Economic Review

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Contents

Economic projections for Belgium – Autumn 2015

Introduction

Since the cut-off date for the Bank's spring projections, published in June 2015, the economic environment has changed quite considerably. Regarding world growth, the projections already took account of some weakening during 2015, mainly as a result of the slowdown in activity in a number of emerging economies. At present, in the light of the latest statistics, global growth outside the euro area even seems to be slightly lower than estimated in the spring projections. More significantly, however, the slowdown in world trade in the first half of 2015 was considerably sharper than expected, even though the estimates of the trade intensity of growth in the Eurosystem's spring projections were already very low and, in particular, were more cautious than some of the estimates published at that time by other international institutions. In fact, according to the latest statistics, the euro area's foreign markets actually contracted during the first two quarters of 2015, shrinking by around 1 % in each quarter. That is extremely unusual, and has not happened in recent times except during the great recession of 2009, although the contraction at that time was of course on a totally different scale. Although some revival is expected in the second half of the year, trade growth will remain well below global growth, and demand for imports from the euro area will be virtually unchanged in 2015.

The exact causes of the marked decline in world trade are not yet entirely clear. While volatility and uncertainty in the initial trade statistics may be a factor, it seems plausible that the principal explanation lies in the changing composition of world growth. Key points here are the declining share of the emerging economies in growth, but also the transition to a growth model based more on consumption and less on investment in certain countries such as China. However, it is noteworthy that, for the time being, the euro area's exports do not seem to have suffered too much from the slackening of global demand since they expanded by almost 3 % in the first half of 2015. In fact, euro area exporters have seen a considerable increase in their market shares in world trade, while exports from the euro area to the United States have also risen strongly. That can probably be attributed to the depreciation of the euro since the autumn of the previous year, when the markets began to anticipate the quantitative easing of European monetary policy which was decided in January 2015. In consequence, European exports became much more competitive. As the projections are based on the assumption that exchange rates will remain stable, any prolonged weakness of world trade will have a more serious impact on the growth of the euro area countries once the beneficial effect of the cheaper euro has disappeared.

On the financial markets, calm was gradually restored following the period of heightened volatility and plummeting share prices which began in the late spring. Stock markets staged a gradual recovery, and fears that the recent dip in Chinese share prices might reflect a sharper slowdown in the real economy have tended to fade away. Similarly, long-term interest rates which had risen strongly, as is evident in particular from government bond yields, have begun edging downwards. In Europe, Greece's persistent financial problems eventually led to a new agreement with the international creditors, easing the uncertainty somewhat, and that is reflected in the Greek economy's positive growth figures in the first six months of the year. The euro has also depreciated further since the beginning of November, mainly on account of strengthening market expectations concerning the widening divergence between the euro area's monetary policy

and that of the United States, in particular, at the end of the year. Finally, after rallying at the start of the year, oil prices did not maintain their upward trend as predicted by the technical assumptions underlying the spring projections, but began falling again.

The initial indications suggest that, in the third quarter, the weakness of foreign demand nevertheless exerted a little more downward pressure on euro area growth which, according to the "flash" estimate, was down again slightly at a quarterly figure of 0.3 %. Activity did in fact lose momentum to some extent in a number of major economies such as Germany, Spain and Italy. Portugal recorded zero growth, while other economies such as Finland and Greece actually contracted further. Overall, however, the Eurosystem made only a slight downward adjustment to its growth forecasts for the euro area compared to the spring projections : the weaker export growth in 2016 and 2017 should be largely offset by more vigorous domestic demand, fuelled in particular by slightly stronger growth of private and public consumption.

The domestic political environment has also undergone fundamental changes since the spring projections. The current projections take account of the federal and regional government budgets for 2016 as well as the package of measures finalised by the federal government in 2015 in connection with the tax shift, which aims to transfer levies on labour incomes to certain forms of consumption and to financial incomes and transactions. Furthermore, while the new reductions in employers' social contributions exert direct downward pressure on labour costs, that effect will be partly negated from 2016 onwards by a higher wage indexation, due mainly to the various measures by the federal and Flemish governments leading to an increase in electricity prices. As a result, the effects of the index jump will fade away sooner than initially expected.

In that context, Belgium's growth forecasts for the next two years, presented in these autumn projections which were finalised on 19 November 2015, have undergone a slight downward revision. The downturn in activity in the second half of the year seems to concern Belgium, too – as is already apparent from the "flash" estimate of growth in the third quarter, at barely 0.2 % – and implies a downward adjustment of the growth estimate, particularly for 2016. Conversely, annual growth for 2015 has been adjusted upwards slightly owing to the more favourable carry-over effects associated with the revision of the national accounts for 2014. Taking account of the common technical and external assumptions underlying the Eurosystem forecasts, the main ones being described in box 1 in the first section of this article, the economic downturn should be short-lived and the recovery will then gradually strengthen. Annual growth in 2017 – estimated at 1.6 % – will moreover differ little from the figure in the spring projections. In that connection it should be remembered that there is a considerable degree of uncertainty inherent in estimates for later years. Moreover, the stronger growth is increasingly driven by investment and net exports, even if the annual results for those components are somewhat biased by specific factors, particularly purchases of intangible assets from abroad in the first quarter of 2015 which, while not affecting growth, gave rise to a proportionate increase in imports and corporate investment. As predicted in the spring projections, private consumption is likely to slacken owing to the combined effects of the gradual disappearance of the increased purchasing power generated by the decline in oil prices and the weaker growth of household incomes as a result of the wage moderation policy.

The labour market recovery is unlikely to suffer much from the minor downward adjustment of the growth estimates, and is continuing unabated. Over the three years considered, namely from 2015 to 2017, almost 115 000 additional jobs should be created, i.e. even more than according to the spring projections, notably as a result of employment growth that slightly exceeded expectations in the first half of 2015. Despite the still rising participation rate and the bigger-than-expected increase in the population of working age owing to the relatively substantial influx of asylum seekers, employment growth exceeds considerably the growth of the labour force. As a result, the unemployment rate should gradually subside to around 8.1 % in 2017, though that is still higher than the average unemployment figure since the start of the century.

At the beginning of the year, inflation dipped to a low point, mainly as a result of the slump in energy prices, but returned to positive territory in April 2015 and has continued to rise since then. According to the current projections, the average inflation rate will only increase very little this year compared to 2014, but will gather pace significantly from 2016 to approach 2 %, and moderate only slightly in 2017. Despite the more favourable movement in oil prices, the inflation estimate is well above the figure given in the spring projections, and that is due entirely to the inclusion of various increases in indirect taxes decided by the federal and Flemish governments. Moreover, in 2016, about a third of total inflation will come from the direct impact of new taxes and higher consumption taxes. Owing mainly to the slump in oil prices, total inflation in 2015 is considerably lower than core inflation, which was in the region of 1.7 % in the final quarter of this year. The particularly modest

rise in unit labour costs will subsequently drive down core inflation until about the beginning of 2017, even though the reduction in costs will be partly offset by the expansion of margins. Only after that will core inflation begin rising again, fuelled by the revival in the growth of labour costs from 2017.

Turning to public finances, the budget deficit is expected to remain just below 3 % of GDP this year. It will probably be 2017 before the deficit falls further. The improvement in the budget position over the projection horizon is due almost exclusively to the reduction in interest charges resulting from the low market interest rates. Moreover, the improvement is clearly smaller than predicted by the spring projections; the slightly less favourable growth estimates can only account for part of that, the main reason being the downward adjustment to the movement in the structural primary balance. Furthermore, these budget projections fall short of the government's current targets for absorption of the nominal and structural deficits. In this connection it should be remembered that, in accordance with the rules applicable to the Eurosystem projection exercises, the forecasts only take account of measures which have been formally adopted by the government – or which are very likely to be approved – and are specified in sufficient detail on the cut-off date for the exercise. Similarly, the additional expenditure approved by the federal government in the wake of the terrorist attacks in Paris has not yet been taken into account as that measure came after the cut-off date for these projections. Moreover, the estimates of the budgetary impact of certain measures such as those relating to fraud prevention deviate from the amounts included in the budget.

1. International environment and assumptions

1.1 World economy

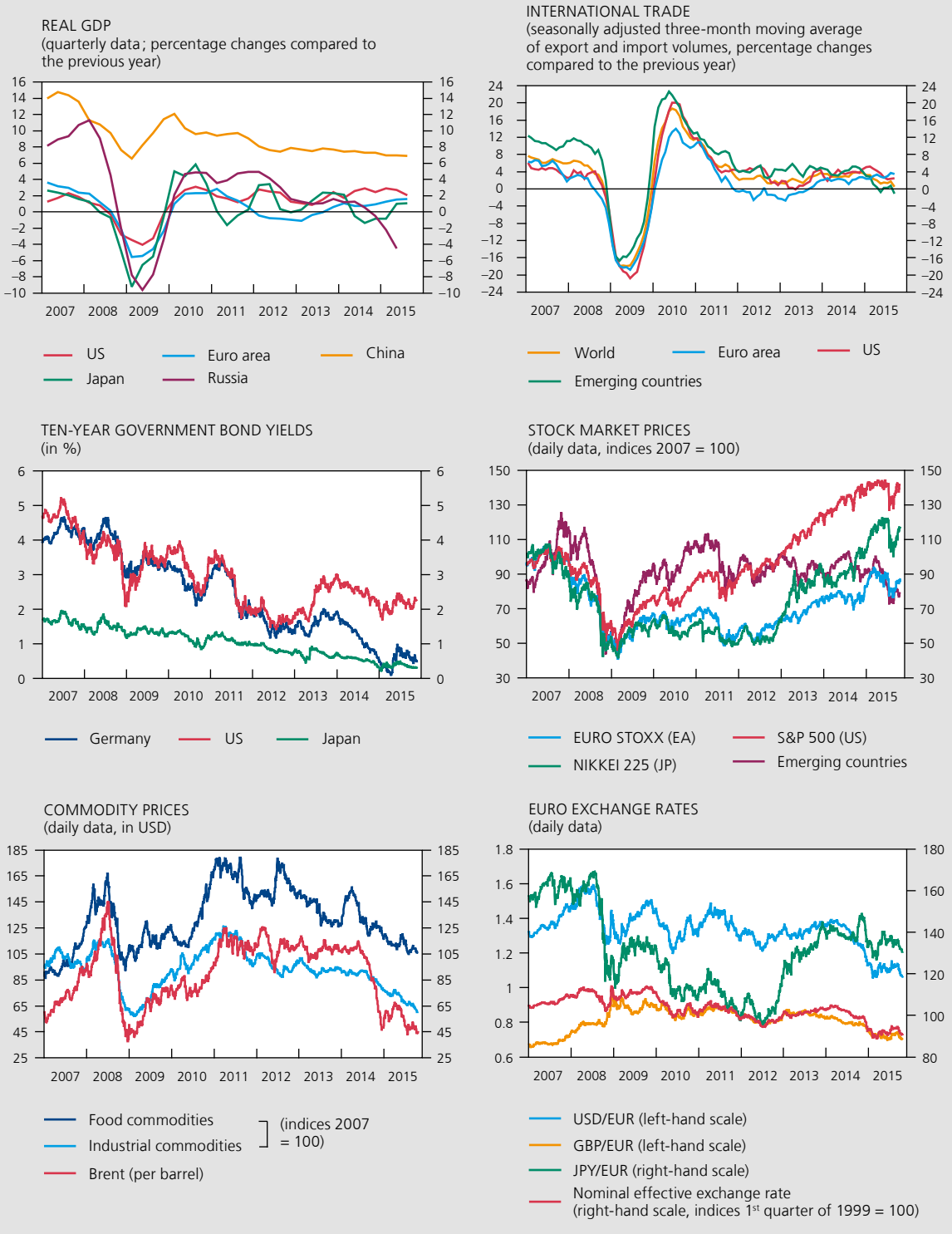
During the past year, the global economic recovery clearly ran out of steam owing to a sharp and widespread slowdown in the emerging economies, primarily China, and in the commodity exporting countries. Conversely, in most of the advanced countries, the economy continued to grow at a modest pace, supported by low oil prices and accommodative monetary policies. In the wake of the crisis, however, the low level of investment continues to depress (potential) growth.

There has been severe pressure on activity in the emerging economies this year. The transition from an economy centred on investment and exports to a model driven more by consumption and services is curbing Chinese growth – although at around 7 % it is nevertheless still vigorous – and the growth of China's trading partners. To counteract the negative effects of this complex process to some extent, the Chinese autorities have taken various measures, including cutting monetary policy interest rates and boosting expenditure on infrastructure. The activity of the commodity exporting countries has again been hit by the collapse of commodity prices. Brazil and Russia, in particular, went into a deep recession, with factors specific to those countries also playing a role. In Brazil, the political uncertainty, precarious budget position and necessary fiscal consolidation were the main factors depressing activity. In Russia, it was the geopolitical tensions associated with the conflict in Ukraine, and their consequences in terms of international sanctions, that inhibited activity. India was relatively unscathed. Growth there was bolstered by structural measures which are having a positive impact on investment. Among the world's large economies, India is expected to be the one recording the strongest growth this year.

The slowdown in the emerging economies has had a bigger-than-expected impact on the growth of world trade, which is down sharply this year. While the fragility of the world trade revival in the wake of the crisis had essentially reflected the sluggishness of demand in the euro area, its current weakness is in fact attributable mainly to the contraction of import volumes from the emerging countries, primarily China. This is due in particular to the rebalancing of the Chinese economy mentioned above, since consumption and services are less trade-intensive than investment and industry. This rebalancing has also had a big impact on Chinese imports of commodities. In addition, global structural factors play a role in the sluggishness of world trade compared to world GDP growth. Thus, the expansion of global value chains seems at least to have slowed somewhat since the crisis, so that this is no longer supporting world trade growth to the same extent as before.

Among the main advanced economies, it is the United States that has so far seen the most vigorous recovery. After having dipped slightly in the first quarter of 2015 as a result of various temporary factors, activity picked up again in the second quarter. Household consumption is still the main driver of American economic growth. Apart from the aforesaid general factors which have buttressed the growth of the advanced countries, consumption is also underpinned by the improvement in both the labour market situation and household balance sheets. Moreover, average wages have also begun rising more strongly. On the other hand, the dollar's appreciation has depressed exports while investment in the energy sector has declined.

CHART 1 GLOBAL ECONOMIC ACTIVITY AND DEVELOPMENTS ON FINANCIAL AND COMMODITY MARKETS



Sources: CPB World Trade Monitor, OECD, Thomson Reuters Datastream.

The recovery in Japan and the euro area is at an earlier stage in the cycle and remains modest. The fragile revival of the Japanese economy at the start of the year has been hit by the growth slowdown in China and in other Asian emerging economies, representing about half of Japanese exports. The rise in real wages has remained moderate,

despite an historically low unemployment rate, and has been offset by a steep and unexpected increase in the household savings ratio, so that private consumption has remained weak. In the third quarter, stock-building inhibited growth, leading to a fall in activity for the second consecutive quarter. However, economic growth is expected to pick up by the end of the year. In particular, exports should benefit from the weakness of the yen, while private consumption, supported by a further wage increase and lower oil prices, should rally.

After the recovery in the euro area had gained momentum in the second half of last year and at the beginning of this year, growth diminished again somewhat in the ensuing quarters. Thus, quarter-on-quarter growth dropped from 0.5 % in the first quarter to 0.4 % and then to 0.3 % in the last two quarters. The dynamism of exports in the first half of the year was striking, given the sharp downturn in world trade, and may be considered in the light of the euro's depreciation resulting from the ECB's accommodative policy. However, the recovery in the euro area is based essentially on private consumption, which is underpinned by the rise in purchasing power following the decline in energy prices and, more structurally, the improvement in the labour market situation. In addition, investment should ultimately continue to be supported by persistently very favourable financing conditions. Nonetheless, the uncertainty and – in some Member States – the need to pursue debt reduction continue to depress investment, hence the absence of a stronger investment revival for the time being.

The economic recovery in the euro area has also become more broadly based. Some of the peripheral countries, in particular, are currently seeing vigorous growth, driven by the recent structural reforms and macroeconomic adjustment programmes, and supported not only by the improvement on the labour market but also by the recovery in the rest of the euro area. Despite the great uncertainty over the change of government at the end of 2014, followed by protracted negotiations on a new aid programme, the Greek economy – which had picked up in the first three quarters of 2014 – maintained its growth in the first half of 2015, notably thanks to a steep decline in household saving. However, in the third quarter activity faltered again. As regards the large core countries of the euro area, growth in France continued to gather pace although investment is still weak and unemployment will fall only gradually. In Germany, the recovery is based essentially on private consumption, supported by the sound labour market. The euro's depreciation has likewise had a beneficial impact on German exports which, moreover, are destined less and less for emerging countries and are increasingly supported by demand from the rest of the euro area and other advanced countries such as the United States.

Inflation in the euro area is very weak again this year, mainly because of the persistently low oil prices. It had begun falling from the end of 2011 and reached a low point in January 2015, when consumer prices declined by 0.6 % year-on-year. Although inflation then began rising again, it became negative again in September, following the further fall in commodity prices and the slight strengthening of the euro. However, from the end of this year, inflation is likely to regain momentum as the economic revival continues and oil prices bottom out before gradually going up again. The labour market situation is improving, and that is also driving down unemployment, which nevertheless remains higher than before the crisis and is still significant in some individual countries. In parallel with accelerating growth, employment should ultimately continue to expand, being also supported in some countries by fiscal and structural measures and by wage moderation.

This year, the financial markets have repeatedly faced episodes of heightened volatility, reflecting the growing concern over the weakness of activity in the emerging economies. In the initial months of the year, however, stock markets maintained the upward trend which had begun in 2014. Owing to the strong demand for long-term government bonds in the euro area, the yield on those instruments dropped to a historical low. Towards the start of the summer, however, financial market volatility increased again, with mounting concern over the situation in the emerging countries and the impact of the imminent normalisation of monetary policy in the United States. That uncertainty triggered a sharp fall in capital flows to the emerging economies, a widening of yield spreads and depreciation of the currencies of those countries, as well as a decline in share prices. In that context, it was mainly the most vulnerable countries that were affected, where credit expansion had accelerated sharply in recent years, fuelled by favourable financing conditions in the period following the financial crisis. It was primarily firms in certain emerging countries which saw a substantial rise in their debt ratio, often largely denominated in foreign currencies.

The impact on the financial markets of the protracted negotiations concerning a new financing programme for Greece was limited overall, as were the spillover effects on the peripheral euro area countries; evident from the weak repercussions on the risk premiums of those countries' government bonds. Conversely, markets were seriously disturbed by developments in China. Between 12 June and 8 July, the Chinese stock market slumped by more than 30 % as a result of some new measures taken by the Chinese supervisory authority in order to curb risky investment behaviour on the part of the shadow banking sector. The subsequent concerns were exacerbated by the People's Bank of China's announcement on 11 August of

an adjustment to its foreign exchange policy. Although this decision was presented as a transition to a more market-conform valuation of the renminbi and although the resulting depreciation of the Chinese currency was small, the markets interpreted it as a signal that the Chinese economy would continue to slow down. Financial market volatility increased, stock markets fell, commodity prices declined and the flight into safe assets drove down yields on government bonds in the advanced countries. Later, calm was gradually restored on the financial markets.

As in the previous year, developments on the foreign exchange markets of the advanced countries reflected monetary policy divergences in the various economic regions. While the ECB announced an extension of its asset purchase programme on 22 January, the American central bank had ended its purchase programme in October of the previous year. The sharp depreciation of the euro against the dollar in the run-up to these events also persisted at the beginning of this year. However, as the markets began to expect postponement of the normalisation of monetary policy in the United States, the euro appreciated against the dollar to some extent during the year. Nevertheless, the euro depreciated again recently as the markets have clearly begun to take account of a new divergence in monetary policy between the euro area and the United States from December 2015.

After having fallen steeply from mid-2014, oil prices picked up again in the initial months of the year. This temporary rally followed signals indicating that production of shale oil in the United States was gradually being adapted to a decline in oil prices, and that global demand for oil was edging upwards again. Similarly, prices of

TABLE 1 PROJECTIONS FOR THE MAIN ECONOMIC REGIONS

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

	2014	2015 e	2016 e	2017 e
Real GDP				
World	3.3	3.1	3.5	3.7
of which:				
Advanced countries	1.8	2.0	2.3	2.3
United States	2.4	2.6	2.8	2.7
Japan	–0.1	0.7	1.1	0.5
European Union	1.4	1.9	2.0	2.1
Emerging countries	4.5	3.9	4.4	4.7
China	7.4	6.8	6.5	6.2
India	7.1	7.2	7.4	7.5
Russia	0.6	–3.7	–0.5	1.0
Brazil	0.1	–2.6	–0.5	1.2
p.m. World imports	*3.3*	*2.3*	*3.6*	*4.5*
Inflation (1)				
United States	1.6	0.2	2.1	2.3
Japan	2.7	0.8	0.7	1.8
European Union	0.6	0.0	1.1	1.6
China	2.1	1.7	2.5	2.5
Unemployment (2)				
United States	6.2	5.3	4.8	4.6
Japan	3.6	3.4	3.3	3.3
European Union	10.2	9.5	9.2	8.9

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

food and industrial commodities surged briefly in the first half of the year. During the summer, however, commodity prices resumed their downward trend. Although the weakness of demand in the emerging countries is a factor, it is primarily the abundant supply that continues to depress oil prices. As for metals, their prices have suffered mainly as a result of diminished demand from the emerging countries, although the increase in supply, in the wake of rising investment in mining production, is also playing a role.

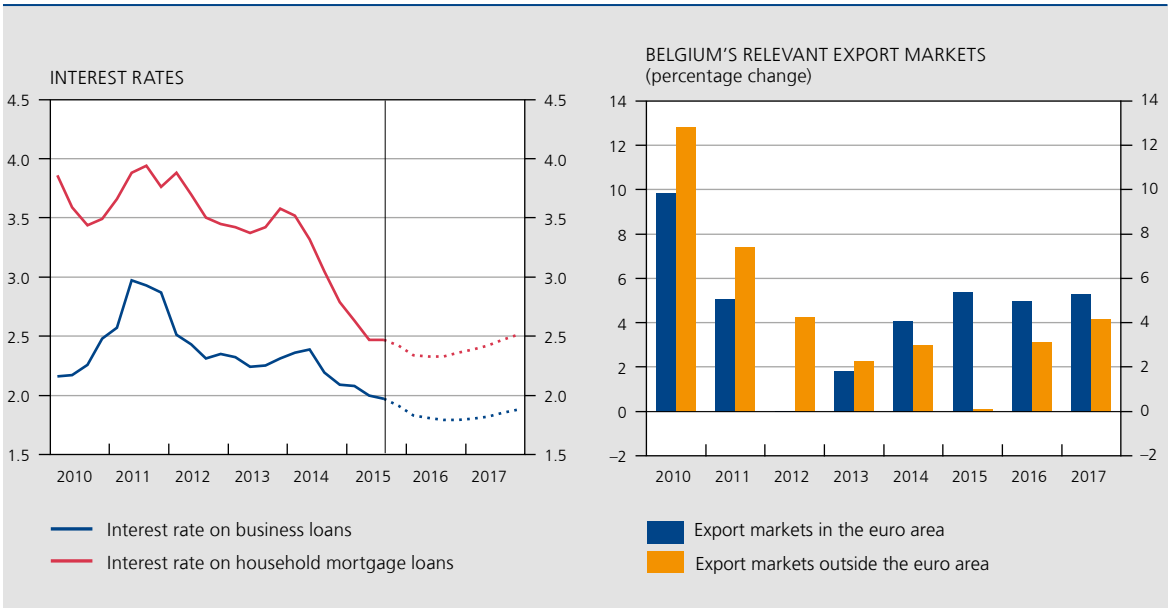
Box 1 – Assumptions adopted for the projections

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. 13 November 2015. 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. In mid-November 2015, following the decline which had begun in the autumn of 2014, the markets expected to see the price per barrel of Brent begin rising gradually over the projection horizon, from an average of $ 48.2 in the final quarter of 2015 to just under $ 58 in the last quarter of 2017. Once again, this implies a substantial downward revision compared to the assumptions for the spring 2015 projections.

INTEREST RATES AND VOLUME GROWTH OF EXPORT MARKETS
(in %)



Source: Eurosystem.

The interest rate assumptions are likewise based on market expectations in mid-November 2015. The three-month interbank deposit rate is projected at –10 basis points in the last quarter of 2015 and is actually likely to dip a little further after that before gradually rising by the end of the projection period to around –6 basis points. The level of Belgian long-term interest rates is projected to rise more sharply from 0.9 % in the fourth quarter of this year to 1.5 % at the end of 2017.

However, the predicted movement in bank interest rates on business investment loans and household mortgage loans may diverge somewhat from the movement in market rates. For instance, the average mortgage interest rate is unlikely to track the upward movement in long-term market rates and will probably remain fairly steady over the whole of the projection period, notably on account of the particularly accommodative monetary policy of the ECB and the resulting abundant liquidity. 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 : at the end of 2017, it is forecast at 1.9 %, which is very similar to the current figure.

The outlook for global economic growth excluding the euro area has clearly worsened since the spring projections published in June 2015, particularly for the emerging economies. Moreover, the recent sluggishness of international trade mentioned above has led to a new downward revision of the trade intensity of world growth. That has a particularly adverse effect on the growth of foreign markets outside the euro area, which is predicted to subside to virtually zero in 2015, the lowest growth rate since the great recession of 2009. The expansion of foreign markets within the euro area has undergone a smaller downward adjustment in relation to the spring projections. Overall, the growth of the foreign markets relevant for Belgian exports should continue to strengthen steadily, approaching 5 % in 2017.

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 prices that competitors charge on the export markets are a key factor in the cost aspects of that competitiveness. Partly as a result of the euro's depreciation, competitors' prices on the export markets will have risen by 3 % in 2015 whereas they declined in both 2013 and 2014. Rising inflation in the euro area, but also elsewhere, will gradually lead to renewed upward pressure on the prices of Belgian exporters' competitors in 2017, regardless of exchange rate fluctuations.

EUROSYSTEM PROJECTION ASSUMPTIONS

(in %, unless otherwise stated)

	2015	2016	2017
		(annual averages)	
EUR/USD exchange rate	1.11	1.09	1.09
Oil price (US dollars per barrel)	53.8	52.2	57.5
Interest rate on three-month interbank deposits in euro	0.0	–0.2	–0.1
Yield on ten-year Belgian government bonds	0.9	1.1	1.4
Business loan interest rate	2.0	1.8	1.8
Household mortgage interest rate	2.5	2.3	2.4
		(percentage changes)	
Belgium's relevant export markets	3.1	4.2	4.8
Export competitors' prices	3.0	1.0	2.2

Source : Eurosystem.

1.2 Estimates for the euro area

Regarding the euro area, the Eurosystem's autumn projections are a little less optimistic than they were in the latest spring projections, and are very similar to the estimates that the ECB published in September 2015. Growth is forecast to surge, reaching 1.5 % this year, and should even rise to around 2 % in 2017. The recovery is supported by favourable initial conditions, such as a cheaper euro and low interest rates which monetary policy has helped to bring about. Despite the relatively large gains in market shares, the weakening of foreign demand is likely to curb the growth contribution of net exports. Nonetheless, that will be offset by a strong rise in domestic demand and, more particularly, private consumption and investment.

Inflation in the euro area dropped to a low point in January 2015 but has since picked up, mainly as a result of the resurgent oil price; nevertheless, it will remain at virtually zero, on average, this year. The projections assume that inflation will continue rising to an average of 1.6 % in 2017. That picture is due only partly to the expected reversal of the pressure from prices of volatile components such as oil prices. In fact, core inflation – i.e. inflation excluding those volatile components – is also set to virtually double during the projection period, rising to 1.6 % in 2017. That rise is attributable not only to accelerating wages and the increase in corporate profit margins but also to the delayed impact of the weaker euro which makes imports more expensive.

The labour market recovery strengthened this year, and employment is expected to continue expanding at a relatively rapid pace until 2017. Of course, that improvement will be encouraged by the strengthening economic growth and by the impact of both the recent labour market reforms and the specific measures designed to curb the rise in labour costs in certain countries. In the euro area as a whole, unemployment is set to continue falling, dropping to around 10 % in 2017, almost two percentage points below the 2013 figure. The increase in net immigration due to the influx of refugees will expand the labour supply.

The average budget deficit in the euro area is forecast at 1.8 % of GDP in 2017. However, that decline will be due solely to the improvement in the economic situation and the continuing fall in interest charges resulting from the abnormally low interest rates. Conversely, the fiscal policy stance is likely to ease slightly during the period considered.

2. Activity and demand

During the first half of 2015, economic activity regained momentum in Belgium, recording an average growth rate comparable to that seen in the second half of 2014 and corresponding to annual growth of around 1.5 %. Growth was driven largely by the strong expansion of private consumption, itself supported by improved consumer confidence and, more particularly, the prospect of lower

TABLE 2 EUROSYSTEM PROJECTIONS FOR THE EURO AREA

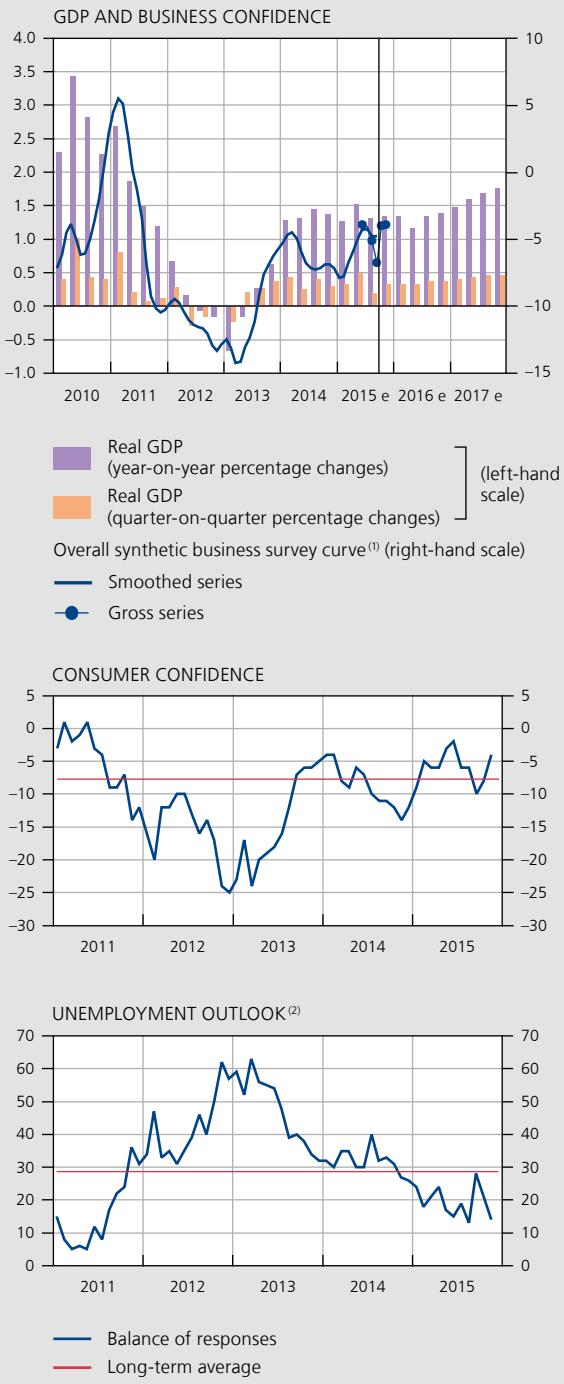
(volume data, percentage changes compared to the previous year, unless otherwise stated)

	2015 e	2016 e	2017 e
GDP	1.5	1.7	1.9
Household and NPI final consumption expenditure	1.6	1.9	1.7
General government final consumption expenditure	1.4	1.2	1.0
Gross fixed capital formation	2.3	2.8	3.8
Exports of goods and services	4.8	4.0	4.8
Imports of goods and services	5.3	4.8	5.3
Inflation (HICP)(1)	0.1	1.0	1.6
Core inflation(1)(2)	0.9	1.3	1.6
Domestic employment(1)	1.0	1.0	1.0
Unemployment rate(3)	11.0	10.5	10.1
General government financing requirement (–) or capacity(4)	–2.0	–2.0	–1.8

Source: ECB.
(1) Percentage changes compared to the previous year.
(2) Measured by the HICP excluding food and energy.
(3) In % of the labour force.
(4) In % of GDP.

CHART 2 GDP AND CONFIDENCE INDICATORS

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



Sources: NAI, NBB.

(1) Non seasonally adjusted data.

(2) In regard to the outlook for unemployment, a rise in the chart indicates a deterioration and a fall indicates an improvement.

unemployment, and by the rise in real incomes resulting from the sharp fall in oil prices. On the production side, the recovery was evident in all major branches of activity, even though growth was underpinned mainly by the expansion of activity in market services.

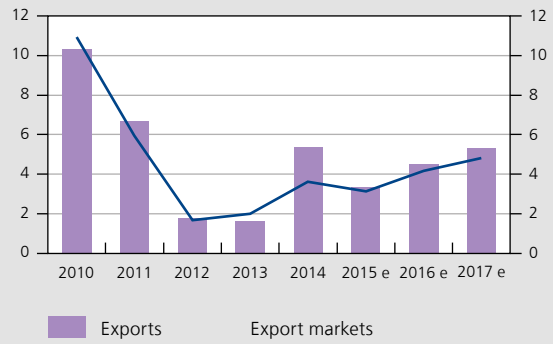
However, from the summer, the Belgian economy like that of the euro area ran out of steam. Although the growth estimated by the Bank in June 2015 for the second and third quarters is fairly close to the current quarterly statistics, according to the NAI's initial "flash" estimate that weakening seems to be slightly more pronounced than was assumed in the spring projections: quarterly growth, which still came to 0.5 % in the second quarter, dropped to barely 0.2 % in the third quarter. That fall is clearly linked with the global economic slowdown, which is accompanied by a marked deterioration in confidence indicators. Consumer confidence has been declining steeply after June, dropping for a time below its long-term average. Another striking point is that in September – following a tendency to improve for about a year – the unemployment outlook suddenly deteriorated to the level prevailing at the end of the previous year, although that was probably due mainly to the heightening of specific geopolitical tensions. Business confidence has also dipped sharply since the summer according to the Bank's surveys.

However, these confidence indicators show a recovery at the start of the final quarter. Against that background, our short-term forecasts for that quarter indicate a slight increase in quarterly growth at around 0.3 %, which would ultimately put year-on-year growth at 1.4 % for 2015. Growth is projected to dip very slightly in 2016 before regaining strength to reach 1.6 % in 2017. In comparison with the 2015 spring projections, the current estimates imply a small upward revision in the annual growth expected for 2015, despite the slightly sharper slowdown in the second half of the year. However, that is due purely to a carry-over effect which, owing to the upward adjustment of growth for 2014 in the annual accounts published at the end of September 2015, is more favourable than was suggested by the statistics available at the time of the spring projections.

Domestic demand will have provided substantial support for year-on-year growth in 2015, even though private consumption slowed significantly in the second half of the year as a result of waning confidence and the gradual disappearance of the favourable impact of lower oil prices on income growth. Moreover, changes in inventories are also making a positive contribution to growth; firms curbed their stock reduction or speeded up their stock-building in the first half of the year, for the first time since 2011. Although it is possible – and even probable – that the same

CHART 3 EXPORTS AND EXPORT MARKETS

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



Sources: NAI, NBB.

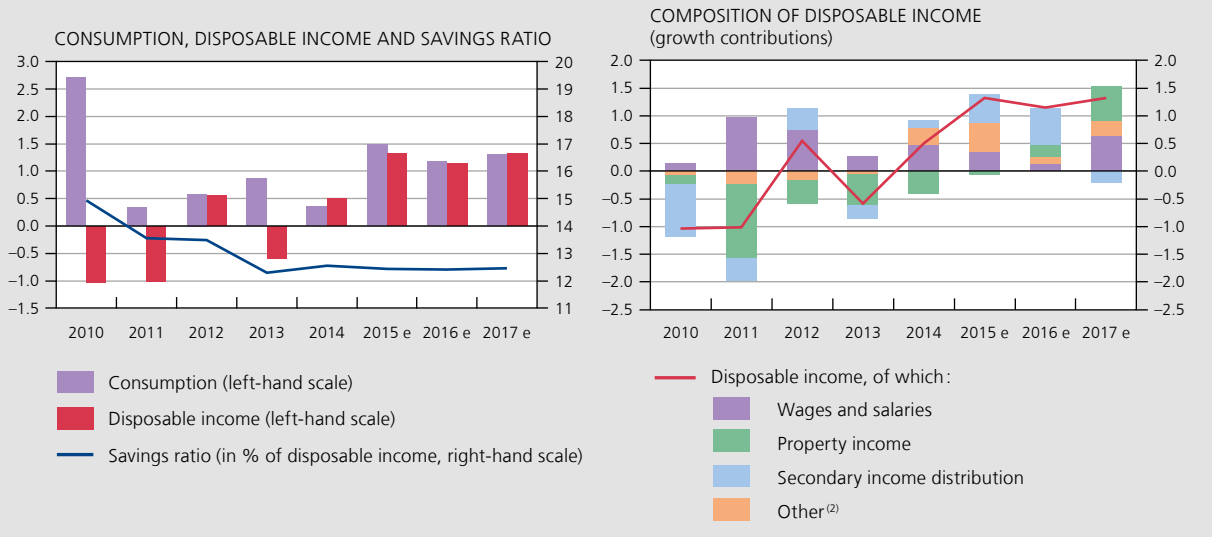
will apply in the near future, according to the technical assumptions adopted for all the quarters in the projection period, changes in inventories are as usual assumed to be growth-neutral, in particular in view of the great statistical uncertainty surrounding that concept. Furthermore, the positive contribution of inventories in 2015 is almost entirely offset by a negative growth contribution from net exports. Although exports have maintained an upward trend as a quarterly average and were stimulated in particular by the euro's depreciation, imports have risen faster on an annual basis. In that regard, it should be borne in mind that – although there was no impact on GDP growth – a number of major purchases of specific investment goods from abroad distorted the import growth figures somewhat, and consequently distorted business investment and domestic demand. Owing to carry-over effects, that will likewise apply to the 2016 growth figures. Leaving aside these specific factors, net exports are predicted to make a small positive contribution to growth in 2015.

While the growth estimate for the next two years – being slightly more cautious than in the spring projections – can be linked to the weaker spillover effect due to the moderate slackening of growth in the second half of 2015, it is attributable more generally to the downward adjustment to Belgium's export markets, as mentioned in Box 1.

Nevertheless, net exports will continue to make a positive, if small, contribution to growth over the next two years. Moreover, that is also the case following adjustment of the statistics to neutralise the effect of the specific purchases of foreign investment goods, it being understood that a number of major investments in the shipping sector are still taken into account for 2016.

CHART 4 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.a

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

More generally, the various measures aimed at moderating labour costs, such as the index jump, reductions in employers' charges and restrictions on the increase in collectively agreed wages, should lead to an improvement in the cost competitiveness of Belgian exporters. The increase in unit labour costs, which will be examined in more detail in section 4, is in fact still well below that recorded in the main neighbouring countries and in the euro area as a whole. Although this cost advantage is only reflected in prices after a time lag, and not necessarily in full – generating an increase in corporate margins, particularly in the short term – it will exert a moderating effect on prices of tradable goods and services, in particular, which will benefit exports. These projections therefore assume that Belgian exports will increase their market shares further by around 0.2 % to 0.5 % per annum.

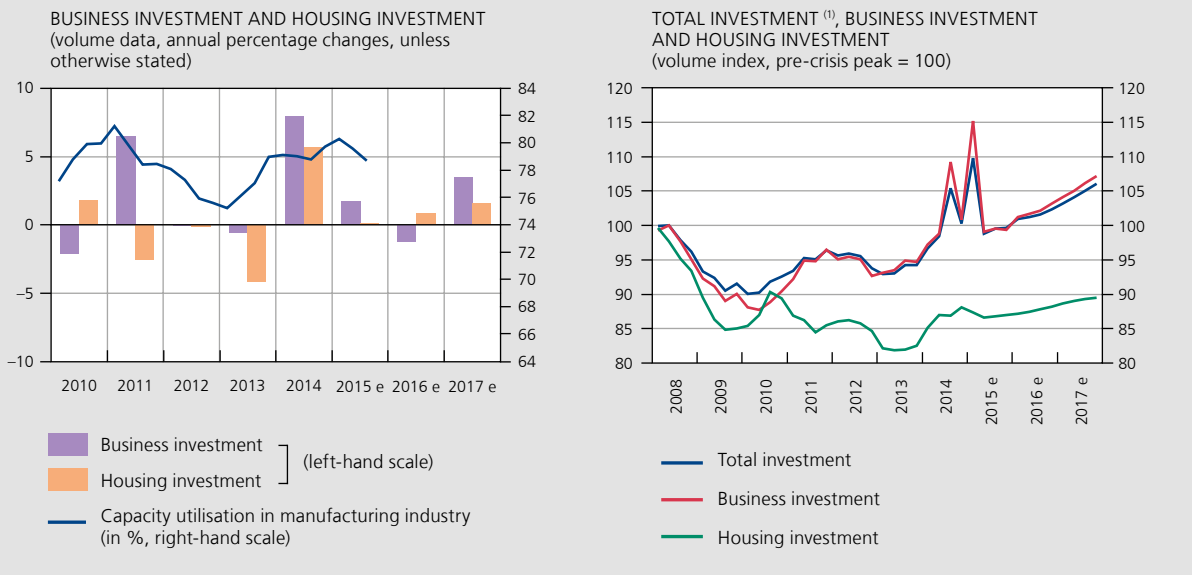
At the end of the projection period, the growth contribution of net exports will diminish. On the one hand, exporters will make smaller gains in market shares during 2017, owing to the marked rise in labour costs in that year. Also, the growth of domestic expenditure, including private consumption in particular, will drive up import growth.

