for bundled services, each with a share of between 30 % and 40 % of the market in 2015.

Bundled services considerably reduce the mobility of Belgian consumers on the telecommunications market, and make it very difficult for genuine alternative operators to gain a foothold. As is evident from the low attrition rate of bundles combining three or four services (in 2014, 14 % and 3 % of households respectively cancelled their contracts), this consumer inertia could encourage the maintenance of high prices for these products, or even tariff increases. Following the liberalisation of cable in 2016 and the entry into force, in July 2017, of the new "Easy Switch" rules aimed at further stimulating customer mobility[7], competition between the leading operators could intensify, and charging practices could be revised.

Conclusions and possible recommendations

During the period 1998-2016, services inflation in Belgium averaged 2.1 %, compared to 1.7 % in the three main neighbouring countries. Since 2009, services have systematically made a positive contribution to the total inflation gap between Belgium and its three main neighbouring countries. Two categories play a decisive role in the inflation gap : restaurants and cafés, and telecommunications.

The movement in services prices can be linked to that in business activity by using the Phillips curve. Since 2014, however, services inflation in Belgium has exceeded the figures expected in the models. The wage moderation efforts of recent years seem to have had little impact on prices. Yet service production costs are largely determined by labour costs, which account for 34 %.

In recent years, regulated services, i.e. services for which the prices are determined directly or indirectly by the government, have made a substantial contribution to services

(1) However, it should be noted that the cheapest internet subscriptions in Belgium, unlike those in the other countries, have limits on usage, which is driving consumers to opt for more expensive formulas offering unlimited usage.

(2) Data from the BIPT, estimated on the basis of the eleven leading Belgian operators. The investment rates came to 19.7 % in 2013, 21.1 % in 2014 and 19.6 % in 2015 respectively.

(3) Data from the ETNO (European Telecommunications Network Operators' Association) and the BIPT.

(4) In fact, on 10 January 2017 Telenet announced an increase in tariffs for some of its services in order to fund new investment in its network and thus respond better to its customers' needs. Proximus also decided to raise the tariffs for some of its products on 1 January 2017, and at the beginning of the year announced a major investment project extending from 2017 to 2030, with the aim of accelerating the deployment of fibre optic in Belgium and hence enabling it to offer ultra-fast internet for its customers.

(5) On the mobile telephony market, Proximus is a major player with a market share of around 40 % in 2015. Its two biggest competitors are Orange and Base (with 22 % and 16 % respectively). Virtual operators (the main ones being Telenet and Lycamobile) nevertheless account for over 20 % of the market. However, in 2016 Telenet took over Base Company, so that the market share of Base Company (and hence Telenet) will be higher in the years ahead.

(6) According to the BIPT, the players currently operating on the residential market in service bundles are Proximus, Belgian Telecom, Billi, Cybernet, EDPnet, Orange Belgium, Scarlet, Schedom/Dommel, SFR, Telenet, TéléSat, TV Vlaanderen, United Telecom, and VOO.

(7) The "Easy Switch" procedure will make it easier to change to a different fixed operator so long as the consumer at least has access to the internet or a television service. Thus, it will be the new operator and not the consumer who has to deal with the switching formalities (termination of services, cancellation, etc.). Among other things, this will shorten the period for which services are interrupted and limit the risk of double charging

inflation. Since 2012, those prices have accounted for most of the inflation gap : before that, the gap was due mainly to prices in restaurants and cafés. In 2016, 93 % of the inflation gap in services between Belgium and its three main neighbouring countries was due to regulated services (38 %), telecommunications (29 %) and restaurants and cafés (26 %). The importance of the last two branches in that connection is all the more striking since their weight in the basket of services is 15.2 % and 6.5 % respectively, compared to 28 % for regulated services.

Prices of certain services are indexed on the basis of different indices, namely the health index and the total national index, but also according to specific indices (e.g. ABEX). Index-linked prices – which most commonly concern public services – tend to foster the persistence of services inflation.

The analysis of the functioning of the markets yields partial findings, mainly because of the limitations of the available indicators. Nonetheless, various indices point to weak competition in certain network services such as telecommunications. However, the opening up of the cable operators' network and the "Easy Switch" measure, intended to help consumers to choose the best offer, should encourage competition. In that regard, it is essential to provide information for consumers, though consumers also have a role to play in choosing the operator offering the service that best suits their profile. In regard to restaurants and cafés, competition operates at local rather than national level. The outlook in that branch is also positive, with the cessation of brewery contracts for cafés. Nonetheless, it will take some time before the impact of those changes can be assessed.

Apart from regular monitoring of services inflation, it is essential to keep a closer watch on the degree of competition in service activities, e.g. with the aid of horizontal screening, in order to identify the branches where structural reforms are appropriate. A higher degree of competition prompts producers to rationalise their production processes, invest in new technologies to enhance productivity, and innovate in order to set themselves apart, and enables the most efficient firms to grow while the inefficient operators will leave the market : all these elements could benefit the customers via cheaper or better quality services. It is therefore vital to strike a balance in market regulation to ensure that the resulting benefits outweigh the associated costs.

Nonetheless, the prices of many services (or adjustments to those prices) are subject to government rules. Those regulations do not systematically specify a transparent methodology (geared to the movement in production costs, for example), and the prices are not always reviewed at regular intervals. More transparent pricing mechanisms, particularly with clearer rules on price increases at the level of the contracts or invoices for certain services (not only public services but also, for example, compulsory insurance contracts), would be a step in the right direction.

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Low inflation in the euro area : Causes and consequences

M. Deroose
A. Stevens (*)

Introduction

Since the onset of the financial crisis in 2007, inflation developments both in the euro area and globally have been more difficult to understand and predict. The first puzzle for economists emerged between 2009 and the end of 2011, when the depth and length of the recession led to expectations of a sharp fall in inflation. In fact, inflation remained surprisingly stable (the "missing disinflation puzzle"). This was followed by a new puzzle in the 2012-16 period. This time, the ongoing economic recovery prompted forecasts of an upturn in inflation, whereas in fact it remained persistently below target (the "missing inflation puzzle").

A more in-depth analysis of inflation dynamics in the euro area over the latter period reveals a number of striking developments. First, headline inflation fell sharply between 2012 and the end of 2016, even dropping below zero at times. The decline in core inflation (headline inflation with energy and food components stripped out) was less steep but – at an average of 1 % over the period – was still very low.

Moreover, inflation forecasts from 2012 onwards systematically overestimated the actual inflation rate. This applies not just for the Eurosystem inflation forecasts (see chart 1), but also for the forecasts from other international institutions such as the European Commission, IMF and OECD, as well as those of other professional forecasters, including economists surveyed by the ECB.

(*) The authors would like to thank Jef Boeckx for his valuable comments and suggestions.

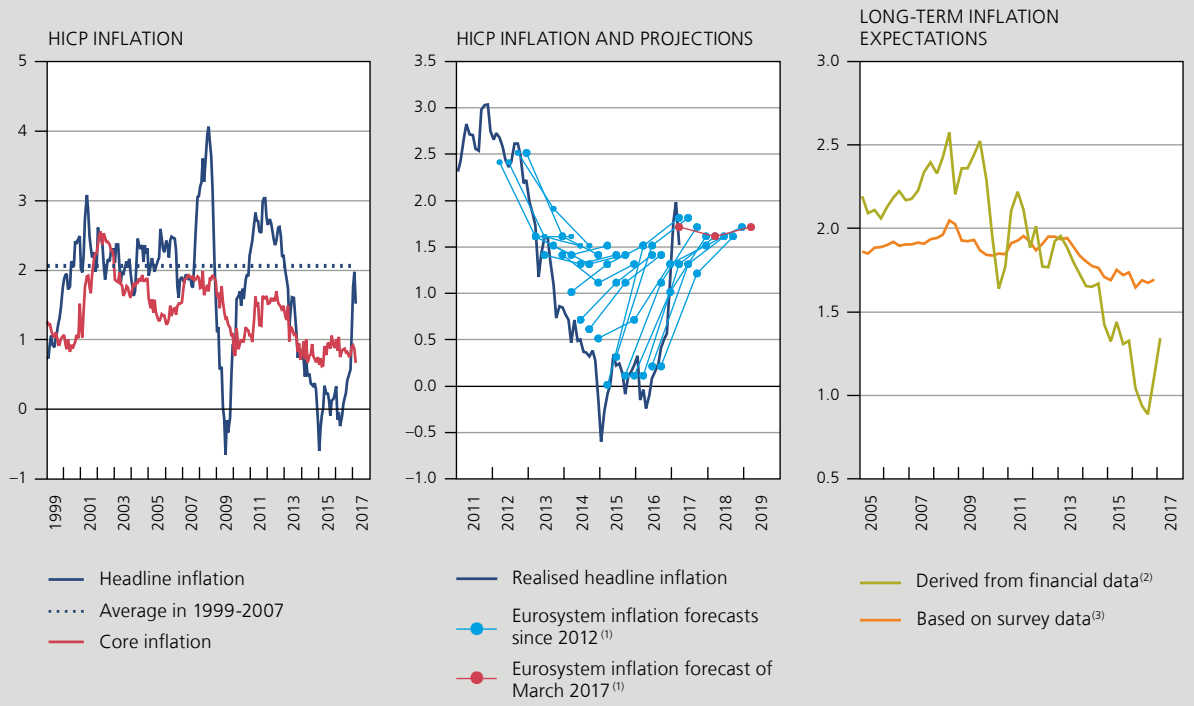
Finally, both short- and long-term inflation expectations also fell. Short-term fluctuations in inflation expectations are unsurprising given the tendency of economic agents to adjust their expectations to macroeconomic shocks that impact prices. In view of its price stability objective, the ECB endeavours, however, to cushion these shocks over the medium term. If economic agents believe the ECB is committed to this, their longer-term inflation expectations should remain firmly anchored around the inflation target, and that was indeed the case in the euro area during the pre-crisis period. The sharp downturn in long-term inflation expectations derived from financial data (which also include risk premiums) and also, albeit slightly later and less steep, in expectations based on survey data (a purer measure) was thus exceptional, and therefore disconcerting.

In a bid to avert the risk of inflation staying too low for too long, the Eurosystem introduced a number of unconventional measures, including an asset purchase programme (APP), and set up a working group, the Low Inflation Task Force (LIFT), which included a number of NBB economists, with a brief to investigate low inflation rates in the euro area between 2012 and 2016. This article presents a brief outline of the working group's main findings; a more detailed analysis can be found in the LIFT report itself (see Ciccarelli and Osbat, 2017). This article does not discuss the specific situation in Belgium, where inflation has risen sharply since early 2015; that is analysed in the article by Jonckheere and Zimmer (2017) elsewhere in this Economic Review.

This article addresses four specific questions relating to low inflation in the euro area. It first gives a brief

CHART 1 LOW INFLATION IN THE EURO AREA SINCE 2012

(year-on-year percentage change)



Sources: ECB, Thomson Reuters.

(1) Inflation forecasts are prepared by Eurosystem staff as part of broader quarterly macroeconomic forecasts for the euro area. The forecasts presented here are annual averages.

(2) Quarterly averages of inflation forecasts derived from inflation swaps which cover the one-year inflation risk in the euro area, beginning four years after conclusion of the contract.

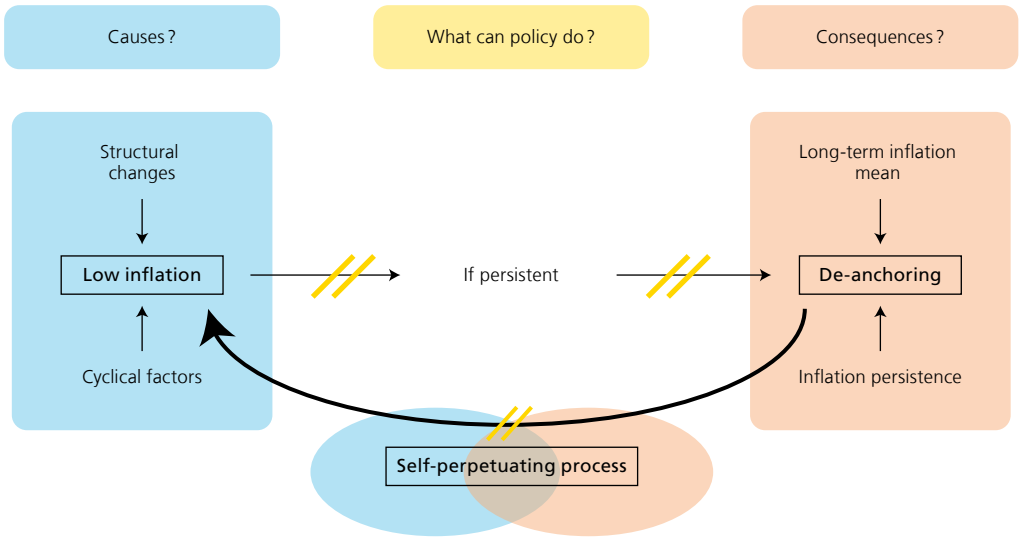
(3) Average of the aggregated probability distribution of inflation projections for the next five years. The data are drawn from the ECB Survey of Professional Forecasters (SPF).

theoretical outline of why it is important to bring inflation back into line with the target and why this justifies unconventional monetary policy measures. The empirical results from the LIFT report are then used to explain the factors that have held inflation down since 2012, suggesting that structural factors such as demographic or technological changes have played a rather limited role and that cyclical factors encompassed supply-side and demand-side shocks of domestic and global origin.

The consequences of low inflation are then analysed. If inflation stays too low for too long, this can cause inflation expectations to be revised downwards, with the threat of these becoming "de-anchored" from the central bank's inflation target. This is worrying because it can lead to low inflation becoming self-sustaining. Low inflation is then no longer merely a symptom of the economic malaise, but also becomes an obstacle to the recovery, for example by hampering debt deleveraging. Low inflation itself then becomes a cause of low inflation. It is key here to examine whether de-anchoring signals persistence of the present low inflation rate or whether actual inflation will follow expectations and return to lower levels. In the former case, it is assumed that temporary but prolonged negative demand shocks will exert disinflationary pressure but that over the longer term expectations will return to the central bank's inflation anchor. In the latter case, there is a risk of expectations becoming permanently de-anchored from the inflation target. A growing persistence of low inflation rates implies that policy instruments are less effective in maintaining price stability, while a downward shift in the long-term inflation mean implies a dwindling belief in the central bank's commitment to price stability.

Lastly, this article discusses what policy can do to bring inflation back to the target of "below but close to" 2 %. To break through a self-perpetuating spiral of low inflation, monetary policy needs to work on two fronts. First, every effort must be made to push inflation towards its target in good time and thus to avert de-anchoring. At the same time, an adequate response is needed to signals of a looming de-anchoring, so that changes in inflation expectations do not affect the desired monetary policy

CHART 2 LOW INFLATION: THREE QUESTIONS



Source : NBB.

stance. Given the limits to what monetary policy alone can achieve, there is also a role for other policy domains.

The analysis presented below focuses on the past but also offers insights which, despite seemingly changing inflation dynamics, remain relevant at the time of going to press. For example, headline inflation in the euro area has risen sharply since the end of 2016 – peaking at 2 % in February 2017 – but this was primarily due to rising oil prices. Core inflation, by contrast, has stayed low and virtually flat, suggesting that domestic price pressures are still very weak and that the rise in headline inflation is not yet sustainable. There has also been a recent uptick in long-term inflation expectations, though these are still well below their pre-crisis levels. In short, while the danger of deflation in the euro area appears to have practically disappeared, it is too early to conclude that the risks presented by low inflation have been completely overcome. The extensive package of monetary policy measures (asset purchases, a negative interest rate and the announcement that the measures will remain in force for a considerable time) is therefore implemented in full.

1. Why does the ECB want to keep inflation close to 2 % ?

Guaranteeing stable prices is considered the best contribution that monetary policy can make to economic growth and welfare. Accordingly, price stability is the primary objective of the ECB. It is defined by its Governing Council as :

"a year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of below, but close to, 2 % over the medium term."

This explicit reference to the 2 % figure is intended to help anchor inflation expectations at around that level. The addition of the nuances "below" and "close to" makes clear that the ECB will not tolerate an inflation rate that is either too high or too low, both of which have in the past proved very damaging to the economy. The focus on the medium term, however, offers the ECB scope to respond cautiously to fluctuations in inflation, enabling it to avoid excessive volatility in economic activity and its own policy instruments while at the same time contributing to macroeconomic stability. Finally, the price stability target applies for the euro area as a whole, with no specific focus on price developments in individual Member States.

Maintaining a stable and positive inflation rate that is in line with the target is always important as it contributes to the smooth functioning of the economy, and this importance only increases when the economy is weak. Persistently low inflation is especially concerning in a weak economic climate because it can slow down the economic recovery. In the euro area, for example, low inflation has made it even more difficult to overcome the challenges following

the financial crisis, including the need to reduce debt levels, even out macroeconomic imbalances in some Member States and address the issue of policy interest rates that are approaching their effective lower bound (ELB).

Most financial contracts are drawn up in nominal terms, which means that an unexpected slowing of inflation pushes up the real costs of contractual liabilities. This makes it more difficult to reduce debt, which, all other things being equal, in turn increases the propensity to save and thus prompts a (further) reduction in demand. On the other hand, if inflation in the euro area were to come back into line with the target of "close to 2 %", this would lead to a more rapid debt deleveraging, as well as avoiding an arbitrary redistribution of wealth from debtors to creditors.

Persistently low inflation across the euro area also makes it more difficult to correct distorted competitive positions, especially regarding costs. Restoring competitiveness requires wages and prices to fall in absolute terms in Member States where the real exchange rate had appreciated sharply before the crisis. For various reasons, however, employers and employees are reluctant to act on this, and this slows the adjustment process, driving up unemployment and further eroding demand[1]. By contrast, an inflation rate of around 2 % in the euro area, achieved through a combination of price rises of over 2 % in the stronger Member States and lower inflation in the weaker countries, could speed up the adjustment process.

Stable, positive inflation expectations that are in line with the target of close to 2 % also reduce the risk of policy rates hitting their effective lower bound. For nominal interest rates equal the sum of inflation expectations and real interest rates. Once nominal policy rates approach their effective lower bound, as is currently the case in the euro area, this constrains the central bank's ability to cut real short-term interest rates further, thus narrowing its scope to pursue an effective and stabilising demand policy. If inflation expectations are then no longer solidly anchored and fall, they actually exert upward pressure on real interest rates, unintentionally bringing about a more restrictive monetary policy which holds back economic growth[2]. This is not only problematic today : lower inflation expectations also reduce the central bank's capacity to accommodate adverse shocks in the future, because nominal interest rates will still be low.