In regard to domestic expenditure, private consumption is set to rise at a fairly moderate pace over the projection period as a whole, after declining from the summer of this year. The main reason for that is the limited growth of household incomes, attributable chiefly to primary labour incomes. Despite rising employment and the – admittedly small – increase in contractual wages, the latter should remain fairly flat in real terms in 2016. That is due to the impact of the index jump, which will continue to be felt until 2016, and the various increases in indirect taxes and levies on private consumption of electricity, introduced by the Flemish authorities. In addition, some of the increases in indirect taxes, such as excise duty on alcohol, tobacco and diesel, exert no upward effect on the health index and therefore do not cause an increase in indexation.

The very weak growth of primary labour incomes is also offset to a small degree by a more favourable distribution of secondary incomes. That results in particular from the cut in personal income tax, mainly in the case of low and middle incomes, introduced via the tax shift. In general, the growth of real household incomes will subside somewhat in 2016. Households are likely to cut their consumption to much the same degree so that their savings ratio will remain at the historically low level which it reached in 2015, and which is very similar to the average for the euro area.

In 2017, a marked revival in real labour incomes is expected, owing to the combined effects of stronger nominal wage growth supported by the reactivation of the indexation mechanisms and a slight dip in inflation. Insofar as Belgian households have substantial net financial assets, the assumed rise in the long-term interest

CHART 5 PRIVATE INVESTMENT



Sources: NAI, NBB.
(1) Also includes public investment.

rate, like the increase in corporate dividend payments, will trigger a steep rise in property incomes in 2017. However, a relatively larger proportion of those incomes will be saved; consumption growth is determined primarily by labour income and replacement benefits. Private consumption will thus gather pace somewhat in 2017, but at the same time the private savings ratio is also likely to rise slightly.

Household investment in housing is also set to increase only moderately. According to the current quarterly statistics, that investment was down sharply in the first half of the year, albeit following strong growth in 2014. That fall may be due partly to anticipation effects following the announcement of a reduction in the housing bonus in the Flemish Region with effect from 1 January 2015, which prompted many households to bring forward their building plans or the purchase of an existing home in the Region. Secondary market transactions may influence the investment figures since the registration fees paid fall in that category in accordance with the ESA 2010 methodology. The current forecasts assume a very gradual return to normal followed by a recovery, so that year-on-year growth will be virtually zero in 2015, but will begin rising in the ensuing two years. That recovery will gain further support, especially in 2016, from the persistently low mortgage interest rates. However, at the end of 2017, this investment is still expected to be about 10 % below the peak prevailing before the great recession.

The growth of business investment is much stronger, even though it is distorted by some specific major purchases of foreign investment goods. Thus, the apparent fall in business investment in 2016 is due solely to one specific purchase in the pharmaceutical industry at the beginning of 2015. Excluding specific factors, business investment is expected to grow steadily during the projection period, reaching an annual growth rate in the region of 4 % by the end of 2017.

Business investment growth will be supported by the increase in corporate profit margins combined with firms' substantial cash reserves, the low interest rate environment and the easing of financing conditions. Moreover, capacity utilisation in manufacturing industry has been a little higher than the long-term average for some time now, so that the growth of demand will increasingly generate investment in expansion. At the beginning of 2016, business investment should regain the level prevailing before the great recession.

In the case of public expenditure, the volume growth of government consumption is likely to decline in 2016 and 2017, owing to the consolidation measures aimed partly at reducing the size of the workforce. The volume of public investment will accelerate sharply this year – in particular because school-building is being stepped up, principally in the Flemish Community – before growth slows somewhat in 2016 and 2017.

TABLE 3 GDP AND MAIN EXPENDITURE CATEGORIES

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

	2013	2014	2015 e	2016 e	2017 e
Household and NPI final consumption expenditure	0.9	0.4	1.5	1.2	1.3
General government final consumption expenditure	–0.1	0.6	0.6	0.4	0.4
Gross fixed capital formation	–1.7	7.0	1.8	–0.4	3.0
general government	–3.7	4.0	5.6	1.6	3.1
housing	–4.1	5.7	0.2	0.9	1.6
businesses	–0.5	8.0	1.8	–1.2	3.5
p.m. Domestic expenditure excluding change in inventories	*0.0*	*1.9*	*1.3*	*0.6*	*1.5*
Change in inventories[1]	–0.7	–0.2	0.5	0.1	0.0
Net exports of goods and services[1]	0.7	–0.4	–0.5	0.6	0.2
Exports of goods and services	1.6	5.4	3.4	4.5	5.3
Imports of goods and services	0.8	5.9	4.0	3.9	5.3
Gross domestic product	0.0	1.3	1.4	1.3	1.6

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

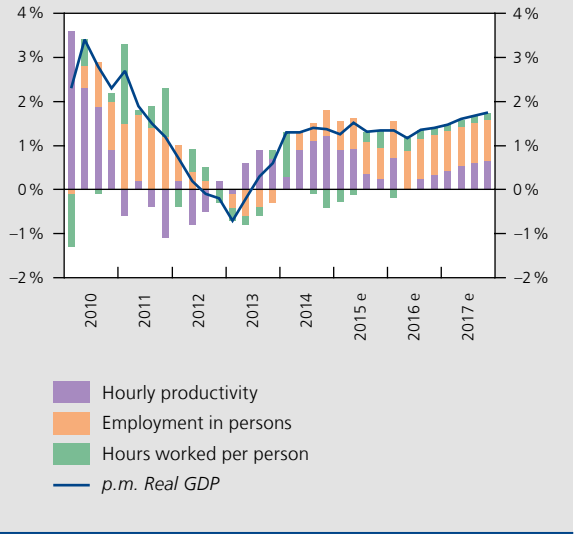
3. Labour market

The economic recovery from the second quarter of 2013 soon led to the expansion of employment, which grew quite steadily by around 0.1 to 0.2 % quarter-on-quarter, although at first that revival was offset by a slight reduction in average working time per person. During the projection period, demand for labour should continue to rise steadily and, according to the current forecasts, will hardly be affected by the slight slowdown in activity from the second half of 2015, due in particular to the various measures to reduce labour costs and make it cheaper for employers to take on staff. However, this implies that labour productivity will dip sharply at the start of the projection period and will improve only gradually as economic growth gains momentum. Since the number of hours worked per person will only increase slightly, the growing demand for labour will be almost entirely reflected in rising employment.

Overall, domestic employment is projected to expand by 114 000 units during the period 2015-2017, driven not only by the activity revival but also by the policy of wage moderation. Both self-employed workers and employees will contribute to the jobs growth. In contrast to earlier

CHART 6 DOMESTIC EMPLOYMENT, WORKING TIME AND PRODUCTIVITY

(contributions to annual 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 e	2016 e	2017 e
Total population	57	55	53	58	56
Working age population	12	9	10	16	11
Labour force	6	29	13	27	24
Frontier workers	–1	–1	0	0	0
Domestic employment	–18	16	32	40	42
Employees	–24	9	23	31	32
Branches sensitive to the business cycle (1)	–25	–4	11	18	22
Public administration and education	3	5	–2	1	–3
Other services (2)	–1	7	14	12	13
Self-employed	6	7	9	9	10
Unemployed job-seekers	25	14	–18	–13	–18
p.m. Harmonised unemployment rate (3) (4)	*8.5*	*8.6*	*8.7*	*8.4*	*8.1*
Harmonised employment rate (3) (5)	*67.2*	*67.3*	*67.1*	*67.3*	*67.8*

Sources: FPB, EC, DGS, NAI, NBB.

(1) Agriculture, industry, energy and water, construction, trade, hotels and restaurants, transport and communication, financial services, real estate activities and business services.

(2) Health, welfare, community, social and personal services, and domestic services.

(3) On the basis of data from the labour force survey.

(4) In % of the labour force (15-64 years), gross data.

(5) Persons in work in % of the total working age population (20-64 years).

years, branches sensitive to the business cycle will be the main engine of that growth, followed by other services. As a result of the government's economy measures, the workforce in public administration and education will shrink, halting the upward trend of the past decade. The growth of the working age population has already been slowing down for some time owing to ageing, but the effect on the labour force is partly offset by the upward trend in the participation rate. That is supported by the increase in the participation rate of older workers as a result of the measures taken by the federal government to limit early departure from the labour market, such as the abolition of the status of older unemployed persons and the tougher criteria for access to the system of unemployment with employer top-up. In addition, the current higher net inflow of migrants, and particularly refugees, is slightly enlarging the working age population; the impact of that will only become clear in the average annual figures from 2016 onwards. It is therefore mainly from that year onwards that the growth of the population of working age and the labour force has been revised upwards compared to the spring forecasts.

Nonetheless, labour demand is still growing strongly enough to absorb that larger increase in the labour force. The number of unemployed should begin to fall from 2015, after having risen for three consecutive years. Although that fall will slow somewhat in 2016, the number of unemployed at the end of the projection period should still be around 49 000 lower than at the start of 2015. The harmonised unemployment rate determined on the basis of the labour force survey and the International Labour Office definitions, expressing the ratio between the number of unemployed persons available for the labour market and actively seeking work (regardless of whether they are registered with the NEO as unemployed and entitled to benefits) and the labour force, should consequently fall from 8.6 % in 2014 to 8.1 % in 2017.

4. Prices and costs

As in the spring projections, labour costs in the first part of the projection period are pushed down by the various measures taken by the federal government to reduce the wage gap with respect to the three main neighbouring countries and to improve the cost competitiveness of Belgian firms. Those measures include the freezing (in 2015) and the moderation (in 2016) of negotiated wage increases, the temporary suspension of the indexation mechanisms (index jump) and the further substantial reductions in levies on labour in 2016 (planned earlier as a part of the competitiveness pact) via, *inter alia*, additional reductions in employers' social security contributions and an increase in the payroll tax exemption for night and shift work.

TABLE 5 PRICE AND COST INDICATORS

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

	2013	2014	2015 e	2016 e	2017 e
Labour costs in the private sector (1)					
Labour costs per hour worked	2.5	0.6	0.2	0.2	1.9
of which indexation	1.9	0.8	0.1	0.4	1.1
Labour productivity (2)	0.4	0.9	0.6	0.3	0.5
Unit labour costs	2.1	–0.3	–0.4	–0.1	1.3
p.m. Labour costs per hour worked according to the national accounts (3)	*2.5*	*0.7*	*0.3*	*0.1*	*1.7*
Core inflation (4)	1.4	1.5	1.6	1.4	1.4
Energy	–4.6	–6.0	–7.7	4.0	3.2
Food	3.6	0.8	1.8	2.4	2.0
HICP	1.2	0.5	0.6	1.9	1.7
Health index	1.2	0.4	1.1	1.7	1.4

Sources: EC; FPS Employment, Labour and Social Dialogue; 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 labour cost for firms.

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

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

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

Via the tax shift, the reduction in labour costs will be strengthened in 2016. The intention is to cut the average rate of employers' contributions to 25 % in 2018, with a specific focus on low and medium wages. Moreover, additional measures were taken to encourage job creation in SMEs, e.g. via specific reductions in labour costs which, since this is a target group measure, are also recorded as a subsidy according to the ESA 2010 methodology.

In order to cut the rate of the employers' contributions to 25 %, it was also decided to convert the existing linear exemption from payment of the payroll tax of 1 % in the profit sector into a reduction in employers' contributions. However, in contrast to the measures mentioned above, that decision does not imply any actual reduction in labour costs for employers, and therefore has no macroeconomic impact since it only represents a (statistical) shift between wage subsidies and social contributions.

However, wage subsidies are not included in the concept of labour costs as traditionally measured in the national accounts. Table 5 above shows both concepts, but it is mainly the broader definition – including wage subsidies – that is relevant for firms. It shows labour costs per hour worked in the period 2016-2017 rising slightly faster than according to the national accounts concept. The reason is that the amount of the accounting shift concerning the 1 % exemption of the payroll tax which distorts the latter concept exceeds the further extension of wage subsidies which are not included in the national accounts concept.

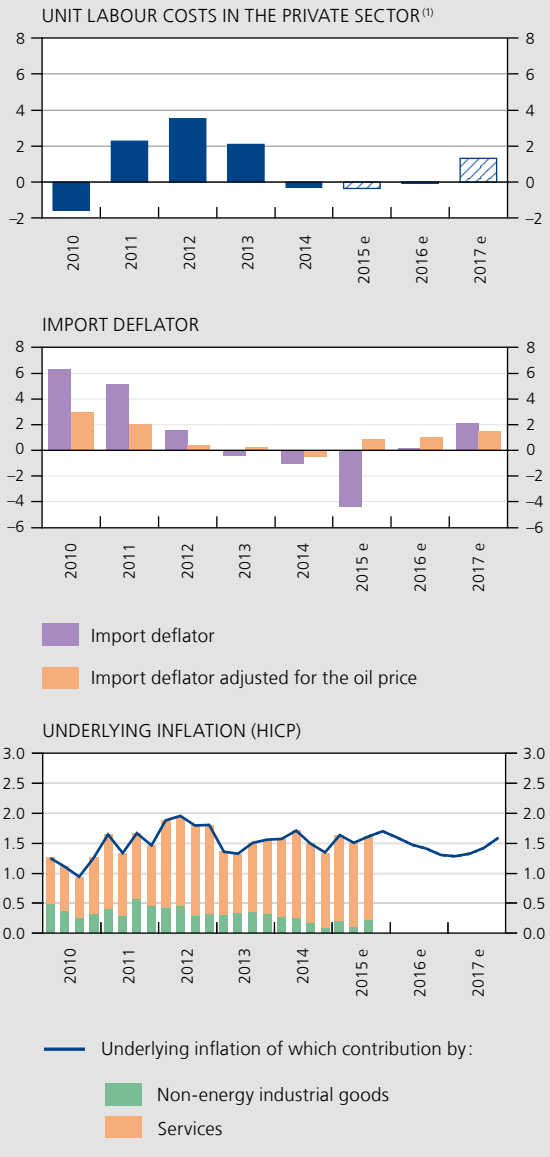
Overall, these reductions in charges on labour should cut labour costs per hour worked by around 1 % over the projection period, the main impact being felt in 2016. Owing to the tax shift, that represents roughly twice the estimated impact in the spring projections. Nevertheless, it is noticeable that unit labour costs have not been revised downwards to the same degree, the reason being that the impact of the larger reduction in charges on labour is largely offset by two other factors. On the one hand, the slower growth of productivity in 2016 drives up unit labour costs. Inflation also accelerates faster and some new indirect taxes, particularly those which increase the price of electricity, propel the health index higher. As a result, the effects of the index jump disappear sooner than foreseen in the spring projections, and the indexation mechanisms will be activated again by the end of the first quarter of 2016. Although this will naturally be a gradual process which depends on the specific indexation mechanisms in each branch of activity, it will already increase wage indexation in 2016, but particularly in 2017.

In regard to the other elements of wage growth, it is assumed – as in the spring projections – that the maximum scope of 0.67 % for collectively agreed wage increases according to the wage norm imposed by the federal government will be used in full in 2016 following three years without any real negotiated increases and in a context of a steady labour market recovery. The estimates for the wage drift are also largely unchanged.

Generally speaking, unit labour costs are forecast to decline in 2016 for the third consecutive year. In 2017,

CHART 7 LABOUR COSTS AND UNDERLYING INFLATION

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



Sources: EC, NBB.

(1) Including wage subsidies and target group reductions.

labour costs are likely to rise quite sharply again. On the one hand, rising inflation means that the indexation effect will already exceed 1 %. On the other hand, negotiated wage increases are likely to accelerate. The scope for real negotiated increases in 2017 is not yet known since the outcome of the negotiations for a central agreement for that year will only become clear in 2016. As in the spring forecasts, however, the current estimates are based on the technical assumption of negotiated wage growth of 0.9 %. This slight acceleration of agreed wages compared to the growth in 2016 takes account of both the continued labour market recovery and the expected further narrowing of the wage gap in relation to neighbouring countries, which will gradually create more scope for real pay increases.

In principle, the very moderate rise in labour costs should be reflected – after a certain time lag – in prices, and more particularly in the underlying inflation rate, which excludes the prices of volatile components, namely food and energy. However, in recent years, that underlying inflation has remained practically unchanged, especially on a annual basis. In the final quarter of 2015, underlying inflation is still estimated at around 1.7 %. As regards the foreign components of the cost structure, import prices rose as a result of the fall in the euro after the summer of 2014, which was connected with (expectations concerning) monetary policy easing in the euro area. That considerably increases the price of imported goods, in particular, or goods requiring imported intermediate inputs. That applies particularly to non-energy industrial goods, and to a lesser extent to services. On the other hand, imported oil has become much cheaper, so that energy costs for Belgian firms have fallen, and average import prices actually declined in 2015.

Furthermore, underlying inflation in Belgium has hitherto remained relatively high in Belgium, compared to the euro area and the main neighbouring countries, despite the very favourable trend in labour costs. In the services sector in particular, price rises have remained persistent up to now, possibly because of certain structural factors such as a relatively low level of competition on certain services markets and fairly small productivity gains. The existence of various indexation mechanisms which determine pricing on many markets and which lead to only partial or delayed adjustment of prices in line with the underlying cost structure may also play a role.

However, the current inflation forecasts indicate that the very modest domestic cost pressure and the disappearance of the impact of the euro's depreciation will gradually bring down underlying inflation, although the reduction will be very small. By the end of 2016, underlying inflation is forecasted to fall to around 1.3 % before rising again as a result of increasing labour costs. Expressed as an annual average, underlying inflation will therefore remain relatively stable over the projection period, albeit at a slightly lower level than at present.

Headline inflation is determined not only by underlying inflation but also by the prices of the volatile components, namely energy and food prices, and the influence of exogenous factors such as indirect taxation.

The various increases in levies on consumption will have a significant direct impact on the inflation figure. For instance, the excise duty on diesel, alcohol, tobacco and soft drinks will increase (or has already done so), and the VAT on household electricity consumption went up again in September from 6 % to 21 %. Apart from these measures introduced by the federal government in order to fund the tax shift, the Flemish government has also adopted certain measures which increase prices, notably the electricity price. For instance, from 2016, a levy is being introduced which aims to eliminate the historical debt accumulated by the electricity distribution network operators, due to the compulsory granting of subsidies to Flemish households that produce energy themselves. In addition, some regulated prices, such as higher education registration fees, are being increased. Although these and other measures by the Flemish government only increase prices in the Flemish Region, they drive up the average Belgian inflation and, in so far as they are included in the health index – which is the case here – they lead to higher indexation of Belgian wages and replacement incomes.

The movement in energy and food prices also drives inflation higher during the projection period. In view of the oil price assumptions presented in Box 1, the negative impact of the movement in energy prices on headline inflation should gradually diminish and turn into a positive contribution from 2016. Together with the expected sharper rise in food prices, that will lead to a clear increase in inflation despite the initially flat and then falling underlying inflation trend. Although inflation this year will be barely higher, on average, than last year's figure, the annual average will increase to 1.9 % from 2016 and only dip slightly to 1.7 % in 2017. About a third of the relatively high inflation in 2016 will be attributable to the federal and Flemish measures concerning indirect taxes and regulated prices. The health index, which is determined by the national consumer price index excluding alcohol, tobacco and motor fuels, is also forecast to increase from 1.1 % in 2015 to 1.7 % in 2016 and 1.4 % in 2017.

5. Public finances

5.1 General government balance

According to the latest estimates, the public finances should end the year 2015 with a deficit of 2.9 % of GDP. In the macroeconomic context described in this article, that deficit will again equal 2.9 % of GDP in 2016 before declining to 2.5 % in 2017.

The deficits are likely to be concentrated mainly on the federal government, but the Communities and Regions will also record further – albeit smaller – deficits during the projection period. Conversely, the social security accounts should be more or less in balance.

The reduction in the general government deficit between 2014 and 2017 is due solely to the decline in interest charges. The expectation is that public loans maturing can be refinanced at interest rates favourable to the government. Primary expenditure is set to fall by 1.5 percentage points of GDP, as a result of the index jump and other economy measures adopted by the various governments and local authorities. The revenue ratio is predicted to fall by roughly the same amount. Consequently, the primary balance which was in equilibrium in 2014 should remain fairly stable over the projection period.

These projections take account of all the budget measures which have already been announced and are specified in sufficient detail, including the tax shift introduced by the federal government to alleviate the heavy tax burden on labour incomes and transfer it to other tax bases. The expenditure included in the estimates is likely to be higher than the budget figures because of the lack of detail concerning a number of measures, such as those relating to social security expenditure and the redesign of the federal authorities, and the assumption that the under-utilisation of appropriations will be slightly less than the government expects. The estimated government revenue is also lower than the budget figures as a result of the expectation that VAT revenues will rise more slowly, the fact that (owing to an agreement within the Eurosystem) the proceeds of the measures to combat tax evasion cannot be taken into account, and a lower estimate of the yield from some measures. The projections indicate that additional consolidation measures are needed in order to attain the budget targets aimed at achieving a structural balance in 2018.

5.2 Revenue

Public revenues expressed as a percentage of GDP are projected to fall by 0.9 percentage point in 2015 and by a further 0.3 percentage point in both 2016 and 2017. This means that the decline in the revenue ratio which began

TABLE 6 GENERAL GOVERNMENT ACCOUNTS
(in % of GDP)

	2014	2015 e	2016 e	2017 e
General government				
Revenue	52,0	51,1	50,8	50,4
Primary expenditure	52,0	51,2	51,0	50,5
Primary balance	0,0	–0,1	–0,2	–0,1
Interest charges	3,1	2,8	2,6	2,4
Financing requirement (–) or capacity	**–3,1**	**–2,9**	**–2,9**	**–2,5**
Overall balance per sub-sector				
Federal government (1)	–2,5	–2,5	–2,5	–2,0
Social security	0,0	0,1	0,0	0,0
Communities and Regions (1)	–0,4	–0,3	–0,3	–0,3
Local authorities	–0,2	–0,2	–0,1	–0,2

Sources : NAI, NBB.

(1) These figures 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.

TABLE 7 PUBLIC REVENUES[1]
(in % of GDP)

	2014	2015 e	2016 e	2017 e
Fiscal and parafiscal revenues	44.8	44.2	43.9	43.6
Levies applicable mainly to labour income	26.2	25.8	24.7	24.4
Personal income tax[2]	11.6	11.3	10.7	10.6
Social contributions[3]	14.5	14.5	14.0	13.8
Taxes on corporate profits[4]	3.2	3.3	3.5	3.5
Levies on other incomes and on assets[5]	4.4	4.2	4.3	4.3
Taxes on goods and services	11.1	10.9	11.4	11.5
of which:				
VAT	6.9	6.8	7.0	7.1
Excise duty	2.1	2.1	2.2	2.2
Non-fiscal and non-parafiscal revenues[6]	7.2	6.8	6.9	6.9
Total revenues	52.0	51.1	50.8	50.4

Sources: NAI, NBB.
(1) In accordance with the ESA 2010, total revenue of general government does not include the proceeds of customs duties which the government transfers to the EU, nor the revenues collected directly by the EU.
(2) Mainly payroll tax, advance payments, assessments and the additional percentages on personal income tax.
(3) Including the special social security contribution and the contributions of persons not in work.
(4) Mainly advance payments, assessments and withholding tax on movable property incomes.
(5) Mainly withholding tax on income from movable property of individuals, withholding tax on income from immovable property (including the proceeds of additional percentages), and inheritance taxes and registration fees.
(6) Property income, imputed social contributions, current transfers and capital transfers from other sectors, plus sales of goods and services produced.

in 2014 will persist, with a particularly sharp reduction in the levies on earned incomes.

The contraction of revenues in 2015 is due to both a decline in fiscal and parafiscal revenues and a reduction in other revenues. Personal income tax and social contributions are depressed by the reduction in the share of wages in GDP resulting from the index jump and the freezing of real negotiated wages. In the case of personal income tax, that effect is augmented by the increase in flat-rate deductible business expenses taken into account in calculating the payroll tax. The withholding tax on income from movable property will also decline as a result of the change in the law concerning liquidation surpluses, whereby the withholding tax was increased from 10 to 25 % in October 2014, causing a temporary rise in these revenues. Taxes on goods and services are also down, mainly because of the decline in VAT revenues resulting from a marked increase in refunds. Taxes on corporate profits have risen following the imposition of corporation tax on some intermunicipal associations and the reduced impact of the notional interest deduction resulting from the lower reference interest rate and a restriction on the use of that system by the banks. Since the effect of these measures will only be partially apparent in the advance payments in 2015, revenues from the assessments can be expected to rise further in subsequent years. The fall in non-fiscal and non-parafiscal revenues is due partly to the decline in the income that the State receives from various financial institutions. In addition, the transfer of responsibility for family allowances to the Communities under the sixth State reform has led to a shift from imputed to actual social contributions in the case of benefits paid to public sector workers.

In 2016, personal income tax is likely to be further depressed by a new rise in the flat-rate deductible business expenses and the adjustment of the tax scales aimed at boosting purchasing power, particularly for workers on low and middle incomes. In addition, employers' social security contributions are being cut from 1 April 2016 in order to improve the competitiveness of firms and stimulate employment. Taxes on goods and services will rise sharply as a result of the increase in the rate of VAT on electricity and higher excise duty on diesel, tobacco and alcohol.

In 2017, most of the revenue categories should remain fairly stable in relation to their 2016 level. However, social contributions are likely to fall slightly because the full impact of the cut in employers' contributions will then be felt.

5.3 Primary expenditure

Primary expenditure as a ratio of GDP are expected to fall sharply in 2015, and – if there is no change of policy – in the two ensuing years. In nominal terms, public expenditure should therefore expand more slowly than economic activity, so that the primary expenditure ratio should fall from 52 % of GDP in 2014 to 50.5 % in 2017.

These developments largely reflect the economy measures of the governments formed after the May 2014 elections. The principal effect is due to the index jump which will significantly curb the growth of social benefits and wages in 2015 and 2016 in all government sub-sectors. The federal government is also endeavouring to reduce its operating expenses by cutting the size of the public workforce and moderating purchases of goods and services. However, the impact of those measures will be partly offset by the new expenditure likely to be allocated to the refugee crisis, which was taken into account in the estimates. The growth of social security expenditure will also be curbed by a number of measures aimed, among other things, at keeping down the cost of health care. The Communities and Regions have also taken economy measures, notably concerning operating expenses in administration and education, and subsidies. Finally, the local authorities have likewise had to introduce cuts in order to maintain sound finances.

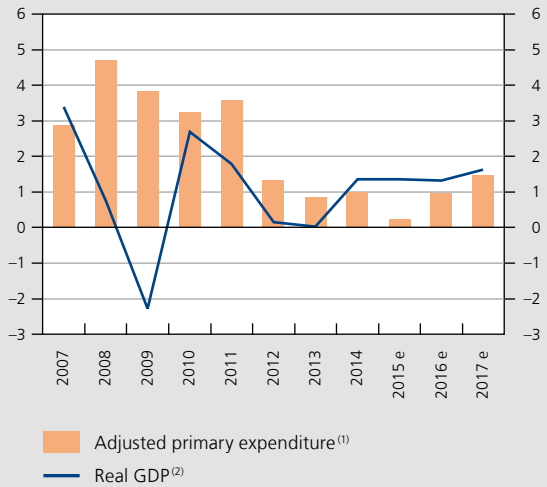
Following adjustment for non-recurring and cyclical factors and the effect of indexation, real primary expenditure should edge upwards by 0.2 % in 2015, which is 1 percentage point below real GDP growth. In 2016 and 2017, adjusted expenditure is forecast to increase again somewhat, by 1 and 1.5 % respectively, while remaining below real GDP growth.

5.4 Debt

The debt ratio has risen steadily since 2008, reaching 106.7 % of GDP at the end of 2014. In 2015, the public debt is projected to rise further to 106.9 % of GDP. That expansion is due to the endogenous increase in the debt amounting to 0.2 % of GDP. The reason is that the implicit interest rate is slightly higher than real GDP growth, and that is combined with a slightly negative primary balance. The impact on the debt of exogenous factors, so called because they influence the debt but not the overall balance, should be virtually neutral. Management of the public debt should reduce the debt ratio slightly, mainly as a result of the favourable effect of substantial issue premiums. The repayment of government loans and participations should also exert slight downward pressure on the debt ratio. That applies, for instance, to the repayment by KBC and Greece's repayment of part of the loan which

CHART 8 PRIMARY EXPENDITURE OF GENERAL GOVERNMENT AND GDP

(percentage changes compared to the previous year)



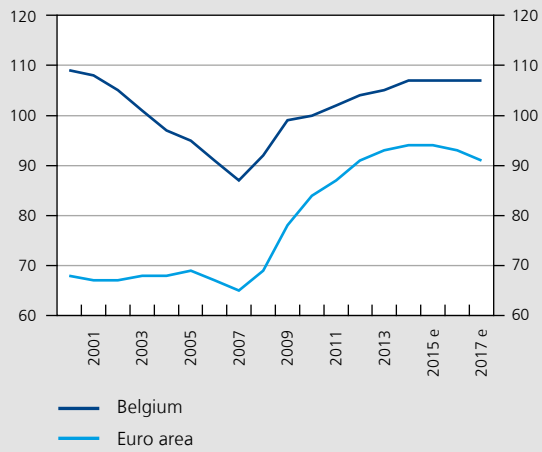
Sources: NAI, NBB.

(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.

CHART 9 CONSOLIDATED GROSS DEBT OF GENERAL GOVERNMENT

(in % of GDP)



Sources: EC, NAI, NBB.

that country received from the European Financial Stability Facility. Conversely, a number of factors, such as the expected increase in loans granted in connection with the social housing policy, will drive up the debt ratio.

In 2016, the public debt is forecast to climb further to 107.3 % of GDP. Despite an endogenous decline in the debt of 0.4 % of GDP brought about by rising nominal GDP, it will increase by 0.8 % of GDP as a result of exogenous factors. The latter are connected mainly with the management of the public debt and the expected further rise in social housing loans.

In 2017, owing to endogenous factors, the debt ratio is set to fall to 106.8 % of GDP, as nominal GDP growth is expected to considerably exceed the implicit interest rate on the public debt. The public debt should thus begin falling again for the first time since the outbreak of the financial crisis.

6. Conclusion and risk factor assessment

These autumn projections continue to present a scenario of gradual recovery which is largely in line with the previous estimates. However, the somewhat sharper-than-expected slowdown in the second half of 2015 and in particular the weaker outlook for world trade have resulted in a slight downward adjustment to the growth forecasts for 2016 and 2017 compared to the spring projections.

These projections are very similar – at least as regards growth – to those of the other institutions, such as the recent autumn forecasts issued by the EC. Some international institutions, such as the OECD and the IMF, are currently still expecting slightly stronger growth in 2016. When comparing the various estimates, it is necessary to bear in mind the different dates of the estimates and the information available when they were produced. For instance, the FPB's September 2015 estimate for the Economic Budget, which also puts growth at 1.3 % in 2016, was not able to take account of the measures relating to the tax shift. The divergences are greater in the case of the inflation forecasts. However, that is partly because the older forecasts taken no account of the various new indirect taxes which increase certain prices, nor of the latest slightly higher-than-expected monthly inflation figures.

The close convergence of the macroeconomic forecasts should not mask the fact that such forecasts are always subject to great uncertainty. In the international environment, downside risks still predominate. For instance, a further heightening of the geopolitical tensions could yet have a detrimental impact on European growth. There is also still a risk that the growth slowdown in China and in other emerging countries may be sharper or more prolonged than the international assumptions currently predict. In that case, Belgian growth could be inhibited in particular via indirect channels, such as growth in the partner countries, confidence effects, or increased financial market volatility. In addition, the impending normalisation of US monetary policy could also influence the financial markets. On the other hand, a relative depreciation of the euro due to a widening divergence between American and European monetary policy could support growth in Europe. Finally, the recovery in the euro area is still fragile and vulnerable to negative confidence effects and specific factors which could depress growth in certain countries or branches of activity.

TABLE 8 COMPARISON WITH ESTIMATES OF OTHER INSTITUTIONS

(in %)

Institution	Publication date	Real GDP growth			Inflation (HICP, unless otherwise stated)		
		2015	2016	2017	2015	2016	2017
Federal Planning Bureau	September 2015 (1)	1.2	1.3		0.6	1.7	
IMF	October 2015	1.3	1.5	1.5	0.7	1.1	1.3
Consensus Economics	November 2015	1.2	1.4		0.5	1.5	
EC	November 2015	1.3	1.3	1.7	0.6	1.7	1.5
OECD	November 2015	1.3	1.5	1.6	0.6	1.3	1.4
NBB	December 2015	1.4	1.3	1.6	0.6	1.9	1.7

(1) Economic Budget 2015-2016. However, the inflation figures are the NCPI figures as estimated in the December 2015 inflation forecast.

In regard to the domestic risks, attention should be drawn to the way in which the recent government measures to improve competitiveness were incorporated in the projections. As in the previous estimates, it was again assumed that the slower growth of hourly labour costs will feed through into prices to a significant extent, albeit after some delay. If that process is faster or slower, or more or less incomplete than expected, or if the economic agents such as employers, investors and foreign customers for Belgian exports do not respond to lower wages and prices in the way that these projections assume, the movement in activity, employment, the budget balance or inflation could deviate from these autumn projections. Generally speaking, the domestic risks to growth seem to be on the upside overall. Certainly in the short term, the likelihood of a stronger confidence revival and somewhat higher quarterly growth in the second half of 2015 and in early 2016 appears to prevail. In addition, these forecasts take no account of the macroeconomic impact of redistribution aspects of the various government measures, particularly in connection with the tax shift. Insofar as the higher purchasing power will tend to favour low- and middle-income earners who generally have a lower savings ratio, private consumption could expand faster than these forecasts predict. Conversely, however, other government measures such as those taxing consumption could have a relatively bigger impact on the purchasing power of low and middle income households.

Next, it should be remembered that these estimates naturally take no account of any new budget measures that may be taken in the future.

Finally, it is also difficult at present to estimate the short- and longer-term economic impact of the heightened terrorist threat following the attacks in Paris and the associated tight security measures in Belgium. In the short term, it seems that the main adverse effect will be on activity in a few specific sectors such as hotels and restaurants, while public consumption will presumably exceed the estimates as a result of the additional expenditure on security. In the longer term, the repercussions of these terrorist attacks and their geopolitical implications are much more uncertain.

Annex

PROJECTIONS FOR THE BELGIAN ECONOMY: SUMMARY OF THE MAIN RESULTS

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

	2014	2015 e	2016 e	2017 e
Growth (calendar adjusted data)				
Real GDP	1.3	1.4	1.3	1.6
Contributions to growth:				
Domestic expenditure, excluding change in inventories	1.9	1.3	0.6	1.4
Net exports of goods and services	–0.4	–0.5	0.6	0.2
Change in inventories	–0.2	0.5	0.1	0.0
Prices and costs				
Harmonised index of consumer prices	0.5	0.6	1.9	1.7
Health index	0.4	1.1	1.7	1.4
GDP deflator	0.7	1.2	1.8	1.7
Terms of trade	0.0	2.9	0.3	0.1
Unit labour costs in the private sector[1]	–0.3	–0.4	–0.1	1.3
Hourly labour costs in the private sector[1]	0.6	0.2	0.2	1.9
Hourly productivity in the private sector	0.9	0.6	0.3	0.5
Labour market				
Domestic employment (annual average change in thousands of persons)	15.6	31.6	40.4	42.0
Total volume of labour[2]	0.5	0.7	1.0	1.1
Harmonised unemployment rate (in % of the labour force aged 15-64 years)	8.6	8.7	8.4	8.1
Incomes				
Real disposable income of individuals	0.5	1.3	1.1	1.3
Savings ratio of individuals (in % of disposable income)	12.6	12.4	12.4	12.5
Public finances				
Public sector financing requirement (–) or capacity (in % of GDP)	–3.1	–2.9	–2.9	–2.5
Primary balance (in % of GDP)	0.0	–0.1	–0.2	–0.1
Public debt (in % of GDP)	106.7	106.9	107.3	106.8
Current account (according to the balance of payments, in % of GDP)	0.1	0.8	1.4	1.7

Sources: EC, DGS, NAI, NBB.

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

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

Sensitivity to the crisis of SME financing in Belgium

Ch. Piette
M.-D. Zachary (*)

Introduction

The financing of small and medium-sized enterprises (SMEs) is one of the current concerns of policy-makers. In recent years, following the financial and sovereign debt crises, business funding has come under pressure, hampering the economic recovery. It is generally accepted that SME financing is more sensitive to crises than the financing of large firms. The main reason is that SMEs are very dependent on bank credit for developing their business (Wehinger, 2013). Given that the banks tighten their lending criteria during a financial crisis, the impact is likely to be greater for SMEs, which have fewer funding options than large firms. Another possible explanation is the relative lack of information on SMEs' credit quality, which could exacerbate the perceived credit risk from the lenders' point of view (OECD, 2015), making lenders more reluctant to extend additional funding to SMEs in an adverse economic climate.

This article examines whether SME financing in Belgium has actually suffered as a result of the successive crises since 2008, and if so, what are the explanatory factors. The article comprises four sections. The first section describes the funding structure of non-financial corporations in Belgium, with a breakdown by firm size. It is clear from this analysis that bank financing is very important to SMEs. The second section examines whether lending to SMEs has become atypical since the crisis, and tries to assess, notably on the basis of survey data, the extent to which demand and supply factors are involved. In that connection it appears that, apart from demand factors, the perception of the risks inherent in SMEs has also exerted a decisive influence on bank lending conditions. The third section examines, on the basis of a microeconomic analysis, the extent to which the financial health of SMEs, and hence their risk profile, actually changed during the crisis. The fourth section endeavours to determine whether lending was adjusted according to the risk associated with SMEs. It should be noted that the analysis conducted here is based primarily on changes in the volume of lending, and is only indirectly concerned with the price effects (interest rates). Finally, the conclusion summarises the main findings.

To support our analysis, we used multiple sources of both quantitative and qualitative data which, being mutually complementary, gave us a detailed insight into the potential determinants of the pattern of bank loans to businesses, be they SMEs or large firms. The national financial accounts list, at macroeconomic level, the various instruments that businesses use to obtain finance (equities, debt securities and loans) (1). While the non-financial corporations category can be specifically identified from these data, it is not possible to obtain a breakdown by firm size. To take account of that criterion, we used two sources of microeconomic data, namely the Central Balance Sheet Office and the Central Corporate Credit Register (2). The Central Balance Sheet Office collects the accounts and balance sheets of all

(*) The authors wish to thank Annick Bruggeman, Christophe Van Nieuwenhuyze and David Vivet for their comments and suggestions, and Christel Lequeux for her technical assistance.

(1) The financial accounts data are usable from 1999 onwards and are produced quarterly. They record both outstanding amounts (stocks at a given moment) and the transactions effected (flows during a given period) for each financial instrument and institutional sector.

(2) These two databases can be linked by means of the enterprise number (a unique number assigned to each firm).

limited liability companies which have to submit their annual accounts each year. We focused mainly on the variables which concern the financial debts of firms, and some accounting ratios which can be used to calculate an indicator of the firms' financial health (namely the Altman Z-score, see below). The Central Credit Register, for its part, records all loans granted by resident banks to non-financial corporations[1]. Finally, we were able to refine our analysis by means of qualitative data for which results are broken down by size of firm. We used the results of (1) the SAFE (Survey on the Access to Finance of Enterprises), which asks SMEs and large firms[2] about their funding sources and needs, their access to the various sources, and the factors accounting for the developments reported; (2) the BLS[3] (Bank Lending Survey), which asks the banks about their lending criteria and the demand from firms, and the factors behind any changes; and finally, (3) for Belgium, the Bank's survey of corporate credit conditions. That survey is addressed to firms and inquires about bank lending conditions and the specific criteria accompanying them (interest rates, ancillary costs, volumes, collateral required).

There are thus multiple sources, and that also limits the analysis to some extent. One limitation concerns the definition of an SME, which varies according to the data source used. In the SAFE and in the NBB survey, an SME is defined on the basis of the number of employees: an SME is a firm with fewer than 250 workers. In the BLS, an SME is a firm with an annual turnover of € 50 million or less, whereas in the data from the Central Credit Register and the Central Balance Sheet Office an SME is a company which submits annual accounts in the abbreviated format (small firms) or one which has an annual turnover of € 37.2 million or less (medium-sized firm). If the turnover exceeds that figure for two consecutive financial years, the enterprise is considered large. We had no option but to go along with the criterion adopted for each data source.

1. Funding structure of non-financial corporations in Belgium

In the euro area, and in Belgium in particular, funds provided by the banks are the primary and most appropriate source of finance for businesses. That is clear both from the qualitative surveys of businesses and from the analysis of their annual accounts.