(1) For studies on downside price and wage rigidities in the euro area, see the work of two Eurosystem working groups, the Wage Dynamics Network and the Inflation Persistence Network.

(2) See for example Cordemans *et al.* (2016).

(3) The rate of interest at which savings and investment are in balance, or at which economic activity achieves its potential level and inflation is stable.

(4) According to Bobeica *et al.* (2017), Anderson *et al.* (2014), Yoon *et al.* (2014), Bullard *et al.* (2012) and Katagiri (2012), an ageing population will tend to depress inflation, while Juselius and Takats (2015, 2016) find the reverse to be the case.

2. What causes low inflation ?

2.1 Role of structural factors rather limited

The inflation rate was systematically overestimated between 2012 and 2015, both by the Eurosystem in its projection exercises and by other organisations (see chart 1). One possible explanation is that the econometric models on which the projections were based took too little account of structural deflationary changes in the economy. On the other hand, there are numerous signals suggesting that structural factors, and especially population ageing and the increase in e-commerce, play but a small part in explaining subdued inflation during the recent period. This also fits the "classic" presumption that inflation in the long run is a monetary phenomenon and is therefore not permanently affected by real factors.

Theoretically, population ageing could impact on inflation in several ways, each with conflicting effects. On the one hand, it could lead to a drop in demand which, if not accommodated by monetary policy, would result in deflationary pressure. Shirakawa (2012), for example, argues that an ageing population depresses expectations regarding potential growth, leading to a reduction in permanent household incomes. This view is endorsed by Katagiri (2012), who posits that if population ageing is caused by increased life expectancy, the longer period spent in retirement prompts households to save more in order to fund their higher consumption and maintenance needs in the future. Both developments lead to more saving and less investment or consumption, in turn pushing down the real equilibrium interest rate[3] and slowing potential growth. Bullard *et al.* (2012) put forward another explanation for the negative relation between population ageing and inflation. They posit that older people – who are net savers – prefer low, stable inflation. As the electoral importance of older voters increases, the authors argue that they are more successful in imposing this preference. On the other hand, the life-cycle hypothesis states that older people begin dissaving after retirement and therefore consume more. This implies that an ageing population increases effective demand. If production capacity fails to keep pace with this rising demand, this gives rise to upward pressure on inflation.

Theoretical channels thus fail to provide a decisive answer as to the correlation between population ageing and inflation. Nor does empirical research ; the prevailing empirical finding is that an ageing population causes inflation to fall, though this is refuted by some studies[4]. However, the different approaches all seem to suggest that demographic change in the first place affects the real equilibrium interest rate and potential growth. It is only

when monetary policy does not or cannot address these developments (for example because policy rates have reached their effective lower bound) that demographic change impacts on inflation.

Technological innovations, such as the rise and spread of e-commerce, can also exert downward pressure on inflation. E-commerce brings down business operating costs, and these savings can be passed on to customers. Transparent pricing can also ramp up competition, again weighing on inflation. However, recent studies show that the strong growth in e-commerce explains only a very small part of the fall in inflation in the euro area over the recent period: an increase of one percentage point in the share of people searching for information about goods and services online would lead to a fall in inflation for non-energy products averaging just 0.025 percentage points per year across the EU[1]. And once again monetary policy, provided it can be eased further, can accommodate the change in relative prices brought about by e-commerce, which is therefore unable to erode inflation over a very protracted period.

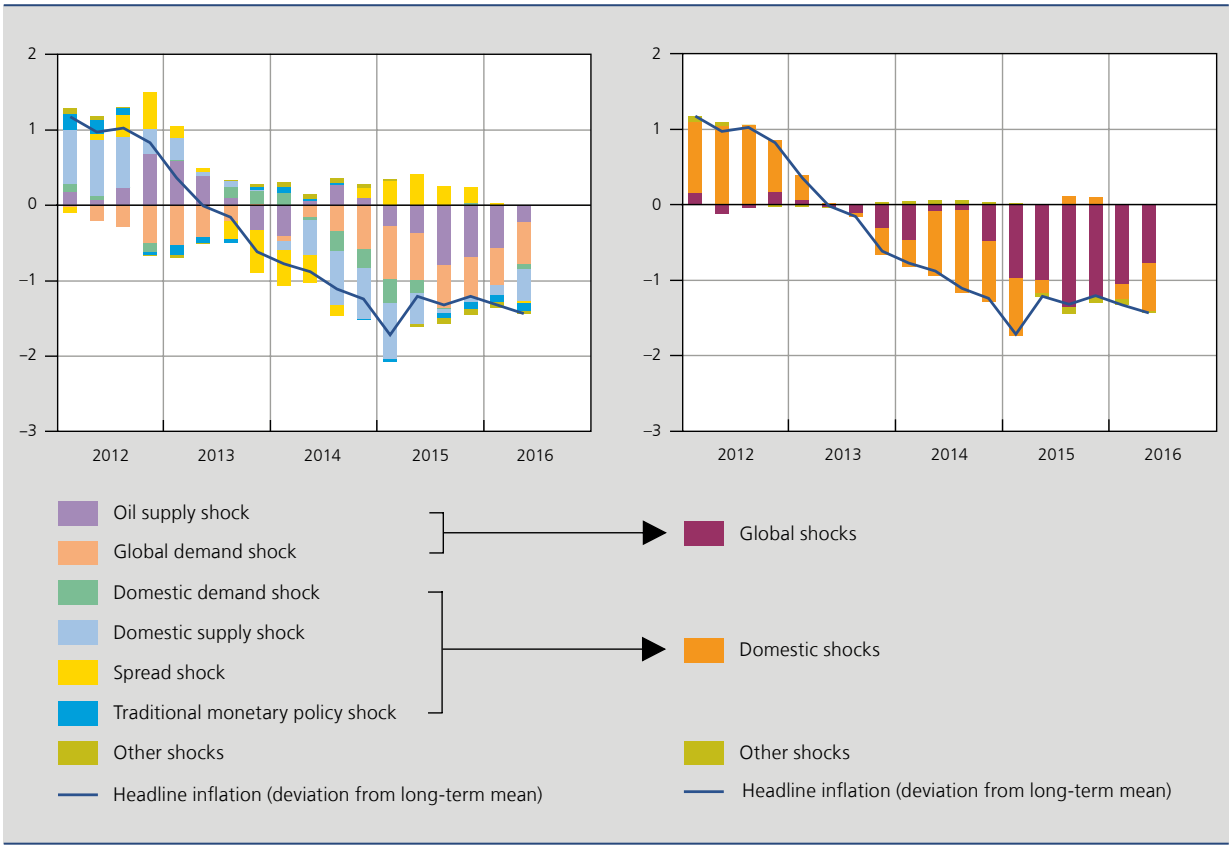
(1) This result was obtained from a LIFT panel data analysis carried out by M. Mohr and I. Rubene (see Ciccarelli and Osbat (2017), Box 3, p. 71).

2.2 Main cause: cyclical factors – initially on the domestic front

Since structural factors appear to have played only a minor role in the low inflation rate in the euro area in the 2012-16 period, an explanation must be sought more in cyclical factors. Monetary policy-makers have an interest in determining whether cyclical shocks are driven more by demand-side or supply-side factors, and whether they are mainly domestic or global in origin. The appropriate response to fluctuations in inflation depends on the nature of the shock that causes them. For example, a negative domestic demand shock which weighs on both economic activity and inflation requires a swift policy response, because the central bank is able to stabilise both variables. A positive global supply shock, such as the fall in oil prices – which weighs on inflation but also props up economic potential – in principle requires a less

CHART 3 HISTORICAL DECOMPOSITION OF INFLATION

(year-on-year percentage change in HICP; contributions in percentage points)



Source: LIFT (Ciccarelli and Osbat (2017), Charts 12-13, p. 21).

urgent response because the central bank is faced with the dilemma of choosing between stabilising growth and inflation. If inflation expectations are eroded, a rapid response is justified regardless of the nature of the shock.

A vector autoregression (VAR) model was used to determine the relative importance of seven cyclical shocks in explaining the low inflation since 2012 (see left-hand panel of chart 3)[1]. This shows that, initially, the change in the contribution of domestic supply shocks has had a major downward impact on inflation, followed later on by the impact of the change in domestic demand shocks, from positive to negative. As of end 2014, the downward pressure stemming form lower oil prices and weak global demand gained importance though. The right-hand panel of chart 3 regroups the seven shocks and thus clearly shows that in the 2012-14 period domestic shocks caused inflation to fell after which global shocks took over.

The VAR model shows that the effective lower bound of nominal policy interest rates has not remained without consequences, as reflected in the slight negative contribution of traditional monetary policy to inflation since 2014 (impact of the interest rate shock), confirming the central bank's difficulty in accommodating negative shocks when policy rates are nearing their lower bound. By adopting unconventional stimulus measures, however, the ECB was able to help push inflation back towards its target (impact of the spread shock). The best-known unconventional measure, the asset purchase programme (APP), came in the wake of the steep, sustained fall in oil prices in mid-2014. Such persistent disinflationary supply shocks demand an immediate monetary policy response to head off the danger of economic agents, especially in a low interest rate environment with under-utilised production capacity, lowering their inflation expectations – something that, through second-round effects, can influence the wage- and price-setting process and thus (further) erode core inflation.

2.3 Phillips curve remains relevant

The observation that domestic rather than global shocks were responsible for the disinflation of the 2012-14 period suggests that the Phillips curve is still a useful tool in understanding inflation dynamics, countering earlier assertions that, based on the two inflation puzzles which followed the onset of the financial crisis, this curve has lost some of its explanatory power[2]. In its simplest form, the Phillips curve expresses the relationship between domestic economic activity and inflation. Theoretically, inflation falls (rises) when economic activity falls (rises) relative to its potential level. Monetary policy-makers are very interested in this relationship because the measures they take impact first on the real economy, and changes in the real economy subsequently influence inflation.

To determine empirically how well the Phillips curve explains disinflation in the euro area *ex post*, inflation projections obtained using the Phillips curve – beginning in 2012 and assuming that the future after 2012 is not known – are compared with the realised inflation rate. A modern version of the Phillips curve is estimated in which core inflation is driven not just by economic activity but also by other relevant factors[3]. The Phillips curve is specified as follows:

$$\pi_t = \underbrace{\mu + \rho\pi_{t-1} + \theta\pi_t^e}_{\text{intercept}} + \underbrace{\beta x_{t-1}}_{\text{slope}} + \gamma\pi_{t-2}^{imp} + \varepsilon_t,$$

where core inflation (π_t) is a function of the past core inflation rate (π_{t-1}), a measure of inflation expectations (π_t^e), a measure of economic slack (x_{t-1}) and imported inflation (π_{t-2}^{imp}). Given the uncertainty regarding the correct measure for inflation expectations and the position in the economic cycle, several variables are used. For example, inflation expectations can be measured based on the expectations of consumers or economists, while the economic performance can be measured using real GDP growth, the output gap, the unemployment gap or the unemployment rate.

For most combinations of variables the empirical exercise suggests a statistically significant link between inflation and economic activity. Moreover, some combinations result in inflation projections that are in line with the realised core inflation rate. These findings thus refute the idea of a decoupling of inflation from real economic activity. The exercise does however also show that inflation dynamics, and in particular the relationship with economic activity, has changed somewhat. The range of inflation projections is fairly wide, suggesting a high degree of model uncertainty. Moreover, the realised inflation rate is at the lower end of this projection range.

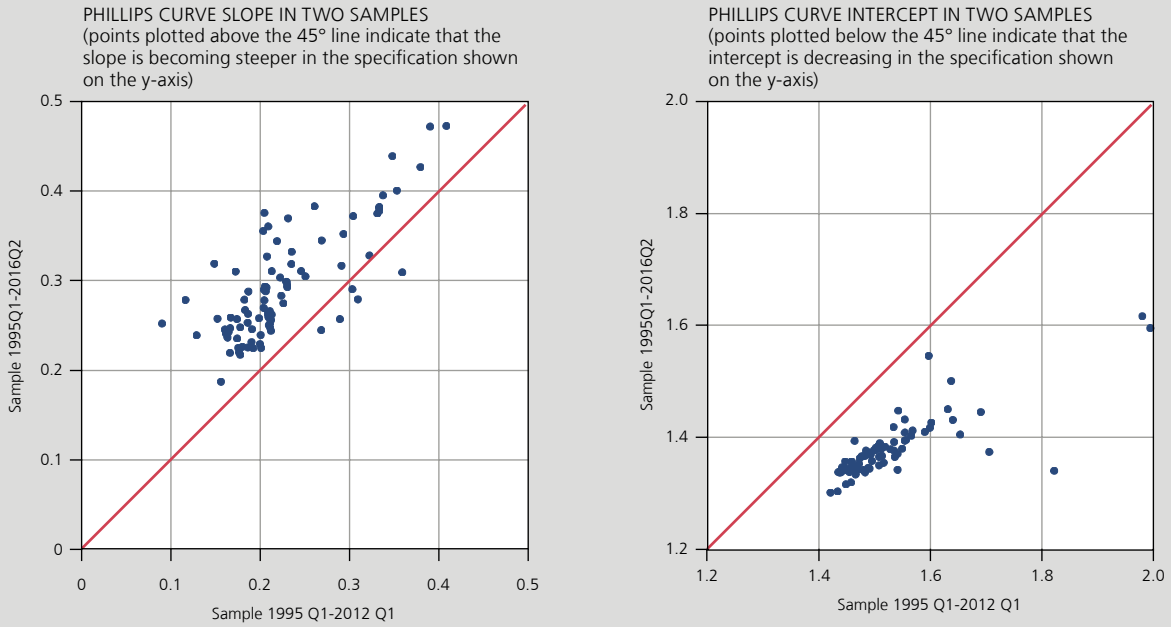
Overestimated inflation in the euro area could suggest underestimated economic weakness or a higher sensitivity of inflation to domestic economic slack. As regards the former, the models with the most negative estimates of the output gap did indeed deliver the best inflation projections. The second explanation implies that, for the same negative output gap, inflation is now falling more sharply than in the past. Since the inflation projections referred to above are

(1) The seven variables used in the VAR model were the price of oil, rest-of-the-world real GDP, real GDP in the euro area, HICP inflation in the euro area, the EONIA, the spread between ten-year government bond yields in the euro area and the EONIA, and the nominal effective euro exchange rate. The seven shocks were identified using zero and sign restrictions. For more informations see Bobeica and Jarocinski (2017).

(2) For an overview, see for example Constâncio (2015).

(3) For a discussion of the key determinants of inflation, see for example Stevens (2013).

CHART 4 CHANGE IN PHILLIPS CURVE PARAMETERS SINCE 2012



Source: LIFT (Ciccarelli and Osbat (2017), Chart 21, p. 29).

based on Phillips curves with constant parameters, the possibility that they overestimate inflation cannot be ruled out.

There is indeed evidence of some time variation in the parameters of the Phillips curve for the euro area. To examine this, the long-term variant of the Phillips curve is estimated over two periods, i.e. 1995 to 2012 and 1995 to 2016. This analysis shows that the slope (β) has steepened over the last four years (see chart 4), suggesting that inflation has recently become more sensitive to domestic economic slack. Increased sensitivity could point to structural changes in the economy, for example structural reforms in certain euro area countries could have made their economies more flexible and thus also enhanced the response of inflation to domestic slack. Nonlinearities may also play a role, making the slope of the Phillips curve steeper during periods of strong growth and deep recession. In other words, the sensitivity of inflation to domestic slack can vary depending on where the economy is in the business cycle.

The intercept of the Phillips curve seems also to have fallen recently due to a lower μ, weaker inflation expectations (π^e) and the greater weight assigned to those expectations (θ). The increase in θ was however too small to neutralise the downturn in inflation expectations.

Low inflation rates since 2012 are thus explained not only by repeated negative cyclical shocks weighing on economic activity and therefore on inflation (the "bad luck" explanation), but also by the growing impact of economic activity on inflation (steeper slope) and a possible de-anchoring of inflation expectations (lower intercept). This latter phenomenon, which can be a source of persistently low inflation, is explored in more detail in the next section.

3. What are the consequences of low inflation?

3.1 De-anchoring of inflation expectations: definition, risks and empirical relevance

When inflation remains far below the central bank's target for a protracted period, this can lead to inflation expectations being revised down, creating the risk of de-anchoring from the inflation target. Such de-anchoring points to a loss of central bank credibility. If economic agents have strong confidence in the central bank's commitment and ability to guarantee price stability over the medium term, they expect temporary shocks mainly to affect short-term inflation while longer-term inflation expectations

remain around the target. This implies that persistently low inflation can only lead to de-anchoring of inflation expectations if the central bank's status as the anchor of price stability is under threat. The precise factors that can produce such a situation are discussed later in this section. First, we look in more detail at the potential consequences of a de-anchoring of inflation expectations, as well as at the seriousness and empirical relevance of this problem.

Impaired credibility of the central bank inflation target and the associated de-anchoring of inflation expectations are problematic because they risk bringing about self-perpetuating inflation dynamics, where falling inflation and lower inflation expectations create a situation in which low inflation produces more low inflation; Section 1 explained why this is not desirable. There are two mechanisms at work here. First, lower expectations influence price and wage setting, and therefore the realised inflation rate. In addition, real interest rates rise when the downturn in inflation expectations is not sufficiently offset by the easing of monetary policy. These higher real interest rates put a brake on economic activity and therefore also on inflation itself. Low inflation is then no longer just a symptom of the economic malaise – already concerning in itself – but also becomes a factor that impedes recovery, and therefore partly a cause of low inflation.

Recent developments in measures of longer-term inflation expectations show that the ECB's target for inflation of below but close to 2 % over the medium term is being undershot (see chart 1 in the Introduction). This suggests that the persistently low inflation of recent years may have increased the risk of de-anchoring. But are these developments significant enough to create a real threat of de-anchoring?