(1) For each recorded loan, the available data include the size of the credit line (authorised credit), the amount used by the firm, the name of the lender bank and any defaults (from April 2012 in the case of this last variable).
(2) However, the results for this category of firms are not published for Belgium.
(3) The BLS and the SAFE are conducted in all euro area Member States.

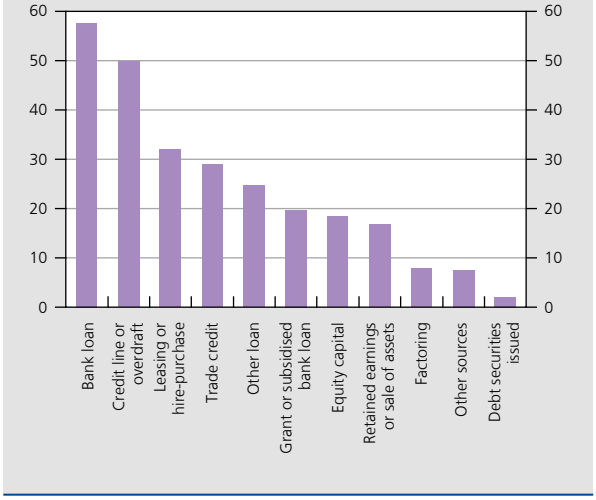
The SAFE survey conducted jointly by the European Central Bank (ECB) and the European Commission (EC) gives information on the financial situation of firms and on their financing needs and conditions. At the level of the euro area, the results obtained can be used to compare SMEs and large firms. The aim is to gain a better understanding of the problems facing non-financial enterprises, be they small, medium-sized or large, in regard to access to finance from banks or other sources.

The data from that survey clearly reveal that bank products are the most appropriate source of finance for euro area enterprises, both for SMEs and for large firms. Many of them (54 % of SMEs and 60 % of large firms, according to the latest wave of the survey at the time of writing this article, namely the one covering the period from October 2014 to March 2015) consider bank credit to be an ideal source of funding for their business. A majority of these firms (55 % of SMEs and 58 % of large firms) also state that they use credit lines or bank overdrafts, or at least intend to do so. In terms of importance, trade credit comes next, being mentioned by 34 % of SMEs and 32 % of large firms. In contrast, market funding sources (factoring, equities and debt securities) are less frequently used or mentioned.

Compared to firms in the euro area as a whole, Belgian SMEs have an even greater preference for bank credit, which is the funding source most often cited and used by these firms (see chart 1): 58 % of them consider it entirely

CHART 1 SOURCES OF FINANCE CONSIDERED APPROPRIATE BY SMEs IN BELGIUM

(in % of the number of respondent firms; data for the second half of 2014)



Source: ECB (SAFE survey).

TABLE 1 STRUCTURE OF THE LIABILITIES OF BELGIAN FIRMS[1]

(in % of the balance sheet total, unless otherwise stated; data for 2013)

Liabilities items	Small firms			Medium-sized firms			Large firms		
	Without financial debts	With financial debts	Total	Without financial debts	With financial debts	Total	Without financial debts	With financial debts	Total
Equity and provisions	**59.6**	**37.9**	**42.7**	**70.8**	**45.3**	**49.7**	**67.7**	**43.6**	**46.3**
Capital, share premiums and revaluation surplus	31.5	24.4	26.0	45.5	31.6	33.9	36.4	23.5	24.9
Reserves and accumulated profits	26.1	11.5	14.7	22.0	11.4	13.3	19.9	14.0	14.7
Other[2]	2.0	2.0	2.0	3.4	2.3	2.5	11.5	6.1	6.7
Debts	**40.4**	**62.1**	**57.3**	**29.2**	**54.7**	**50.3**	**32.3**	**56.4**	**53.7**
Financial debts to credit institutions and leasing[3]	0.0	27.5	21.4	0.0	15.9	13.2	0.0	13.4	11.9
Other financial debts	0.0	6.1	4.8	0.0	17.8	14.8	0.0	24.9	22.1
of which:									
Subordinated loans payable after more than one year[4]	n.	n.	n.	0.0	2.6	2.2	0.0	4.5	4.0
Unsubordinated debentures payable after more than one year[4]	n.	n.	n.	0.0	1.6	1.4	0.0	2.3	2.0
Other debts[5]	40.4	28.5	31.1	29.2	21.0	22.4	32.3	18.1	19.7
Balance sheet total (€ million)	**51.460**	**181.119**	**232.579**	**64.671**	**312.150**	**376.821**	**79.728**	**629.567**	**709.296**
p.m. Debts to affiliated enterprises	*n.*	*n.*	*n.*	*13.1*	*27.3*	*24.9*	*11.6*	*33.4*	*30.9*
Number of firms (units)	*105.499*	*197.302*	*302.801*	*6.195*	*9.929*	*16.124*	*608*	*1.630*	*2.238*
Average balance sheet total (€ thousand)	*488*	*918*	*768*	*10.439*	*31.438*	*23.370*	*131.132*	*386.238*	*316.933*

Source: NBB (Central Balance Sheet Office).

(1) Aggregate data constructed on the basis of the annual accounts filed by Belgian firms with the Central Balance Sheet Office. Firms active in agriculture, forestry, fisheries, mining and quarrying, financial and insurance activities, and in the sectors regarded as non-market (public administration, education, health, social work, etc.) were disregarded. Firms whose annual accounts contain anomalies, i.e. if certain accounting identities are not verified, were also excluded from the sample.

(2) Investment grants, reserves and deferred taxes.

(3) Including amounts payable after more than one year falling due within one year.

(4) This item is not reported in the annual accounts compiled in the abbreviated format.

(5) This item includes trade debts, advances received on contracts in progress, tax, wage and social security debts, deffered charges and accrued income.

appropriate. Credit lines or bank overdrafts are also considered very relevant (50 % of Belgian SMEs had used them in the six months preceding the survey or considered this source of finance to be appropriate). Conversely, they seem to make less use than their euro area counterparts of grants or subsidised loans, or their own resources.

The importance of bank credit for SMEs is reflected in their annual accounts[1] (see table 1). However, it should be noted that just over a third of them do not make use of loans from credit institutions, nor other forms of financial debt. Those firms are generally relatively modest in size, and finance their business mainly with equity. Their reserves, and particularly their accumulated profits, make up a bigger proportion of their balance sheet total. In the case of firms funded partly by means of financial debts, small firms make much more use of loans granted by credit institutions (27.5 % of the balance sheet total, on average) than medium-sized firms (15.9 %) and large firms (13.4 %). The annual accounts reveal in fact that large firms make more use than SMEs of bond loans and subordinated loans. Debts to affiliated enterprises also represent a considerable proportion of their funding sources. Finally, firms – regardless of size – report other types of debts (apart from own funds and financial debts) on the liabilities side of their balance sheets which also constitute a substantial proportion of the liabilities. They include in particular short-term trade debts and tax, wage and social security debts.

2. Bank financing in the context of the crisis

During the recent financial and economic crises, changes were apparent in the funding sources used by or accessible to Belgian firms. This resulted in some modifications in the type of debt taken on by firms – meaning all bank loans and issued bonds. To follow developments in regard to bank credit and debt securities, it is possible to use both the data from the financial accounts (data on outstanding amounts and flows relating to bank credit and debt securities for all firms) and the data from the Central Credit Register, which permit a breakdown of firms by size in the case of bank credit.

The period considered for the analysis was determined according to the availability of the data. It extends from 2000 to 2015. In order to present an overview of the data, several sub-periods were defined on the basis of economic activity. During this 15-year period there were two episodes of recession or weak economic growth (2001-2005 and 2009-2015) and one boom period (2006-2008). The years 2001 to 2005 followed the burst of the dot-com bubble: this was a period when activity gradually picked up following the 2000-2001 "recession". The years 2006 to 2008 are regarded as a period of economic revival: in that period the business survey indicator was almost continuously higher than the average. Finally, the period 2009-2015 suffered the repercussions of the 2008 financial crisis, the sovereign debt crisis and the ensuing downturn.

The developments in terms of bank credit and debt security issuance are summed up by the annual growth rate of these two types of instrument in each of these sub-periods (see table 2). A number of lessons can be drawn. The pro-cyclicality of bank credit is clearly apparent: the annualised growth rate for all firms regardless of size is lower during the two periods of weak economic activity (2001-2005 and 2009-2015) than during the boom (2006-2008). From 2006 to 2008, the annualised growth rate came to 10.3 %, compared to an average of 1.5 % from 2009 to 2015. From 2001 to 2005, it was actually negative (–0.5 %). In the case of debt securities, we find that the growth rate was slightly negative in the years following the outbreak of the burst of the dot-com bubble (–1.1 %), but the issuance of securities surged in the years from 2009 to 2015, and that is reflected in their high growth rate (19.3 %), even exceeding the figure recorded in the boom period (15 %). During the financial crisis, firms therefore continued to make successful calls on the financial markets, and debt instruments constituted an alternative source of funding to bank credit, at least for the largest firms.

Finally, the credit data broken down by size show that, during the boom period, the growth of bank credit was strong for all types of firms. In addition, the larger the firm, the higher the growth. Large firms thus took most advantage of the availability of bank credit during that period. Conversely, during the years of weak activity or crisis, the growth rates collapsed. They became negative for large firms, whereas they remained positive – albeit at a low level – for small and medium-sized firms (at least at the time of the financial crisis and in the ensuing years in the case of medium-sized firms).

The pro-cyclicality of lending is due mainly to fluctuations in demand for credit: firms generally request less (more) funding in periods of weak (strong) economic growth. In periods of weak economic activity, most firms have to downgrade their outlook for growth and profits, so

(1) The accounting data used here cover a period up to the year 2013, as the annual accounts for 2014 were not yet available for all firms when this article was finished. Interested readers will find an account of the financial health of firms in 2014 in the article by D. Vivet published in this Economic Review (pp. 67-81).

TABLE 2 BANK LENDING AND DEBT SECURITY ISSUANCE

(annualised growth rate[1], in %, 2000Q1-2015Q2)

	Average			
	2000-2015	2001-2005	2006-2008	2009-2015
Bank credit used				
Total non-financial corporations	3.0	–0.5	10.3	1.5
By size				
Small firms	5.3	5.2	9.7	2.5
Medium-sized firms	4.0	–2.3	12.4	4.2
Large firms	–0.5	–6.3	14.8	–4.0
Debt securities	11.8	–1.1	15.0	19.3
Total bank credit[2] and debt securities	4.1	–0.4	10.4	4.5

Source: NBB (Central Corporate Credit Register, financial accounts, balance sheets of credit institutions).

(1) The annualised growth rate is determined as follows: an average is calculated from the quarterly growth rates $(Outstanding\ amount_{Q-1}/Outstanding\ amount_{Q-1} - 1)$. That average is then annualised. In the case of bank credit, the quarter featuring a break in the data series from the Central Corporate Credit Register, namely the second quarter of 2012, was disregarded.

(2) According to Scheme A (balance sheet of credit institutions).

that their propensity to invest diminishes and their debt repayment burden increases. In addition, supply factors may also contribute to the pro-cyclical character of lending. The banks are normally more exacting when activity is weak than during expansion phases since, overall, the credit risks are then higher whereas the assets which can be provided as collateral are generally lower in value. However, that is not reflected solely or necessarily in a contraction in the volume of lending, as lenders may also choose to increase their interest margins or demand additional collateral.

The decline in bank credit during the financial crisis and the ensuing years was more marked for large firms than for SMEs. However, as the financial accounts data indicate, some firms were able to tap other sources of funding at relatively favourable cost. At the end of the second quarter of 2015, the outstanding amount of bank credit used by large firms stood at € 25.9 billion, compared to € 33.5 billion in December 2008, whereas the outstanding amount of bonds recorded as firms' liabilities came to € 43.5 billion (for all non-financial corporations[1]) in the first quarter of 2015, compared to € 15.5 billion in December 2008.

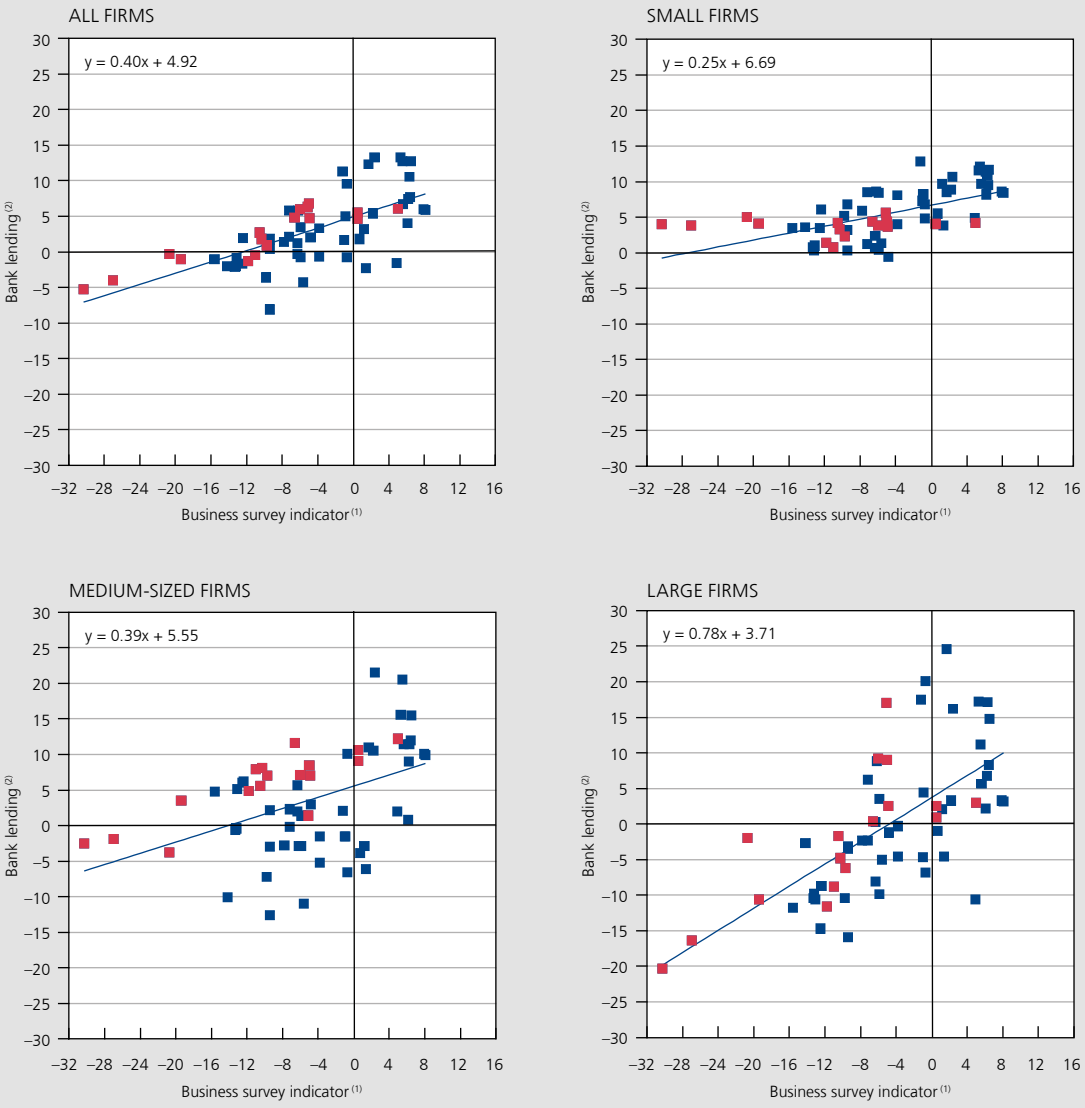
In order to distinguish between the impact of these changes on economic activity and the specific impact of the financial crisis (2008Q3-2009Q2) or the sovereign debt crisis affecting the euro area (2009Q4-2012Q3), we began by comparing the business survey indicator to the credit growth rate between 2000 and 2015 for the various categories of firms. To take account of lending's delayed response to economic developments, we applied a lag of three quarters to the growth of lending compared to the economic growth represented by the business survey indicator. That time lag was chosen because it shows a better correlation between the two variables. The reason for the delayed response of credit growth to cyclical fluctuations is that firms sometimes wait several months for an upturn in activity to be confirmed before they seek new sources of funding, and that the banks need time to process applications for loans. Finally, another reason is that part of the outstanding amount of bank credit has a maturity of several years. This means that the volume of credit can only be adjusted in line with the (deterioration in) economic activity when the loans mature, and that makes the growth of credit more persistent. Next, we looked at the sub-period covering the financial and sovereign debt crises (2008Q3-2012Q3) and tried to determine the degree to which the cyclical sensitivity of bank credit in Belgium was affected by the crises, by estimating a simple regression for the three categories of firms with the aid of a dummy variable equal to 1 over the whole of the period 2008Q3-2012Q3.

The first part of the analysis confirms the overall findings presented above (see chart 2). The cyclical variations account for part of the fluctuations in lending (annualised

(1) In practice, however, most debt securities are issued by large firms which have the necessary size, competence and reputation.

CHART 2 BUSINESS CYCLE AND BANK CREDIT GROWTH

(period 2000Q1-2015Q2)



Source: NBB (Central Corporate Credit Register and business surveys).

(1) Synthetic business survey curve (smoothed curve), average over three months, three months ahead.

(2) Variation in credit used by non-financial corporations (granted by resident banks), calculated as the average of quarterly growth over four quarters which is then annualised (excluding the break in the series in 2012Q2).

Note: The crisis period (2008Q3-2013Q3) is indicated in red.

growth rate) observed for all firms between 2000 and 2015. When the economy is doing better, the credit growth rate is generally higher, indicating the pro-cyclicality of lending (positive regression coefficients). That finding holds for each firm size category. However, the link is stronger the bigger the firm, indicating that sensitivity varies according to the size criterion. These data show that lending to large firms was therefore more sensitive to the business cycle in Belgium than lending to SMEs.

In the second part of the analysis, the regressions confirm that bank lending becomes more sensitive to the business cycle the larger the firm. During the periods 2000Q1-2008Q2 and 2012Q4-2015Q2, a 1 percentage point rise in the business survey indicator was accompanied by credit growth averaging 0.3 percentage point for small firms, 0.6 percentage point for medium-sized firms and 0.9 percentage point for large firms (see table 3). In the period covered by the two crises, namely 2008Q3 to 2012Q3, the discrepancies actually

TABLE 3 IMPACT OF THE GLOBAL FINANCIAL CRISIS AND THE SOVEREIGN DEBT CRISIS IN THE EURO AREA ON THE GROWTH OF BANK LENDING

(regression coefficients; estimation period: 2000Q1-2015Q2)

	Small firms	Medium-sized firms	Large firms
Constant (in %)	6.67 ***	5.51 ***	3.68 ***
$BC_{(-3)}$ [1]	0.35 ***	0.65 ***	0.92 ***
$BC_{(-3)} \times Dummy_{(-3)}$ [1]	–0.18 **	–0.46 ***	–0.26
Combined effect	0.17	0.19	

(1) "*BC*" corresponds to the quarterly average of the synthetic business survey curve (smoothed indicator) and "*Dummy*" is a binary variable for the global financial crisis and the sovereign debt crisis in the euro area, equivalent to 1 during the period 2008Q3-2012Q3. Regarding significance thresholds, "***" (**) indicate that the estimated coefficient differs from zero with a significance of 1 % (5 %) respectively.

increased further. Thus, in the case of lending to small and medium-sized firms, the sensitivity to the business cycle dropped to 0.2, while the decline of 0.3 recorded for large firms is not statistically significant.

Although the annual percentage change in lending to small firms declined sharply during the crisis, the above results suggest that the reduction in credit growth was smaller than might have been expected in view of the economic climate. The reason could be that small firms need a minimum amount of bank credit to be able to pursue their activities (in the absence of alternative funding sources) and that demand for credit therefore becomes less elastic when the economy is exceptionally weak, as was the case during the period 2008Q3-2009Q2.

The smaller contraction in demand for loans on the part of SMEs as opposed to large firms during periods of weak economic activity is likewise reflected in the results of the BLS, in which banks are asked about changes in their credit criteria and changes in the level of demand. In regard to the latter, there are several differences depending on the size of the firms. In the case of large firms, demand for bank credit diminishes sooner and more sharply at times of crisis, whereas demand from SMEs is steady for a time before also weakening, but the decline is generally smaller and more short-lived (see chart 3).

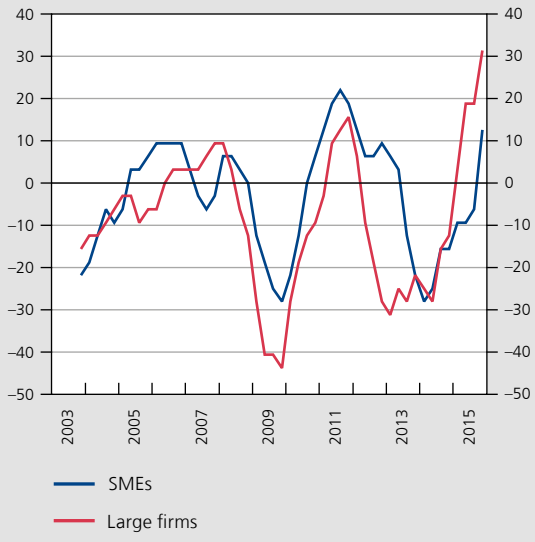
The banks also attribute these downward movements to the option available to firms of using other sources of funding (issuance of shares or bonds). However, that explanation mainly concerns large firms, as SMEs have only limited access to the financial markets. In order to finance their activities, SMEs therefore have no alternative but to maintain their demand for bank credit even if the supply conditions may seem unattractive.

After having considered the determinants of firms' demand for credit, we shall now examine the other aspect of the lender-borrower relationship, namely the conditions associated with the supply of credit. The qualitative surveys reveal both the viewpoint of the firms (the SAFE survey and the NBB survey of credit conditions) and that of the banks (the BLS).

Although it seems that, on average, Belgian SMEs face few constraints in accessing finance [1] (according to the SAFE survey), the supply of credit nevertheless poses problems for some of them. Thus, as regards the terms and conditions associated with bank financing, the first obstacles to credit cited by SMEs are the high level of costs other than the interest rate, and the collateral that credit institutions demand. Firms considered the collateral requirements to be particularly high at the time of the surveys conducted between the second half of 2011 and the first half of 2013 (i.e. taking account of a time lag, during the sovereign debt crisis and the ensuing months). During that period, those perceptions were reflected in practice

CHART 3 DEMAND FOR BANK CREDIT IN BELGIUM

(weighted net percentages [1], averages over four quarters)



Sources: ECB, NBB (Eurosystem Bank Lending Survey).

(1) A positive (negative) percentage corresponds to an increase (reduction) in firms' demand for credit.

(1) According to the SAFE survey, fewer than 10 % of Belgian SMEs overall mention finance as the biggest problem that they face. A larger number report that staff recruitment, labour or production costs, and finding customers are bigger problems.

in an increased percentage of SMEs being refused a bank loan, rejecting a loan on cost grounds, being discouraged from contracting a new loan, or receiving only a small part of the sum requested.

In addition, these findings are borne out by the survey of credit conditions conducted by the Bank, which provides information broken down by firm size (see chart 4). Thus, according to that survey, small firms appear to be more negative than others about all the criteria, monetary or not, associated with borrowing, except for the interest rate: a systematically larger number of them report a deterioration in both other expenses and the volume of the loan and the collateral demanded. In general, they therefore report less favourable credit conditions than large firms. However, it should be noted that the general assessment of those conditions has improved for all firms in the recent period, although there is still a noticeable effect related to firm size.

The information obtained from the surveys of firms is supplemented by that derived from the BLS. Thus, the BLS results show that the banks adjust their supply of credit differently according to the type of firm. To justify changes in their credit conditions, they may invoke three types of explanatory factors: their funding costs and balance sheet constraints, pressure of competition, and risk perception. They also have to state their position on specific determinant(s) associated with the loan (interest rate, other costs, volume or duration of the loan, collateral, special clauses) which may have been modified (see chart 5).

CHART 4 ASSESSMENT OF CREDIT CONDITIONS BY FIRMS IN BELGIUM: BREAKDOWN BY SIZE

(net percentages (1), averages over four quarters (2))

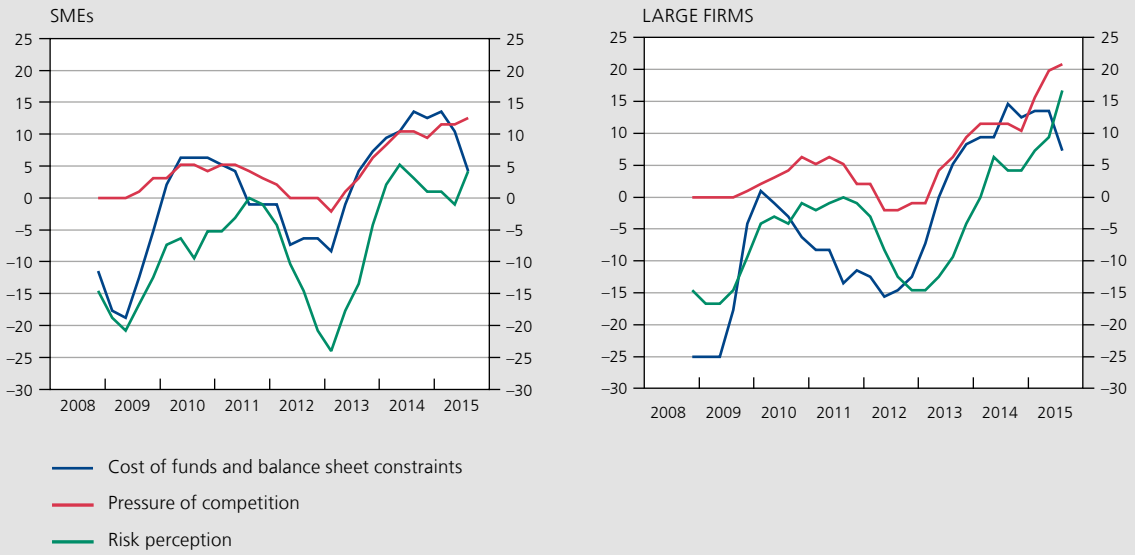
Source: NBB (quarterly survey of business credit conditions).

(1) Net percentages of responses by business managers indicating an improvement (+) or a deterioration (–) compared to the previous quarter. Variation in credit used by non-financial corporations (granted by resident banks), calculated as the average of quarterly growth over four quarters which is then annualised (excluding the break in the series in 2012Q2).

(2) Annual data between 2002 and 2008, quarterly data from the first quarter of 2009.

CHART 5 BANK LENDING CONDITIONS IN BELGIUM: EXPLANATORY FACTORS

(net percentages[1], averages over four quarters)



Sources: ECB, NBB (BLS).

(1) A positive (negative) percentage corresponds to a factor which has contributed to the easing (tightening) of credit standards.

The tightening of the credit supply for SMEs during the crisis was evidently dictated mainly by an increase in the risk perception, giving rise to the application of higher interest margins and demands for additional collateral, rather than a reduction in credit volumes. Conversely, for large firms, the tougher conditions were caused mainly by a rise in funding costs and balance sheet constraints, reflected in higher interest margins and limits on the amount and duration of loans.

At the end of the period (2014-2015), the banks' perception of the risks relating to SMEs improved considerably, although the improvement was less marked than in relation to large firms, and that likewise contributed to a general easing of credit conditions.

3. Impact of the crisis on the financial health of SMEs

One of the key findings of the survey data concerns the Belgian banks' perception of an increased credit risk following the crisis. According to those same data, this problem was more acute for loans to SMEs, suggesting that the crisis had a bigger impact on SMEs' financial health and hence on their solvency.

Indicators based on SMEs' annual accounts permit a more detailed review of the financial health of SMEs and how that has changed since the start of the crisis. One approach involves calculating the probability of failure for each firm, i.e. the likelihood that the firm will go bankrupt in the coming years. An indicator of this type, composed of a wide range of financial variables, was developed by the Bank (Vivet, 2011) and is now used in the company files produced by the Central Balance Sheet Office. The following analysis is based mainly on an indicator calculated from a smaller number of financial ratios, which can thus cover a bigger sample of firms. This is the "Z-score" developed by Altman (1968), a measure of financial health which is internationally recognised and often used in the economic literature. The Z-score is based on a linear combination[1] of four balance sheet indicators[2], namely:

– the working capital, i.e. the difference between the current assets and the debts at up to one year. It can

(1) The coefficients of the linear combination that determines the value of the Z-score for each firm are estimated on the basis of a multiple discriminant analysis. This is a statistical method which can be used to estimate the function of multiple variables allocating the observations as accurately as possible among various pre-identified groups. Here, the sample used to estimate the coefficients is the population of Belgian firms which published their annual accounts in 2009, from which the data needed to calculate the four variables considered were extracted. These firms were divided into two groups: firms going bankrupt before 1 January 2015 and firms still in business after that date. The score thus calculated can therefore be considered representative of the probability of failure in the medium term.

(2) The Z-score as developed by Altman (1968) comprises a fifth indicator, namely the firm's turnover divided by its total assets. Since the turnover figure is not mentioned in the annual accounts compiled in the abbreviated format applicable to small firms, it cannot be included in calculating the Z-scores for most Belgian firms.

also be seen as the part of the assets linked to current activities (inventories, total claims taking all maturities together, and current investment) financed with equity capital and long-term debts. This indicator flags up any problems concerning inadequate reserves of liquidity to repay short-term loans;

- the accumulated profits (or losses), which measure the returns accumulated by the firm during its existence. They are generally more substantial for older firms, which explains why the financial health of the latter is often more robust than that of firms established more recently;
- the operating profit, i.e. the profit made by the firm before taking account of financial or extraordinary income and charges and corporation tax. In a way, this is a measure of the "real" profitability of the means of production;
- the ratio between the equity and the debts, both short and long-term, which constitutes a measure of solvency.

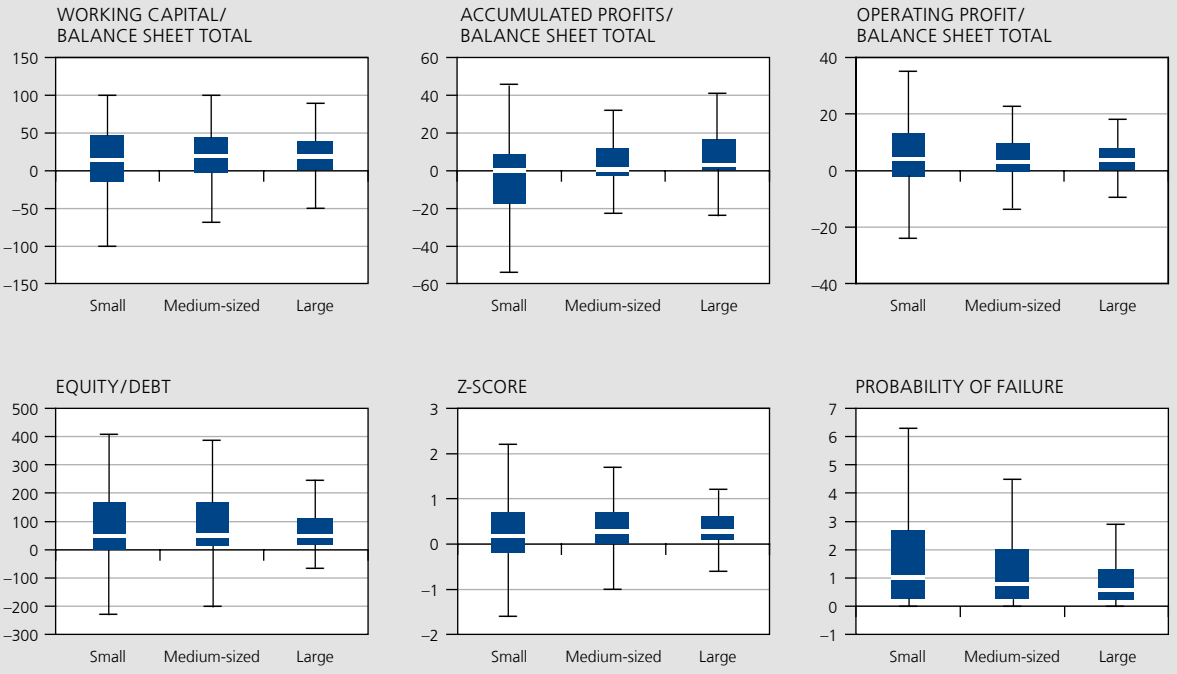
The first three indicators listed above are expressed as a percentage of the total assets. The Z-score is very simple to interpret: the higher a firm's score, the healthier its financial situation.

The distributions of the Z-scores and of their four components, calculated for Belgian firms on the basis of their annual accounts filed in 2013, are shown in chart 6. Generally speaking, the central values of these distributions do not deviate significantly between small, medium-sized and large firms, as the medians for each of those categories are relatively similar. Nonetheless, the accumulated profits are often negative for small firms. The differences between these three groups are much more marked as far as the dispersion for each indicator is concerned, which is systematically greater for small firms and smaller for large firms. This heterogeneity is naturally reflected in the Z-scores, and it is also seen in the indicator of the probability of failure, calculated according to the method developed by Vivet (2011).

The level of financial health therefore appears more disparate for SMEs than for large firms. This means in particular that, even though some SMEs may be in a very sound financial position, the riskiest borrowers from the credit

CHART 6 INDICATORS OF FINANCIAL HEALTH (1)

(in %, data for 2013)



Sources: NBB (Central Balance Sheet Office) and own calculations.

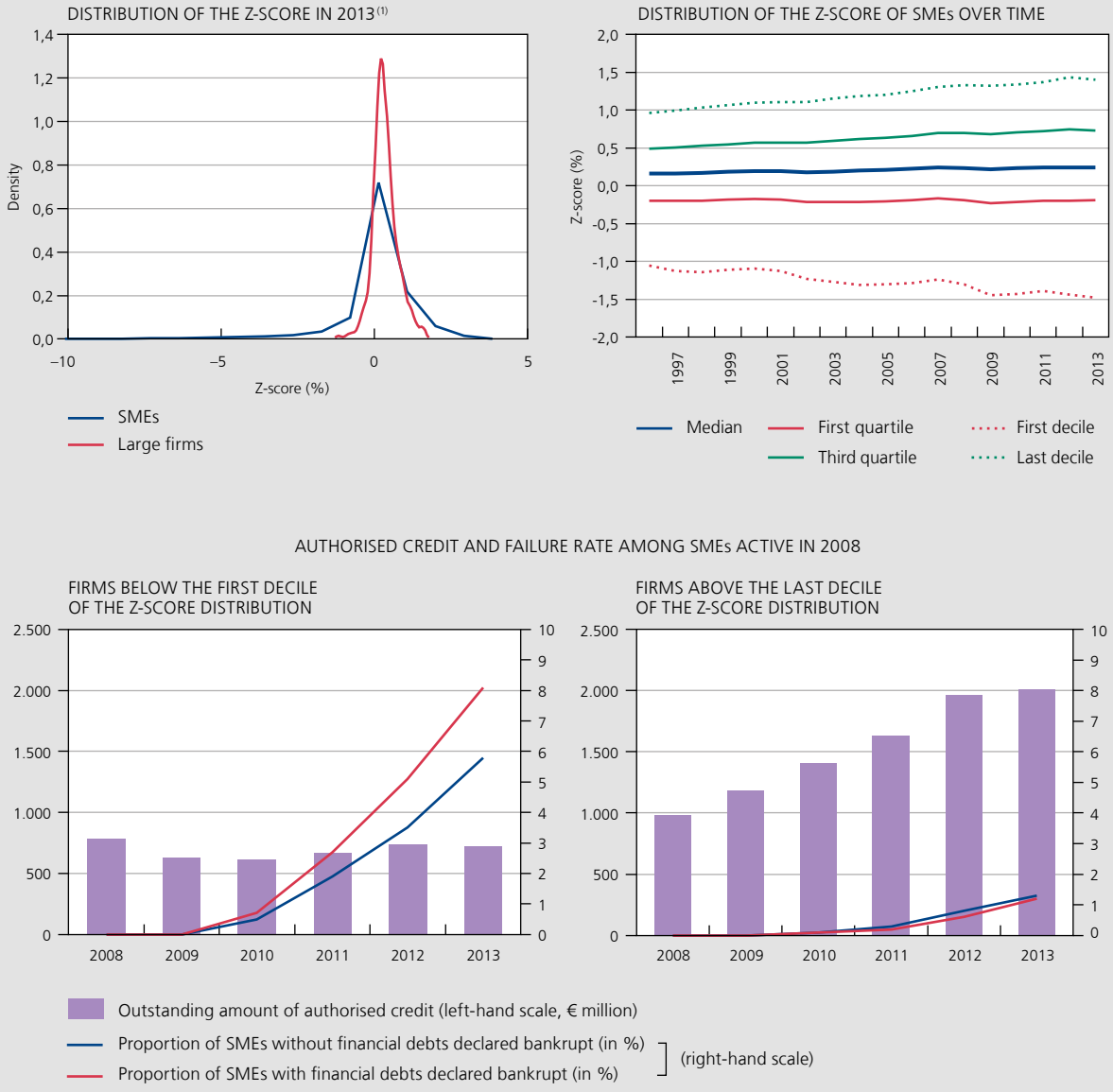
(1) In this chart, the distributions of each indicator for a given category are represented in the form of a box plot. The lower and upper edges of each box correspond respectively to the first and third quartiles of the distribution, while the line inside the box shows the median. The extreme ends of the lines, whose length is determined on the basis of the interquartile range, correspond to the "adjacent values", i.e. the minimum and maximum values observed once the extreme values have been eliminated from the distribution.

institutions' point of view, i.e. the ones most likely to default at a given moment, are found among this category of firms[1]. A more detailed examination of the firms with a Z-score below the first decile of the distribution, which can be considered the most fragile firms, shows that they are generally smaller in terms of both their balance sheet total and their number of employees than firms above the last decile, i.e. the healthiest firms. However, these size differences are relatively small. By way of illustration, on the basis of that definition, the most precarious firms employed on average 6.1 workers in 2013, while the most robust had 7.7 employees. The divergences are much more marked in the case of productivity levels as measured on the basis of the value added per employee: the average came to around € 13 000 for the most fragile firms, compared to € 133 000 for the healthiest firms.

Taking account of this apparent link between firms' productivity (and more generally, their economic performance)

(1) That is also borne out by an above-average proportion of non-performing loans for SMEs (see De Backer *et al.*, 2015).

CHART 7 FINANCIAL HEALTH OF SMEs AND AUTHORISED CREDIT



Sources: FPS Economy (Central Enterprise Data Bank), NBB (Central Balance Sheet Office and Central Corporate Credit Register) and own calculations.
(1) Observations below the first centile and above the last centile of the distributions are not shown in this chart.

and their financial health, the crisis probably had a detrimental effect on the financial health of some of them. The changing distribution of SMEs' Z-scores over time, shown in chart 7, suggests that it was mainly the firms in the most precarious situation according to their Z-score in 2008 that experienced deteriorating health after that year, while the position of the strongest firms remained generally stable, and actually improved in some cases. In reality, as indicated by the change in the first decile of the distribution of the Z-score, the most fragile firms tend to become more fragile over the years, and the crisis seems to have somewhat accelerated that tendency in 2009.

Moreover, this was the group with the highest failure rate in the years following the start of the crisis, particularly among those with financial debts, which illustrates the riskiness of the loans granted to them. In fact, 8.1 % of SMEs which could be considered the weakest in 2008 and which had financial debts on the liabilities side of their balance sheets were declared bankrupt in the ensuing five years. For those without any borrowings, the bankruptcy rate was lower (5.8 %), suggesting that lending to the most fragile firms increases their risk of failure. Such a link between debts and failure rates is not seen among the soundest SMEs.

Belgian banks seem to take account of these differences in financial health, and hence also in the level of the credit risk, in their lending policy. In fact, the soundest firms benefited from the growth in authorised credit after the onset of the crisis, while the outstanding amount of lending to the most fragile firms was down slightly in 2009 and 2010.

4. Microeconomic determinants of lending to SMEs

The data described in the previous section clearly reveal that there is a link between firms' financial health – and hence their risk profile – and the credit that they are granted. The deteriorating financial situation of some firms during the crisis period is therefore very likely to have influenced the movement in the outstanding amount of lending by banks to SMEs. However, an econometric analysis is needed in order to assess the degree to which banks may have adjusted their credit risk policy after the crisis erupted. The analysis conducted for this article is in two parts:

- the first part concerns the determinants of the year-on-year change in the credit granted to each SME which already had a credit line or loan with at least one bank in the previous year. For this purpose, we use a simple linear model estimated by the ordinary least squares method, with the growth rate of the amount of authorised credit as the dependent variable.
- the second part concerns the conclusion of new contracts between SMEs and banks. The dependent variable of the ("logit" type) model used for that purpose is the probability that, in a given year, an SME obtains a loan from a bank with which it did not previously have any credit relationship.