The inflation expectations of chart 1, for one thing, vary depending on the information source used. Inflation compensation measures derived from financial instruments to hedge inflation risks show a bigger downturn and more volatility than the inflation expectations captured in the inflation surveys. These divergent trends stem from the specific information content of the two types of measures. Inflation surveys normally offer a pure measure of expected inflation, whereas inflation compensation measures express the extra return that investors demand in order to cover their portfolios against loss of value due to future inflation. This required compensation takes into account all possible future scenarios and therefore depends on both average inflation expectations and any risks surrounding that average. The relative valuation of those risks is expressed in the "inflation risk premium". A positive (negative) premium means the consequences (in terms of welfare) of unexpectedly high (low) inflation are thought to be more important than the consequences of unexpectedly low (high) inflation, driving the required inflation compensation above (below) average inflation expectations.

The recent fall in inflation compensation measures may therefore overestimate the actual decline in inflation expectations, with the steeper fall reflecting a reduction in the inflation risk premium to below zero[(1)]. This finding should concern monetary policy-makers, as negative inflation risk premiums imply greater worries about inflation being lower than expected in the future than concerns that it will be higher than expected. Whilst these concerns have no impact on the average market expectations regarding future inflation, this is nonetheless a sign that inflation expectations are in danger of becoming de-anchored (see box 1).

(1) It should be noted that the observed difference between inflation compensation measures and survey-based inflation expectations is not only explained by the inflation risk premium, but also by the the presence of liquidity premiums in market prices and measurement errors in survey data. That said, recent estimates, for example by Camba-Mendez and Werner (2017), suggest that these additional components have proved relatively unimportant in recent years. Empirical research shows that, since the onset of the financial crisis in 2008, the inflation risk premium has fallen steadily to below zero.

Box 1 – Determinants of the inflation risk premium

The inflation risk premium contained in measures of inflation compensation is the extra yield demanded by investors to hedge their investments in nominal securities (e.g. bonds) against unexpected movements in inflation. Future inflation can turn out unexpectedly higher or lower than average market forecasts. Whether the inflation risk premium is positive or negative depends on how investors evaluate these upside and downside inflation risks. If concerns about unexpectedly high future inflation prevail, the inflation risk premium will be above zero, but it will dip into the red if investors are more concerned about the risk of inflation turning out lower than expected.

What drives this risk evaluation? Put simply, the position in the economic cycle. Regardless of whether the risk is positive or negative, it receives more attention if it occurs in times of economic difficulty. A positive risk that generates an extra source of income, while never amiss, is especially welcome when employment and income are under pressure. Conversely, negative risks which erode income will receive more attention if they occur mainly during recessions.

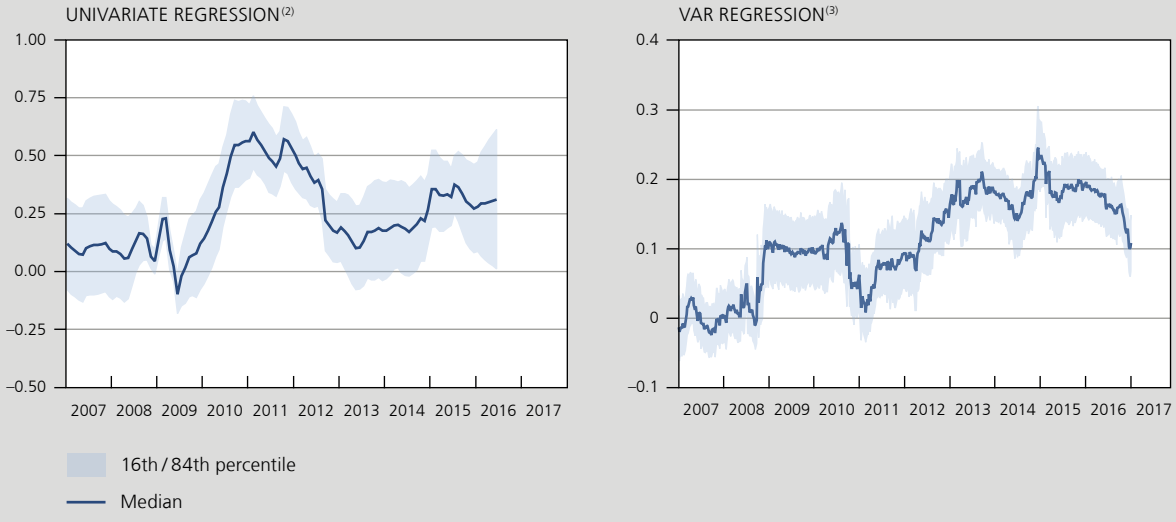
In other words, the type of risk that dominates in economically weak periods receives most attention. In the current context of falling and even negative inflation risk premiums (see for example Camba-Mendez and Werner (2017) for recent empirical evidence), in which the consequences of unexpectedly low inflation are consistently seen as more important, this means that investors think it is increasingly likely that periods of persistently low inflation will be accompanied by periods of slow growth. This in turn points to dwindling confidence in the central bank's stabilisation function.

Econometric analysis offers deeper insights into the risk of de-anchoring of inflation expectations. A common method for measuring the degree of anchoring consists in estimating the pass-through of short-term developments to long-term inflation expectations. If inflation expectations are solidly anchored, they should not react to inflationary pressures either from current macroeconomic developments or from events expected to occur in the near future.

Chart 5 shows the results of two econometric models estimating the response of long-term inflation expectations

CHART 5 PASS-THROUGH OF SHORT TERM (1Y/1Y)[1] TO LONG-TERM INFLATION EXPECTATIONS (5Y/5Y)[1]

(in percentage points, median and 68 % probability interval of the posterior distribution)



Sources: LIFT (Ciccarelli and Osbat (2017), Charts 28 and 29, p. 35) and own calculations (update of the VAR regression).

(1) Inflation expectations derived from inflation swap contracts: "x"-year "y"-year refers to the inflation swap rate that covers the inflation risk for the x-year period that begins y years after the conclusion of the contract.

(2) Time-varying estimates of the pass-through coefficient of changes in long-term inflation expectations over the previous six months onto changes in short-term inflation expectations over the same period. The model is estimated with Bayesian techniques and allows for stochastic volatility.

(3) Time-varying estimates of the impact response of long-term inflation expectations to shocks that cause short-term inflation expectations to rise by one percentage point, derived from a VAR model of dynamic interactions between weekly measures of short and longer-term inflation expectations, and where the structural identification of shocks based on a Cholesky decomposition assumes that shocks affecting short-term expectations can have an immediate impact on long-term expectations, but not vice versa. The time variation is estimated on the basis of a rolling sample. The estimates presented are dated at the end of each sample.

to changes in short-term inflation expectations over time. The pass-through coefficient has been significantly positive in several periods since the onset of the financial crisis in 2008, suggesting a real danger of de-anchoring of inflation expectations. There were clear signs of de-anchoring at the start of the financial crisis, following the collapse of Lehman Brothers in October 2008, and in the wake of the sovereign debt crisis. The different models do not produce an unambiguous conclusion for the first two years of the period of low inflation that began in 2012 : while one estimate shows that de-anchoring risks receded after ECB President Draghi's August 2012 promise to overcome the debt crisis and do whatever it takes to protect the euro, the other suggests that the risks continued to increase steadily. What is clear is that plummeting oil prices in the second half of 2014 reasserted the risk of inflation expectations being de-anchored, though that risk was curtailed by the ECB announcement of an expanded asset purchase programme in January 2015. In fact, recent developments actually suggest a significant reduction in the de-anchoring risk, or at least that the risk is becoming more uncertain. The policy options for defusing the de-anchoring risk – which turned out to be successful – are discussed in section 4.

3.2 Types of de-anchoring

The above findings show that there has been a real risk of de-anchoring of inflation expectations in recent years. However, there are different types of de-anchoring. How serious it is, in terms of its ability to disrupt price stability, depends on the underlying change in the inflation dynamics that cause de-anchoring, as, depending on the cause, the de-anchoring process impacts on a different aspect of the credibility of monetary policy's ability to maintain price stability. To clarify this, credibility issues are discussed below in terms of the ECB's price stability mandate.

On the one hand, de-anchoring of inflation expectations may indicate increasing inflation persistence. Temporary negative demand shocks are then expected to exert disinflationary pressure, but eventually – after the shocks have played out – inflation returns to the nominal anchor of below but close to 2 %. However, this takes so long that it also impacts on longer-term inflation expectations. Since price stability is the ECB's primary objective, increasing persistence is an indicator that the policy instruments used to achieve this are becoming less effective. If the central bank fails to act or acts too late, there is then a danger of the medium-term price stability objective being implicitly redefined.

On the other hand, de-anchoring can also occur as a result of changes in the public perception of the long-term mean of inflation, i.e. the expected inflation rate for an economy that is in equilibrium, or a rate to which inflation will gravitate once all shocks have played out. A reduction in the long term mean thus implies a questioning of the commitment to price stability. More specifically, it is not so much the central bank's ability to steer inflation towards its target level that is questioned, but more its willingness to do so. Economic agents are then likely to interpret the target of "close to but below 2 %" differently, for example as 1.8 % rather than 1.9 %.

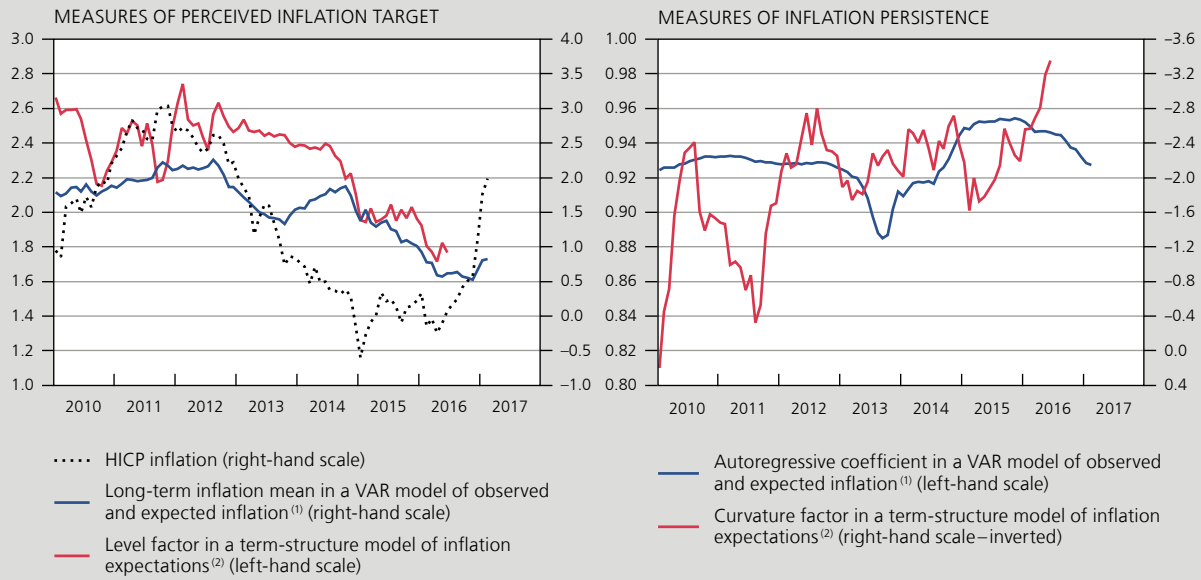
Lower longer-term inflation expectations can of course also reflect a combination of both types of de-anchoring, with the present low inflation returning more slowly to a lower perceived inflation target.

De-anchoring of inflation expectations is less worrying when it reflects a perceived lack of policy effectiveness rather than a loss of credibility of the central bank's inflation target. In a persistent low-inflation environment with interest rates around their effective lower bound, any reduction in the perceived inflation target leads to a structural rise in real interest rates and hence to secular stagnation, raising the prospect of permanent underutilisation of production capacity and a deflationary spiral. By contrast, reduced policy effectiveness merely implies a slower recovery of the economy to its pre-crisis equilibrium level, with sustainable positive growth and inflation close to the central bank target. While that scenario is also problematic, as an impaired stabilisation function of the central bank increases macroeconomic volatility, it is less worrying than a permanent reduction in inflation expectations, which risks pushing the real interest rate above its equilibrium level for an extended period, resulting in secular stagnation.

The relative importance of these two sources of de-anchoring risks can be gauged by estimating inflation models which include data on inflation expectations. Measures of those expectations, and in particular the slope of their term structure, contain important information on the mean and persistence of the inflation process. Changes in the long-term mean influence current and expected inflation to the same degree and therefore have no impact on the slope of the term structure. Changes in inflation persistence, on the other hand, have a bigger effect on current inflation and short-term inflation expectations than on longer-term inflation expectations, and therefore do affect the term structure slope. With this in mind, combined analyses of observed and expected inflation, or of inflation expectations over different periods, can be useful in estimating both the trend in the long-term mean and the persistence of the inflation process.

CHART 6 CHANGES IN INFLATION DYNAMICS

(time-varying estimates, in %)



Sources: LIFT (Ciccarelli and Osbat (2017), Charts 6-9, pp. 16-17), own reworkings and own calculations (update of the long-term inflation mean and autoregression coefficient derived from the VAR model).

(1) The VAR model assumes that inflation expectations are formed in a consistent way. The time variation is estimated on the basis of a rolling sample. The estimates presented are dated at the end of each sample.

(2) Based on Gimeno and Ortega (2016).

Chart 6 summarises the results of two such analyses. The first model (based on Gimeno and Ortega, 2016) analyses the term structure of market-based inflation expectations by estimating three factors that together describe the term structure: the level factor, which reflects the long-term mean of inflation expectations and is therefore a measure of the perceived inflation target; the slope of the term structure, reflecting the difference between the long-term level and the short-term inflation expectations; and the curvature, which determines the rate at which inflation returns to its long-term mean when the economic equilibrium is disrupted by shocks: more negative (positive) values point to a slower (faster) pace and therefore to a greater (lower) inflation persistence. The second model is a time-series model of observed and expected inflation. The autoregressive structure of this model determines the persistence of the inflation process, while the inflation rate at which the model is in equilibrium indicates the perceived inflation target.

Estimates by both models show that the observed risks of de-anchored inflation expectations in recent years were due to declining confidence in both the effectiveness of monetary policy and the inflation target. The measures of the perceived inflation target since 2012 show a clear downward trend, for example, while the measures of inflation persistence follow a rising trend. This prompted the central bank to take a number of measures to guarantee price stability (see section 4). One encouraging element is that recent estimates suggest a turning point, as the persistence is estimated to be lower and the inflation trend higher.

3.3 Channels of de-anchoring

This section concludes with a brief description of the factors that can undermine the central bank's credibility, either in terms of its effectiveness or its commitment to bring inflation back to target. Understanding these factors makes clear when persistently low inflation can give rise to de-anchoring of inflation expectations. As stated earlier, temporary shocks, even when frequent, have little impact on longer-term inflation expectations provided the central bank is able to retain its credibility.

Impaired effectiveness of monetary policy in guaranteeing price stability can result from increased nominal rigidities in the labour and product markets. These rigidities make the economy less resilient by making it harder to correct for disruptive cyclical factors using appropriate wage and

price mechanisms. These dynamics make the economy – and inflation – more cyclical.

Another possible explanation is that disruptions to monetary policy transmission and consequently to the central bank's stabilisation function undermine the effectiveness of monetary policy. This can happen when policy interest rates hit their effective lower bound, but also when financial fragmentation impedes the smooth transmission of policy interest rates to market rates. In such circumstances, economic agents will perceive that monetary policy is less able to accommodate negative inflation shocks and that inflation is thus set to remain low for an extended period. In addition, there are a number of amplifying effects which weigh further on economic activity and inflation. If the policy response is inadequate, falling inflation expectations will lead to an *ex-ante* rise in real interest rates, effectively tightening monetary policy. This rise in real interest rates will also lead to a currency appreciation in real terms, resulting in reduced competitiveness. Lastly, falling inflation – if nominal interest rates remain unchanged – increases the debt burden in real terms, at least compared with a scenario where inflation remains near the target level. If prices fall, and with them wages and profits, there is less money from which to repay the debt and interest, and this not only slows down debt reduction but also holds back new lending. Both effects put a brake on the economic recovery.

Importantly, impaired policy effectiveness – as a kind of second-round effect – can also erode trust in the central bank's commitment to price stability. If the stabilisation function of monetary policy is under threat, inflation projections based on past experience can offer a more accurate picture of the future than the inflation anchor communicated by the central bank. In that case, it becomes a rational choice for economic agents to base their inflation expectations on the actual rate of inflation rather than the official inflation target (a process referred to in the literature as "adaptive expectations"). A prolonged period of excessively low inflation far below target will then lead to the perceived inflation target being revised downwards, thus reinforcing low inflation.

4. How can economic policy combat low inflation?

Having explored the causes and consequences of low inflation, the question now is what policy can do to counter excessively low inflation and growing risks of de-anchoring of inflation expectations. This question is all the more pertinent against the backdrop of interest rates that are approaching their effective lower bound and the limited scope for accommodative fiscal policy in many euro area countries. This section first looks at whether unconventional monetary policy measures, and specifically quantitative easing, can offer a solution, and then turns to the potential role of other policy domains such as fiscal policy and structural reforms.

4.1 Unconventional monetary policy measures

Persistently low inflation and associated weak economic growth prompted the ECB to launch an unconventional "expanded asset purchase programme" in January 2015. Policy interest rates were approaching their effective lower bound, limiting the ability of traditional monetary policy to support the economy. Under the asset purchase programme, the ECB bought public and private-sector securities in the euro area to the tune of € 60 billion per month from March 2015 to March 2016, rising to € 80 billion per month in April 2016. It was subsequently decided to cap the purchases at € 60 billion per month again from April 2017 until at least the end of December 2017, and in any event until inflation and inflation expectations were in line with the price stability target (see NBB Annual Reports for 2015 and 2016).

These asset purchase programmes are termed "quantitative easing" (QE) because they increase the available money supply. The literature describes several channels via which QE measures are expected to support economic activity and boost inflation. For a recent intuitive description of these channels, reference is made among others to Cordemans *et al.* (2016). Put simply, while conventional monetary policy steers the funding costs of investment by adjusting short-term interest rates, QE aims to reduce those costs by driving down long-term interest rates directly. The ensuing paragraphs examine whether theory and practice align on this point, and more specifically whether the ECB's asset purchase programme has proved to be effective in boosting inflation.

The econometric VAR analysis in section 2 suggests that this is the case. The historical decomposition of inflation dynamics in chart 3 shows that, since the announcement of the asset purchase programme in 2015, unconventional monetary policy measures have contributed to an acceleration of inflation. The empirical study in the LIFT report mentioned two specific channels explaining this positive impact of the asset purchase programme on inflation.