The two models comprise the same explanatory variables. The one of primary interest is the financial health, still viewed in terms of the Z-score. A slope dummy variable, i.e. the product of the Z-score and a binary variable with a value of 0 until 2008 and 1 from 2009, was also included in each model. That interaction variable can be used to determine whether there has been a change in the relationship between the financial health of firms and the credit extended to them. Other variables which may influence the loans that a credit institution grants to an SME were also taken into account in specifying the two econometric models, namely:

- the number of employees, to take account of any size-related effects;
- labour productivity, to measure economic performance;
- age, i.e. the number of years of activity. This variable is used in the specification in order to take account of the fact that demand for loans could be stronger among the newest firms, i.e. those which are most likely to develop new activities and will therefore more often need new funds to finance investment;
- a dummy variable specific to each year, to capture the change in the macroeconomic and macrofinancial situation;
- a dummy variable specific to each industry (at the 2-digit NACE level) to isolate any sectoral effects.

The two models were estimated for the period from 1999 to 2011. The data for subsequent years could not be used owing to methodological changes in 2012 to the collection of data by the Central Credit Register[1]. In the equations, the number of employees and labour productivity are expressed in logarithmic form.

The results of the estimations for the two models are presented in table 4. In general, the elasticities estimated for the Z-score confirm the importance of a firm's financial health for the total credit granted to the firm by the banks. Thus, all other things being equal, a 1 percentage point rise in the Z-score of a given firm was reflected – on

(1) That change concerned in particular the inclusion of all lending to non-financial corporations, whereas previously only loans of € 25 000 or more had to be entered in the database.

average up to 2008 – in a 3.6 percentage point increase in the annual growth of the total amount of credit granted to the firm. Contrary to what might be assumed, that elasticity edged downwards from 2009, dropping to 3.3. That result could be due to a slightly less restrictive policy on credit risk on the part of banks towards their existing SME customers. Since the model cannot separate the supply and demand effects, this lower coefficient could also reflect a slightly stronger demand for credit than before the crisis. In any case, the decline in this elasticity is small, emphasising the fact that the risk profile of SMEs is still a major determinant of the amounts made available to them by credit institutions. The deterioration in the financial health of a relatively small group of firms (see above) therefore probably exerted a negative effect on the movement in total credit.

The estimations concerning the establishment of new credit relationships present a very different picture. While banks' lending to new customers is likewise greatly influenced by the level of risk associated with those customers, this aspect became more important after the onset of the crisis. According to the model, this was reflected in the fact that credit institutions tended increasingly to favour financially sound firms in granting new loans, to the detriment of more fragile firms. Nevertheless, this effect – the estimation of which is illustrated in chart 8 – was relatively moderate, and the negative impact on the creation of new credit relationships essentially concerned SMEs in an extremely weak financial position, namely those with a very negative Z-score.

TABLE 4 ESTIMATED PARAMETERS FOR THE ECONOMETRIC MODELS[1]

(estimations by ordinary least squares for credit growth and by maximum likelihood for the probability of a new loan)

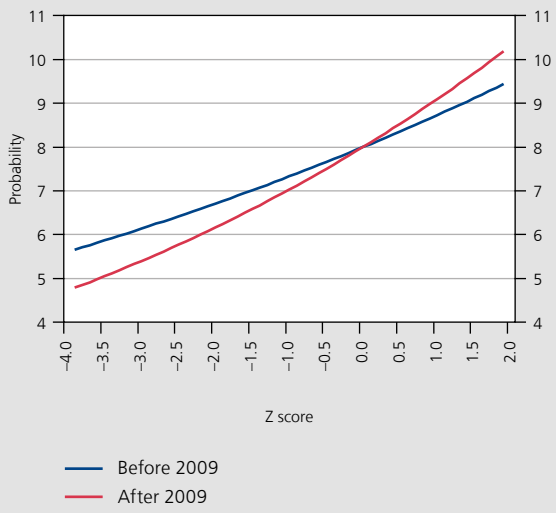
Explanatory variables	Dependent variable	
	Year-on-year growth of a firm's authorised credit	Probability that a firm receives a new loan[2]
Z-score before 2009	3.615	0.713
Z-score after 2009	3.292	1.063
Number of employees ...	0.003	0.011
Value added per employee	–0.013	0.005
Age of the firm	–0.115	–0.129
Number of observations	**686 491**	**1 146 692**

(1) The parameters relating to the Z-score, the number of employees and the value added per employee are interpreted as the average impact of a one percentage point increase in each of these explanatory variables on the dependent variable. The parameters relating to the firm's age are interpreted as the effect of one additional year of activity on the dependent variable. The Z-score, the number of employees and the value added per employee are incorporated with one lag in the specification in order to prevent any endogeneity problems. The specification of each equation also comprises dummy variables to capture the effects specific to each year and to each industry; their estimated coefficients are not included here. All the parameters mentioned in this table are significant at the 1 % level.

(2) Marginal effects calculated on the basis of the average values for the whole sample.

CHART 8 PROBABILITY OF THE GRANT OF A NEW LOAN DEPENDING ON THE Z-SCORE[1]

(in %)



(1) The probabilities are estimated on the basis of the model described in the second column of table 4, fixing the value of the other variables at their averages observed for the whole sample.

Although statistically significant, the estimated elasticities for the other variables in the two models are fairly low. The estimated link between credit growth and firms' productivity is negative in the first equation, suggesting that economic performance exerts hardly an influence – at least not directly – on the banks' lending decisions, and that the banks are indeed influenced primarily by the borrower's risk profile. Moreover, as expected, lending to SMEs shows a negative correlation with the firm's age.

Finally, most of the estimated parameters for the annual dummy variables (not mentioned in table 4) proved to be significant. This confirms that the economic climate has a significant impact on lending to businesses, and probably also confirms the importance of factors specific to the banking sector, such as those concerning balance sheet constraints, alongside considerations relating to the credit risk specific to each firm.

Conclusion

Most SMEs depend on bank credit to fund their activities and are more likely to need this source of finance than

larger firms which can resort to other instruments by accessing the capital markets. This lack of alternatives is one reason why, in the context of the financial crisis that erupted in 2008 with the collapse of Lehman Brothers, demand for bank credit from SMEs did not diminish as sharply as demand from large firms, even though credit conditions had been tightened. Indeed, Belgian banks, having perceived an increase in the risks associated with lending to SMEs, reduced their supply, in particular by adjusting the required collateral.

Various points made in this study indicate that the risk factor did indeed play a major role in the lending policies of Belgian banks, and the deterioration in the financial situation of a relatively small number of SMEs is therefore likely to have exerted some downward pressure on the granting of bank loans in recent years. Nonetheless, it seems that firms in better financial health saw an increase in the amount of their authorised credit.

Overall, however, given the same level of risk, the Belgian banks do not seem to have imposed tougher restrictions on their existing customers after the outbreak of the crisis, which suggests that they preferred to maintain long-term relationships with those customers. Conversely, the findings presented in this article reveal that the banks also became a little less inclined to take risks in lending to SMEs with which they had no previous business relationship, by tending to favour those with a better risk profile.

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Macroeconomic determinants of non-performing loans

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M. Emiris
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Introduction

Belgium is typically considered to face only moderate credit risk associated with the non-financial private sector's financial health, given that the private debt ratio is not problematic and net financial wealth of households is high (EC, 2015; Bruggeman and Van Nieuwenhuyze, 2013). Indicators measuring realised (*ex-post*) credit risk, such as non-performing loans (NPLs) recorded on bank balance sheets and payment arrears of households (booked in the Central Individual Credit Register, CICR), tend to confirm the relatively high quality of bank assets in Belgium. That said, these figures have been on the rise since the financial crisis, coinciding with further increases in the private debt ratio.

It is against this backdrop that this article aims to assess the current level of and developments in banks' *ex-post* credit risk using their NPLs and, more specifically, households' payment arrears. Furthermore, this credit risk is explained by means of both macroeconomic factors and structural credit market variables such as loan-to-value (LTV) and debt-service-to-income (DSTI) ratios. If these variables prove significant for credit risk, macroprudential policies might prove useful.

One of the challenges of this analysis is the paucity of available data and the absence of a uniform international definition of NPLs. To an extent, the volume of NPLs reflects national accounting definitions, making it difficult to compare them across the world. However, the European Banking Authority (EBA) recently introduced a harmonised definition (EU, 2014) and data in line with this new definition are available for Belgium from the third quarter of 2014 onwards, with the drawback that these data do not support a time series analysis. NPL data according to national definitions are available for a longer period (since 1993Q2), but do not enable any breakdown of data by type of credit. Trends in realised credit risk per sector or type of loan can only be analysed for households based on CICR data, and then only from 2006.

This article has four sections. The first compares NPL levels and developments in Belgium with those in the other euro area countries. The second provides an overview of the available data resources for realised credit risk in Belgium, while the third investigates to what extent payment arrears in the mortgage loan market may be explained by macroeconomic conditions and by structural loan market factors (LTV, DSTI, bank business models). The final section discusses the implications of NPLs (feedback effects on macroeconomic conditions), and provides an outlook using an analysis of recent developments in debtors' creditworthiness.

(*) The authors would like to thank A. Francart for his assistance with this article.

1. Non-performing loans: An international comparison

The years following the financial crisis have seen the quality of assets in the euro area deteriorate sharply. Consolidated bank data released by the ECB[1] show NPLs to have increased most in the peripheral euro area countries and NPL ratios (NPLs/total loans) to have reached exceptionally high levels in Cyprus (53 %), Greece (27 %) and Ireland (22 %) by mid-2014 (latest available data), compared with the euro area average of 5.8 %. Credit quality is typically better in the core countries, Belgium being one of them (5.6 %). What is more, NPLs in the countries with higher NPL ratios have continued to rise, while some countries with lower ratios are already reporting minor falls.

The comprehensive assessment (CA) of the euro area's biggest banks – the outcomes of which the ECB published in October 2014 – suggest that these data underestimate credit risk. The asset quality review (AQR), which used a uniform NPL definition reflecting the more rigorous EBA definition, arrived at total NPL volumes for the banks reviewed of € 879 billion, € 136 billion more than previous estimations (ECB, 2014).

(1) This article draws on the ECB's international data up to and including June 2014 which are not yet based on the EBA definition, enabling a comparison over time. The ECB is aiming to publish quarterly figures in accordance with the EBA definition at the end of 2015 (data from 2014Q4 onwards).

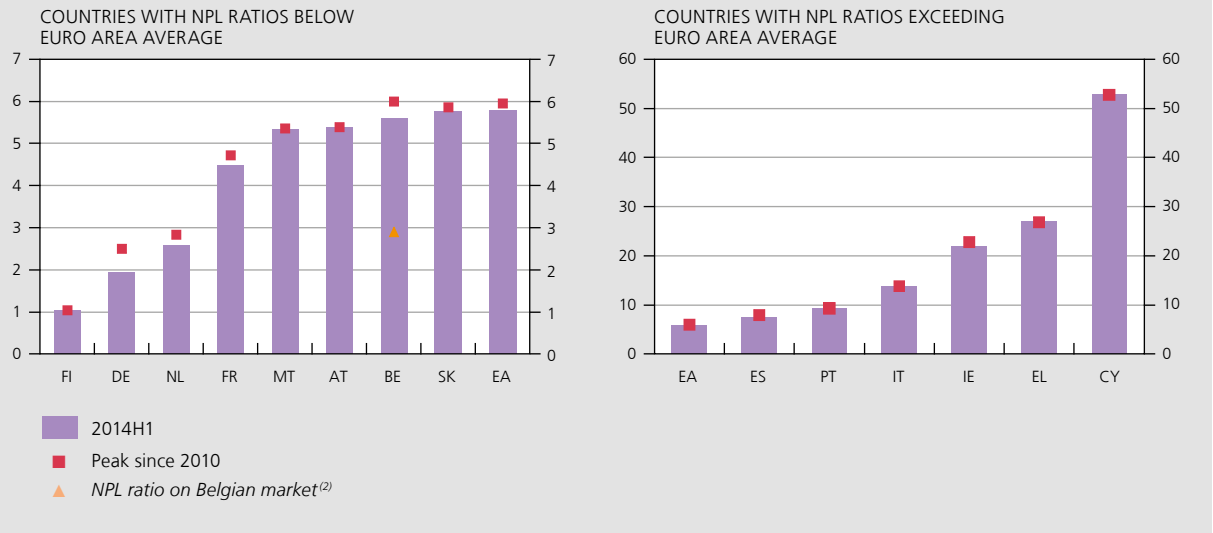
We also note that these data reflect credit risks at the level of banking groups, i.e. consolidated data including the operations of foreign subsidiaries and branches, and thus do not necessarily reflect credit risks in these groups' domestic markets. For Belgium, based on non-consolidated data – i.e. excluding the activities of foreign subsidiaries but including branches – credit risk turns out to be a lot smaller in the national market, with the NPL ratio averaging 2.9 %. The significant difference between the two sets of figures is down to the exposure of some Belgian banks to high credit risk in foreign markets, e.g. KBC through its subsidiary KBC Ireland (NBB, 2014). Since the aim of this article is to model credit risk in the Belgian market, it will primarily draw on non-consolidated data, except for international comparisons.

The financial crisis demonstrated that credit risk in the euro area is not a separate issue but ties in with macroeconomic conditions. In fact, the highest NPL ratios were recorded by the peripheral countries buffeted by the deepest recessions and reporting the most fragile private sector balance sheet positions. This is corroborated by a cross-sectional analysis comparing the NPL ratios of the various countries with the consolidated gross debt of the non-financial private sector.

For the euro area countries, a clear link emerges between the size of the non-financial private sector's debt ratio

CHART 1 NPL RATIOS: INTERNATIONAL COMPARISON[1]

(NPLs as a % of total loans)

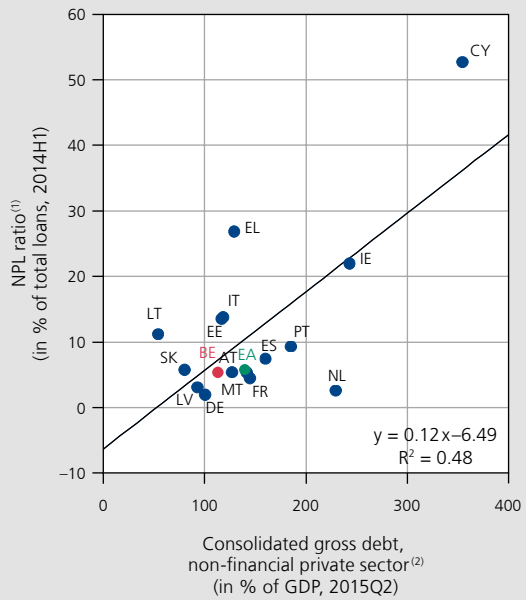


Source: ECB.

(1) Consolidated data (domestic banking groups, i.e. including foreign subsidiaries and branches) for the euro area countries for which these data are available.

(2) Non-consolidated data (Belgian banks, excluding foreign subsidiaries), June 2014.

CHART 2 NON-FINANCIAL PRIVATE SECTOR DEBT LEVELS AND NPL RATIOS



Sources: ECB, NBB.

(1) Consolidated data. No data for Luxembourg, Finland and Slovenia.

(2) For Belgium, consolidated gross debt excluding loans granted by the non-bank foreign sector, 'captive financial institutions and non-institutional money lenders', as these typically represent intra-group funding. The available data do not allow for a similar adjustment for the other countries, but the extent of these intra-group loans tends to be limited in most.

and NPL ratio levels[1]. Drawing on the latest available data for both variables – i.e. the first half of 2014 for the NPL ratio and the second quarter of 2015 for the debt ratio – an increase of 10 percentage points of GDP in the non-financial private sector's debt ratio sees the NPL ratio go up by 1.2 percentage points. The profile for Belgium does not stand out in any way, meaning that its NPL ratio comes in at the level that would be expected based on the debt ratio of the non-financial private sector[2].

Section 3 will discuss in greater detail the structural and cyclical determinants of credit risk in Belgium, but the next section will first provide an overview of available data about (*ex-post*) credit risk in Belgium.

(1) Countries with high NPL ratios are major contributors, but even if outliers such as Cyprus (with an NPL ratio of over 50 %) are factored out, the positive correlation remains, albeit less tightly so.

(2) An unreported analysis also showed up a significant cross-sectional correlation between changes in the NPL ratio and real GDP growth. Section 3 of this article also confirms the strong link between NPL ratios and the economic cycle in Belgium.

(3) In the footsteps of the Central Individual Credit Register, the Central Corporate Credit Register has been keeping track of payment arrears since April 2012. These series offer too short a history to be of use to our analysis.

2. Default data sources and definitions in Belgium

To measure (*ex-post*) credit risk, there are two types of publicly available data in Belgium:

– accounting data from banks: non-performing loans (NPLs), i.e. loans that are no longer producing any returns or that are expected not to produce the return agreed at contract date, are recognised in bank balance sheets as NPLs;
– Central Individual Credit Register (CICR): this register keeps track of all consumer and mortgage loans for private individuals (positive register), as well as payment arrears on such loans (negative register); banks and other lenders report this information to the CICR[3].

Both sources and definitions used – and in particular the criteria for registering a non-performing loan and/or payment arrears – are explained in greater detail below.

2.1 Non-performing loans

The definition of a non-performing loan depends on whether banks report consolidated data – i.e. including foreign subsidiaries and branches – or non-consolidated figures, that is, excluding foreign subsidiaries but including branches. Consolidated data are in line with international financial reporting standards (IFRS), whereas the non-consolidated numbers follow Belgium's generally accepted accounting principles (BE GAAP).

Although consolidated data tend to be more comparable across the world than non-consolidated data, there are still significant differences in the way banks interpret accounting principles for recognising NPLs. Under-reporting is also an issue, as the ECB's comprehensive assessment (CA) illustrated. As a result, in January 2015, the EU introduced a uniform and broader definition of NPL consistent with EBA guidelines.

The EBA defines a non-performing loan as:

(i) a loan that is in arrears for more than 90 days (principal and/or interest);
(ii) a loan that is unlikely to be repaid without collateral being realised.

The recent changes in methodology for the consolidated series give rise to a major drawback: no lengthy time series of data is available (from 2014Q3 onwards in

Belgium). Even more important for our analysis is that the data include the operations of foreign subsidiaries and branches and thus do not reflect credit risk in the domestic market, which is much better captured by non-consolidated data – i.e. excluding operations of foreign subsidiaries. In addition, these figures reach back much longer, to 1993Q2 on a quarterly basis.

BE GAAP (Scheme A) defines a non-performing loan as:

- irrecoverable or doubtful, i.e. 'problem risks on counterparties whose inability to honour their commitments has been established or is virtually certain, and also risks which are the subject of a lawsuit for which it is certain, or virtually certain, that its outcome will result in non-recovery of the disputed claims or in the impossibility of exercising the disputed legal remedies'; or:
- a loan with uncertain outcome, i.e. 'problem risks on counterparties that are established or foreseen as having trouble honouring their commitments, but whose inability has not been established or is not virtually certain, as well as the risks which are the subject of a lawsuit whose outcome is uncertain'.

In addition to the aggregate data, this article also draws on non-consolidated data per credit institution [1], grouped and not identified separately for reasons of confidentiality.

The BE GAAP definition of a non-performing loan is less broad than the EBA definition and does not, for instance, impose a 90-day criterion. Another drawback is that BE GAAP data do not provide any breakdown by type of debtor or loan, and any relationship with macroeconomic conditions will be less accurately identifiable than sector or individual borrower levels would allow.

2.2 (Negative) Central Individual Credit Register

CICR data do provide the required sector breakdown of payment arrears in the domestic market, albeit only for private individuals and from 2006 (from 2007 on a monthly basis). In addition to payment arrears in euros, the register also keeps track of the numbers of contracts and the number of people in arrears.

Payment arrears are supposed to be reported to the register by banks and other lenders, and the register imposes criteria by type of loan, the 90 days past due criterion being the most important. Mortgage arrears are expected to be reported to the register:

- when the amount due is not or not fully paid within three months of it becoming due;
- when the amount due is not or not fully paid within one month of a formal notice being served by registered letter.

The 90 days past due criterion also applies to other types of loan such as revolving credit and instalment sales and loans.

2.3 Probability of default

Using these data sources, the probability of default (PD) can be approximated, which is a central concept in the loan loss calculations of banks. In line with Basel II, the expected loss (EL) is a function of the probability of default (PD), the loss given default (LGD) and the exposure at default (EAD):

$$EL = PD * LGD * EAD$$

Particularly relevant is the degree to which the PD is determined by macroeconomic conditions. Stress tests (see Ferrari *et al.*, 2011) and more particularly credit risk models typically link the PD to a range of macro-economic scenarios. Usually, it is assumed that LGD depends on accounting practices, while EAD is kept constant.

In the case of banks' accounting data, we derive our (simple) PD measure by taking the ratio of NPLs over total outstanding loans (both expressed in euros), i.e. the NPL ratio; for the CICR, we take the number of loans in arrears as a percentage of the total number of loans. When referring to credit risk, this article refers to PDs so calculated.

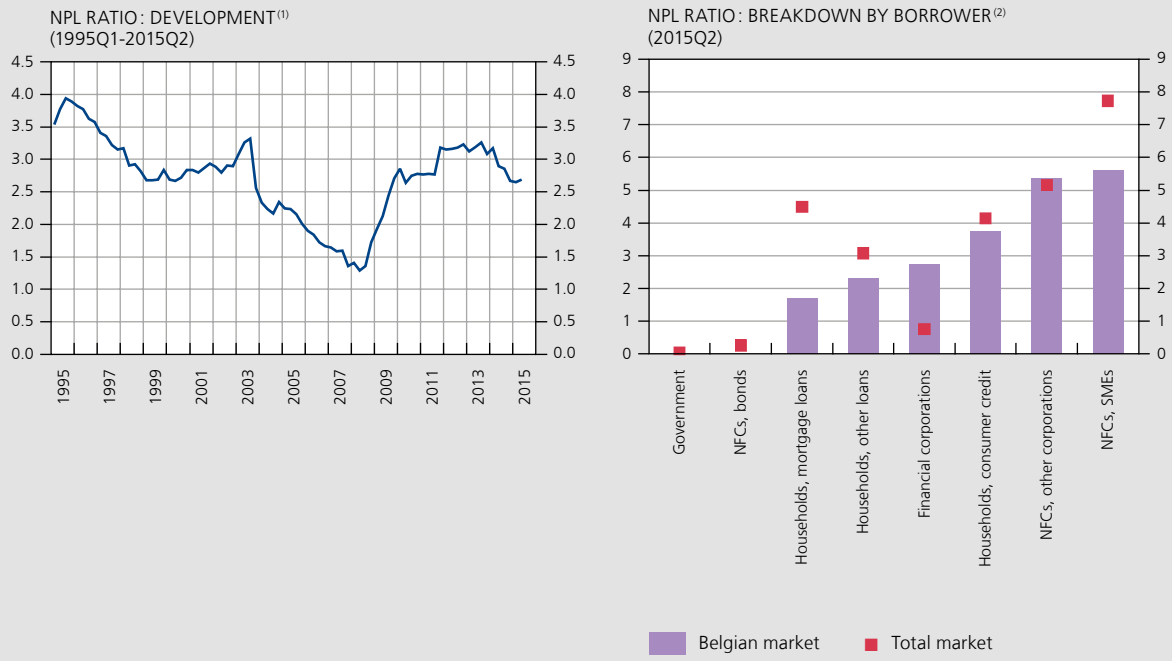
The NPL ratio (i.e. the PD) based on non-consolidated data reflects credit risk developments in the Belgian market since the mid-1990s, and shows that credit quality improved in the run-up to EMU and in the pre-crisis years. The ratio gradually came down from a maximum of around 4 % in 1995 to a historic low of 1.3 % in June 2008, partly explained by favourable macroeconomic conditions – relatively high economic growth coupled with falling interest rates and unemployment [2]. This trend was shared with the United States and the United Kingdom, which also saw their NPL ratios fall (ECB, 2005).

(1) In mid-2014, 39 Belgian credit institutions were drawing up their balance sheets on a non-consolidated basis.

(2) As noted, this figure should be assessed with caution as NPL interpretations not only differ between countries and between banks, but also from period to period. The observation that credit risk is hitting a low just before the crisis might reflect too upbeat a take by banks – for instance on loans 'with uncertain outcome' – and might not reflect the actual credit risk in the market. Different write-down percentages might also contribute, as these cause NPLs to go off-balance. For Belgium, no information about write-down percentages is available.

CHART 3 NPL RATIO FOR THE BELGIAN BANKING SECTOR: DEVELOPMENT AND BREAKDOWN BY BORROWER

(NPLs as a % of total loans)



Source: NBB.

(1) Non-consolidated data.

(2) Consolidated data.

The financial crisis reversed all this, and the NPL ratio went up relatively quickly from 1.3 % in 2008Q2 to 3.3 % in 2013Q3 – still better than the figures recorded in the mid-1990s. Some slight improvement has been noted since the end of 2013, and the NPL ratio stood at 2.7 % by the end of June 2015.

The breakdown of the consolidated data reveals that the NPL ratio depends heavily on the institutional sector – households, non-financial corporations (NFCs), etc. – and the market that debtors belong to, i.e. domestic or foreign market.

On the Belgian market, 2015Q2 NPL ratios varied from close to 0 % for government and NFC bonds [1] to 5.6 % for loans to SMEs. This relatively high credit risk on loans to SMEs matches the situation in foreign markets and is not surprising, given the typically higher risk profiles and the greater vulnerability to crises of the most fragile SMEs [2]. As it turns out, credit risk is also greater for loans with weaker collateral – mortgage loans have a relatively low NPL ratio of 1.7 %, well below the 3.8 % recorded for consumer credit.

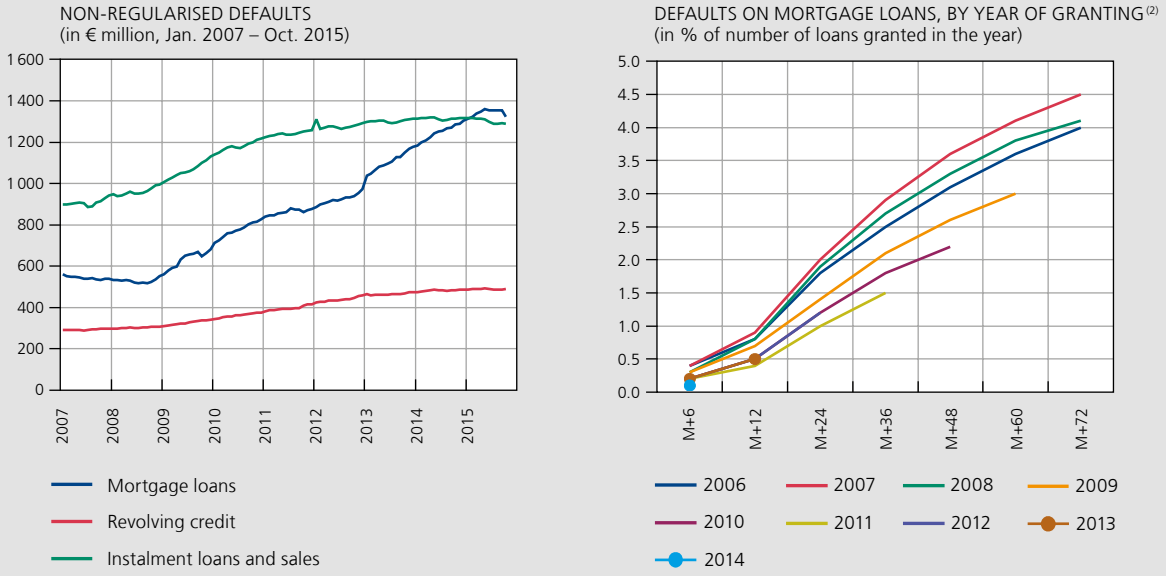
In nearly all sectors, foreign market credit risk was higher than in the Belgian market in 2015Q2, with the one exception of financial corporations. If we break this down further, we find that this is not down to credit institutions so much as to the non-banking financial sector (including non-financial holding companies and corporations in the sector usually described as shadow banking). The biggest difference between domestic and foreign markets is the credit risk on mortgage loans, reflecting the diverging macroeconomic trends in Europe, particularly in the housing market. Countries such as Ireland and the Netherlands – both of which faced very challenging trends in their housing markets – typically weigh heavily in the foreign portfolios of Belgian banks (NBB, 2015).

CICR data can be used to illustrate developments in household credit risk in Belgium, but only from 2006 (and on a month-by-month basis from 2007). These

(1) Note that the EBA definition is not limited to loans but also includes debt securities such as bonds. Non-performing loans and debt securities taken together are also referred to as non-performing exposures (NPEs).

(2) See the article by Piette and Zachary (2015) in this Economic Review.

CHART 4 CENTRAL INDIVIDUAL CREDIT REGISTER: DEFAULTS [1]



Source: NBB (Central Individual Credit Register).

(1) A mortgage loan is registered to be in default when a due sum has not been paid either in part or in full (i) within three months following its due date or (ii) within one month after formal notice has been served by recorded delivery letter. Instalment sales and loans are considered to be in default when three instalments have not been paid either in full or in part by their due date, when a due instalment has not been paid either in full or in part for three months, or when the instalments become payable immediately. Lastly, revolving credit is considered to be in default when a capital sum and/or total expenses become due in accordance with the credit agreement conditions and are not repaid in full within three months or when the capital has become repayable in full and the amount owing has not been repaid in full, or when the total amount repayable has not been repaid within one month of the deadline for restoring a zero balance.

(2) Loans are grouped by the year they were granted, with the curves showing the number of defaulting loans as a percentage of the original total number of loans, after a certain number of months following the granting of the loans. No account is taken of any regularisation of the loans.

data also allow for breakdowns by type of loans, e.g. mortgage loans on the one hand and consumer credit, such as instalment sales and loans and revolving credit, on the other. Total nominal amounts show that arrears on mortgage loans have recently become the most important category (€ 1.32 billion in October 2015), compared with those on instalment sales and loans (€ 1.29 billion) and those on revolving credit (€ 0.49 billion).

Note that the total amount of arrears does not just reflect increased credit risk or the PD, but also the upturn in the number of mortgages and trends in the average mortgage amount per loan.

The right-hand chart illustrates the PD based on CICR data, showing the percentage of loans agreed in a specific period that fall into arrears within a specific timeframe. The PD is cumulative and unadjusted, meaning that it does not factor in any regularisation of loans that were in arrears in the previous period. The chart reveals that credit risk was highest for loans issued in 2007, and that credit quality has improved slightly since then. The PD for mortgage loans issued in 2007 was 0.9 % after twelve months as against 0.5 % for loans agreed in 2013 [1]. This trend applies to all terms in which the first default was recorded.

This detailed PD information on mortgage loans allows for an accurate analysis of the correlations with macroeconomic and structural determinants, the subject of section 3.

3. Evaluation and determinants of mortgage defaults in Belgium

This section aims to explain the PDs calculated in the previous sections by linking them to both macroeconomic factors and a number of structural variables of the credit market. Structural factors include loan features – macroprudential risk measures/instruments such as LTV and DSTI – as well as bank characteristics, for instance bank size. Macroeconomic variables include cyclical variables such as unemployment, economic growth, interest rates, etc. This section will investigate whether higher LTVs, DSTIs and more fragile

(1) A final figure for the number of loans issued in 2014 and in arrears after twelve months will not be available until the end of 2015.

macroeconomic conditions effectively constitute greater credit risk and thus whether macroprudential policies based on these variables might prove useful.

To arrive at as accurate a measurement as possible of the correlation between the PDs and structural/macroeconomic factors, we will focus on the mortgage loans market for which PD data are available (CICR data) and for which we can consult other sources on the structural aspects of the credit market, such as the Household Finance and Consumption Survey (HFCS) and the PHL (Prêts Hypothécaires – Hypothecaire leningen) survey on mortgage loans.

3.1 Structural and macroeconomic determinants

The HFCS[1] provides insight into a range of structural features, such as the risk profile of outstanding mortgage debt, calculating a number of risk measures at household level[2]. Households have trouble repaying their mortgages when their income is not sufficient to meet their scheduled debt repayments and when they do not have sufficient (liquid) financial assets to meet these payments or repay (a proportion of) the outstanding debt if their sources of income suddenly dry up. What is more, if the property put up as collateral is not worth significantly more than the loan, banks run the risk of suffering losses. To assess the risk profiles of households' mortgage burdens, three macroprudential risk measures relate mortgage debt to income, to financial assets and to the value of the property respectively:

- the debt-service-to-income ratio (DSTI) divides the monthly mortgage payments by a household's gross income at the time of the survey. This ratio reflects the proportion of its income a household needs to meet its scheduled debt payments;
- the liquid-assets-to-debt ratio (LATD) divides the value of a household's liquid assets (deposits, bonds, listed shares and mutual funds) by its outstanding mortgage debt at the time of the survey. This ratio reflects what proportion of the outstanding mortgage debt a household could repay immediately from its financial assets, in the event of a sudden loss of income;
- the loan-to-value ratio (LTV) divides a household's outstanding mortgage debt by the – self-assessed – value of the property at the time of the survey.

If debt ratios linked to income or liquid assets exceed specific critical values, the risk increases that households will be unable to meet their debt commitments (Du Caju *et al.*, 2014). To assess credit risk, this article focuses on mortgaged households[3] that are looking at excessive debt ratios, and more specifically on their share of the total outstanding mortgage debt. Excessive debt ratios

(1) The ESCB's Household Finance and Consumption Survey (HFCS) investigates the financial behaviour of households in the euro area: for an in-depth review, see Du Caju (2013). The first wave of surveys was conducted in 2010 in most countries, including Belgium, with over 62 000 euro area households surveyed in total, 2 364 of them in Belgium. Fundamental features of the assets and liabilities breakdown typically remain fairly stable over time, and an analysis of 2010 data therefore has relevance today. The survey was conducted in Belgium, Germany, Greece, Spain, France, Italy, Cyprus, Luxembourg, Malta, the Netherlands, Austria, Portugal, Slovenia, Slovakia and Finland. The 'euro area as a whole' signifies these fifteen countries.

(2) The survey assesses all risk measures at the time of the survey and not at the time a loan was agreed or a property transaction made.

(3) Note: according to HFCS data for 2010, 69.7 % of Belgian householders are owner-occupiers compared with 60.1 % in the euro area; 30.5 % of Belgian households have mortgage loans compared with 23.1 % in the euro area.

TABLE 1 PROPORTION OF OUTSTANDING MORTGAGE DEBT (2010)

(measured by DSTI[1], LATD[2] and LTV[3] ratios)

Risky categories	Belgium	Euro area	Less risky categories	Belgium	Euro area
DSTI > 40 %	18.2	14.9	DSTI < 30 %	75.1	76.1
DSTI > 50 %	12.7	10.0	DSTI < 20 %	51.1	55.1
LATD < 10 %	46.0	57.0	LATD > 25 %	34.2	24.3
LATD < 5 %	35.1	41.4	LATD > 50 %	21.4	13.3
LTV > 80 %	20.2	26.5	LTV < 70 %	71.6	66.0
LTV > 90 %	10.0	18.2	LTV < 60 %	63.2	55.8

Source: NBB (HFCS 2010).

(1) The debt-service-to-income ratio divides the monthly mortgage payments by a household's gross income at the time of the survey.

(2) The liquid-assets-to-debt ratio divides the value of a household's liquid assets (deposits, bonds, listed shares and mutual funds) by its outstanding mortgage debt at the time of the survey.

(3) The loan-to-value ratio divides a household's outstanding mortgage debt by the – self-assessed – value of the property at the time of the survey.

are defined as DSTI > 40 %, LATD < 10 % and LTV > 80 % respectively.

On the ability to repay the mortgage from current income flows (DSTI), the table shows that, in Belgium, 18.2 % (12.7 %) of mortgage debt is concentrated with households that spent over 40 % (50 %) of their income on debt repayments at the time of the survey, compared with 14.9 % (10.0 %) for the euro area. Judged by income-related debt ratios, then, Belgium's risky category is bigger than that for the euro area, a finding that corroborates the sensitivity of the repayment capacity of Belgian households to loss of income, more specifically due to unemployment (Du Caju *et al.*, 2014).

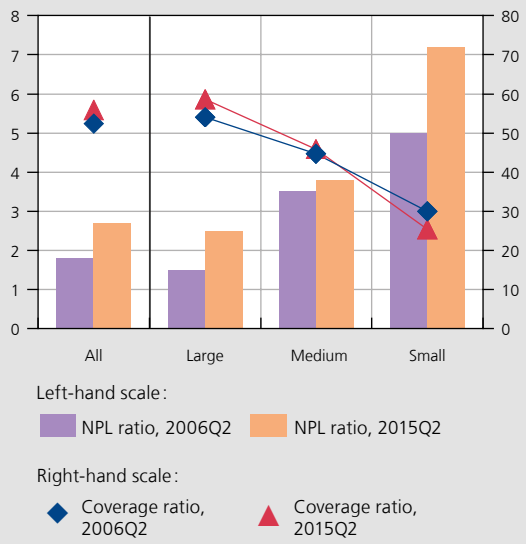
However, when measured by asset-related debt ratios (low LATD and high LTV), the proportion of risky mortgage debt in Belgium dips below the figures for the euro area. If we look at mortgage debt as covered by liquid financial assets, at the time of the survey 46.0 % (35.1 %) of mortgage debts in Belgium were less than 10 % (5 %) covered by households' liquid assets, compared with 57.0 % (41.4 %) for the euro area. What is more, 20.2 % (10.0 %) of outstanding mortgage debt in Belgium comprises loans with LTVs over 80 % (90 %) at the time of the survey, as against 26.5 % (18.2 %) for the euro area. By the same token, these ratios suggest that the less risky categories with high LATDs and low LTVs are bigger in Belgium than in the euro area.

Drilling deeper into households' outstanding mortgage debt by way of their liquid financial assets (LATD) and the value of their properties (LTV), we find a significant proportion of the debt to be covered: HFCS figures show that 35.1 % of Belgian mortgage debt in 2010 was less than 5 % covered by liquid assets, while 9.9 percentage points boasted LTVs of over 80 %. By comparison, 41.4 % of euro area mortgage debt was less than 5 % covered by liquid assets, of which 15.5 percentage points had LTVs higher than 80 %. At the other end of the spectrum, Belgium sees 14.9 % of total outstanding mortgage debt concentrated with households with sufficient liquid assets to pay off their debt immediately (LATD > 100 %). These households hold on to these assets to finance other expected or unexpected expenses or simply because of their returns, which may well be higher than the cost of the loan, partly because of its tax treatment. In the euro area, only 8.9 % of total outstanding mortgage debt is completely covered by liquid assets.

(1) Banks were classified by peer group based on quantitative criteria only, e.g. total assets. Given the highly variable NPL ratio between banks, an individual bank's NPL ratio may diverge sharply from that derived from the aggregate figures for the group. The standard deviation of the NPL ratio between banks is higher for smaller banks than for medium-sized or large banks.

CHART 5 SIZE AND ASSET QUALITY OF CREDIT INSTITUTIONS (1)

(in %)



Source: NBB.
(1) NPL ratio for the total loan portfolio. Non-consolidated data.

In summary, HFCS findings highlight the importance of distribution aspects when estimating credit risk, proving that a very large number of mortgaged households spend the bulk of their income on repaying debt and have few financial reserves to offset any loss of income. These households account for a significant proportion of total mortgage debt and are vulnerable to unemployment shocks. This observation holds for Belgium as much as for the euro area, albeit that Belgium has a larger proportion of outstanding mortgage debt fully covered by liquid financial assets and a smaller proportion of outstanding debt that is barely covered at all.

Features specific to banks and their business models, such as their size or the sectors and markets they target, may also be suggestive of credit risk. An analysis of the NPL ratio per individual credit institution (non-consolidated data) reveals that, on average, the NPL ratio has a reverse correlation with the size of the bank. Based on aggregate data for banks in the various groups (large/medium-sized/small) (1), the 2015Q2 NPL ratio varied from 2.5 % for the majors, to 3.8 % for medium-sized and 7.2 % for small banks. Overall, credit risk has risen most sharply for small banks since 2006.

The relatively high NPL ratio for a number of small banks may suggest that they operate in niche markets with greater credit risk exposure, focusing more on corporate

and consumer loans, or seeking out the riskier segments of the mortgage market. As well as facing higher credit risks, these banks tend to provide less for their risks, as evidenced by their coverage ratios expressing provisions as a percentage of NPLs. Coverage ratios barely touch 25 % for small banks, compared with 46 % and 59 % for medium-sized and large banks respectively. In fact, small banks have seen their coverage ratios edge down even further since 2006. This may reflect a less than solid capital position and make these banks reluctant to take losses on loans. Some authors (Salas and Saurina, 2002) point to the importance of the capital position for both size and cover of NPLs, while also flagging the possibility of a 'gambling for resurrection' strategy that sees banks increase their portfolios' credit risks even more when their NPLs rise (Keeton and Morris, 1987).

It should be noted that small banks account for a negligible share of the market : the banking majors held around 80 % of the loan market at the end of June 2015, as against barely 1 % for all small banks together. Although the risks to overall credit quality in the Belgian market are limited, an asset quality review may be as useful to small banks as it is for the majors.