First of all, policy-driven expansions of the central bank balance sheet make a positive contribution to re-anchoring

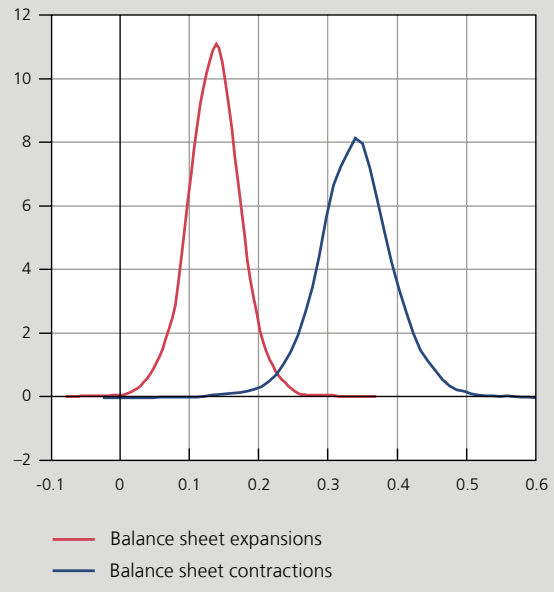
longer-term inflation expectations. This is illustrated in chart 7, in which the pass-through coefficient of long-term to short-term inflation expectations described earlier is estimated under the condition of an expanding or contracting central bank balance sheet. In the 2009-16 sample, balance sheet contractions were clearly associated with a positive pass-through coefficient, suggesting a growing risk of de-anchoring of inflation expectations in the period. By contrast, the pass-through coefficient, and thus the threat of de-anchoring, fell sharply in periods of balance sheet expansion.

Unconventional policy measures, though less persistent than conventional measures, also have a positive exchange rate effect (see chart 8). The central bank's asset purchases reduce long-term yields, leading to a currency depreciation and a concomitant rise in consumer prices, partly due to imported price inflation [1].

(1) The estimation of the exchange rate pass-through (ERPT) was based on the VAR model described in section 2. The advantage of this model for an ERPT analysis is that it allows the estimate to be mapped to the shock that hits the economy. This approach, which was introduced by Shambaugh (2008), takes account of the fact that the size and sign of the ERPT can vary depending on the disruption to the economy. Chart 8 shows an estimation of the pass-through of an exchange rate depreciation to consumer prices based on the ratio of the dynamic effects of the shock concerned on, on the one hand, the exchange rate and, on the other hand, consumer prices.

CHART 7 EFFECT OF CENTRAL BANK BALANCE SHEET EXPANSION/CONTRACTION ON PASS-THROUGH FROM SHORT-TERM TO LONG-TERM INFLATION EXPECTATIONS

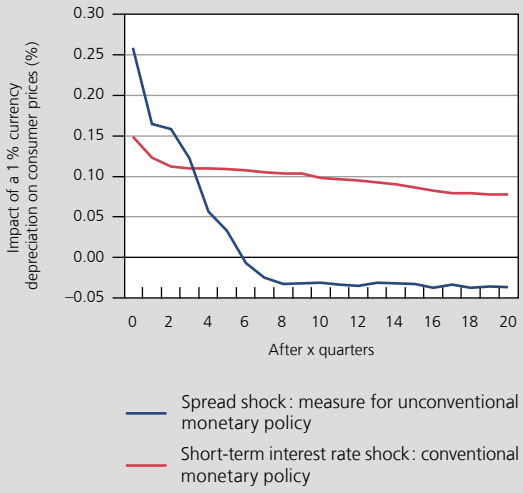
(estimated distribution of the 5y/5y regression coefficient on 1y/1y inflation swaps [1])



Sources: LIFT (Ciccarelli and Osbat (2017), Figure 41, p. 50).

(1) "x" year "y" year refers to the inflation swap rate that covers the inflation risk for the x-year period that begins y years after the conclusion of the contract.

CHART 8 IMPACT OF THE EXCHANGE RATE ON PRICES AFTER MONETARY POLICY SHOCKS



Sources: LIFT (Ciccarelli and Osbat (2017), Chart 42, p. 52) and own calculations.

4.2 Positive synergies with other policy domains

The preceding analysis demonstrates the effectiveness of unconventional measures; they thus can be put to use as an active policy instrument when conventional policy measures cease to have any impact. In such situations, monetary policy effectiveness may also benefit from positive synergies with measures taken in other policy domains.

Arce *et al.* (2016) clearly demonstrate this in their LIFT model simulations. Taking two countries representative of surplus and deficit countries in the euro area – Germany and Spain, for instance – they first simulate a scenario capturing the financial crisis, specifically assuming that an adverse financial shock results in stricter credit conditions in deficit countries, triggers a drop in demand across the euro area and slows down economic activity to such an extent that policy rates reach their effective lower bound. Consequently, conventional monetary policy can no longer kick-start the economy through rate cuts. In this senario, the model simulations study the effects of a number of policy options that might support the constrained monetary policy.

Structural reforms

As a first option supportive of monetary policy, structural reforms in the labour and product markets aim both to boost competitiveness and eliminate inefficiencies in

the wage- and price-setting process. Not only does this improve the outlook for the future growth potential, it also helps to create a more flexible economy able to correct existing imbalances faster through appropriate wage and price changes. The past years' policy debates often revolved around structural reforms bolstering the competitiveness of deficit countries – which had been hardest hit by the financial crisis – and thereby encouraging economic recovery.

While structural reforms have demonstrable beneficial effects in the longer term, they may also cause short-term drawbacks when interest rates languish close to their lower bound, as such reforms typically spark downward price pressures through a squeeze on corporate profit margins or increased labour supply following labour market reforms. If monetary policy cannot accommodate such disinflationary forces, real rates rise and monetary policy in effect tightens. Model simulations by Arce *et al.* (2016) suggest that this constitutes a not insignificant negative effect. When policy interest rates hit their lower bound, structural reforms in deficit countries may help expand their own economies but simultaneously slow down economic recovery in core countries, as a result of lower demand from deficit countries and real appreciation in surplus countries. The additional deflationary pressures so unleashed may be stemmed by the central bank credibly stating it will continue to pursue a low interest rate policy for a considerable length of time, thus constraining the upward pressure of structural reforms on real interest rates.

Fiscal policy

A second policy option might be – in theory at least – an appropriate fiscal stance addressing the demand side of the economy in addition to the accommodating monetary policy stance. This would make it less hard for monetary policy to remedy the fall in demand and would also help avoid monetary policy running into new constraints. In the real world, however, the feasibility of this particular policy option is often stymied by a multitude of issues and uncertainties.

A first important constraint on this policy option is that it will have to fall within the European governance framework for public finances. With the past having seen many countries flout the fiscal rules, these days the focus tends to be on restoring confidence in the sustainability of public finances. If this fails, the past years' – sometimes very painful – consolidation measures would appear to have been in vain. In fact, only a few surplus countries in the euro area have any real room for fiscal manoeuvre. In other words, an accommodating fiscal stance for the Monetary Union would appear feasible only if it is driven by the euro area's core. The question is whether this would fit into the EMU's institutional framework and achieve what it set out to do.

The model simulations presented by Arce *et al.* (2016) in the LIFT report would appear to suggest that this is indeed the case : despite its limited size, a more expansive fiscal stance in the core countries when policy rates are at the effective lower bound has been demonstrated to work for the euro area at large. Compared with normal circumstances in which policy rates are unrestrained, positive effects on economic activity in surplus countries are found to be larger, while deficit countries experience positive spillovers that were previously either not there or rather negative. That said, the economic literature does not unambiguously agree on the size of these spillovers : Arce *et al.* (2016) consider them significant, while Gadatsch *et al.* (2016) find them to be minor. It remains uncertain to what extent expansive fiscal policy in individual euro area countries may ease the job for monetary policy.

In addition, it should be noted that the euro area's post-crisis under-utilisation of production capacity is nearly or fully cleared by surplus countries. Conseqently, expansive fiscal policy in these countries might cause their economies to overheat – which begs the question of how desirable such a policy really is. And yet an intelligent approach to fiscal policy – paying sufficient attention to the economy's demand side and government investment – could well be conductive to sustainably supporting both supply and demand sides of the economy.

Conclusion

Persistently low inflation coupled with systematically overestimated inflation projections and declining inflation expectations since 2012 have prompted the ECB to launch a range of unconventional measures, including an asset purchase programme (APP). Sailing blindly into uncharted waters is not advisable, however, hence staff at the ECB and the various national central banks, including the NBB, joined forces in the Low Inflation Task Force (LIFT). Its remit was to investigate the causes and consequences of low inflation in the euro area, while it has also identified policy options that might help defuse the risks of too long a stretch of low inflation. This article has summarised the task force's key findings (see Ciccarelli and Osbat, 2017).

Structural factors – e.g. demographics and technology – were found to constitute only a small part of the reason for low inflation in the euro area in the 2012-16 period,

with cyclical factors a much more decisive force. More specifically, domestic shocks caused inflation to fall in the 2012-14 period, following which non-domestic shocks gained traction, particularly the strong and protracted downturn in oil prices in 2015.