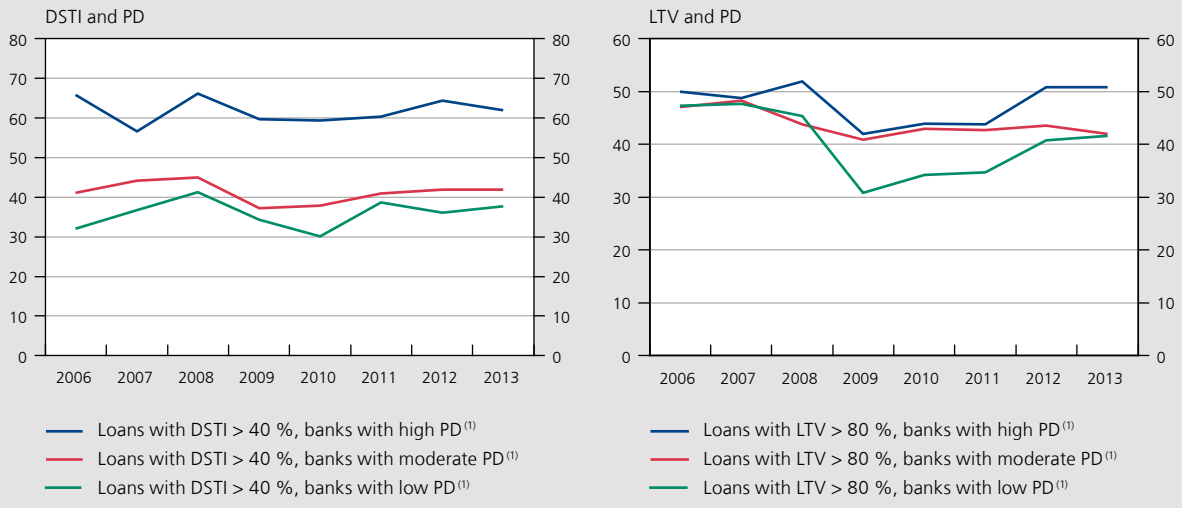
(1) DSTI and LTV data are taken from the PHL survey and are measured at the time loans are issued, implying that they may differ from the HFCS, which measured them in 2010 for the Belgian market. This does not necessarily coincide with the date the loans were issued.
(2) Note that the LTV ratio may well determine ultimate losses taken via the loss given default (when collateral is realised).

From a macroprudential perspective, it is worthwhile investigating the extent to which the difference in NPL ratios or PDs is down to the features of the loan portfolio (e.g. DSTIs, LTVs).

Drawing on CICR data for PDs and the PHL survey for DSTIs and LTVs[1], we have ranked Belgium's banks in different percentiles according to their PD on mortgage loans (lowest PD for the first percentile, highest PD for the last). The next step is to highlight the percentage of loans with high DSTIs (> 40 %) and LTVs (> 80 %) for these percentiles : p25, p50, p75, in the 2006-2013 period. The suspected link with DSTIs is indeed corroborated ; that is to say, banks with low (high) PDs have a relatively low (high) percentage of loans with high DSTIs in their mortgage portfolios. The link between PDs and LTVs is less clear-cut.

The importance of these links should not be underestimated. The positive correlation between DSTIs and PDs shows that credit risk (PD) may be curbed by reining in DSTIs and so improve the financial stability and resilience of banks. The link between LTV and PD is less clear, which suggests that DSTI might be a more efficient macroprudential instrument than LTV to reduce credit losses by way of lower PDs[2]. This might be explained by diverging property valuation methods and DSTI being a direct measure of the debt burden, which is not so much the case for LTVs that do not contain information about income.

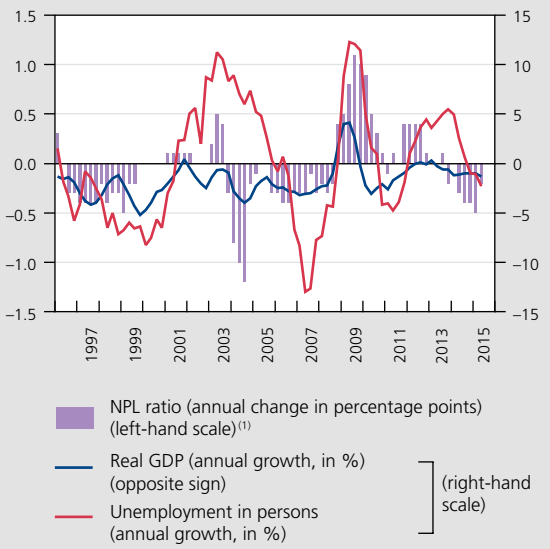
CHART 6 RELATIONSHIP BETWEEN DSTI, LTV AND ASSET QUALITY
(in %)



Source : NBB.
(1) On the mortgage portfolio (CICR data). A low/moderate/high PD coincides with percentiles 25/50/75. Excluding banks for which DSTI/LTV data are missing in the PHL survey for one or more years.

CHART 7 COUNTER-CYCLICAL BEHAVIOUR OF THE NPL RATIO

(in %)



Source: NBB.
(1) Non-consolidated data.

Of course, NPL ratios (PDs) do not just reflect structural variables – e.g. loan features, bank characteristics – but also mirror macroeconomic conditions, as noted in section 1. In Belgium, NPL ratio developments are closely correlated with macroeconomic indicators such as real GDP growth (–0.57) and unemployment (0.38). NPL ratios are counter-cyclical, coming down when business cycles improve and going up when they deteriorate (see Marcucci and Quagliariello, 2008).

Although aggregated NPL data do not allow for a very accurate measurement of the relationship with macroeconomic conditions (we may safely assume that NPL for households will be sensitive to macroeconomic conditions in a different way from corporations), these data do have the advantage – as we have noted – of spanning a lengthier period and therefore multiple economic cycles. The next sub-section discusses the contribution of macroeconomic and structural variables, albeit only for the PDs of mortgage loans – which are available from 2006 and therefore the correlation with the macroeconomic environment is mainly determined on the basis of the most recent economic cycle.

3.2 Econometric analysis of the probability of default on mortgage loans

To gain a more general picture of the determinants of realised *ex-post* credit risk, this sub-section will econometrically investigate the significance of macroeconomic variables on the one hand and structural factors on the other – i.e. loan features such as DSTI and LTV; and bank characteristics such as size. It will focus on the Belgian mortgage lending market, for which both PD data and information on structural factors are available.

TABLE 2 DEFAULT RATE OF MORTGAGE LENDING TO PRIVATE INDIVIDUALS

New contracts		… for which a first default was recorded …		
		… within nine months		
Year	New mortgage loan agreements for private individuals	Proportion	1st quartile	3rd quartile
		(in %)		
2006	317 438	0.54	0.08	0.70
2007	263 250	0.76	0.18	0.59
2008	258 902	0.67	0.14	0.71
2009	290 421	0.49	0.14	0.48
2010	350 397	0.38	0.09	0.39
2011	402 271	0.28	0.04	0.34
2012	321 261	0.46	0.05	0.63
2013	294 785	0.46	0.04	0.33

Source: NBB (Central Individual Credit Register).

Readers will recall that the percentage of mortgage lending agreements in arrears reached record levels in 2007, with 0.76 % of the year's 263 250 loans having run into arrears within nine months. Credit quality improved in subsequent years, leading to lower default rates.

As it turns out, default rates on mortgage lending to private individuals also vary from one bank to the next and these differences even exceed year-on-year variability. In 2013, for instance, default rates averaged 0.46 %, but a quarter of banks showed relatively high default rates (over 0.33 %) and another quarter showed relatively lower variablity (less than 0.04 %).

Note that this observation – of a large default rate variability between banks coupled with a lower variability from one year to the next – applies equally to mortgage agreements that go into arrears after more than nine months.

Can changes in macroeconomic conditions explain the observed variation in default rates ? Or is this variation explained by changes in the risk profiles of banks' mortgage loan portfolios ? We will try to answer these questions using an econometric model that explains the variations in monthly default rates [1] between banks and over time on the basis of two types of determinants : macroeconomic conditions on the one hand, and structural / macroprudential features on the other.

More specifically, we use the following Tobit model [2] :

$$PD^{i}_{kt} = c + \alpha_t + \gamma_k + \sum_{j=1}^{J_{Macro}} \beta_j * X_{kt}(j) + \sum_{j=1}^{J_{Prud}} \beta_j * X^{i}_{k}(j)$$

with PD^{i}_{kt} representing the monthly default rate for all loans originated by bank i in year k that are in arrears t months later. $X_{kt}(j)$ equals the j^{th} macroeconomic variable ($j = 1,\ldots, J_{Macro}$), $X^{i}_{k}(j)$ corresponds to the j^{th} macroprudential variable ($j = 1,\ldots, J_{Prud}$), α_t represents a fixed effect related to the loan age at default and γ_k is a fixed effect related to the year in which the loan was originated. Coefficients β_j measure the default rate's sensitivity to a 1 % change in an explanatory variable, assuming that the other variables remain unchanged at their mean.

More specifically, the analysis considers the following macro-economic conditions at the time the loan was in arrears [3] :

- key policy interest rate : a higher policy rate will affect the interest rate on variable-rate mortgages. Borrowers on variable-rate mortgages will face higher debt payments, increasing the probability of default. This implies an expected positive relationship between the policy rate and default rates ;
- unemployment rate : a higher unemployment rate increases the probability of borrowers losing their jobs and having trouble repaying their loans. This relationship – between unemployment and the default rate – is expected to be positive ;
- property price : a rise in residential property prices increases the probability of borrowers being able to refinance their mortgage at better conditions and thus reduce the default risk. The relationship between residential property prices and default rates is therefore expected to be negative.

The macroprudential variables measure specific features of banks' mortgage loan portfolios at origination. The data cover the period 2006-2013 and derive from the PHL survey.

The following variables were calculated as macroprudential determinants of the default rate :

- the proportion of the mortgage portfolio with a debt-service-to-income ratio (DSTI) higher than 40 % ;
- the proportion of the mortgage portfolio with a loan-to-value ratio (LTV) higher than 80 % [4] ;
- the proportion of the mortgage portfolio with maturity of over 20 years ;
- the proportion of the mortgage portfolio with variable interest rates.

These variables are often considered in the context of macroprudential policy measures related to the real estate sector. The underlying assumption is that they capture a bank's mortgage portfolio risk profile at the time the loans were originated. A higher risk portfolio would imply a higher default rate.

In addition, three other bank-specific variables come into play :

- a bank's share of the mortgage loans market : the relationship between market shares and default rates can be positive or negative. A negative correlation would mean that a bank with a smaller share of the mortgage loan has higher default rates, possibly because it focuses on riskier segments of the property market ;

(1) The default rate of the econometric model equals the monthly default rate defined as the proportion of loan agreements that defaulted at X months after origination among those that had not defaulted after (X-1) months.

(2) The Tobit model describes a relationship between a dependent variable called 'censored' as it is restricted in some way or another – monthly default rates can only be between 0 % and 100 % – and independent variables, i.e. the set of macroeconomic and structural variables.

(3) We also looked at other variables measuring macroeconomic circumstances, in particular GDP at the time of the payment arrears. For technical reasons – multicolinearity between variables – a Tobit model can handle only a limited set of variables simultaneously.

(4) Other models were run with macroprudential variables pegging different thresholds, e.g. LTV > 90 % or DSTI > 50 %. The results are still valid.

TABLE 3 MACROECONOMIC AND BANK DETERMINANTS OF THE DEFAULT RATE OF MORTGAGE LOANS TO PRIVATE INDIVIDUALS[1]

	Coefficient βj (standard deviation)	Standard deviation of the determinants (in %)	Impact on default rate (in percentage points)
Macroeconomic determinants at the time of default:			
Key policy interest rate	0.006943 *** (0.002317)	0.9	0.006
House prices, growth rate	–0.003176 ** (0.001477)	3.0	–0.010
Unemployment rate	0.002994 (0.003068)	0.5	0.002
Bank determinants in the year the loan was issued:			
Average interest rate	0.075311 *** (0.009698)	0.5	0.041
Proportion of portfolio with maturity > 20 years	0.003037 *** (0.000247)	10.4	0.032
Proportion of portfolio with DSTI > 40%	0.000453 *** (0.000103)	19.2	0.025
Market share for mortgage loans	–0.001458 *** (0.000188)	7.8	–0.011
Proportion of portfolio with LTV > 80%	0.000381 *** (0.000153)	9.3	0.009
Proportion of portfolio with variable interest rates	0.000770 *** (0.000067)	32.1	0.004
Growth rate of the mortgage portfolio compared to banking sector average	0.000074 * (0.000043)	32.3	0.002
Dependent variable:			
Monthly default rate (average, in %)	0.0628		
***Log*-likelihood**	11 364		
Number of observations	2 100		

Source: NBB.

(1) The parameters of the Tobit model were estimated with maximum likelihood between 2006 and 2013 for a sample of 15 banks and a period of 72 months (age of the loan at the time of default). (***), (**) and (*) flag the significance of the coefficients at threshold values of 1 %, 5 % and 10 % respectively. The final column equals the product of the coefficients (βj) and the corresponding standard deviations.

- the growth of the mortgage portfolio compared with the average growth of mortgage portfolios in the banking industry at large: the effect on default rates is positive if a larger market share encourages a bank to lend more to riskier borrowers;
- average interest rate on the mortgage portfolio: this interest rate is a weighted average of the rates applicable to various mortgage agreement[1], with weights reflecting their share in the loan portfolio and specific to individual banks. This average will depend on both the structure of the bank's portfolio and the term structure of interest rates. The effect on default rates will be positive if this variable reflects a risk premium.

(1) Interest rate data were taken from the MIR survey and reflect weighted averages that Belgian credit institutions apply to their new mortgage loans: agreements with initial fixed-rate terms of (1) less than one year, (2) over one year and less than five years, (3) over five years and less than ten years, and (4) over ten years.

We can draw three conclusions from the estimated model. The estimation results are presented in table 3.

First, variations in default rates between banks and over time are explained by the macroeconomic conditions at the time of default as well as by the specific features of a bank's mortgage portfolio at origination.

To assess the economic significance of these variables, the final column in the table presents the estimated coefficient multiplied by a standard change for the variable (the standard deviation). The key policy interest rate and residential property prices turn out to be the most important macroeconomic factors. A one-standard-deviation slowdown in annualised property prices equalling 3 % exerts the biggest relative impact, i.e. an increase in the model-projected default rate of 0.01 percentage points.

An increase in the key policy interest rate by a standard deviation equalling 0.9 % pushes up the monthly default rate by 0.006 percentage points.

Among bank-specific determinants, the average interest rate would appear to be the variable that best explains default rates. Out of any two banks with the same risk profile in all other respects, a bank having more loans at higher interest rates in its portfolio is likely to also face higher default rates.

Two other bank factors with a relatively large impact on default rates are the proportion of the mortgage portfolio with maturity of over 20 years and the proportion of the portfolio with a debt-service-to-income ratio of over 40 %. Note that the elasticity of default rates to the proportion of the mortgage portfolio with a loan-to-value ratio higher than 80 % is lower than the elasticity of default rates to the proportion of the portfolio with a debt-service-to-income ratio higher than 40 %, confirming the relationships identified in chart 6 (sub-section 3.1).

In keeping with the observations in sub-section 3.1, a bank's share of the market has a negative effect on default rates, meaning that the smaller the bank in the market for mortgage loans, the higher its default rates are likely to be. Coefficients related to the other two characteristics – i.e. the proportion of the portfolio with variable interest rate mortgages and growth of the mortgage portfolio as compared to the bank sector average – are significant, but less important.

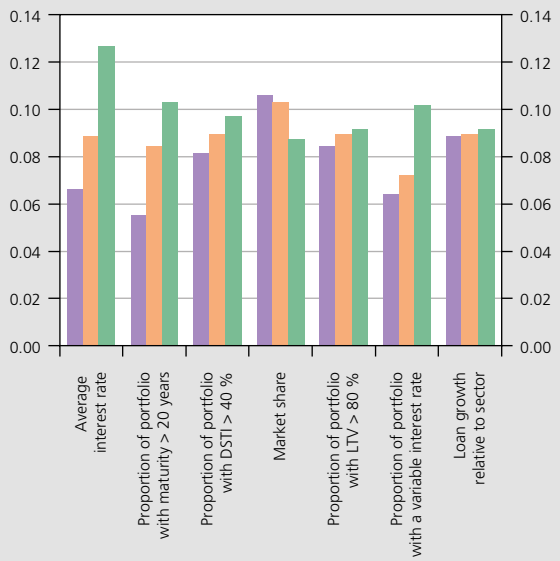
The second conclusion to draw from our analysis relates to differences in default rates between banks. To find out which features of banks' portfolios help explain the differences in default rates between banks, we need to review two factors: the sensitivity of the default rate for the relevant variables (see table above) and the variables' heterogeneity between banks (table in chart 8). This heterogeneity can be measured by the difference between the third quartile (line 'p75') and the first (line 'p25') of the distribution of each of these variables.

A first glance suggests that average interest rates best explain the variations in default rates between banks. This is mainly due to the sensitivity of default rates for this particular variable, as average interest rates are not all that different from one bank to the next: the spread between the third and first quartiles for average interest rates amounts to 0.8 percentage point.

Two prudential characteristics underpinning the heterogeneity of default rates between banks are the proportion of

CHART 8 DEFAULT RATE EXPLAINED BY BANK CHARACTERISTICS[1]

(in %)



p25	3.8	36.0	27.0	0.2	30.3	8.4	–21.2
p50	4.1	45.6	45.5	2.1	44.2	18.8	–7.1
p75	4.6	51.8	61.8	12.7	50.1	57.0	18.2

Source: NBB.

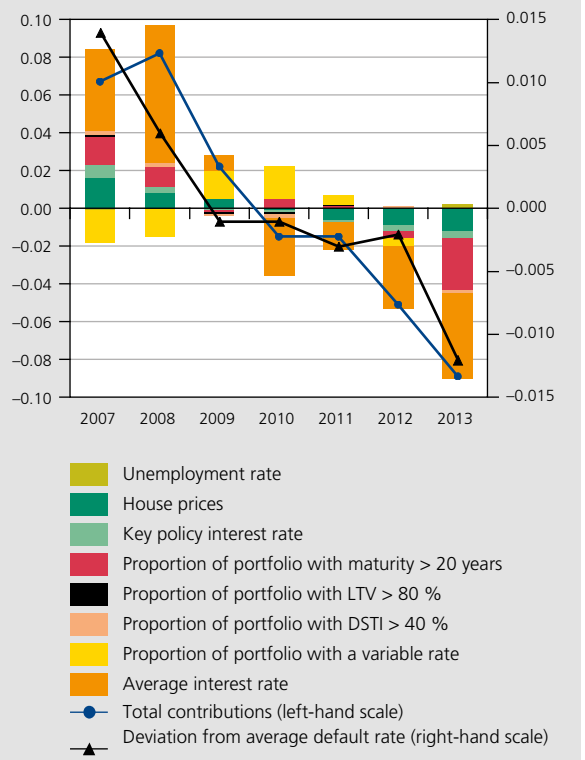
(1) Monthly default rates were calculated for 2013 and relate to loans originated in 2010. Bank characteristics are assumed to have the same values for all banks, with the exception of the characteristic being observed. Macroeconomic variables equal their average in the 2006-2013 period.

the loan portfolio with maturity of over 20 years and the proportion of the bank's portfolio with a variable interest rate. Although default rates are less sensitive to the proportion of adjustable-rate loans in the bank portfolio, this variable is very heterogeneous across banks: for one-quarter of Belgian banks, the adjustable interest rate proportion of the portfolio is below 8.4 %, while the other end of the distribution shows a quarter of banks at over 57 %. The differences between banks are a lot smaller when it comes to the proportion of the loan portfolio with maturity of over 20 years.

The actual size of a bank's market share turns out to be a better predictor of default rate variability than any changes in the variable. As for the remaining two macroprudential determinants, the proportion of the mortgage portfolio with a debt-service-to-income ratio higher than 40 % relates to a greater variability between banks than the proportion of the portfolio with a loan-to-value ratio higher than 80 %. In addition, heterogeneity for the debt-service-to-income ratio is greater than for the loan-to-value ratio.

CHART 9 DEVIATION OF THE DEFAULT RATE FROM ITS AVERAGE IN 2006-2013 PERIOD: CONTRIBUTIONS BY MACROECONOMIC AND BANK VARIABLES

(in percentage points)



Source: NBB

Note: The difference between the sum of the contributions and the deviation of the actual default rate from its average is explained by the sum of the model's constant, the average of the fixed effects related to the age of the loan at default and the fixed effect related to the origination year. Contributions of variables not included in the chart are close to zero.

The third conclusion to be drawn relates to factors explaining the variation of default rates from year to year. To capture the relative roles that macroeconomic and macroprudential conditions play in default rate trends, the chart below shows how the determinants contribute to the deviation in default rates relative to their averages in the 2006-2013 period. These contributions are defined as the product of the estimated sensitivity coefficients and the spread of any variable over its average throughout the period.

Over this period, changes in the average default rate are largely attributable to variations in both the key policy rate and the average mortgage interest rate. In 2007 and 2008, in particular, default rates recorded a surge on the back of a major contribution by interest rates. Once the financial crisis had taken hold and interest rates began to drop below their averages, their contributions turned negative.

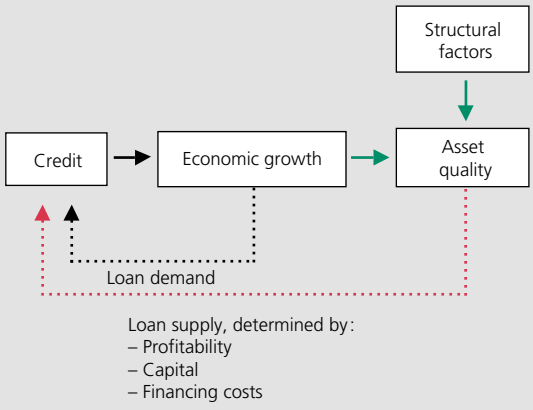
Two characteristics of bank portfolios turn out to be key contributing factors for default rate developments. First, the proportion of the mortgage portfolio with a variable interest rate was smaller than average during the 2007-2008 period of (relatively) high interest rates, making for a downward effect on default rates (as deviation from the average). As soon as interest rates come down, the proportion of the loan portfolio with a variable interest rate starts to rise to above-average and adds to the default rate. Secondly, the proportion of the mortgage portfolio with maturity of over 20 years has been falling since 2012 and has been a negative contributor to the default rate since then, particularly in 2013. Note also that the virtually unbroken rise in residential property prices in the 2010-2013 period helps to push the model-predicted default rate to below its average. Lastly, we note the limited contribution of the other macroprudential features, in particular the proportion of the portfolio with a loan-to-value ratio of more than 80 % and a debt-service-to-income ratio higher than 40 %. This lack of influence is mainly down to the variables barely changing year-on-year.

4. Implications and outlook

This final section reviews the implications of NPLs (feedback effects on macroeconomic conditions), and provides an outlook based on an analysis of debtors' creditworthiness.

The interaction between NPLs and macroeconomic conditions can be illustrated in a figure. The green arrows show the NPL determinants, i.e. both macroeconomic

CHART 10 INTERACTIONS BETWEEN MACROECONOMIC ACTIVITY AND ASSET QUALITY



Source: NBB.

conditions and structural factors as the previous section demonstrated. Conversely, NPLs may influence macroeconomic conditions via the loan supply (red dotted line).

NPLs can change the loan supply through three closely related mechanisms:

- profitability: bank profitability is adversely affected by large numbers of NPLs: these loans fail to generate expected returns and compel banks to make more provisions to cover any losses;
- capital: NPLs typically push up risk-weighted assets, for instance by way of an adjustment of internal ratings-based (IRB) risk weights, and, as a result, the regulatory capital required;
- financing costs: NPLs heighten uncertainty over banks' profits and capitalisation, causing markets to demand higher risk premiums for their external borrowing requirements (Kashyap *et al.*, 1994).

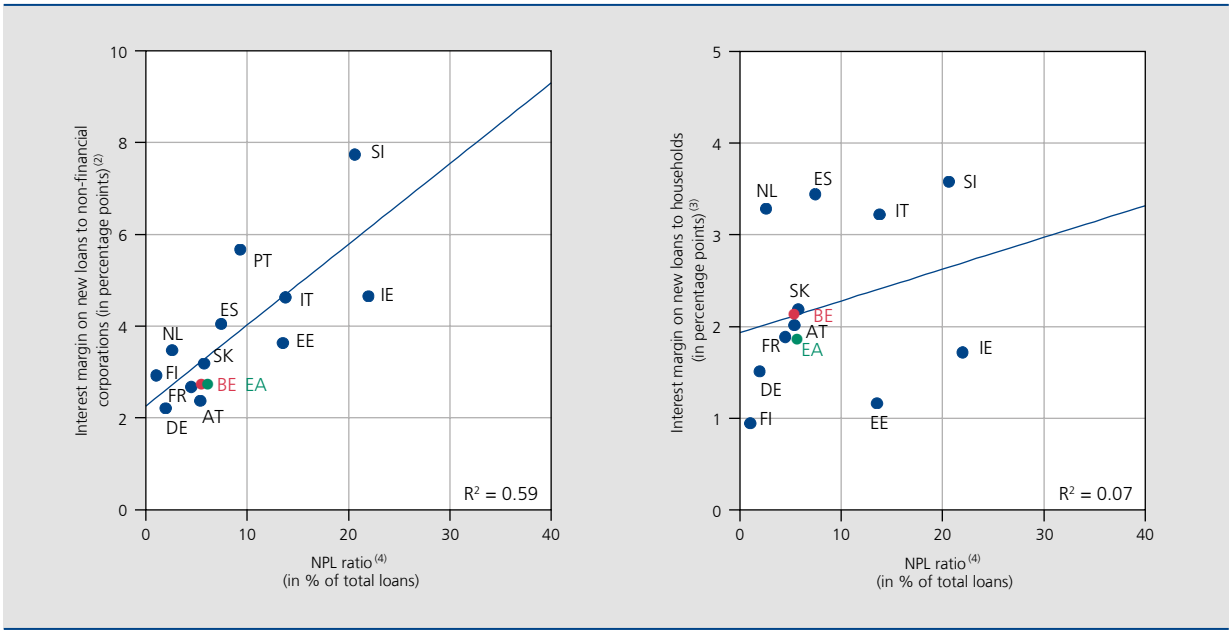
(1) For Belgium, a VAR-based causality test shows a unidirectional causal link between NPLs and the economic cycle. Statistical tests demonstrate that the two economic indicators observed – year-on-year growth of real GDP and unemployment in persons – influence twelve-month changes in the NPL ratio, but that NPL ratio changes do not have any impact on the economic cycle – a highly plausible outcome in view of Belgium's relatively low NPL ratio.

Together, these three mechanisms can cause greater numbers of NPLs to spark tighter loan supply, i.e. higher bank lending rates and/or lower lending volumes.

Comparing NPL ratios (consolidated data) in the euro area countries with the interest margins of banks on new loans granted to non-financial corporations and households, we find that higher NPL ratios typically go hand in hand with higher interest rate charges or margins. This is particularly true for interest charged to non-financial corporations, while the relationship is much less significant for interest charged to households. Possibly, the credit risk as defined here – i.e. the NPL ratio – plays a less important part in the pricing of household loans, as these types of loans are more highly collateralised and other determinants might play a role too in determining margins (e.g. competition).

Looking at corporations, NPLs could be suggested to be part of the cause of the post-crisis financial fragmentation in the euro area. Belgium is among the countries with a relatively low NPL ratio and relatively low interest margins. NPLs are a particular challenge in the peripheral euro area countries, not just because of their level but also because they appear to coincide with tighter loan supply depressing economic activity[1].

CHART 11 IMPACT OF NPLs ON FINANCING CONDITIONS IMPOSED ON PRIVATE SECTOR IN THE EURO AREA[1]



Sources: ECB, NBB.

(1) Situation in June 2014, no data for Cyprus, Greece, Latvia, Lithuania, Luxembourg and Malta. For households, also Portugal is excluded (series too volatile).

(2) Interest rate charged on new loans of € 1 million or less at an initial fixed-rate term of less than five years. Margin vis-à-vis five-year swap.

(3) Interest rate charged on new loans at an initial fixed-rate term of over ten years. Margin vis-à-vis ten-year swap.

(4) Consolidated data.

These countries would do well to resolve the issue of challenging NPL levels, as there are parallels with Japan's lost decade when banks waited too long to take losses on bad debts (see Boeckx *et al.*, 2015 and Inaba *et al.*, 2003). With their capital tied up in this way, they were no longer able to fund the economy independently, and became known as 'zombie banks'.

Better resolution of NPLs depends on a range of factors (see IMF, 2015), such as the prudential framework (e.g. NPL definitions and forward-looking provisions) as well as the legal framework (e.g. insolvency laws), a market for bad credit, information (e.g. credit scores for SMEs) and the tax regime (e.g. favourable tax treatment of provisions). An IMF survey of 18 European countries with sizeable NPLs found there was room for improvement on all these counts[2].

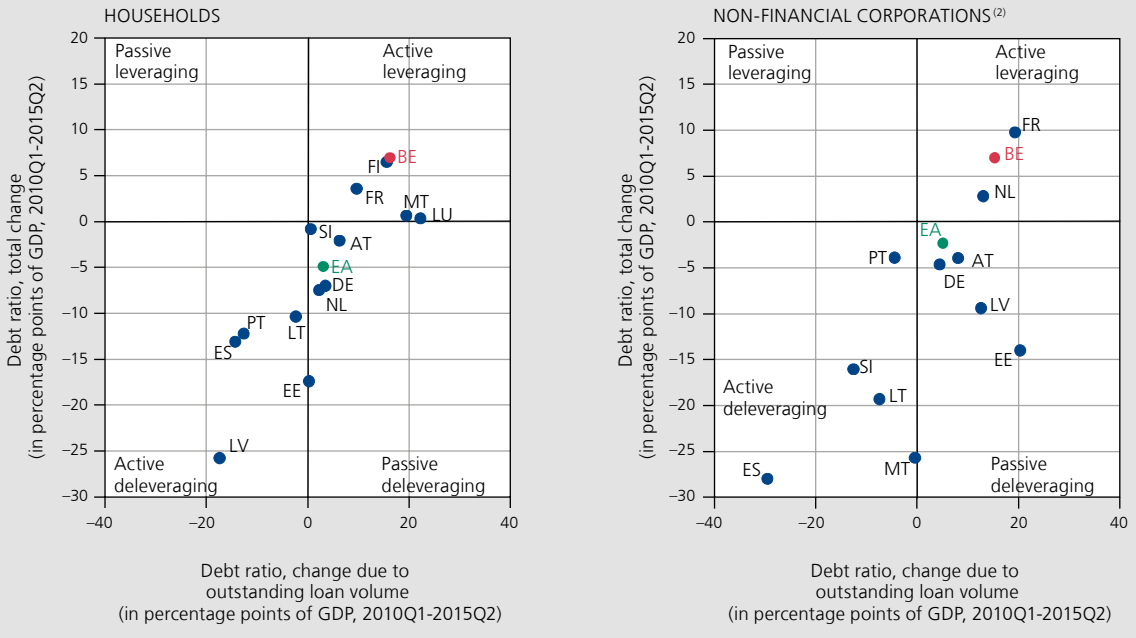
Another focus could be to reduce debt, as NPL challenges imply too great a debt burden. In that respect, conditions in the euro area are a little less worrying than shortly after the crisis, as debt ratios have declined in a number of countries (deleveraging) and as monetary easing has taken some of the sting out of the debt pile through lower interest charges.

The euro area at large has seen a deleveraging trend since early 2010 and the consolidated gross debt of the non-financial private sector has fallen from 146 % of GDP in 2010 to around 140 % of GDP mid-2015. Deleveraging may be quite modest when compared with the rapid build-up of debt that preceded it, but it does reflect a trend reversal from the previous decade, which recorded a constant rise in debt ratios. The improved balance sheet of the euro area's private sector is also clear from its lower debts as a ratio of financial assets.

In Belgium, by contrast, consolidated gross debt has continued to increase in the non-financial private sector and is gradually closing the gap with the euro area, particularly for households (58.8 % of GDP in Belgium compared with 60.6 % in the euro area in 2015Q2). Belgium has merely seen the debt-to-financial assets ratio stabilise in the past few quarters, but this particular ratio is still at a significantly lower level than in the euro area.

(1) The market for bad debt is relatively underdeveloped in Europe: the IMF (2015) puts it at € 64 billion at the end of 2013, compared with $ 469 billion in the United States.

CHART 12 DEBT RATIO SINCE 2010: ACTIVE VERSUS PASSIVE (DE)LEVERAGING [1]

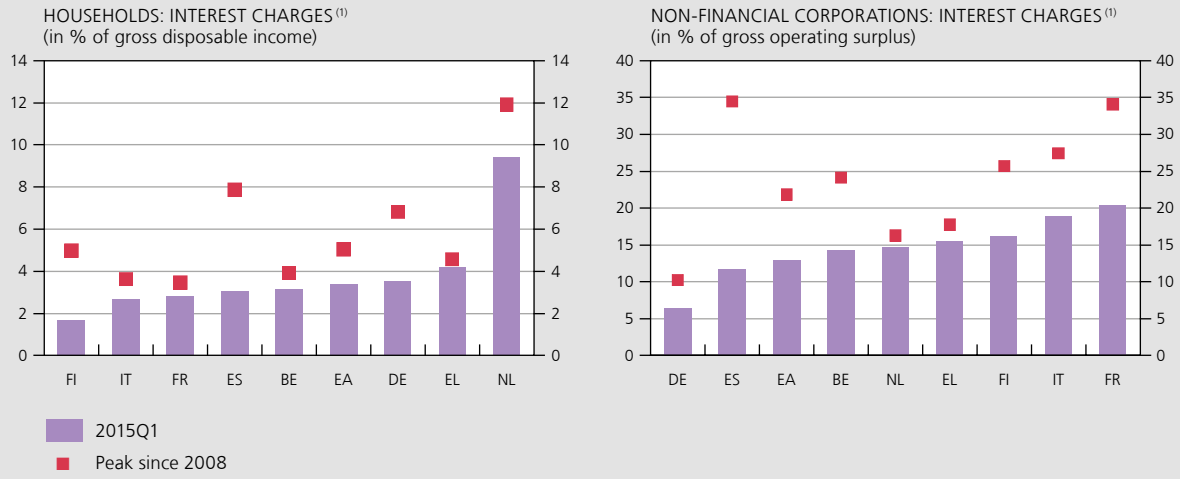


Sources: ECB, NBB.

(1) No data for Cyprus, Greece, Ireland, Italy, Slovakia. Non-financial corporations also exclude Finland and Luxembourg.

(2) For Belgium, consolidated gross debt excluding loans granted by the non-bank foreign sector, 'captive financial institutions and non-institutional money lenders', as these typically represent intra-group funding. The available data do not allow for a similar adjustment for the other countries, but the extent of these intra-group loans tends to be limited in most.

CHART 13 INTEREST CHARGES PAID BY HOUSEHOLDS AND NON-FINANCIAL CORPORATIONS



Sources: ECB, NBB.

(1) Calculated on the basis of the national accounts of the countries for which these data are available. Interest charges include fees for financial intermediation services indirectly measured (FISIM), that is to say interest actually paid, which in addition to the reference interest rate also includes an interest margin (FISIM).

Although the deleveraging trend is not broadly shared across the euro area, it seems that deleveraging occurs in the countries facing the highest credit risk. If we break down the debt ratio changes into credit flows and changes in nominal GDP, we find that about half of these countries are actively deleveraging, implying that loans have been cut back in nominal terms; the other half is deleveraging passively, i.e. reducing debt ratios thanks to nominal GDP growth. Belgium is part of a group of countries where debt ratios have risen relatively sharply and actively since 2010 due to new loan (primarily mortgages) flows. Nonetheless, this development is seen as sustainable as NPLs have not risen significantly.

In addition to the decline in debt ratios in the non-financial private sector in some countries, monetary easing has also reduced the debt burden in the euro area, as shown by the interest charges of households and non-financial corporations (i.e. interest payments as a percentage of gross disposable income for households and as a percentage of gross operating surplus for non-financial corporations)[1]. Interest payments reached an all-time high at the end of 2008, but have been consistently falling in the wake of successive interest rate cuts since October 2008.

That said, the impact of monetary stimulus varies, which can be related to underlying debt developments and interest rate variability of outstanding loans. Countries that have deleveraged the hardest and where loans typically have floating rates – e.g. Spain – have seen their interest burden shrink the fastest. In Belgium, by contrast, the effect of monetary policy on household interest charges has been rather muted, reflecting the ongoing increase in the debt ratio and the relatively large proportion of fixed-rate loans[2].

Monetary policy has helped to improve the sustainability of debt positions by reducing interest charges, and has probably prevented NPL ratios in some countries from rising even higher. These countries should make the most of such conducive circumstances by resolving the heavy legacy of the past – i.e. NPLs – so that it does not constantly threaten to dampen the growth outlook.

Conclusion

This article assesses realised (*ex-post*) credit risk in Belgium, as measured by both NPLs and payment arrears of households. It also examines the extent to which that risk can be explained by the macroeconomic environment and by

(1) Calculated on the basis of the national accounts. These interest charges include fees for financial intermediation services indirectly measured (FISIM), that is to say interest actually paid, which in addition to the reference interest rate used in the national accounts also includes an interest margin (FISIM). Interest charges as published in the national accounts do not include this margin (recorded as consumption by the sectors using these services). Only a few countries (those included in chart 13) release actual interest charges.

(2) Interest charges on fixed-rate loans can also be reduced by refinancing, although usually after a time lag.

structural variables, such as credit characteristics (e.g. LTV, DSTI) and features of the banks (e.g. their size). Such an analysis is relevant to macroprudential policies that might seek to curb credit risk via one or more of these variables.

Poor data availability on both credit risk and structural features has compelled us to focus our analysis on mortgage credit risk.

Outstanding mortgage debt in Belgium has a mixed risk profile. Overall, Belgian households' net financial wealth is high, but their debt ratio continues to rise. Distribution aspects are important. There are pockets of risk, as many Belgian households with mortgages spend a large proportion of their income on debt repayment (which tallies with a high DSTI). The analysis shows that these structural features of credit are informative for the credit risk incurred by banks on their loan portfolios. Banks with a relatively high NPL ratio also tend to have a relatively high proportion of loans with a high DSTI in their portfolio. Apart from the loan risk profile, banks' size also appears to be indicative of credit risk. An analysis of the NPL ratio per individual credit institution shows that, on average, a higher NPL ratio is observed for the group of small banks.

An econometric analysis confirms the explanatory power of a number of these structural factors for credit risk in Belgium, and also indicates that this depends, albeit to a lesser extent, on the macroeconomic environment. Moreover, in some countries where very high NPL ratios are recorded, non-performing loans also appear to be having an impact on economic activity through a tightening of credit supply, especially via higher interest margins on new loans to businesses.

In these countries, it would be advisable to look for a solution to the problematic NPL level. On the one hand, efforts can be devoted to a better resolution of bad loans ; on the other, preventive steps can be taken giving consideration to the relationships put forward in this article. In that respect, one positive factor is that a number of these countries are now recording a drop in their private debt ratio. Furthermore, accommodative monetary policy is also playing a supporting role via a considerable decline in interest charges. These countries need to make the most of these circumstances and get rid of the heavy legacy of the past (NPLs) so that it does not constantly threaten to dampen the growth outlook.

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Has the reorganisation of global production radically changed demand for labour ?

J. De Mulder
C. Duprez (*)

Introduction

The organisation of global production has undergone profound changes in recent decades. Technological progress has revolutionised creation, production and distribution methods, and even customer relations. Technology has become widespread in all sectors of the economy, and has really taken off via the use of robots, digitalisation, computerisation and developments in information and communication.

Coupled with the decline in transport costs, these technological developments have also helped to open up the production chains by facilitating the transfer of data and providing greater scope for supervision. Nowadays, the creation of a final product is based on intermediate components or services originating from different locations, sometimes in distant countries. In this new form of organisation, production units are no longer geared to making final products for consumers, but each unit represents a link in a production chain which is often complex and fragmented. As a result, the emerging countries – especially in East Asia – have assumed a bigger role in the global market production chains, particularly in the industrial segment.

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(1) This article uses data from various sources. The period for which data are available varies from one source to another. The period analysed runs from 2000 to the latest available year.

These changes have had an impact on economic activity and employment, and repercussions on industry and market services. In addition, the composition of demand for labour has changed radically in the past fifteen years. Demand for highly-skilled jobs has risen to the detriment of medium-skilled occupations. Low-skilled jobs have been less affected. Viewed from the angle of the occupations pursued, demand for labour has therefore polarised (see also Goos *et al.*, 2014, Michaels *et al.*, 2014 and Eurofound, 2013).

This article describes the reorganisation of production chains and the polarisation of employment, and examines the link between the two during the recent period (1). The article does not consider wages or the impact of technology on low-qualified workers since these aspects have already been studied (see in particular Goux and Maurin, 2000 and Revenga, 1992). But it uses new ways of measuring the fragmentation of production which appear relevant for explaining the polarisation of demand for labour.

The article is in two parts. The first chapter describes the global production chains. The major changes that have influenced their organisation are discussed in section 1.1. Section 1.2 focuses on Belgian market production chains, analysing the contributions of the production factors of the main economic regions. The second chapter looks at developments in demand for labour. Section 2.1 takes a look at employment in Belgium and the EU15. Since the level of education is not the most appropriate angle for analysing demand for labour, section 2.2 gives a breakdown by type of occupation. Section 2.3 describes the

polarisation of demand for labour in Belgium and elsewhere in Europe. Section 2.4 presents the econometric results of the regressions linking globalisation, technological progress and the polarisation of demand for labour. This article ends with a conclusion.

1. Production chains

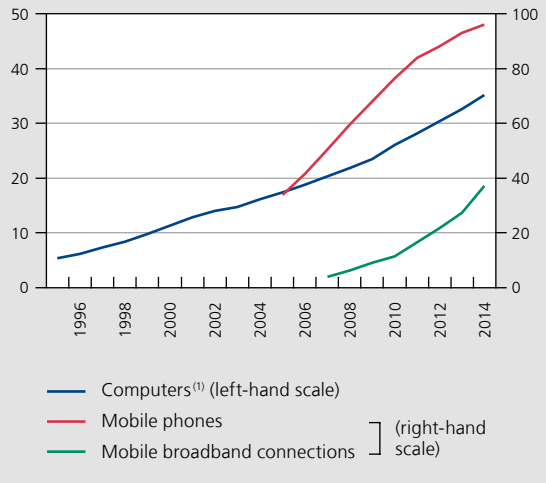
1.1 Technological progress and globalisation of production chains

The history of information and communication technology (ICT) features a series of revolutionary developments, such as the telegraph, the telephone, television and computers. The past fifteen years have also brought a rapid succession of innovations, with the advent of mobile phones, the internet, digitalisation, high definition, etc. These innovations have become widespread in the economy, in both the market sector and the non-market sector, bringing changes in organisation, production and distribution methods, and in the channels for reaching customers, etc.

Although the figures available internationally are often fragmented, the development of ICT has been accompanied by an increase in the corresponding capital stock. In Belgium, the net volume of IT and telecommunications equipment expanded by 133 % between 1995 and 2013.

CHART 1 GLOBAL SPREAD OF ICT

(per 100 inhabitants)

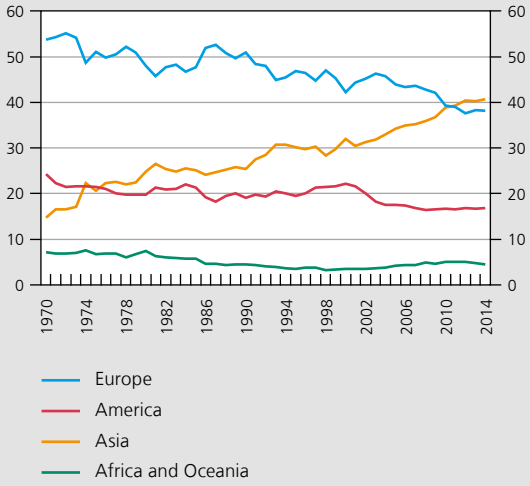


Sources: IMD, ITU.

(1) Average for a selection of 44 countries worldwide. See the World Competitiveness Center (IMD) for more details.

CHART 2 SHARE IN GLOBAL EXPORTS OF GOODS

(in % of the world total)



Source: UNCTAD.

For comparison, the intangible capital which consists of R&D, software and other intellectual property grew by 102 % over the same period, while other productive assets such as buildings (excluding housing), civil engineering works, transport equipment and other machinery and equipment recorded only 19 % growth.

By facilitating the transfer of information, the ICT revolution has also been one of the factors leading to the opening up of production chains, thus contributing to their international fragmentation. The creation of a final product now requires numerous inputs, often coming from different firms which, in some cases, are located in distant countries. In those circumstances, production units no longer manufacture a final product for the consumer, but form just one link in a fragmented production chain. Companies, and particularly multinationals, have taken advantage of this situation to locate some elements of their production in countries offering a more flexible regime in terms of taxes and social and environmental legislation, plus an abundant supply of relatively cheap labour. R. Baldwin (1) summed it up by saying "ICT made it possible, wage differences made it profitable".

The expansion of ICT is not the only factor enabling the emerging countries, and especially the Asian economies, to gradually become the biggest manufacturers in the

(1) See WTO (2013).

world. Another reason lies in the political choice made by some countries, notably China, to develop their industry, particularly the export sectors. In so doing, these countries maintained an extremely high investment ratio, exceeding 40 % since 2009, whereas that ratio remained steady at around 20 % in the EU15 and the new EU Member States. Overall, in the past 15 years, Asia's share in global exports of goods – which are constantly increasing – has grown by more than 10 percentage points to reach 40 % in 2012.

1.2 Belgian production chains

The emerging countries' participation in the global economy has intensified, driven mainly by the East Asian countries. On the basis of the OECD's Inter-Country Input-Output (ICIO) data[1], the share of the emerging economies in global GDP increased from 23.4 % in 2000 to 39.6 % in 2011[2]. However, that figure takes account of total value added, i.e. including that involved in the creation of non-market services which are, by nature, less subject to globalisation. By using global input-output matrices, the analysis can focus on the chains for the creation of market goods and services, i.e. those where the final product offered for sale is commercial[3]. In these chains, the contribution of each branch including any contribution from the non-market sector can be measured by its value added, regardless of the production stages incorporating the components or intermediate services. As a supplement to the national accounts, which enable the total contribution of each branch to be deduced from the breakdown of value added by branch of activity, it is thus possible to separate the contribution of the different branches of activity to the market production chains by means of global input-output matrices.

In the global market production chains, the share of the emerging countries grew from 24.9 % in 2000 to 43.3 % in 2011. Their market consumption at current prices practically quadrupled, whereas the increase for the advanced countries came to only 60 %. The new demand potential in the emerging countries is an opportunity for all producing countries, including the advanced economies.

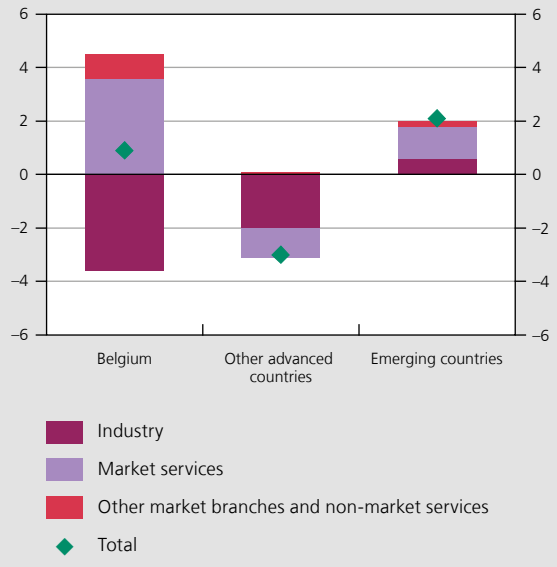
(1) See www.oecd.org for more information on this database.

(2) The available data on global value chains (ICIO, WIOD) concern only a limited number of countries. In this article, which is based largely on those data, the countries are divided into two groups. The group of advanced countries includes the EU15, Norway, Switzerland, the United States, Canada, Australia, New Zealand, Japan and South Korea. All other countries, including the "rest of the world" in the value chain data banks, belong to the "emerging countries" group. The latest available year in the ICIO database is 2011.

(3) See Timmer *et al.* (2014) for a description of the calculation method. By convention, the market branches of activity comprise agriculture, industry, construction, trade, transport, accommodation and food service activities, information and communication, financial services and real estate activities, professional, technical and scientific activities, and administrative and support service activities (sections A to N of the NACE 2008 nomenclature). The non-market branches of activity are public administration, education, health and social work, the arts, entertainment and other service activities (sections O to S of NACE 2008).

CHART 3 CONTRIBUTIONS TO BELGIAN MARKET CHAINS

(change between 2000 and 2011, in percentage points)



Source: NBB calculations based on the ICIO data (OECD).

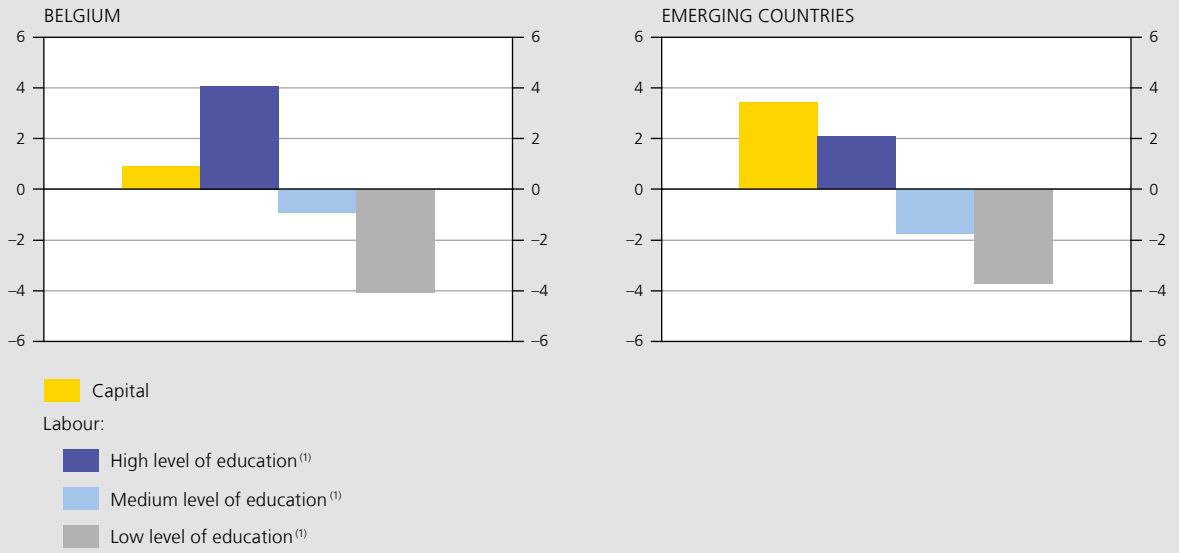
However, by expanding their production capacities, the emerging countries are also competing with advanced countries for creating value and jobs. In Belgium, the share of final consumption of market products imported direct from emerging countries rose from 3.9 % in 2000 to 4.8 % in 2011.

In addition, Belgian production processes used more components from the emerging countries as inputs. The contribution of the emerging countries, particularly China, India and Russia, in Belgian market chains in fact expanded from 5.7 % in 2000 to 7.8 % in 2011. That was not at the expense of components from Belgium but affected those from other advanced countries, whose contribution thus declined by 3 percentage points to 20.2 % in 2011. In this group of countries, it was mainly France, the United Kingdom, the United States and Japan that lost market shares. Belgian firms, which generated 72 % of Belgian market output in 2011, actually increased their contribution by 0.9 percentage point over that period.

In Belgium, the main branches of activity have not all followed the same pattern. By way of illustration, the market chains can be sub-divided into industrial product chains and chains producing market services. For each of these chains, it is also possible to calculate the contributions of the different branches of activity, including

CHART 4 SHARES OF PRODUCTION FACTORS IN THE RESPECTIVE CONTRIBUTIONS TO BELGIAN MARKET CHAINS

(change between 2000 and 2008, in percentage points)



Source: NBB calculations based on the WIOD.

(1) See the annex for more details on the breakdown by level of education.

those of industry, market services and non-market services. The contribution of Belgian industry has declined, as has the contribution of industry in the other advanced countries, especially in the industrial product chains. In Belgium, this de-industrialisation was accompanied by wider outsourcing of services by industrial firms, which thus made greater use of trading firms or those specialising in business services in order to produce their goods. In the chains producing market services, the Belgian market services branches also stepped up their contribution, even though it was already high, at almost 82 %.

At this stage, it may be worth going into more detail on the two segments that have gained market share in Belgian market output, namely the Belgian segment and that of the emerging countries. In the WIOD database[1], a breakdown of remuneration per production factor is available up to 2008[2]. The remuneration of labour is also broken down by the level of education[3]. This shows that the remuneration of low-qualified workers declined in relative terms between 2000 and 2008. In the Belgian segment, the contribution of the low-qualified has fallen primarily in favour of the highly qualified. In the emerging countries segment, that fall has also – and primarily – favoured capital even though the original share of capital was greater than in the Belgian segment.

It therefore seems that the market share of the Belgian industrial segment contracted mainly in favour of capital in the emerging countries, as the latter have specialised in the initial links in industrial production, such as extraction, which are capital-intensive by nature. There are two comments to be made here. First, demographic or socio-economic factors may play a role in the relatively small share of wages in the emerging countries, and therefore in the large share of capital remuneration. Also, some of the capital there may be owned by firms in advanced countries. However, it is difficult to put a figure to the scale of that at present, since no data are available on the financing of value chains.

2. Changes in demand for labour

2.1 Employment trends since 2000

The great forces affecting the organisation of global production chains have also had implications for employment. The loss of market shares for European industry was accompanied by a decline in the volume of labour in industry

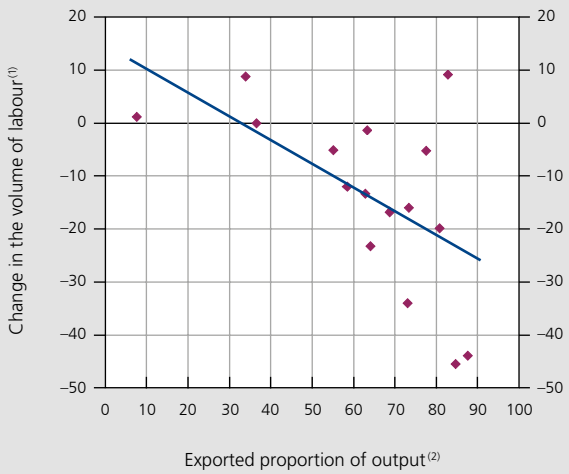
(1) See Timmer *et al.* (2015) for more information on this database.

(2) See Timmer *et al.* (2014) for a detailed analysis of these data.

(3) As we shall see, a breakdown by occupational category would be preferable. However, that is not available in the WIOD. See the annex for more details.

CHART 5 CHANGE IN THE VOLUME OF LABOUR AND EXPORTS OF BELGIAN INDUSTRY

(each diamond represents one of the 16 industrial branches of activity in the A38 classification)



Source: NBB calculations based on EU KLEMS data and Dhyne and Duprez (2015).

(1) Between 2000 and 2012, in millions of hours.

(2) Proportion of output exported directly or indirectly (via another branch of activity), average over the period 2002-2012.

in all the EU15 countries, though the impact was greater for some (Portugal, Denmark, the United Kingdom) and smaller for others (Luxembourg, Germany, Austria). The new Member States also had to contend with this gradual de-industrialisation: in their case, the contribution of industry to the increase in the total volume of hours worked between 2000 and 2014 was –2.4 percentage points, compared to –3.7 percentage points for the EU15.

In Belgium, the industrial branches of activity that felt the biggest impact were the ones featuring the highest degree of globalisation. For the 16 industrial branches in the A38 classification of the NACE 2008 nomenclature, the correlation between the proportion of output exported and the movement in the volume of labour between 2000 and 2012 is clearly negative. In contrast, that correlation is zero and non-significant for market services.

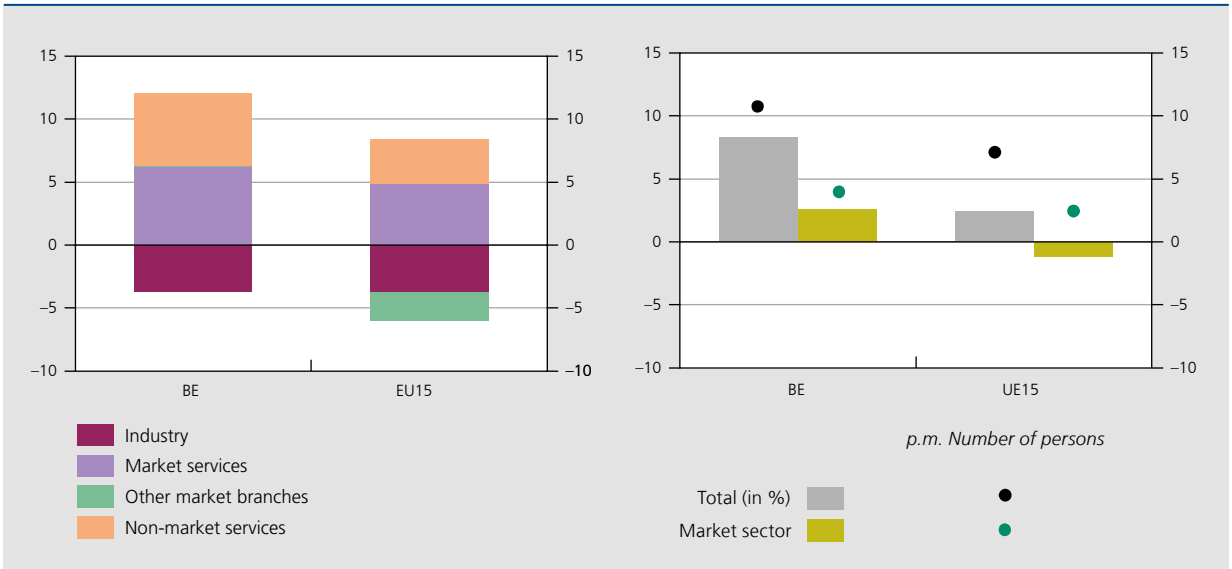
In contrast to industry, market services recorded an increase in the volume of labour, although in Belgium that is due partly to the government measures concerning service vouchers(1). The growth of employment in market services occurred in all European countries. Between 2000 and 2014, the contribution of market services to the expansion of the volume of labour came to 4.8 percentage points in the EU15.

In Belgium, employment in the other market branches, namely agriculture and construction, was unaffected, in contrast to other European countries such as Portugal, Greece, Spain and Ireland. Largely as a result of the economic crisis, the market sector in all European countries

(1) See NBB (2015).

CHART 6 CHANGES IN THE VOLUME OF LABOUR OVER THE PERIOD 2000-2014

(contribution to the total change; percentage points, unless otherwise stated)



Source: EC (national accounts).

therefore posted relatively weak growth, or even negative growth in most countries. However, the total volume of labour increased overall, thanks to the positive contribution from the non-market sector.

The change in the volume of labour is the best way of measuring the influence of economic activity on the labour market. However, in the absence of data on the number of hours worked, the analysis in the rest of this chapter is based on employment in terms of the number of persons. The trend in the number of persons in work over the period 2000-2014 is clearly more positive than the trend in the volume of hours worked. Indeed, a reduction in average working time per person was recorded, to a greater or lesser degree, in all EU Member States and in the various branches of activity. Different working regimes, particularly part-time working, became more widespread during that period, since they offer more flexibility for both employers and workers (1). On average, the number of hours worked declined even more sharply in the EU15 than in Belgium. The number of people working in the market sector therefore also increased in the EU15. During the period considered, the total number of persons in work was up by almost 11 % in Belgium and around 7 % in the EU15.

2.2 How to assess demand for labour

In the previous chapter, the production factor "labour" was broken down according to the level of education, the only detail available in the WIOD database. However, that breakdown which – as explained in the annex – is based on the highest diploma or certificate gained is not a good indicator of demand for labour. It is strongly influenced by the structure of the available labour supply (the labour force) whose average level of education has risen in recent decades. If the labour supply is abundant, employers may tend to fill vacancies with people who are in fact over-qualified for the job, thus driving out the less qualified. In addition, the highest diploma gained does not provide any information on what the person in question has done since completing his or her education, so that this breakdown is particularly problematic in the case of people who left school quite some time ago. This dissonance may operate in either direction. For instance, during their career, people gain experience, enabling them to perform more complex tasks than their diploma would indicate. Conversely, a period of prolonged inactivity may imply that certain abilities are lost. In the context of "working longer", it is also possible that older workers reaching the end of their career step down and take on a less demanding job. All these factors can affect the share of the various levels of education in total employment, so that this breakdown does not give an accurate picture of demand for labour, in which employers wish to recruit people with specific skills for certain jobs.

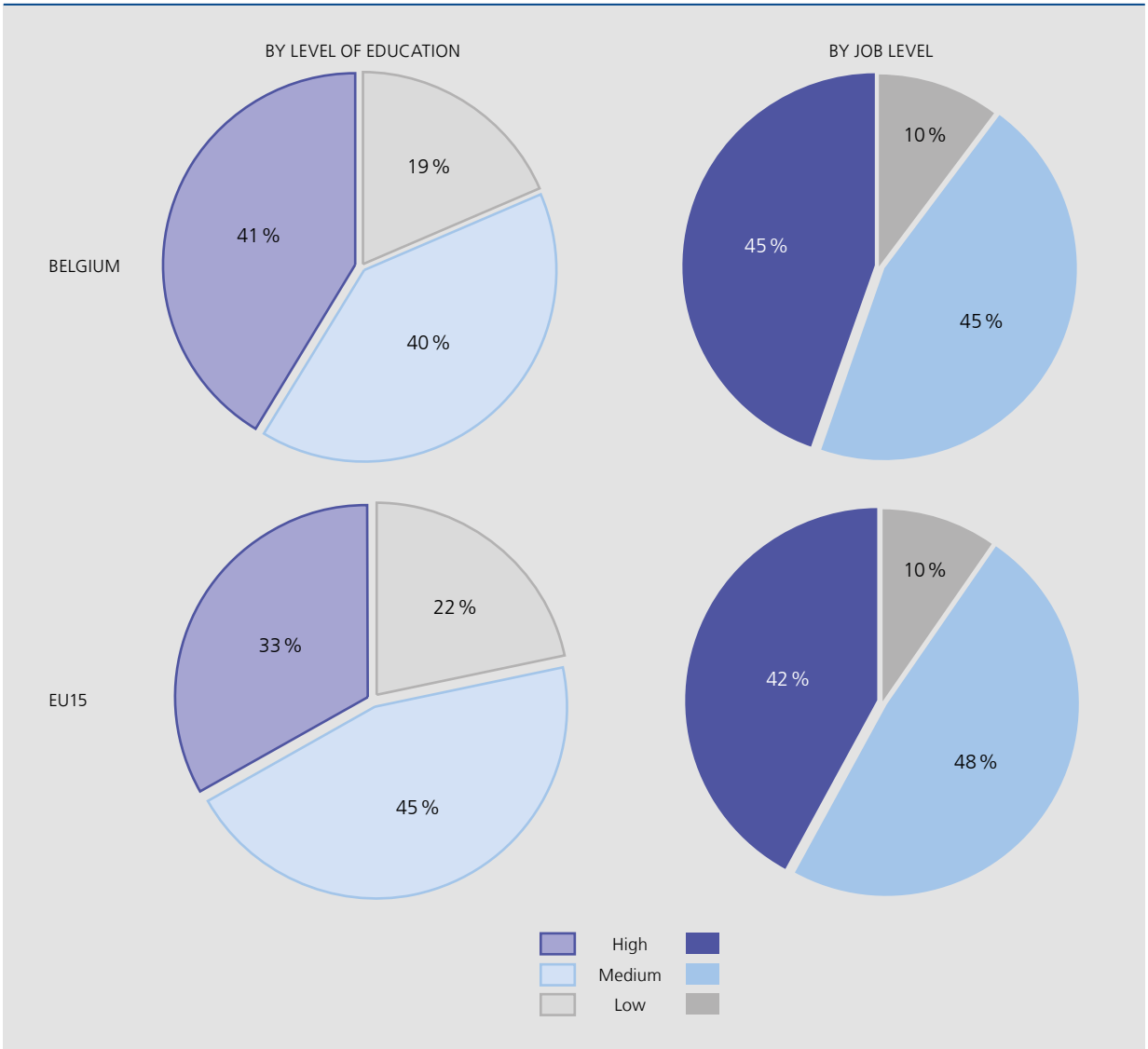
A breakdown of employment by type of job performed gives a better idea of demand for labour, because the actual content of the job indicates precisely the activities for which jobs are created. Moreover, the various effects mentioned above which distort the breakdown of employment by level of education do not apply if employment is broken down by job level. As stated in the annex, the results of the labour force survey (LFS) provide that information. By analogy with the sub-division commonly used for the level of education, a breakdown into three groups – namely highly-skilled, medium-skilled and low-skilled jobs – is used here (2). Low-skilled jobs are elementary occupations such as cleaners, refuse collectors, etc. Medium-skilled jobs include clerical workers and service staff, sales workers, handicraft workers and plant and machine operators. Finally, highly-skilled jobs concern managers, for instance, and intellectual, scientific and artistic occupations (3).

The breakdown of employment according to the job level presents a significantly different picture from the breakdown according to the level of education. While low-qualified workers accounted for around 19 % of employment in Belgium in 2013 (4), the proportion of low-skilled jobs was much lower, namely 10 %. Conversely, the proportion of medium-skilled and highly-skilled jobs (around 45 % each) exceeded the proportion of groups of workers with the corresponding level of education (40 % and 41 % respectively). Similar shifts in the respective proportions are also seen elsewhere in the EU15. Furthermore, the impression that employment in Belgium is more highly qualified, on average (in 2013, 41 % of workers held a higher education diploma, compared to 33 % in the EU15) disappears almost entirely if the job level is considered. At this fairly aggregated level, demand for labour in Belgium is therefore very comparable to that in other EU15 countries.

Comparison of the data relating to educational attainment and jobs performed also reveals that, in other EU15 countries, greater "upward mobility" is necessary to meet the demand for labour. In those countries more so than in

(1) For an in-depth analysis of the trend in working time, see *Conseil supérieur de l'emploi* (2015).
(2) The definition of the skill levels used here is described in detail in ILO (2012).
(3) In the breakdown used in this article, military occupations were disregarded because for that category the ISCO 88 classification did not permit any breakdown according to the various skill levels. The annex presents a more detailed illustration of the ISCO 08 classification at 2-digit level.
(4) This is the latest year for which the LFS microdata are available.

CHART 7 EMPLOYMENT IN 2013 ACCORDING TO LEVEL OF EDUCATION AND JOB LEVEL



Source: EC (LFS).

Belgium, less-qualified workers have to do a more highly-skilled job. In the EU15, a larger proportion of medium-qualified workers are employed in highly-skilled jobs, while a larger proportion of low-qualified workers take on medium-skilled or highly-skilled jobs. However, the fact that there is less need for upward mobility in Belgium does not permit the conclusion that there is less qualification mismatch on the labour market. For that, it would be necessary to conduct a more detailed analysis of the skills sought and the skills available on the labour market[1].

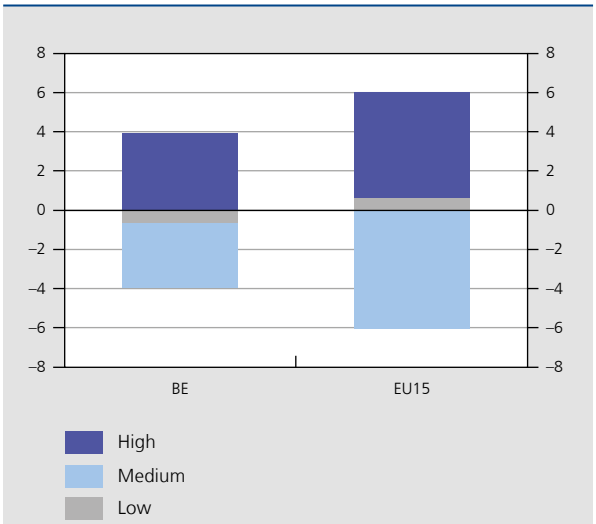
(1) A simple comparison is not enough, for two reasons. First, as already mentioned, the highest level of educational attainment does not indicate the worker's current skills. Also, the breakdown used, which is based on three groups of jobs, is too aggregated to permit meaningful conclusions regarding the degree of qualification mismatch.

2.3 Polarisation of employment

As mentioned in section 2.1, the number of people in work has clearly risen since 2000. In Belgium, employment has grown in each job category. But that rise has not been uniform. The expansion was most pronounced in the case of highly-skilled jobs. Next come the low-skilled jobs and finally the medium-skilled jobs. The same ranking applied in the EU15, but there employment in medium-skilled jobs actually declined over that period. As a result of these divergences, the proportion of medium-skilled jobs in total employment declined considerably in the period 2000-2013. In Belgium, that fall amounted to 3.3 percentage points; it was even more marked in the EU15, where it came to 6 percentage points. Conversely, there has been a clear

CHART 8 EMPLOYMENT BY JOB LEVEL DURING THE PERIOD 2000-2013

(shares in the total, changes in percentage points)



Source: EC (LFS).

rise in the proportion of highly-skilled jobs, up by 3.9 and 5.4 percentage points respectively, while the proportion of low-skilled jobs has been fairly stable. Employment has therefore polarised during this period[1]. That polarisation was even more marked in the EU15 than in Belgium.

No polarisation of employment appears from the breakdown by level of education, where it is mainly the proportion of low-qualified people that has contracted sharply. This development is greatly influenced by the structure of the labour supply, confirming the importance of assessing demand for labour on the basis of the results by job level.

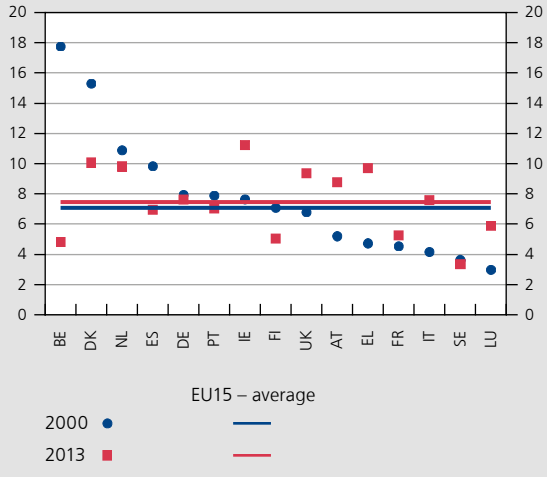
However, when viewed from the angle of the job level, the polarisation is universal, as indicated by table 1. It was already in progress during the sub-period 2000-2008 which preceded the crisis, and clearly continued during the sub-period 2008-2013, both in Belgium[3] and on average in the EU15. It is therefore not connected with the crisis but is a structural trend. It is also worth examining whether the polarisation of employment concerns the economy as a whole or principally certain branches of activity. This analysis shows that, although the changes vary in scale, the phenomenon is very obvious in both the market sector and the non-market sector, in Belgium and in the EU15. It is therefore not confined to the market sector, which is more exposed to the impact of globalisation. In the market sector, there is a clear polarisation in market services and in the "other market branches".

In Belgian industry, there does not, at first sight, appear to be any polarisation: the proportion of low-skilled jobs has declined considerably in favour of highly-skilled jobs, but also medium-skilled jobs, albeit to a lesser extent. However, appearances are deceptive. During the period 2000-2013, and primarily before the crisis, the structure of employment in Belgian industry changed radically: in 2000, low-skilled jobs still accounted for around 18 % of industrial employment, by far the highest proportion in all the EU15 countries. The decline in that category was therefore much steeper in Belgium than in the other countries. As a result of the restructuring carried out during the period considered, that proportion stood at around 5 % in 2013, the lowest figure in the EU15 except for Sweden. A movement on such a scale dominates all the other changes in the structure of employment. Consequently, the pressure on medium-skilled jobs – which is likewise prevalent in Belgium industry – is not immediately apparent.

In the EU15, on average, the share of low-skilled jobs in total industrial employment was virtually stable in

CHART 9 SHARE OF LOW-SKILLED JOBS IN INDUSTRY IN THE EU15

(in % of total industrial employment)



Source: EC (LFS).

(1) The finding of employment polarisation is nothing new. Previous international studies often described the phenomenon by distinguishing between jobs according to the duties entailed and/or the wage level (see, for example, Goos *et al*, 2014) and established a link with other explanatory factors such as jobless recovery or the theory of routine-biased technological change; see below in this article). Other criteria were also used to break down employment, such as the level of educational attainment and job quality (see, for example, Eurofound, 2013). However, in the case of these criteria, employment polarisation is not always found.

(2) Owing to specific developments in industry (see below), the polarisation of employment in Belgium during the pre-crisis period is not entirely clear from the figures.

TABLE 1 EMPLOYMENT BY JOB LEVEL DURING THE PERIOD 2000-2013: BREAKDOWN BY SUB-PERIOD AND BY BRANCH OF ACTIVITY

(shares in the total, changes in percentage points)

	Belgium			EU15		
	Low-skilled jobs	Medium-skilled jobs	Highly-skilled jobs	Low-skilled jobs	Medium-skilled jobs	Highly-skilled jobs
By sub-period						
Before the crisis (2000-2008)	–1.6	–1.4	3.1	1.1	–4.9	3.8
Since the crisis (2008-2013)	1.0	–1.9	0.9	–0.4	–1.1	1.6
By branch of activity						
Market sector	–1.0	–2.3	3.3	1.0	–6.3	5.3
Industry	–12.9	4.3	8.6	0.4	–9.0	8.7
Market services	4.4	–4.6	0.2	1.6	–3.2	1.6
Other market branches	–0.1	–4.1	4.2	–0.8	–5.6	6.4
Non-market services	–0.2	–3.6	3.8	–0.4	–3.0	3.4

Source: EC (LFS).

the period 2000-2013, as the sometimes considerable changes in the various countries largely balanced each other out. Thus, in contrast to what happened in Belgium, the change in the employment structure was not dominated by an adjustment concerning low-skilled jobs, which makes the polarisation of employment very obvious.

The detailed LFS data on jobs performed[1] offer a more specific idea of the kind of jobs that have either suffered or benefited from this change in demand for labour. In the case of highly-skilled jobs, there has, for example, been an increase in the number of IT specialists, engineers and architects, accountants and financial specialists; that is clearly linked to developments in ICT. There has also been an increase in senior nursing staff and midwives, highlighting the growing importance of medical services.

In regard to medium-skilled jobs, a decline is apparent, for example, among administrative staff and workers in the printing, textiles and metallurgy sectors. In addition, while the number of specialist secretaries (classed as highly-skilled jobs) is increasing, the opposite applies to typists (an operational function and therefore classed as medium-skilled). In many cases, these are jobs consisting mainly of routine tasks which are fairly easy to automate or which can be readily relocated to foreign countries where labour is cheaper. This chimes with the theory of routine-biased technological change as a factor accounting for the evident polarisation (see, for example, Goos *et al.*, 2014).

In the case of low-skilled jobs, there has been a rise in the number of domestic helpers and cleaners. In Belgium, that can be attributed to the jobs created via the service voucher scheme. However, an increase is also apparent elsewhere in the EU. These are jobs which, logically, are

TABLE 2 EMPLOYMENT DURING THE PERIOD 2000-2013: JOBS GREATLY AFFECTED

Highly-skilled jobs. Increases in, for example:
- IT specialists
- Engineers, architects
- Senior nursing staff and midwives
- Accountants and financial specialists
- Specialist secretaries

Medium-skilled jobs. Decreases in, for example:
- Typists
- Administrative staff
- Skilled trades in metallurgy and the textiles industry
- Printing trades

Low-skilled jobs. Increase in, for example:
- Domestic helpers

Source: EC (LFS).

(1) However, this analysis is hampered by the switch in 2011 to the new "ISCO-08" nomenclature (see annex). The LFS data are insufficiently detailed to check the changes in all jobs over time. That is why only the main trends are mentioned, which are generally evident both in Belgium and on average in the EU15.

more difficult if not impossible to automate or to outsource to other countries.

However, the general picture of employment polarisation does not apply to all occupations within the three job levels. For example, the number of hairdressers and beauticians is not declining, in contrast to other medium-skilled jobs. Like activities such as domestic help and cleaning (low-skilled jobs), these are personal services involving an interaction between the service provider and the customer. The polarisation seen is therefore not grounds for concluding that all medium-skilled jobs are under threat or that all low-skilled jobs will be spared. The exact range of tasks inherent in the various occupations varies considerably, so that globalisation or technological progress will affect these jobs to different degrees.

Another point is that the changes in demand for specific occupations are having some impact on the composition of employment according to other criteria, such as sex, age, level of education or even origin. In practice, some jobs are done mainly by people presenting a particular profile. For instance, there are traditionally "female occupations" and "jobs for young people", or highly-skilled jobs reserved almost exclusively for graduates. The breakdown of employment according to these criteria is therefore determined to some extent by the available labour supply. Since this article focuses on demand for labour, that analysis is beyond the scope of the subject studied.

TABLE 3 CHARACTERISTICS OF THE BRANCHES OF ACTIVITY AND SHARE OF JOB LEVELS[1]

	Highly-skilled jobs	Medium-skilled jobs	Low-skilled jobs[2]
Length of the production chains	0.030 *** (0.005)	–0.048 *** (0.000)	0.017 ***
Relative position in the production chains	0.324 ** (0.015)	–0.655 *** (0.000)	0.331 ***
Imports	–0.127 (0.234)	–0.157 (0.164)	0.284 ***
Exports	0.108 ** (0.009)	–0.096 ** (0.027)	–0.012
High-tech capital	0.019 *** (0.000)	–0.024 *** (0.000)	0.004
Fixed effect branch/country	yes	yes	
Observations	920	920	
R^2	0.95	0.94	

Source: NBB calculations based on EC data (LFS), EU KLEMS and WIOD.

(1) Coefficients estimated by SURE regression. The p-values are indicated in brackets. *** means significant at the 1% threshold, ** significant at the 5% threshold, and * significant at the 10% threshold. Each job level is expressed as a share of the total. The length of the production chains, in the data ranging between 1.9 and 5.6, measures the average number of branches of activity successively involved in the chains in which the branch of activity participates. The relative position indicates whether a branch of activity tends to specialise in the initial phases of production (value close to 0) or in the final phases (value close to 1). Direct imports and exports are expressed in shares of output. The volume of high-tech capital is expressed as an index 2005 = 1.

(2) Since the sum of the shares of the various categories is equal to 1, the coefficient of this category is equal to the inverse of the sum of the coefficients of the other two categories. The significance test concerns the sum of the other two coefficients.

2.4 Links between globalisation, technological progress and polarisation

The polarisation of demand for labour evident in most European countries seems to indicate that forces are at work on a large scale. An econometric analysis was conducted to test that assumption and establish whether the polarisation is linked to globalisation and technological progress. Compared to previous studies on polarisation (see, for instance, Goos *et al.*, 2014, Michaels *et al.*, 2014, and van den Berge and ter Weel, 2015), the originality of the regressions presented here is that they incorporate, alongside the traditional export and import data, new indicators of globalisation, namely measures of the length of global production chains and the position within those chains.

In practice, the analysis was based on the annual data for the period 2000-2010 of a division into ten market branches of activity for the nine EU15 countries available in EU KLEMS[1]. The shares of the three job levels in total employment in each market branch[2] were compared with various indicators relating to ICT and the globalisation of production chains. In regard to ICT, the analysis included a measure of the volume growth of high-tech capital. This variable, obtained from the EU KLEMS database, shows developments concerning computer hardware, telecommunications equipment, and software. Various indicators relating to globalisation were also included. The measures of the length of production chains and relative position within those chains, based on Antràs *et al*. (2012), proposed by Dhyne and Duprez (2015), and calculated on the basis of the WIOD data, present a picture for each branch of activity. The length of the production chains gives the average number of branches

(1) See O'Mahony and Timmer (2009) for details concerning the EU KLEMS data. The countries are: Germany, Austria, Belgium, Spain, France, Italy, Finland, the Netherlands and the United Kingdom. The branches of activity are: agriculture, mining and quarrying, manufacturing industry, electricity, gas and water supply, construction, trade, transport; hotels and restaurants, real estate and business services, financial activities.

(2) Although they are not reported here, the regression results are fairly similar if the analysis is conducted for the economy as a whole, i.e. with the addition of the following four branches of activity: public administration, education, health and social work, and other service activities.

of activity successively involved in the production chains in which each branch participates[3]. The relative position within the production chains indicates whether a branch of activity tends to specialise in the initial phases of production (value close to 0) or, conversely, in the final segment that delivers the final product (value close to 1). To take account of the degree of internationalisation of the branches of activity, direct imports and exports – expressed as the share of their total output – are also included. Finally, the regressions included a fixed effect for each branch of activity in each country. Those fixed effects neutralise the specific characteristics of each branch of activity in each country.

It should be noted that, since the sum of the shares of the three job levels must always be equal to 100, any changes in those shares must always cancel one another out. Therefore, if the regressions have been carried out for two job levels, the coefficients of the third can be calculated automatically. The share of low-skilled jobs was chosen arbitrarily as the residual variable. Its share therefore moves in the opposite direction to the total changes in the other two categories.

Although the regressions cannot tell us anything about the causality of the mutual relationships, they do offer an indication of the complementarity between the reorganisation of global production and the change in the shares of the various job levels. As indicated in table 3, which presents the overall results, a lengthening of the production chains is accompanied by an increase in the shares of highly-skilled and low-skilled jobs and a decline in the share of medium-skilled jobs. This threefold relationship confirms the link between globalisation and the polarisation of demand for labour. That polarisation is more pronounced the closer the branch of activity to the final consumer. The polarisation of labour is therefore associated with the fragmentation of value chains and a position at a later stage of production. Furthermore, an increase in imports coincides with a rise in the share of low-skilled jobs. Similarly, an increase in exports and high-tech capital is accompanied by growth in the share of highly-skilled jobs to the detriment of medium-skilled jobs. Internationalisation and high-tech capital therefore seem to complement highly-skilled and low-skilled occupations, whereas they replace medium-skilled jobs.