Although recent inflation dynamics would appear to be driven by the supply side, the launch of the APP in early 2015 was the right move. Empirical evidence suggested that persistently low inflation could cause economic agents to lower their inflation expectations, threatening to de-anchor them from the official inflation target. This, in turn, could have repercussions on wage and price setting and thereby depress core inflation further. Inflation would thus become a self-perpetuating spiral : no longer a mere symptom of economic malaise, low inflation would beget low inflation.

To break through such a self-perpetuating spiral of low inflation, monetary policy needs to work on two fronts. On the one hand, every effort must be made to push inflation towards its target in good time and thus avert de-anchoring. On the other hand, an adequate response is needed to signals of a looming de-anchoring, so that changes in inflation expectations do not affect the desired monetary policy stance. The ECB's asset purchase programme has proved successful on both fronts, not just by supporting actual inflation – e.g. through a favourable exchange rate effect – but also by contributing to the anchoring of inflation expectations. In the current environment of policy rates close to their effective lower bound, monetary policy does benefit from positive interactions with measures in other policy domains. Growth-friendly structural reforms and intelligent fiscal measures can help ease monetary policy's task in kick-starting the economy and supporting inflation.

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Abstracts from the Working Papers series

315. Creating associations to substitute banks' direct credit. Evidence from Belgium, by M. Bedayo, December 2016

Firms' incentives to join other firms to collectively apply for a unique loan is empirically studied. When several firms jointly apply for a unique loan an association of firms is created. The authors identify the associations that had access to credit in Belgium over the period 2001-2011 and the firms that created each association, observing the amount of credit both the firms and the associations obtained from each financial institution they used. They analyse the amount of credit obtained by firms depending on whether they belong to any association, firms' likelihood of forming associations, the impact of belonging to an association on the amount of credit firms receive from banks, as well as the effect of not obtaining any credit directly on this amount. Further, the authors analyse whether associations formed by common-ownership firms have access to higher amounts of credit than the rest of the associations. They find that big and old firms are more likely to join other firms to mutually apply for credit and that associations get more credit if all their members use the same bank the association uses to get credit from. Furthermore, the lower firms' credit over the last year the more likely they are to form associations to obtain credit, and the authors show that associations composed of small firms with no credit history are specially credit constrained.

316. The impact of export promotion on export market entry, by A. Schminke, J. Van Biesebroeck, December 2016

For small open economies, it is essential that many firms find their way to the export market and most governments provide some form of export promotion assistance. The authors use detailed firm-level data for Flanders, Belgium's largest region, to evaluate whether its programme raises firms' propensity to start exporting outside the EU Single Market. They find robust evidence for such an effect by relying on the selection-on-observables assumption which they implement using various estimators. Results remain positive and statistically significant, but they are smaller in size, when they use two strategies to mitigate self-selection concerns : (i) focus on sub-samples of firms where endogenous selection into treatment is less likely, and (ii) use firms that receive the weakest form of support as controls for firms that receive more extensive support.

317. An estimated two-country EA-US model with limited exchange rate pass-through, by G. de Walcque, Ph. Jeanfils, T. Lejeune, Y. Rychalovska, March 2017

The authors develop a two-country New Keynesian model with sticky local currency pricing, distribution costs and a demand elasticity increasing with the relative price. These features help to reduce the exchange rate pass-through to the import price at the border and down the chain towards the consumption price, both in the short and the long run. Oil and imported goods enter at the same time as inputs in the production process and as consumption components. The model is estimated using Bayesian full information maximum likelihood techniques and based on real and nominal

macroeconomic series for the euro area and the United States together with the bilateral exchange rate and oil prices. The estimated model is shown to perform well in an out-of-sample forecasting exercise and is able to reproduce most of the cross-series co-variances observed in the data. It is then used for forecast error variance decomposition and historical decomposition exercises.

318. Using bank loans as collateral in Europe: The role of liquidity and funding purposes, by F. Koulischer, P. Van Roy, April 2017

The authors show that illiquid assets such as bank loans are used by euro area banks both as central bank collateral for short-term liquidity insurance purposes and for longer-term funding purposes for issuing covered bonds or asset-backed securities. They then explore the determinants of the choice to use bank loans for short-term liquidity insurance purposes or long-term funding purposes focusing on the case of Belgian banks. They find that (1) loan types are key to alleviating asymmetries of information; (2) regulatory requirements play a major role in the banks' choices, both directly and indirectly through clientele effects and (3) there are significant switching costs between the various uses of bank loans as collateral so historical decisions also determine the use of bank loans as collateral.

319. The impact of service and goods offshoring on employment: Firm-level evidence, by C. Ornaghi, I. Van Beveren, S. Vanormelingen, May 2017

Advances in communication technology have led to a remarkable increase in the tradability of services, resulting in a substantial increase in offshoring of services over the last two decades. Research investigating how this surge in service offshoring affects employment has been largely hampered by the paucity of suitable microdata. The paper tries to fill this gap by using a newly constructed database of Belgian firms that combines individual transaction-level data on international trade in goods and services with annual financial accounts. This unusually rich dataset makes it possible to produce fresh evidence on the impact of goods and service offshoring on total employment and employment by educational levels for both manufacturing industries and the service sectors. The results show that: (i) goods offshoring has a positive impact on employment growth among workers with both low and high levels of education in the manufacturing industry, but this effect disappears when controlling for scale effects; and (ii) service offshoring has a negative impact on employment growth among highly-educated workers in the service sectors. This novel evidence suggests that globalisation may threaten job security of higher-educated workers too.

320. On the estimation of panel fiscal reaction functions: Heterogeneity or fiscal fatigue?, by G. Everaert, S. Jansen, May 2017

The paper investigates whether fiscal fatigue is a robust characteristic of the fiscal reaction function in a panel of OECD countries over the period 1970-2014 or merely an artifact of ignoring important aspects of the panel dimension of the data. More specifically, the authors test whether the quadratic and cubic debt-to-GDP terms remain significant once dynamics, heterogeneous slopes and an asymmetric reaction to the business cycle are allowed for. The results show a significant heterogeneous reaction of the primary balance to lagged debt with fiscal fatigue not being a general characteristic of the fiscal reaction function shared by all countries in our panel. In line with the literature, the authors further find that fiscal balances tend to deteriorate in contractions without correspondingly improving during expansions. Explorative stochastic debt simulations show that debt forecasts crucially depend on the specification of the fiscal reaction function.

Conventional signs

%	per cent
e.g.	*exempli gratia* (for example)
etc.	*et cetera*
i.e.	*id est* (that is)
p.m.	*pro memoria*

List of abbreviations

Countries or regions

BE	Belgium
DE	Germany
IE	Ireland
EL	Greece
ES	Spain
FR	France
IT	Italy
LU	Luxembourg
NL	Netherlands
AT	Austria
PT	Portugal
FI	Finland
DK	Denmark
SE	Sweden
UK	United Kingdom
EA	Euro area
EU	European Union
EU15	European Union, excluding countries that joined after 2003
JP	Japan
US	United States

Other abbreviations

ABEX	Belgian Association of Surveyors
APP	Asset purchase programme
BACH	Bank for the Accounts of Companies Harmonized
BIPT	Belgian Institute for Postal services and Telecommunications
BIS	Bank for International Settlements
CBDC	Central bank digital currency

CBS	Statistics Netherlands
CEC	Centre for Exchange and Clearing
COFOG	Classification of the Functions of Government
COICOP	Classification of Individual Consumption by Purpose
CPB	Central Planning Bureau (the Netherlands)
CSPP	Corporate sector purchase programme
DEA	Data envelopment analysis
DGS	Directorate General Statistics
DLT	Distributed ledger technology
EBA	One-off tax discharge statement
EC	European Commission
ECB	European Central Bank
ECCBSO	European Committee of Central Balance-Sheet Data Offices
ELB	Effective lower bound
EMU	European Monetary Union
ERPT	Exchange rate pass-through
ESA	European System of Accounts
ETNO	European Telecommunications Network Operators' Association
FISIM	Financial intermediation services indirectly measured
FPB	Federal Planning Bureau
FPS	Federal Public Service
FRB	Full reserve banking
GDP	Gross domestic product
HFCS	Household Finance and Consumption Survey
HHI	Herfindahl-Hirschman Index
HICP	Harmonised index of consumer prices
IMF	International Monetary Fund
INSEE	National Institute of Statistics and Economic Studies
IRB	Internal ratings-based (approach)
LIFT	Low Inflation Task Force
MIP	Macroeconomic imbalance procedure
MIR	Monetary financial institution interest rates
NACE	Nomenclature of economic activities in the European Community
NAI	National Accounts Institute
NBB	National Bank of Belgium
NCPI	National consumer price index
NEO	National Employment Office
NPI	Non-profit institution
OECD	Organisation for Economic Cooperation and Development
OMT	Outright monetary transactions
OPEC	Organization of the Petroleum Exporting Countries
PISA	Programme for International Student Assessment
PSPP	Public sector purchase programme

QE	Quantitative easing
S&P	Standard and Poor's
SPF	Survey of professional forecasters
VAR	Vector autoregression
VAT	Value added tax
WEF	World Economic Forum

National Bank of Belgium
Limited liability company
RLP Brussels – Company number: 0203.201.340
Registered office: boulevard de Berlaimont 14 – BE-1000 Brussels
www.nbb.be

Publisher

Jan Smets

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Cover and layout: NBB AG – Prepress & Image

Published in June 2017