Apart from the variables taken into account, other factors may also be at work. An examination of the correlation between the residuals shows that a shock having a positive impact on the share of a particular job level always has a negative impact on both the other shares. That is not really surprising since the share of a job level can only increase at the expense of at least one of the other two shares. It is nevertheless interesting that the negative impact is greater for the medium-skilled jobs. Technically, by conducting the regressions simultaneously, it was possible to compare the residuals two by two. In the case of the regression for medium-skilled jobs, the correlation of the residuals is –0.85 with those of highly-skilled jobs and –0.36 with those of low-skilled jobs. For comparison, the correlation of the residuals between highly-skilled and low-skilled jobs is only –0.19. This means that, apart from the indicators relating to ICT and globalisation included in the regressions, other variables seem to accentuate the polarisation of demand for labour.

Conclusion

In recent decades, the economy has undergone radical changes at global level. In all sectors, technological progress has revolutionised creation, production and distribution methods and altered relationships with consumers. It has also helped to open up production chains and contributed to the growth of the emerging economies. Backed by a high investment rate, some Asian countries have assumed their place in market production and have gradually become the world's biggest manufacturers. Those countries have therefore gained market shares in the market production chains of the advanced countries, including those in Belgium. This progress has benefited the remuneration of capital in the emerging countries and, to a lesser extent, that of highly qualified workers, but has not increased the remuneration of low-qualified workers.

The European labour market has also experienced fundamental change. Against the backdrop of de-industrialisation and a rising number of jobs in market and non-market services, demand for labour has radically changed. The level of education of the workforce is not the best approach to assessing that change. Breaking down employment according to job level, offering an idea of the job content, is a better way of conducting that analysis.

In Belgium as in other EU15 countries, medium-skilled jobs have been under pressure, mainly in favour of highly-skilled occupations, while demand for low-skilled jobs has been fairly stable. During the period 2000-2013, the share of medium-skilled jobs declined by 3.3 percentage points in Belgium and 6 percentage points on average in the EU15. Conversely, the share of highly-skilled jobs increased by 3.9 and 5.4 percentage points respectively.

(1) Intra-branch trade is taken into account. In that respect, the length indicates the average number of firms successively involved in the production chains.

We can therefore say that demand for labour has polarised. This structural trend, which was already evident before the crisis, is widespread in all the main branches of activity.

The econometric analysis conducted for this article shows that all these developments are linked. The polarisation of demand for labour in the market branches has been accompanied by a fragmentation of production chains and growth of high-tech capital. These radical changes have been to the detriment of medium-skilled jobs such as typists, administrative staff and those in metallurgy, textiles and printing trades. It is the most repetitive jobs that have been hardest hit, some having become obsolete while others belong to production segments which have been relocated to emerging countries. Conversely, low-skilled jobs have been less affected, particularly if they are non-routine and involve interaction between the service provider and the customer, such as domestic services. Highly-skilled jobs, notably those closely linked to information and communication technology, such as IT specialists, engineers, specialist secretaries, etc. have likewise seen an increase in demand. Jobs within each category have not all been affected in the same way, since the impact depends on the exact range of tasks inherent in the various occupations. There have been wide divergences in the changes affecting each specific job, and that will doubtless continue to be the case in the future.

However, the rise of the East Asian economies and technological progress are not the sole determinants of demand for labour. Other factors may influence the polarisation of employment. For instance, labour market institutions play a role. In that connection, an active labour market policy and fiscal/parafiscal measures support low-skilled employment. Measures such as Belgium's service vouchers are a good example. In addition, greater prosperity, the feminisation of the labour supply, and population ageing can contribute to growing demand for personal or health services. That also favours the interactive or non-routine occupations.

Finally, it is worth pointing out that the available data used for our analysis do not tell us anything about the impact of the recent developments on demand for labour. It seems that the fragmentation of the production chains has ceased since 2010 (see Al-Haschimi *et al.*, 2015 and Dhyne and Duprez, 2015). The latest data also indicate that investment is slowing down in the emerging economies, particularly in China. Conversely, there is nothing to indicate that technological progress is losing momentum (see OECD, 2015). Firms will therefore need to continue adjusting to a constantly changing world. While technological progress and globalisation present a major challenge, they also open up immense prospects in terms of economic development and employment, especially for firms which assume their full role in the value creation chains and exploit potential demand, including that in the emerging countries.

Annex

Statistics on employment by level of education and job level

The labour market data used in this article were derived mainly from the labour force survey (LFS). That survey is harmonised at European level by Eurostat and therefore provides mutually comparable results for the various countries. Those results are broken down according to various criteria. The groups of variables used in this article are not always available on the Eurostat website, so that microdata made available by Eurostat were used; those microdata currently relate to a period up to and including 2013.

The LFS breakdown according to **level of education** is based on the ISCED classification (International Standard Classification of Education), drawn up by UNESCO. That classification permits an international comparison. Since 1998, the "ISCED 97" classification has been used. In this – highly-detailed – classification, it is usual to distinguish between three main groups:

– *low-qualified* persons are those who have not gained a certificate of secondary education,
– *medium-qualified persons* are those who have gained a certificate of secondary education but no higher education diploma,
– *highly-qualified persons* are those with a higher education diploma.

The breakdown of employment by **job level** is based on the ISCO classification (International Standard Classification of Occupations) drawn up by the ILO (International Labour Office). This classification can also be used to produce internationally comparable statistics. Up to and including 2010, the LFS used the "ISCO 88" version; the version used since 2011, known as "ISCO 08", has undergone major changes. Conversion between the two versions is only possible at a highly-detailed level (namely at the 5-digit level), whereas the relevant LFS data are only available at the 3-digit level, hampering comparisons over time at the detailed level. However, by analogy with the sub-divisions according to the level of education, this article has generally used a breakdown which distinguishes between three main groups for which the ILO has produced a conversion table, and which can therefore be followed over time.

By way of illustration, the "ISCO 08" classification at the 2-digit level is given below (source: DGS).

Highly-skilled jobs (ILO skill levels 3 and 4) include:

11 Chief executives, senior officials and legislators
12 Administrative and commercial managers
13 Production and specialised services managers
14 Hospitality, retail and other services managers
21 Science and engineering professionals
22 Health professionals
23 Teaching professionals
24 Business and administration professionals
25 Information and communications technology professionals
26 Legal, social and cultural professionals
31 Science and engineering associate professionals
32 Health associate professionals
33 Business and administration associate professionals
34 Legal, social, cultural and related associate professionals
35 Information and communications technicians

Medium-skilled jobs (skill level 2) include:

41 General and keyboard clerks
42 Customer services clerks
43 Numerical and material recording clerks
44 Other clerical support workers
51 Personal service workers
52 Sales workers
53 Personal care workers
54 Protective services workers
61 Market-oriented skilled agricultural workers
62 Market-oriented skilled forestry, fishery and hunting workers
63 Subsistence farmers, fishers, hunters and gatherers
71 Building and related trades workers, excluding electricians
72 Metal, machinery and related trades workers
73 Handicraft and printing workers
74 Electrical and electronic trades workers
75 Food processing, wood working, garment and other craft and related trades workers
81 Stationary plant and machine operators
82 Assemblers
83 Drivers and mobile plant operators

Low-skilled jobs (skill level 1) include:

91 Cleaners and helpers
92 Agricultural, forestry and fishery labourers
93 Labourers in mining, construction, manufacturing and transport
94 Food preparation assistants
95 Street and related sales and service workers
96 Refuse workers and other elementary workers

Armed forces occupations (group 0) were disregarded.

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Monetary policy communication in the wake of the great recession

N. Cordemans (*)

Introduction

"Within our mandate, the ECB is ready to do whatever it takes to preserve the euro. And believe me, it will be enough." Those few words spoken by Mario Draghi, President of the ECB, in London on 26 July 2012 marked a turning point in the sovereign debt crisis confronting the euro area since the beginning of 2010. In early August, they were followed by the announcement of a programme of outright monetary transactions (OMTs) aimed at removing once and for all the doubts surrounding the irreversibility of the single currency. However, since then, the measure has not actually been applied, because the dissipation of the financial market tensions and the easing of the sovereign debt crisis that started at the end of July 2012 have proved long-lasting.

The impact of the speech by Mario Draghi in London is an excellent illustration of the importance of words in the current conduct of monetary policy. Nowadays, central bankers around the world make a specific point of explaining themselves and ensuring that they are clearly understood. Communication has been elevated to the position of a monetary policy instrument, and is a major factor in the effectiveness of that policy. Moreover, it is seen as a democratic responsibility of the central bank, which has been given a specific mandate and enjoys great independence in fulfilling it.

The transparency and openness of central banks regarding monetary policy is nothing new, but it has been given fresh impetus in recent years in the wake of the great recession. Key events include the announcement of quantitative inflation targets by the Federal Reserve and the Bank of Japan, and the ECB Governing Council's decision to publish accounts of its monetary policy meetings from January 2015. In that context, this article seeks to summarise the latest initiatives concerning communication by the leading central banks of the advanced economies, focusing particularly on the Eurosystem. The first section offers a brief history of central bank communication and tries to explain how central banks have emerged from the shadows into the limelight. The second section discusses recent developments in the United States, Japan, the United Kingdom, and more particularly the euro area. Finally, the third section addresses an aspect of central bank communication which is sometimes hidden but is no less important, namely its readability. It includes an empirical analysis of how the complexity of monetary policy statements has developed over time. The conclusion sums up the main findings while suggesting some ideas for future exploration.

1. Emerging from the shadows

1.1 Secrecy, mystique and opacity

For much of the 20th century, central banks maintained strict secrecy, basing their actions on a mystique derived from a somewhat metaphysical approach to monetary policy. That approach was based on the widespread belief among central bankers that the conduct of monetary policy was essentially an art, with access to that art and the exercise of it being confined to an initiated elite.

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

The esoteric nature of that art was due to the impossibility of spelling out its principles in explicit and intelligible terms (Brunner, 1981, quoted by Issing, 2005). In such circumstances, amateurs were not expected to usurp the prerogatives of insiders and should not interfere in the monetary debate (Federal Reserve Board, 2004a).

In practice, the opacity shrouding the conduct of monetary policy took diverse forms, varying through time and space. In particular, it was reflected in the absence of explicit targets or strategies, the lack of publicity regarding decisions taken or operations carried out, and the vague, irregular or ambiguous nature of statements by the monetary authorities.

The maxim applied by Montagu Norman in his day as Governor of the Bank of England from 1921 to 1944 clearly illustrates the long-held view of monetary policy: "Never explain, never excuse". Some comments made later by Alan Greenspan, Chairman of the Federal Reserve from 1987 to 2006, are equally revealing. In 1987, he affirmed, somewhat tongue in cheek, that since becoming head of the American central bank he had "learnt to mumble with great incoherence", and when a journalist thanked him after a conference for the clarity of his statement, he retorted: "You've probably misunderstood what I said."

Apart from the fact that, historically, a rather secretive culture could reflect preferential relations with political power, the original status as a private bank (Dincer and Eichengreen, 2007), or a bureaucracy's natural desire to maximise its authority and prestige (Mishkin, 2004), there have also been some economic arguments justifying opacity in the conduct of monetary policy. In the late 1970s, for example, the Federal Open Market Committee (FOMC) of the Federal Reserve justified its opacity by stating that transparency[1] was liable to offer some major speculators an advantage and could therefore be a source of unfair competition; in addition, it threatened to trigger inappropriate reactions on the markets, to increase the cost of government borrowing, to tie the monetary authorities' hands, or to make it more difficult to smooth interest rates (Goodfriend, 1986)[2]. Theoretical arguments justifying the secrecy which has long surrounded central banks were proposed by Cukierman and Meltzer (1986) in a landmark article on the theory of credibility, ambiguity and inflation under discretion and asymmetric information. They demonstrated that a degree of ambiguity in the conduct of their policy enables [monetary] authorities – whose preferences in terms of employment and inflation are assumed to vary over time – to stimulate economic activity by taking the economic agents by surprise. As a result, the optimum level of ambiguity is higher than the minimum that is technologically achievable. Finally, at one time, opacity was presented as a means of evading political control which would be prejudicial to the fight against inflation (Mishkin, 2004). This view was based on the theory of the time-inconsistency of optimal policies, which suggested taking the conduct of monetary policy away from the government in order to avoid political pressure in favour of an excessively expansionary monetary policy to exploit the short-run trade-off between unemployment and inflation.

1.2 Transparency and openness

From the mid-1970s, the central banks of the advanced economies gradually modified their policy on communication. Slowly but surely, opacity gave way to transparency and openness, a move which was accompanied by fundamental changes in the institutional framework and in the understanding as well as practice of monetary policy.

Two major developments started the trend: the switch to floating exchange rates following the collapse of the Bretton Woods system in 1973, and the stagflation of the 1970s. The end of the fixed exchange rate regime based on pegging the US dollar to gold ended the prevailing nominal gold-dollar parity and gave countries more flexibility to conduct an independent monetary policy[3]. That drove central banks to adopt a new nominal anchor in order to preserve the purchasing power of what had become a fiduciary currency. The experience of stagflation in the 1970s demonstrated the absence of any systematic trade-off between inflation and unemployment and illustrated the vertical shape of the Phillips curve in the long term, noted in the late 1960s by Milton Friedman and Edmund Phelps. It thus encouraged acceptance of the idea that, in the long run, the central bank is only capable of influencing inflation and not real variables such as output and employment.

(1) From an economic point of view, transparency can be defined as the absence of asymmetric information (Geraats, 2013). Transparency in monetary policy is therefore related to the degree to which the information relevant for the conduct of that policy is made public.

(2) These arguments against transparency in the conduct of the Federal Reserve's monetary policy were preserved in the American court archives following the case of Merrill versus FOMC (1975-1981). In that case, David Merrill, a student at Georgetown University, sued the Federal Open Market Committee under the 1966 Freedom of Information Act, requiring publication of its policy guidelines and minutes immediately after each meeting. After proceedings lasting several years, the American court ruled in favour of the FOMC, arguing that the obligation to publish could be waived if it was detrimental to the government's monetary functions or commercial interests. The FOMC's arguments are based to a large extent on monetary and financial theory (see Goodfriend, 1986, for more details).

(3) According to Mundell's trilemma, in a context of capital mobility, monetary policy can aim at either an external target (such as the exchange rate) or an internal target (such as inflation), but not both at once. Under the international monetary system established at Bretton Woods in 1944, the maintenance of fixed (albeit adjustable) parities with the US dollar thus obliged the participating countries to make their monetary policy subordinate – to a very large degree – to that of the Federal Reserve.

These two events were very influential in prompting the central banks of the advanced economies to adopt price stability as the nominal anchor of monetary policy from the mid-1970s. Subsequently, the research that highlighted the benefits and success factors of controlling inflation and the examples of good practice gradually persuaded the monetary authorities to favour transparency[1][2].

First, central bank independence came to be seen as the preferred solution to the time-inconsistency and inflationary bias of governments. Thus, from the 1980s, a central banker independent of the government and taking a conservative approach – i.e. aiming at price stability – has increasingly been viewed as essential to a credible non-inflationary monetary policy. In that context, there was no longer any justification for the opacity deemed to impede potential interference in fiscal policy. Conversely, democratic accountability emerged as the corollary to independence: the central bank given a mandate without any democratic legitimacy must account for its actions. That accountability includes in particular detailed communication on the way in which the central bank endeavours to perform its task. Although the link between independence and accountability was quickly established, it became steadily stronger against the backdrop of broader changes in society, according greater attention to democratic accountability in public administration in general (Dincer and Eichengreen, 2014).

Next, the actual adoption of a nominal anchor such as an effective commitment to preserve price stability also resulted in increased communication with the public, because in order to fulfil its commitments the central bank had to be credible: it had to convince economic agents that it could honour its commitments and that it was resolved to do so. In other words, it had to anchor inflation expectations[3]. For that purpose, the public needs to gain a good understanding of what the central bank does and why; it is therefore in the central bank's interests to be clear in announcing its targets, its strategy and its decisions.

Finally, there gradually emerged a consensus on the essential role of managing expectations, regarding not only inflation but also monetary policy in the broad sense[4]. The interest rate relevant for decisions on consumption and investment is in fact the real long-term interest rate, which reflects expectations regarding future short-term rates plus an uncertainty premium. Consequently, the economy is influenced by expectations regarding future monetary policy rather than current policy. The readability and predictability of monetary policy are therefore important to its effectiveness and are achieved by judicious communication[5]. The role accorded to communication becomes even more significant if the policy rates fall to the floor and conventional monetary policy therefore becomes ineffective (for more details, see Woodford, 2012).

The importance of central bank communication with the public has increased over time as expectations regarding future monetary policy have gained more influence over the monetary policy transmission mechanism. The increasing liberalisation of capital markets, progress in information and communication technologies, and the growing economic and financial interdependencies between countries have contributed to that by bringing closer links between the expectations and decisions of economic agents (ECB, 2002). Progress in information and communication technologies has moreover enhanced the ability of central banks to communicate promptly with the maximum number of people.

As mentioned above, from the mid-1970s, there was a move towards greater transparency in the conduct of monetary policy, in the context of the adoption of monetary targets and more attention to long-term price stability. In practice, however, the real revolution only began in the early 1990s with the adoption of inflation targets by the Reserve Bank of New Zealand, the Bank of Canada, the Sveriges Riksbank and the Bank of England. In principle, inflation targeting – which entails setting an explicit inflation target in order to anchor inflation expectations – requires particular transparency, as its success is closely linked to the credence that the markets accord to the central bank's ability and determination to meet its target (Mishkin and Schmidt-Hebbel, 2001)[6]. Central banks that adopted inflation targeting thus enhanced their transparency measures in varying degrees and in successive stages,

(1) It should be noted that in ending the inevitable revaluations/devaluations – requiring maximum secrecy in order to ward off speculative attacks – the switch to floating exchange rates eliminated a major obstacle to greater transparency for some central banks (Chant, 2003).

(2) Goodfriend (1986) was one of the first to offer a detailed critique of the secrecy surrounding the operation of the Federal Reserve. On the basis of the theory of rational expectations – whereby the agents base their expectations on all the available information and are assumed to know about the real functioning of the economy – he points out that increased transparency should bring market reactions more into line with the intentions of the monetary authorities. His conclusion ("Given the inconclusiveness of the theoretical arguments and the presumption that government secrecy is inconsistent with the healthy functioning of a democracy, further work is required to demonstrate that central bank secrecy is socially beneficial") opened the way to more fundamental questions about the opacity surrounding the conduct of monetary policy.

(3) As illustrated by the expectations-augmented Phillips curve developed by Milton Friedman, inflation expectations in fact play a significant role in determining inflation.

(4) See Woodford (2003).

(5) Although, from a theoretical and empirical point of view, there are powerful arguments in favour of transparency, some studies nevertheless show that greater transparency is not necessarily beneficial, particularly if the disclosure of information is noisy (see Geraats, 2013). While a general consensus on the benefits of transparency in the conduct of monetary policy appears to prevail today, there is still an ongoing debate about its optimum level, connected partly with the institutional environment of the central bank. For a discussion on the limits of transparency, see for example Cukierman (2009).

(6) Demonstrating the particularly high level of transparency in central banks which have adopted inflation targeting, Eijffinger and Geraats (2006) show that, over the period 1998-2002, the most transparent central banks were the Reserve Bank of New Zealand, the Sveriges Riksbank, the Bank of England and the Bank of Canada. However, they note that this monetary policy framework is neither a prerequisite for transparency nor sufficient to ensure it.

not only by publishing a large amount of information on their objectives and strategies, but also by publishing inflation forecasts, inflation reports and minutes recounting the discussions of their monetary policy committee.

Central banks which opted for a different monetary policy strategy have taken similar action. For example, the Federal Reserve decided to announce its federal funds target rate decisions immediately from February 1994, and later that year it decided to supplement the FOMC statement with a description of the economy and the grounds for its decisions. However, it was only from May 1999 onwards that the FOMC systematically published a statement at the end of each of its meetings. In 1998, in the context of a new law increasing its independence, the Bank of Japan opted to announce its monetary policy decisions immediately and to publish the votes and the minutes of its committee meetings. The Bundesbank has long since favoured transparency regarding objectives and performance, and numerous official publications bear witness to that. Its strategy of monetary targeting, applied since the mid-1970s – which includes an inflation target – gave it a framework for signalling its intentions and explaining its decisions to the public (Posen, 1997). Modelled explicitly on the independence and strategy of the Bundesbank, the Eurosystem naturally accorded a prominent role to communication, which Otmar Issing[1] referred to as the "hidden pillar" of its monetary policy strategy (Issing, 1999). By way of illustration, back in the autumn of 1998, the Governing Council announced a quantitative definition of price stability and a clear strategy for achieving it. Since the introduction of the euro in January 1999, decisions have been invariably explained and justified at a post-meeting press conference[2] and in the Monthly Bulletin (renamed the Economic Bulletin in 2015), which also includes a detailed analysis of the economic situation and the risks to price stability.

(1) Chief economist at the ECB and a member of its Executive Board from 1998 to 2006.

(2) In that respect, the ECB can be considered more open and transparent than the Bundesbank, whose decisions were only announced in a press release. Nor did the Bundesbank board members appear before the Bundestag, whereas members of the ECB Executive Board are regularly heard by the European Parliament.

TABLE DEVELOPMENTS IN CENTRAL BANK TRANSPARENCY

Frequency of divulging information (in %)	1998	2004	2010
Transparency of the monetary policy framework			
Formal statement of objectives	90.8	95.0	96.6
Quantification of objectives	44.2	60.8	66.4
Independence of the instruments	34.2	49.2	53.4
Transparency regarding economic information			
Publication of projections	14.2	46.7	54.3
Quarterly medium-term projections for inflation and GDP	3.3	11.7	19.8
Transparency regarding decisions			
Explicit monetary policy strategy	50.0	65.0	73.3
Minutes	5.0	9.2	16.4
Publication of votes	4.2	6.7	10.3
Transparency in communicating decisions			
Immediate announcement of decisions	15.0	40.0	46.6
Explanation of decisions	12.5	32.5	43.1
Indications regarding future monetary policy measures	0.0	2.5	4.3
Transparency in the implementation of the measures			
Evaluation of performance in relation to the main operational target	9.2	20.8	22.4
Information on disruption affecting the transmission process	15.8	42.5	47.4
Sample size[1]	120.0	120.0	116.0

Source: Geraats (2013).

(1) The reason for the reduction in the sample size between 2004 and 2010 is that Cyprus, Malta, Slovakia and Slovenia joined the euro area.

The 2000s brought a second wave of transparency and greater openness on the part of central banks which was not confined to the advanced economies[1]. As shown by the above table, in 2010, most central banks around the world were adopting an explicit monetary policy strategy while more than half of them were publishing macroeconomic projections specified in figures. Although the number of central banks publishing minutes of monetary policy discussions and the outcome of committee voting remained small, there was a significant increase. It had also become much more common to offer explanations when announcing the decisions. Finally, a number of central banks had begun providing explanations regarding the direction, timing or likely pace of policy changes. After the move by the Reserve Bank of New Zealand in 1997, Norges Bank and Sveriges Riksbank decided in 2005 and 2007 respectively to publish the expected path of their key interest rates. The Bank of Japan offered forward guidance on its policy rates for the first time in September 1999, and in May of that year the Federal Reserve began indicating what path its monetary policy might follow, before introducing actual forward guidance in 2003.

2. New impetus in the wake of the crisis

The fundamental trend towards more communication by central banks which had begun in the 1970s has never faltered. The transparency and openness actually have been given new impetus against the backdrop of the recent economic and financial crisis, which presented a huge challenge to the world's monetary authorities. Firstly, they communicated extensively on macroeconomic developments, the risks to price stability, and the measures they have taken in order to fulfil their mandate. The complexity of the situation and the renewed uncertainty made it necessary to step up the communication in order to offer explanations and reassurance. Next, the central banks made direct use of communication as an instrument of monetary policy. Communication about the central bank's future intentions provides information on its reaction function and can bring the private sector's expectations regarding inflation and interest rates into line with the central bank's intentions. In view of the scale of the shocks hitting the economies, and faced with the zero lower bound for nominal interest rates, the central bank naturally endeavoured to do more to influence the monetary policy stance by direct intervention in the longer-term segment of the real yield curve. Finally, the central banks took unprecedented steps to stabilise the financial system, performing to the full their role as lender of last resort. In order to safeguard public confidence and establish their democratic legitimacy in that context, they had to demonstrate clarity in their actions and operations.

To illustrate this new impetus, we shall now review the recent progress in communication on the part of the main central banks of the advanced economies, namely the Federal Reserve, the Bank of Japan, the Bank of England and the Eurosystem[2]. The developments concerning the Eurosystem will form the subject of particular attention owing to their scale and because they are of more direct concern to us.

2.1 Federal Reserve

At the instigation of Ben Bernanke, its Chairman from 2006 to 2014, the Federal Reserve was unsparing in its efforts to increase its transparency and enhance its democratic legitimacy. There have been numerous initiatives recently, but they have merely speeded up a gradual process that began in 1977 with the adoption of two fundamental monetary policy targets. The weaknesses of the Federal Reserve on the eve of the recent crisis included in particular its lack of transparency regarding objectives, owing to their multiplicity and the failure to prioritise and quantify them. Moreover, when it came to taking decisions, the Federal Reserve had no explicit strategy defining its monetary policy framework. Finally, its economic projections were not published very frequently (Eiffinger and Geraats, 2006). Conversely, one of its strengths was that the Federal Reserve had for some time been publishing minutes, the outcome of voting in the FOMC, and transcripts of its meetings. In addition, FOMC members already had a long tradition of addressing Congress. Some of the recent initiatives helped to close the gap in relation to the central banks considered to be the most transparent.

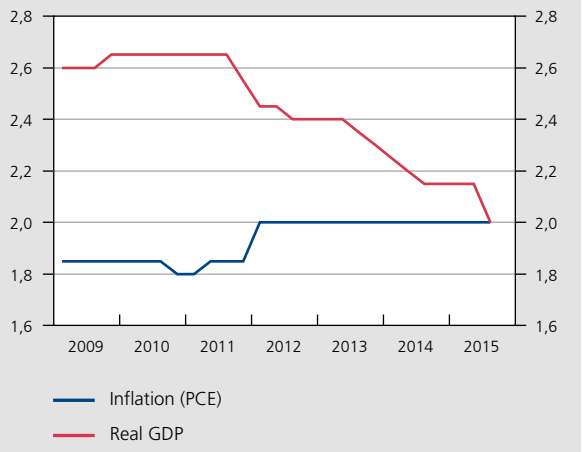
In November 2007, the FOMC announced that in order to raise its democratic accountability and improve the public's understanding of the conduct of its monetary policy, it intended to boost the frequency and content of its members' economic projections. The projections were to be published four times a year instead of twice, and the projection horizon would be extended to three years rather than two. It was also decided to publish individual projections for headline inflation at the same time as the projections for real growth, unemployment and core inflation. However, the projections for nominal GDP growth were dropped. Since 1979, a summary of the members' economic projections had been published in the Federal

(1) See Dincer and Eichengreen (2014) or Geraats (2013) for a detailed review of the progress in transparency over the period 1998-2010.

(2) An annex contains a summary table showing, for each of these central banks, the main transparency measures adopted and the date of their introduction.

CHART 1 SUMMARY OF THE LONGER-TERM ECONOMIC PROJECTIONS OF FOMC MEMBERS

(central tendency[1], central value, annual growth)



Source: Federal Reserve Bank of St Louis.

(1) The central tendency excludes the three highest projections and the three lowest projections for each variable.

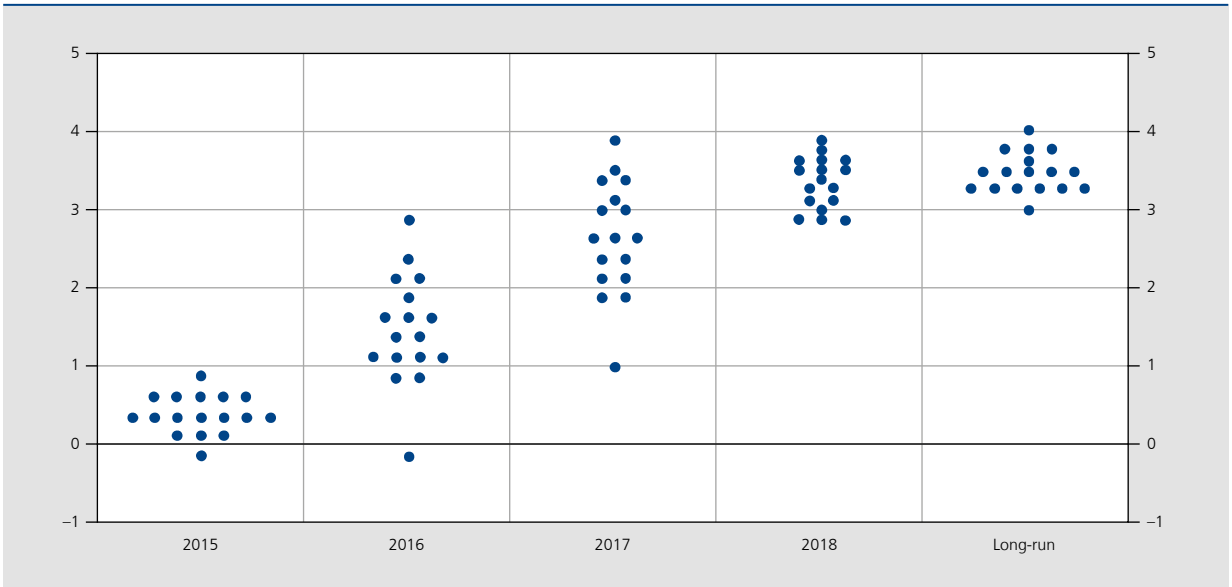
Reserve's half-yearly monetary policy report to Congress and in the minutes of the FOMC meetings. But since April 2011, the projection ranges and central trends have been made public at a Chairman's press conference. In February 2009, long-term projections were also published for the first time for headline inflation, real growth and the unemployment rate. It is worth noting that the long-term inflation projections are not far off the 2% target adopted subsequently. The intention to publish long-term inflation projections can thus be interpreted as an initial step along the way to the adoption of a quantitative target.

Two important steps were taken in January 2012. First, the FOMC began publishing its members' individual projections for the federal funds target rate. Those projections concern the rate expected at the end of the current year and the ensuing three years, and the long-term rate. They are shown in a dot plot published with the economic projections. These interest rate projections are anonymous but they indicate how the FOMC members feel about the economic outlook and the expected monetary policy stance. In the long term, they also offer indications on the equilibrium interest rate, i.e. the rate deemed to prevail when economic activity has achieved its potential level and in the absence of price pressures.

The FOMC also issued a statement setting out its long-term objectives and its monetary policy strategy. For the first time, it set an explicit long-term target of 2% for inflation measured according to household consumption expenditure (PCE inflation). The FOMC stated that clear public communication of this target helped to anchor inflation expectations and therefore encouraged price stability and moderate long-term interest rates, strengthening its ability to promote maximum employment in a turbulent economic context. In other words, the FOMC

CHART 2 PROJECTIONS FOR THE FEDERAL FUNDS TARGET RATE IN SEPTEMBER 2015

(central values expected at the end of the calendar year)



Source: FOMC.

considered that setting a target inflation figure helped it to fulfil its dual mandate of full employment and price stability.

Finally, in recent years, the Federal Reserve has been very open about the future path of its monetary policy. In December 2008, it adopted qualitative forward guidance on its policy rates after having reduced the federal funds target rate to its effective lower bound, corresponding to a range of 0 to 0.25%. In September 2011, it offered details on timing, announcing that the economic conditions justified keeping interest rates on the floor for at least the next two years, while between December 2012 and March 2014, it set specific thresholds, clarifying the key factors that would influence future policy changes. Apart from the information on how its policy rates were expected to move, the Federal Reserve also indicated the factors influencing the scale, pace and composition of its securities purchases. That applied specifically to its latest asset purchase programme, which ended in October 2014. When that programme was approved in September 2012, the Federal Reserve did not determine an end date but stated that the programme would continue until there was substantial improvement on the labour market in a context of price stability. It later amended its statements on a number of occasions (for more details, see for example Cordemans and Ide, 2014, or Engen *et al.*, 2015).

2.2 Bank of Japan

Following the new law governing the Bank of Japan which came into force in April 1998, the Japanese central bank had taken a number of steps to increase the transparency of its monetary policy. In particular, it had promoted the disclosure of information via various channels, such as the publication of minutes and a monthly report on economic and financial developments, and the organisation of press conferences, hearings before Parliament or speeches. Despite this progress, the Bank of Japan still appeared to be relatively opaque (Eiffinger and Geraats, 2006). It had not given a quantitative definition of its price stability objective and had no explicit monetary policy framework. Nor did it systematically offer explanations after each meeting of its Monetary Policy Committee. However, the Bank of Japan is among the central banks achieving the largest increase in the level of transparency over the recent period.

After having introduced a new framework for conducting its monetary policy in March 2006, the Bank of Japan decided in July 2008 to extend its communication strategy "against the backdrop of an ever-changing economic situation and an uncertain outlook". It justified its decision by its desire to provide a timely, thorough explanation regarding the economic situation and the outlook for the economy and prices, as well as risk factors in line with its framework for the conduct of monetary policy. First, it announced that in future, after every monetary policy meeting – and not just the ones resulting in a change of policy – a summary of the assessment of the economic and price situation and the Bank's thinking on the future conduct of its monetary policy would be issued along with the policy decision. Next, it chose to increase the projection horizon of its economic forecasts from two years to three. Third, it agreed on a quarterly based publication of the forecasts of the "majority of the members" of its Monetary Policy Committee[1] and risk balance charts. As the fourth and final point, it announced that the minutes of monetary policy meetings would be released systematically, subject to their approval, after the subsequent meeting.

In December 2009, in order to overcome deflation and return to a growth path compatible with price stability, the Bank of Japan "clarified" its understanding of medium- to long-term price stability. In April 2009, it had already stated that price stability meant an annual rise in the consumer price index (CPI) "in the range approximately between 0 and 2 %, with most Policy Board members' median figures at around 1 %". In December 2009, it specified that the committee members would not tolerate an annual rise in the CPI equal to or below 0 %, and that price stability should therefore be understood as positive inflation of 2 % or lower, the midpoint for most committee members being 1 %. In February 2012, aiming to affirm its determination to beat deflation, it set an explicit goal of "1 % for the time being". In October of that year, the Bank of Japan and the government also issued a joint statement on their concern to overcome deflation "as early as possible" and their commitment to "working together" to achieve that. The Bank announced that it intended to achieve its inflation goal "by powerful monetary easing, conducting its zero interest rate policy and implementing the asset purchase programme mainly through the purchase of financial assets". It stated that it would continue with this until its 1 % goal was in sight. Finally, in January 2013, the Bank of Japan revised its medium/long-term price stability objective and decided to introduce a "price stability target" set at 2% in terms of the year-on-year rise in the consumer price index. The Bank announced that it would maintain its accommodative policy in order to attain that target as soon as possible. A note setting out the details of the Bank of Japan's "new" understanding of price stability was published in parallel (Bank of Japan, 2013a).

(1) The forecasts of the majority of the Monetary Policy Committee members consist of ranges based on the individual forecasts of each member, excluding the highest and lowest forecasts.

In June 2015, the Policy Board of the Bank of Japan announced its unanimous decision to expand the monetary policy deliberations and step up the Bank's communication on the subject. It stated that, from January 2016[1]: (1) the Outlook for Economic Activity and Prices (Outlook Report) would be published quarterly rather than twice yearly, (2) as well as the Policy Board's forecasts, the individual forecasts of each board member and their individual risk assessments would be released, (3) a document containing a summary of the opinions expressed at the meetings would be published about a week after the meeting, and (4) the number of meetings would be cut from around 14 at present to 8 per year.

Finally, just as it had done in 1999, the Bank of Japan recently issued forward guidance on its monetary policy. In October 2010, against the backdrop of its policy of comprehensive monetary easing (CME), it had announced that it would maintain its zero interest rate policy "until it has achieved its price stability target, on condition that there are no significant risks, including the accumulation of financial imbalances". In addition, when launching its programme of quantitative and qualitative easing (QQE) in April 2013, it stated that this asset purchase programme was intended to achieve its price stability target of 2 % as quickly as possible, over a two-year horizon. The launch of this programme was accompanied by statements stressing its firm intention to eliminate deflation expectations by communicating its monetary policy stance to the markets, businesses and households in a "clear and intelligible" manner (Bank of Japan 2013b). It should be noted that the Bank of Japan's QQE policy caused it to change its operational target from the overnight interest rate on uncollateralised loans to the monetary basis. Its forward guidance over the recent period has therefore concerned the size and composition of its balance sheet, rather than its policy interest rates.

Although inflation expectations have risen to some degree, they are still far short of the 2 % target defined in 2013 (Boeckx *et al*., 2015).

2.3 Bank of England

The Bank of England was one of the first central banks to adopt inflation targeting, back in 1992. Well before the crisis, it had established a solid reputation for transparency by regularly communicating its views on the economic outlook and its forecasts for GDP growth and inflation, and by explaining the factors underlying its policy changes. Before the crisis, its main communication tools already included a quarterly inflation report accompanied by a press conference, publication of the minutes of Monetary Policy Committee meetings and disclosure of the voting in the Committee, as well as regular parliamentary hearings. Among the few negative points, the Bank of England did not offer immediate explanations of its monetary policy decisions nor indications of its future policy, in the form of either a press conference or a statement.

Although the Bank of England could rely on its existing instruments during the crisis, it nevertheless expanded its communication still further, notably in order to explain its unconventional policy measures, such as its quantitative easing policy (QE), adopted early in 2009. In August 2013, in view of the weakness of the economic recovery and in order to preserve the accommodative stance of its monetary policy, the Bank of England also introduced explicit forward guidance for the first time, linking the movement in its policy interest rate and its stock of assets to the level of unemployment. An extensive document was published, detailing the reasons why the Committee considers that this explicit information may have enhanced the effectiveness of its monetary policy (Bank of England, 2013).

Finally, in December 2014, the Bank of England announced changes to the way in which it presents and explains its interest rate decisions; those changes represented the most significant revision since the Bank gained its independence in 1997, and were intended to "enhance transparency and make the Bank more accountable to the British people". First, the Committee stated that from March 2015 it would publish the transcripts of the monetary policy meetings after eight years. It considered that this delay ensured the right balance between the need to offer members freedom of debate and the requirements of democratic accountability and transparency governing its activities. Second, the Committee stated that, from August 2015 onwards, it intended to publish the minutes of the discussions and – in the months concerned – the Inflation Report at the same time as the monetary policy decision, as it considered that a single announcement containing all that information would make its communication more effective, by giving the clearest possible monetary policy signal. Third, the Monetary Policy Committee decided to reduce the number of its meetings from twelve to eight [per year] with effect from 2016.

2.4 Eurosystem

While the Eurosystem exhibited a fairly high degree of transparency from the start, there has not been much

(1) In so far as the plan is approved by the Prime Minister's office.

significant progress between its creation in 1998 and the recent crisis. However, two developments are worth mentioning. The first is the May 2003 decision by the Governing Council to clarify the definition of price stability adopted in 1998. Thus, it confirmed that it intended to pursue a medium-term price stability objective by aiming at an inflation rate below 2 %, while specifying that it meant a rate close to 2 %. That clarification indicates in particular that the Governing Council is concerned to guard against the risk of deflation. The Governing Council also considered it necessary to take account of any bias in the HICP and of inflation differentials between euro area countries. The second relevant development is the switch from twice-yearly to quarterly inflation and output projections from June 2004. The Eurosystem's weakness, which was regularly pointed out, had always been the non-publication of Governing Council minutes and votes. The recent period has brought more extensive communication, plus the use of that communication for instrumental purposes and the creation of a new communication tool.

Throughout the crisis, the ECB made its communication more explicit in order to continue to manage the expectations of economic agents in an environment which had become particularly complex and uncertain. Using "traditional" communication tools such as its President's press conferences, press releases or the speeches of members of its Executive Board, it continually reaffirmed its mandate, and explained its medium-term policy stance, its overall view and the symmetrical character of price stability. It thus sought to keep inflation expectations firmly anchored by suppressing both fears of excessive inflation and fears of a deflationary spiral, in a context featuring high debt levels and balance sheet adjustments (ECB, 2014a). The ECB also offered more information on its view of economic and financial developments, and explicitly discussed the variables that it considered relevant for the conduct of its monetary policy[1]. Finally, it naturally explained the many – predominantly unconventional – monetary policy measures that it implemented in order to deal with the recession and the disruption in the transmission of its monetary policy.

In 2013, confronted by the limits of the interest rate instrument and various contingencies, the Eurosystem expanded its communication by opting to offer forward guidance on the movements in its key interest rates, to indicate its future policy intentions and to clarify its reaction function. In order to provide reassurance on its future monetary policy stance, the Governing Council thus abandoned its "mantra", famous during the days of Trichet, "to never pre-commit". More recently, it has also offered forward guidance on its expanded asset purchase programme announced on 22 January 2015.

Finally, in 2014, the Eurosystem decided to create a new communication tool by publishing an account of the Governing Council meetings from January 2015 onwards. On the same occasion, it announced that the frequency of monetary policy meetings would be reduced.

The decisions to offer indications about its future monetary policy and to publish accounts of its Governing Council meetings both mark significant turning points in the conduct and transparency of the Eurosystem's monetary policy. They therefore merit a closer look. The question of the reduction in the number of meetings is in line with a general trend, as is evident from the recent decisions by the Bank of Japan and the Bank of England. All these central banks have thus joined the Federal Reserve, the Bank of Canada and the Reserve Bank of New Zealand in the group of monetary authorities whose committees meet eight times a year. That is another development worthy of comment.

FORWARD GUIDANCE

At its July 2013 meeting, the ECB Governing Council announced that "its monetary policy stance would remain accommodative for as long as necessary" and that it expected "the key ECB interest rates to remain at present or lower levels for an extended period of time". It specified that this expectation was based on "the overall subdued outlook for inflation extending into the medium term, given the broad-based weakness in the real economy and subdued monetary dynamics". This was the first time in its history that the ECB had given an explicit indication regarding its monetary policy stance. That information was offered in the context of a still fragile economic recovery and a decline in inflation. It came after a marked and unjustified rise in euro area interest rates, beginning in the spring of 2013, following the statements by the Chairman of the Federal Reserve mentioning a possible reduction in asset purchases by the US central bank (for more details see Boeckx *et al.*, 2013). Since then, the Governing Council has continually reaffirmed its forward guidance on the ECB's key interest rates.

By indicating the expected level of future interest rates, depending on the outlook for price stability, forward guidance helps to clarify both the central bank's assessment of the macroeconomic situation and its reaction function. Forward guidance thus plays on the two components of the expectations channel for the transmission of

(1) In his speech at Jackson Hole in August 2014, Mario Draghi (ECB, 2014c) stated, for example, that the five-year swap interest rate five years ahead was the ECB's usual metric for defining medium-term inflation.

monetary policy. As it reduces uncertainty, forward guidance is a particularly suitable instrument in times of crisis. In addition, it is a way of exerting more direct influence on long-term interest rates and is therefore a valuable monetary policy instrument when the key interest rates are approaching their lower bound[1]. Forward guidance thus helps to ensure that inflation expectations are firmly anchored and permits closer control over the monetary policy stance.

Apart from indications about the expected movement in interest rates, in April 2014 – taking account of the risk of a protracted period of low inflation – the ECB also presented a number of contingencies together with the appropriate monetary policy responses (ECB, 2014a).

The first contingency consisted in an unwarranted tightening of the monetary policy stance (caused by external developments) to which the ECB would respond by adopting new conventional measures. The second contingency concerned a persistent deterioration in the bank lending channel, which would give rise to targeted credit easing measures. Finally, the last contingency considered the possibility of a worsening of the medium-term inflation outlook and/or a weaker anchoring of inflation expectations, which would justify the launch of an expanded asset purchase programme.

When these contingencies actually arose, the Governing Council matched its actions to its words by taking a range of new monetary policy measures at the end of 2014 and the beginning of 2015. First, it cut its key interest rates on two occasions, in June and September 2014, lowering the interest rate on the main refinancing operations to 0.05 %, the marginal lending facility rate to 0.30 % and bringing the deposit facility rate down to –0.20 %. Next, in June 2014, it announced that it would conduct a series of targeted longer-term refinancing operations (TLTROs), to encourage the banks to lend to the private sector. Finally, in September 2014, it decided to ease its monetary policy further by adopting a programme for the purchase of private sector assets. In January 2015, that was incorporated in an expanded programme which also included massive purchases of government bonds. The Governing Council then announced that the monthly purchases, set at € 60 billion, were "intended to be carried out until at least September 2016" and would continue in any case until the Governing Council saw "a sustained adjustment in the path of inflation that is consistent with its aim of achieving inflation rates below, but close to, 2 % over the medium term". The "open" character of the expanded asset purchase programme demonstrates the Eurosystem's determination to do whatever is necessary. By influencing the expectations of economic agents, it thus performs an automatic stabilising role which reduces uncertainty over inflation and helps to ensure that expectations are firmly anchored.

After that, the Governing Council constantly showed that it was ready to use all the available instruments within its mandate to respond if necessary to any (new) undue tightening of its monetary policy.

PUBLICATION OF ACCOUNTS

Since the creation of the European Central Bank, there has been much discussion regarding the publication of the minutes of Governing Council meetings. The initial decision not to publish the minutes of monetary policy meetings was repeatedly criticised, and prompted many observers to conclude that the ECB was less transparent than other central banks.

There were several arguments underlying that decision. First, prior to the establishment of the monetary union, none of the euro area central banks published any minutes of discussions by their decision-making bodies. Next, unlike other central banks such as the Federal Reserve, the ECB had chosen to explain and justify its decisions systematically after the meetings of its Governing Council by means of a President's statement and a press conference followed by a question-and-answer session. It therefore seemed unnecessary to offer subsequent explanations and justifications in minutes published several weeks later. Third, it had considered that the publication of minutes might impair the frank and open nature of the discussions. It was felt that keeping the debates confidential would ensure the independence of the members of the Governing Council and would thus encourage them to take a European rather than a national standpoint. Also, the publication of minutes was liable to shift the real debate to the informal meetings of the Governing Council, which would have made the minutes much less relevant (Bini Smaghi and Gros, 2001). Finally, on the basis of international experience it had been suggested that the publication of minutes did not necessarily enhance the effectiveness of monetary policy or improve the understanding of policy decisions. On the contrary, *ex-post* publication of the discussions would tend to focus the attention of the media and the public on differences of opinion between committee members, at the expense of the fundamental questions relating to the conduct of monetary policy.

Although these arguments may not have become totally irrelevant, they have nevertheless been partly superseded

(1) For a more detailed discussion of the ECB's forward guidance, see Praet (2013).

over time. For example, a number of central banks nowadays explain and justify their monetary policy decisions immediately, but without abandoning the publication of minutes. Furthermore, various authors have shown that the publication of minutes offered useful information and helped to shape expectations regarding future monetary policy decisions (for a review of the literature on the subject, see Kedan and Stuart, 2014). In recent years, the economic environment and the conduct of monetary policy have also become considerably more complex. Uncertainty has grown, as have the differences of opinion among members of monetary policy committees.

In these circumstances, the ECB Governing Council felt the need to expand its communication, and more particularly to provide a more detailed commentary on the rationale behind its decisions. In July 2014, after careful consideration, it announced that it intended to publish accounts of its monetary policy meetings with effect from January 2015. It felt that this would allow the public and markets to further improve their understanding of the Governing Council's reaction function, its assessment of the economy and its response to evolving economic and financial conditions (ECB, 2014a). These accounts thus fulfil the monetary authority's need to be accountable while also being conducive to a more effective monetary policy.

The accounts are sub-divided into two quite separate main sections. The first section describes the recent financial, economic and monetary developments and lists the available policy options. The second summarises the discussions in the Governing Council, the main arguments put forward and the monetary policy decisions approved. So as not to compromise the independence of the members – who are acting in a personal capacity and not as representatives of their country – and to preserve the collegiality of the discussions, it was decided that contributions would not be attributed to individuals and that the results of any voting would not be disclosed. In this respect, the Eurosystem differs from the main central banks of the advanced economies. However, in order to permit an assessment of the extent of support for the opinions expressed and the decisions adopted, it was agreed to use qualifiers. Four expressions in particular were chosen to indicate the support for the decisions taken: consensus, majority, large majority and unanimity. The accounts should be deemed to complement the real-time messages conveyed in the press conferences, and are certainly not a substitute for those messages (ECB, 2014a).

REDUCTION IN THE FREQUENCY OF MEETINGS

Following the announcement of the publication of accounts of its monetary policy deliberations, the Governing Council indicated that the frequency of its monetary policy meetings would be reduced to a six-week cycle with effect from January 2015. It stated that meetings not concerned with monetary policy would continue to be held at least once a month.

To justify that decision, ECB President Mario Draghi (ECB, 2014b) explained that every monetary policy meeting of the Governing Council inevitably generated expectations of potential action. He stated that those expectations were reflected in market behaviour and could thus be self-fulfilling, even if they had nothing to do with economic fundamentals. But he stressed that the horizon used by the Governing Council in assessing the risks to price stability was medium-to long-term and that monetary policy measures were therefore not adopted on the basis of short-term considerations. In that situation, monthly meetings were considered too frequent. Spacing them out was meant to match the timing of the decisions more closely to the creation of the associated expectations. However, the reduction in the annual number of Governing Council monetary policy meetings should certainly not be seen as a sign that the Governing Council considered its job was largely finished so that it would need to intervene less. If necessary, an emergency meeting could always be arranged on an *ad-hoc* basis, as it was in October 2008 at the height of the crisis.

Another reason put forward for spacing out the meetings is the decision to publish the accounts. From a practical point of view, an interval of six weeks rather than one month between meetings was considered preferable as it allowed the time needed to produce an account offering timely information on decisions previously adopted but without disturbing expectations of future action.

Finally, apart from any considerations regarding communication, but with the aim of ensuring efficient decision-making in the Governing Council, the system of rotating voting rights was launched on 1 January 2015. In 2003, the Council of the European Union had in fact decided that this system would take effect once the number of national central bank governors in the Governing Council exceeded 18. That has been the case since 1 January 2015, when Lithuania joined the euro area. The rotation implies that the number of votes in the Governing Council is limited to 21 and each governor's voting frequency is adapted to take account of the representativeness of the various member countries in the economy of the euro area as a whole. However, all the governors still take part in the Governing Council meetings and debates. The six members of the Executive Board are not subject to the rotation system and retain a permanent right to vote. For more information on the rotation system, see ECB (2009).

3. Communication, accountability, efficiency and readability

The recent global economic and financial crisis undeniably gave an extra push towards greater transparency and openness among central banks. It resulted not only in more intensive use of the existing tools but also in the development of new means of communication. In addition, it is behind a veritable revolution in the use of communication as a monetary policy instrument. Finally, the great recession undoubtedly triggered closer convergence in the ways central banks conduct monetary policy, and hence communicate on the subject.

Nowadays, the Federal Reserve, the Bank of Japan, the Bank of England and the ECB all have an explicit quantified inflation target and publish a full account of their monetary policy committee deliberations within a reasonable period of time. All these central bank committees or councils systematically issue statements or give explanations after their meetings and they all offer or have offered indications about their future monetary policy stance. They all have quarterly projections for inflation and GDP in their respective economies – whether produced by their staff or their members – and soon they will all meet eight times a year. The main differences in terms of communication between these four central banks will therefore lie only in the transparency of their decision-making procedures and the more or less explicit character of the indications regarding their future monetary policy stance.

While there is not the slightest doubt that central banks have recently extended the scale of their communication, there are nevertheless two fundamental questions on qualitative aspects : exactly to what extent have they increased the democratic accountability of the monetary authorities ? And how much have they done to enhance the efficiency of monetary policy ? This concerns the rationale for central bank transparency : democratic accountability and the effectiveness of monetary policy, the source of better economic performance. It is beyond the scope of this article to give exhaustive, definitive answers to these questions. Nevertheless, it is appropriate to end by examining a key element which is sometimes overlooked : the readability of central bank communication.

In a more complex and uncertain environment, the monetary authorities have endeavoured to provide explanations and reassurance. However, the question is whether their greater transparency has been at the expense of clarity in their statements. Accessible communication is crucial from the point of view of both democratic accountability and the effectiveness of monetary policy, as it not only has to enable the general public to understand the economic situation and the actions of the central banks, but must also allow the markets to assess and anticipate the monetary policy stance. A properly understood and correctly anticipated policy forms the basis of a responsible and effective policy, leading economic agents to take the optimum investment and consumption decisions in the light of the prevailing economic and financial situation and future prospects.

It is interesting to analyse the clarity of monetary policy committee statements on the basis of the Flesch-Kincaid grade level index, which assesses the difficulty of an English text according to the length of the sentences and the number of syllables per word. The score obtained corresponds in practice to the number of years of education generally required to understand the text – according to the American education system. For example, a score of 12 indicates that the text is accessible to a person who has completed compulsory schooling and is therefore about 18 years old. We have used this index to study the changes over time in the readability of the monetary policy statements of the FOMC, the Bank of Japan Policy Board and the ECB Governing Council [(1)].

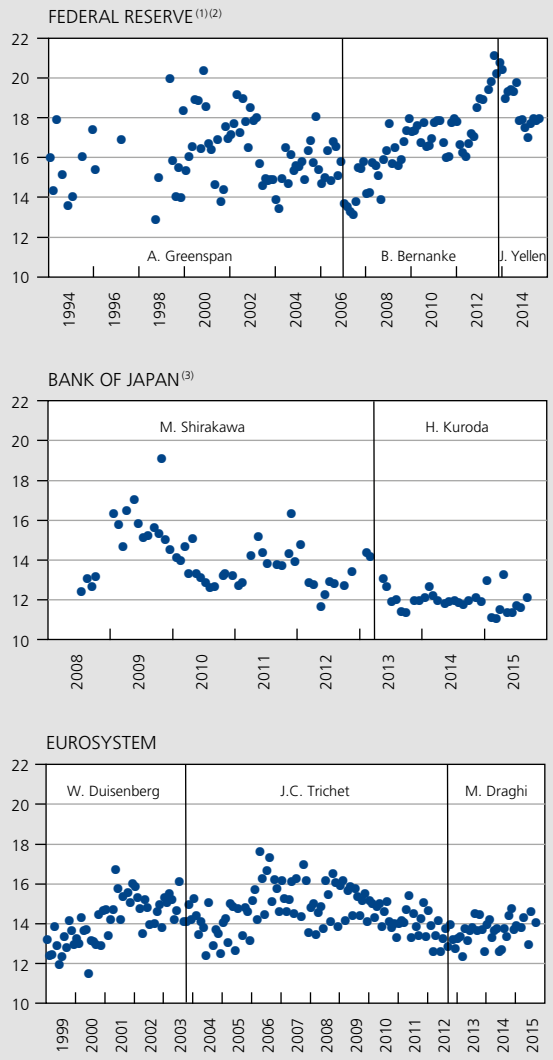
The results show that, in general, the complexity of statements by the Federal Reserve has varied considerably over the years. While there was no clear trend between 1994 and 2007, the statements became noticeably more complex from the end of 2008 when the Federal Reserve embarked on a policy of quantitative easing. Thus, while FOMC statements between 2006 and 2008 would have been readily comprehensible to people with 15 years of education, between 2009 and 2011 that figure increased to 17 years, and to almost 19 years between 2012 and 2014. However, since Janet Yellen became Chairman in February 2014, a tendency towards simplification has emerged. Nonetheless, according to our analysis it currently takes 18 years of education to understand a Federal Reserve statement, which implies a level of schooling comprising around six years of higher education.

In the case of the Bank of Japan, it seems that the Policy Board's messages have become slightly more accessible in recent years, despite the many unconventional monetary policy measures adopted. Between July 2008 and March

(1) The statements studied were issued in February 1994 for the FOMC, July 2008 for the Bank of Japan and January 1999 for the Eurosystem. The Bank of England does not issue statements following decisions by its Monetary Policy Committee but, since August 2015, publishes a monetary policy summary with the Minutes. It was therefore not included in the analysis. The exercise was conducted using the on-line program : http://www.online-utility.org/english/readability_test_and_improve.jsp. The information tested for each statement is that relating in the strict sense to monetary policy. Titles, dates, ancillary information and any results of committee votes were excluded.

CHART 3 MONETARY POLICY COMMITTEE STATEMENTS

(Flesch-Kincaid grade level index)



Sources: Federal Reserve, Bank of Japan, ECB, own calculations.

(1) The FOMC started issuing statements in February 1994 but has only done so systematically since May 1999.

(2) The results obtained differ in some respects from the findings of the study by Hernández-Murillo and Shell (2014). That applies in particular to the period when Alan Greenspan headed the Federal Reserve. Following consultation with the authors, it seems that the divergences are due in particular to differences in the selection of the analysed texts. To a lesser degree, differences in the test programs may also have been a factor.

(3) Statements made before July 2008 were disregarded because they were very few in number.

2013, when Masaaki Shirakawa was Governor, a ready understanding of the Bank of Japan's monetary policy statements required about 14 years of education. Since Haruhiko Kuroda became head of the institution, it seems that 12 years are sufficient.

In the case of the ECB Governing Council, it seems that the number of years of education presumed necessary for a ready understanding of the introductory statements has varied over time, although it has fluctuated within a narrower range than in the case of the FOMC statements. Moreover, in contrast to the Federal Reserve's messages, those issued by the ECB do not appear to have become more complex since the crisis. It even appears that, on average, the Governing Council's statements have tended to become more accessible since 2007. Between 2006 and 2007, it took about 16 years of education to understand an introductory statement, whereas since 2012 the average requirement has fallen to 14 years.

Except for the Federal Reserve, it seems that the readability of monetary policy committee statements has not been impaired by the complexity of the economic environment and monetary policy decisions in the recent period. The communication of both the Bank of Japan and the Eurosystem would even appear to have become somewhat clearer in recent years. While these developments are reassuring, two caveats are appropriate.

First, while the Flesch-Kincaid index takes account of the length of words and sentences, two factors recognised as contributing to the difficulty of reading, it does not consider the context in which the words are used nor the background knowledge needed to understand a text. It is therefore likely to underestimate the difficulty of the monetary policy committee statements to some degree. Second, although there has been some improvement in the accessibility of monetary policy statements, they are still not universally comprehensible. In the euro area in particular, it is notable that in 2012 the average number of years of education was 11.2 [1]. That is therefore still well below 14 years. To put this in perspective, it is worth noting that the latest State of the Union address by the US President Barack Obama in January 2015 scored 9.3 on the Flesch-Kincaid index. It thus seems that central banks still have some scope for improving the readability of their statements.

Monetary policy committee statements are certainly not the only sources of information on the economic situation and on the conduct of monetary policy, as there are many publications that try to explain the aims and activities of central banks to the broadest possible public [2]. But, as preferential

(1) Average value weighted by the size of the population on the basis of UNESCO data for Belgium, Cyprus, France, Germany, Italy, Lituania, Malta, the Netherlands, Portugal, Slovenia and Spain.

(2) However, it should be noted that despite the central banks' efforts at communication, the general public's knowledge of monetary policy evidently remains very limited. For example, on the basis of a Dutch household survey, van der Cruijsen *et al.* (2015) conclude that very few people are aware of the monetary policy objectives of the Eurosystem, but also that a considerable section of the population does not necessarily want to receive information on the subject. The results of their study nevertheless suggest that knowledge of monetary policy plays a significant role in forming inflation expectations. They also stress the importance of the media in the acquisition of that knowledge.

instruments for announcing new monetary policy decisions, the statements are special communication tools. It is without any doubt a sizeable challenge to make these texts easy to read without sacrificing the complexity of the economic environment and the decisions adopted. That challenge is even more daunting for the Eurosystem because it has to address not only various audiences but also diverse and varied cultures.

Conclusion

For much of the 20th century, central bankers maintained strict secrecy, but nowadays they make a specific point of explaining themselves and making sure that they are clearly understood. Communication on the subject of monetary policy is perceived as a democratic responsibility of the central bank, which has been given a specific mandate and enjoys great independence in fulfilling it. Since communication is a significant factor influencing the expectations of economic agents, it is also considered a key element of an effective monetary policy.

A move towards greater transparency in the conduct of monetary policy emerged in the mid-1970s, when price stability was accorded increased attention. But the real revolution came about in the early 1990s in parallel with the adoption of the inflation targeting strategy, and it was followed by a new wave of openness in the 2000s.

The transparency and openness of central banks regarding monetary policy has been given fresh impetus in the wake of the recent economic and financial crisis. The great recession prompted not only wider use of existing tools but also the development of new means of communication. In addition, it triggered a veritable revolution in the use of communication as a monetary policy instrument. Finally, it undeniably led to closer convergence in the ways central banks conduct monetary policy and hence in their communication on the subject.

Except in the case of the Federal Reserve, it seems that the readability of monetary policy committee statements was not impaired by the complexity of the economic environment and monetary policy decisions over the recent period. Communication by both the Bank of Japan and the Eurosystem would even appear to have become a little clearer in recent years. These developments are reassuring, since a proper understanding and correct anticipation form the foundation of a responsible and effective policy. However, monetary policy statements are still not accessible to everyone, and there appears to be considerable scope for improving their readability.

In view of a fundamental tendency that has persisted continuously since the mid-1970s and the recent spate of new initiatives, it is reasonable to ask about the limits of central bank transparency concerning monetary policy.

The subject is not new. Some authors have in fact already suggested that there might be an optimum level of transparency (see for example Morris and Shin, 2002, or van der Cruijsen *et al.*, 2010). Beyond a certain point, it could be that economic agents become over-reliant on public information and therefore neglect their own information sources, especially if they cost money. Furthermore, swamped by information, they might cease to be able to identify the most relevant factors determining their expectations. Finally, the surfeit of information could potentially damage the central bank's credibility by revealing its uncertainty.

The optimum level of information in the conduct of monetary policy is clearly an elastic concept: it depends on such factors as the type of information, the macroeconomic environment, the level of uncertainty, the conduct of monetary policy and the policy transmission channels. These last variables have changed radically in recent years. Nonetheless, a cost-benefit analysis of increased monetary policy transparency is still well worthwhile. The large number of recent initiatives has very probably made such an exercise even more relevant, thus opening up new perspectives for research.

TABLE

	Federal Reserve (1913)	Bank of Japan (1882)	Bank of England (1694)	Eurosystem (June 1998)
Transparency of the monetary policy framework				
Formal statement of objectives	Since 1977 (Federal Reserve Reform Act): maximum employment, stable prices and moderate long-term interest rates.	Since 1998 (Bank of Japan Act): price stability.	Since 1998 (Bank of England Act): price stability.	Since its creation: price stability is the primary objective.
Quantification of objectives	Since January 2012: an inflation rate (PCE) of 2 % in the medium term.	Range from April 2009: CPI inflation between 0 and 2 %; explicit quantification since February 2012: 1 % inflation goal; since January 2013: inflation target of 2 % in the medium/long term.	Price stability is defined each year by the Chancellor of the Exchequer. Since 2004, the target has been 2 % for CPI inflation.	Quantitative definition of price stability adopted in 1998 and clarified in 2003: inflation (HICP) "below, but close to, 2 % in the medium term."
Transparency of economic information				
Publication of internal projections for GDP and inflation	Summary of FOMC members' projections published twice yearly since 1979 and quarterly since 2008; publication available with the minutes since the end of 2007 and at the chairman's press conference since April 2011.	Projections of the majority of Policy Board members published twice yearly since October 2000 and quarterly since January 2009.	Staff quarterly projections since February 1993; the committee has published on a quarterly basis a collective judgement since May 1997.	ECB / Eurosystem staff projections published twice yearly since December 2000 and quarterly since June 2004.
Publication of individual committee members' projections	No.	From January 2016.	No.	No.
Publication of key interest rate projections	Since January 2012.	No.	No.	No.

Sources: Federal Reserve, Bank of Japan, Bank of England, ECB.

TABLE (continued 1)

	Federal Reserve (1913)	Bank of Japan (1882)	Bank of England (1694)	Eurosystem (June 1998)
Transparency in decision-making				
Explicit monetary policy strategy	Since January 2012.	Since 2008.	Since 1993.	Since its creation.
Account of the deliberations at monetary policy meetings	Since 1936. Minutes published in their present form since 1993; publication delay cut from around six weeks to three in 2005.	Since January 1998; published after next meeting since 2008.	Since April 1994 (after five to six weeks; since October 1998 (after two weeks); immediately since August 2015.	Minutes published after thirty years; accounts published since January 2015, usually after four weeks.
Publication of votes in the monetary policy committee	Since 2002.	Since January 1998.	Since June 1997.	No.
Publication of transcriptions of monetary policy discussions	Since 1993, after five years.	Since January 1998, after ten years.	Since March 2015, after eight years.	No.
Transparency in communication of decisions				
Immediate announcement of decisions passed	Since February 1994.	Since January 1998.	Since January 2000.	Since January 1999.
Explanation of decisions passed	Since May 1999.	Since July 2008	In the minutes.	Since January 1999.
Statement after each committee meeting	Since May 1999.	Since July 2008	No.	Since January 1999.
Indications of future monetary policy measures	Since May 1999.	No.	No.	Since April 2014(1).
Forward guidance	For the first time in 2003.	For the first time in 1999.	For the first time in August 2013.	For the first time in July 2013.

Sources: Federal Reserve, Bank of Japan, Bank of England, ECB.
(1) ECB (2014a).

TABLE (continued 2)

	Federal Reserve (1913)	Bank of Japan (1882)	Bank of England (1694)	Eurosystem (June 1998)
Transparency in the implementation of measures				
Assessment of performance compared to objectives	Superficial (1).	Superficial (1).	Superficial (1).	Superficial (1).
Assessment of the balance of risks to the outlook	Since 2000.	Since 2008.	Since 1993.	Since 1999.
Independence and democratic accountability				
Independence	Since the 1951 Accord (2).	Since 1998.	Since 1997.	Since its creation.
Hearings before Parliament	Twice a year since 1975.	Regularly since 1998.	Regularly since 2003.	Four times a year since 1999.
Frequency of monetary policy committee meetings	Eight times a year since 1981.	Fourteen times a year since 1998; eight times a year from 2016	Twelve times a year since 1997; eight times a year from 2016.	Twelve times a year from 1999 to 2014; eight times a year since 2015.

Sources: Federal Reserve, Bank of Japan, Bank of England, ECB.
(1) Source: Dincer and Einchengreen, 2014.
(2) Treasury-Federal Reserve Agreement. The independence of the Federal Reserve has been stepped up since 1977 with the reform of the Federal Reserve Act.

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Main CompNet research results

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Introduction

The Competitiveness Research Network (CompNet) was set up by the European System of Central Banks in 2012. Its main objectives were to identify the factors driving competitiveness and productivity in European countries and firms and to describe the relationship between these various competitiveness factors and macroeconomic performance (e.g. exports or growth). It brought together over a hundred researchers from around fifty institutions (central banks, the European Commission, international institutions and universities) with the intention that they should focus on the subject of competitiveness and the analysis and understanding of the development of global production chains. Special efforts were devoted to the creation of new competitiveness indicators. The National Bank of Belgium has made numerous contributions, both in compiling statistics and at the scientific level, as is evident from the list of studies carried out by members of the Bank's staff or with the support of the Bank [1].

In addition to the various research projects, two new analysis tools were devised by CompNet: the diagnostic toolkit on competitiveness and the CompNet database.

The first tool consists of a database encompassing 80 novel competitiveness indicators developed by CompNet, some being macroeconomic indicators (indicators of comparative advantages by type of products – high-technology products, low-technology products, intermediate products – or intra-branch trade indicators), some microeconomic (derived mainly from the CompNet database) and some transnational indicators (measures of participation in global value chains) for EU countries. Each indicator is accompanied by a descriptive data sheet stating the definition, the method of calculation and the possible interpretation. This toolkit is presented in Karadeloglou *et al.* (2015).

The second tool is the CompNet database [2], described in Lopez-Garcia *et al.* (2014 and 2015). This database contains a detailed description of a range of firm-level indicators for 17 European countries (including 13 euro area Member States) [3]. Since there are legal obstacles to the pooling of microeconomic databases from multiple countries, CompNet developed a common methodology for constructing in each participating country a series of aggregate statistics permitting the most detailed possible description of the distribution of a number of economic indicators (total factor productivity, labour productivity, unit labour costs, exports, markups) or financial indicators observed at firm level. Those distributions are available at national or sectoral level, for both industry and services, and for certain categories of firms (small and medium-sized firms, large firms). The various components of this database have given rise to a number of publications, including Berthou *et al.* (2015b) for measures of export performance, Ferrando *et al.* (2015) for financial indicators, and Amador *et al.* (2015a) for markups.

The purpose of this article is to comment in more detail on some of the CompNet findings [4]. It comprises six sections. The first section defines the concept of competitiveness

(1) This list of studies includes Amador *et al.* (2015a), Amiti *et al.* (2014), Ariu (2012), Ariu (2012, 2015), Berthou *et al.* (2015a), Berthou *et al.* (2015b), Decramer *et al.* (2014), Di Comite *et al.* (2014), Dhyne *et al.* (2014), Dhyne *et al.* (2015), Duprez (2014), Vandenbussche (2014) and Verschelde *et al.* (2014).

(2) Under some conditions, this database is available through the ECB (cf. "Internal governance for the use of CompNet produced firm level data", ECB).

(3) The period covered by this database varies from one country to another. These data are updated annually. The latest update of the results for Belgium concerned the period 1996-2013.

(4) The network's final report was published by the ECB (see Di Mauro and Ronchi, 2015).

while the next three analyse the main determinants of competitiveness, namely productivity, cost competitiveness (traditionally measured by unit labour costs) and non-cost determinants of competitiveness (for example, the quality of the export products), and the fifth section examines the contribution of firms' dynamics to competitiveness and to the optimum allocation of resources.

Since the reorganisation of production chains at international level in recent decades has fundamentally altered the structure of world trade, CompNet has also examined the consequences of that in terms of competitiveness. The sixth section presents the main lessons to be drawn from the development of global value chains.

Finally, the conclusion sets out the main lessons for economic policy.

1. Competitiveness: concept and measures

Whether it is viewed in terms of a country, a firm or a product, competitiveness is a relative concept which is defined in comparison with the competitors of the country, firm or product in question. Thus, quite naturally, a country's competitiveness is usually analysed on the basis of its macroeconomic export performance[1], or possibly the competition from imported goods on the local market.

While traditional macroeconomic analysis links external performance to relative cost indicators such as unit labour costs or prices, microeconomic analysis mainly reveals the role of the firm's productivity as a key determinant of its success on foreign markets. The two types of analysis are in reality based on the same theoretical assumptions. Beginning with the observation that not all firms are exporters, microeconomic models have stressed the role of heterogeneity in productivity to explain divergences in firms' export performance (see Melitz, 2003). More generally, prices are determined by the ratio of wages to productivity, or in other words unit labour costs, up to markups. Prices are a vital element of a firm's profitability. These models put the emphasis on productivity gaps because they make the assumption that wages are homogenous between firms.

$$Price = markup \times \frac{Average\ wage}{Productivity}$$

$$Price = markup \times unit\ labour\ cost$$

or

$$p = \mu \frac{w}{\left(\frac{y}{l}\right)} = \mu.ulc \qquad (1)$$

These factors (price, unit labour costs or productivity) play a dual role. On the one hand, entry into a foreign market implies fixed costs, e.g. in connection with exploring a new market or adapting the product to local customer demand and preferences. Therefore, in order to be able to export to a foreign market, the firm has to achieve a level of profitability sufficient to cover these fixed costs. That explains the now familiar conclusion that export firms are generally more efficient (productive) than those which do not take part in international trade. Also, productivity or unit costs are key factors in pricing the firm's product, and consequently, in determining its share of foreign markets. Here we see the relationship between the firm's efficiency (how much it can produce with the quantity of inputs that it uses) and its unit costs which determine both the firm's entry into new markets (extensive margin) and the development of its exports on those markets (intensive margin).

While this cost-effectiveness ratio is a vital determinant of a firm's international performance, other non-cost factors will also influence its profitability, such as the perceived quality of its products or its organisational efficiency. These non-cost factors are likewise crucial for explaining a firm's export performance in the advanced economies.

2. Productivity and competitiveness

As mentioned above, the new international trade theories along the lines of Melitz (2003), which incorporate the heterogeneity of performance at firm level, reveal that productivity is a key determinant of firms' performance on foreign markets. A number of CompNet studies were therefore devoted to measuring productivity and describing the distribution of productivity in the EU countries.

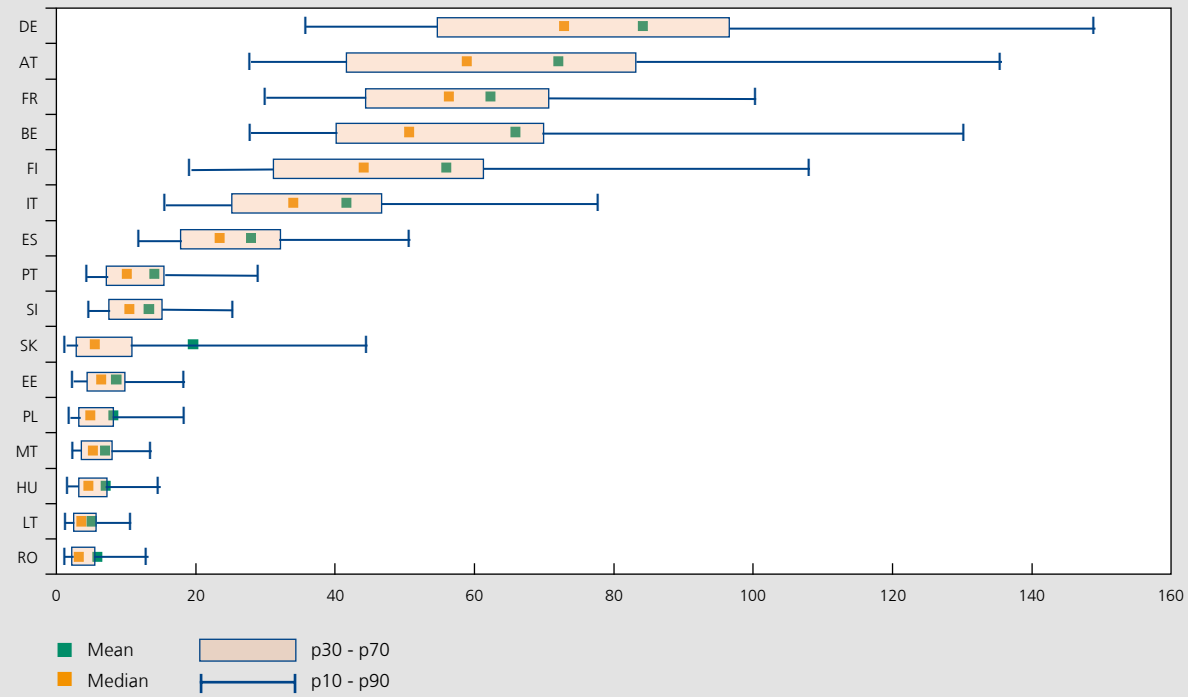
2.1 Firms with widely heterogeneous performance

One of the main CompNet contributions concerns the description of the productivity distribution in the various EU countries.

On the basis of standardised treatment of the microeconomic data available in each country participating in the CompNet database, it was possible to describe the productivity distribution of firms in manufacturing industry and market services in those various countries to arrive

(1) The great majority of microeconomic studies concern trade in goods. Nevertheless, in the case of Belgium, one could mention the articles by Ariu (2012 and 2015) which describe trade in services in Belgium.

CHART 1 DISTRIBUTION OF LABOUR PRODUCTIVITY[1] BETWEEN 2003 AND 2007



Source: CompNet.

(1) Results based on individual data for firms with 20 or more employees, in manufacturing industry and market services (NACE 2008 branches C to N, with the exception of branches D and E). Averages of the various moments of the distribution of apparent labour productivity assessed at the level of NACE 2-digit branches of activity over the period 2003-2007.

at a valid comparison. This exercise was conducted both for labour productivity (measured as the ratio of value added to employment) and total factor productivity (TFP) (calculated as the residual value of the estimation of a production function).

This international comparison shows that, on average, Belgian firms are among the most productive in the EU, but that the productivity distribution is highly dispersed and asymmetric. However, there is a relatively substantial mass of highly productive firms, and it is in this part of the distribution that export firms are mainly found.

2.2 Microeconomic comparative assessment of productive efficiency

The empirical observation of productivity distributions quite naturally casts serious doubt on the classic approach to the economy based on the concept of the representativeness of the average firm, as those productivity distributions are very far from a normal distribution. The average of the distribution is therefore no longer sufficient to describe it. The heterogeneity and form of the productivity distribution are also vital determinants of competitiveness.

In fact, while the average level of productivity is still a determinant of macroeconomic performance, it is not average firms that are active on international markets but firms whose productivity exceeds a certain threshold. Other parameters of the productivity distribution must therefore be taken into account as well in diagnosing an economy's competitiveness, as was shown for example by Barba Navaretti *et al.* (2015) and Benkovskis and Bluhm (2015). These studies reveal that export performance depends not only on the sector's average level of productivity but also on the dispersion and asymmetry of the productivity distribution. In particular, given the same average level of productivity, a sector or country will record better export performances and stronger growth of real GDP and TFP if it has a larger proportion of highly efficient firms.

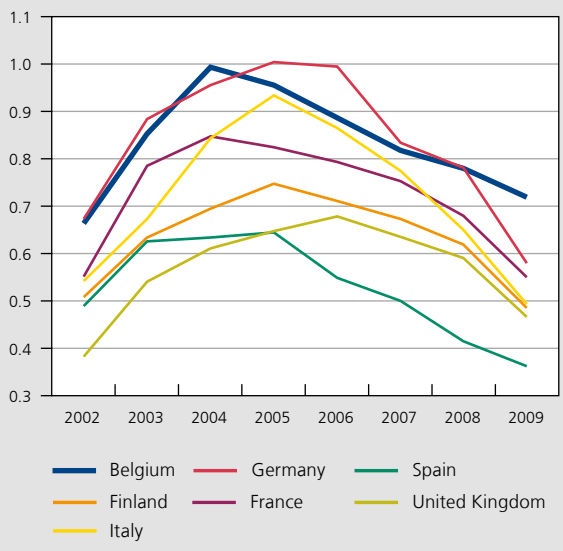
Finally, the values of a series of variables such as productivity per sector or per type of firm may prove

essential for the purpose of microeconomic analysis of competitiveness. As pointed out by Dhyne *et al.* (2014), competitiveness on foreign markets has to be measured in comparison with the competitors present on those markets. An exporter's position in the distribution of its competitors on the export market is the most appropriate measure of competitiveness. In the absence of individual data available at international level, most microeconomic studies were unable to capture competitiveness in such a disaggregated way (by product or by sector).

Verschelde *et al.* (2014) analyse differences in efficiency between firms or countries from the angle of the frontier of production potential. That is defined as the maximum output achievable with a set of given production inputs. On the basis of firm data gathered for seven European countries, they estimate the frontier of production potential for each country and for Europe as a whole. Their findings indicate that, in the metallurgy sector, for example, Belgium and Germany have production frontiers which are higher than those of the other European countries considered. Another noteworthy point is that efficiency gaps between countries did not diminish between 2002 and 2009.

This analysis reveals various possible routes to increase competitiveness: one approach involves being as efficient as possible, taking account of the production technology used (in other words, getting as close as possible to the production frontier); another entails developing more efficient technologies (in other words, moving the production frontier). Improvements to management might be an illustration of the first route, while a technological innovation is an example of the second. Analysis of the potential causes of the productivity slowdown makes this distinction very clear. Recent studies have indicated that the reasons why productivity has slowed more sharply in Europe than in the United States include a less effective dissemination of information technologies rather than the sectoral composition of GDP, the less favourable development of human capital, and openness to international trade. Firm size and managerial model also appear to be key factors in the adoption of new technologies.

CHART 2 ESTIMATION OF PRODUCTION FRONTIERS IN THE METALLURGY SECTOR (1)



Source: Verschelde *et al.* (2014).

(1) Weighted median efficiency frontier per country. A reduction in the frontier indicates a widening of the gap between a small group of highly productive firms and other firms.

2.3 Exports and productivity

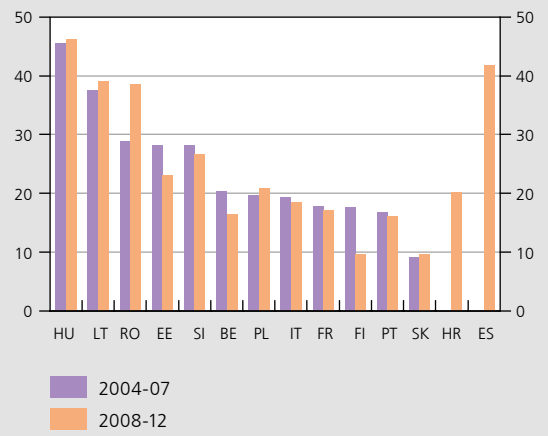
Apart from the distribution of certain indicators such as apparent labour productivity shown in chart 1, the CompNet database also comprises an "International trade" module which describes the export situation of industrial firms in 15 European countries.

The data collected via that module (and discussed in detail by Berthou *et al.*, 2015b) indicate, for example, that in the 15 European countries contributing to the module (1), one in four industrial firms exports at least 0.5 % of its output (Belgium's score is average). In fact, exports represented on average 46 % of the turnover of industrial exporters in 2010 (51 % in Belgium, where firms seem more exposed to international demand). However, a country's exports are highly concentrated. For instance, in Belgium, the ten largest industrial exporters accounted for just over 20 % of total industrial exports in 2008.

Exporters differ significantly from non-exporting firms. On the basis of equation (1), a firm's productivity is clearly a key determinant of its competitiveness. This theoretical relationship, revealed in numerous microeconomic studies, is also illustrated in the CompNet database. On average, for all 15 countries participating in the "International trade" module of the CompNet database, export firms active in industry are 20 % more productive than firms confining their activities to the domestic market. That 20 % productivity gap between exporting and non-exporting firms is also observed in Belgium. In the case of the ten biggest exporters, it is extremely large, at 40 %, and is part of the

(1) Namely Belgium, Croatia, Estonia, Finland, Hungary, Italy, Lithuania, Malta, Portugal, Romania, Slovenia, Slovakia, Poland, France and Spain.

CHART 3 PRODUCTIVITY GAPS BETWEEN EXPORTING AND NON-EXPORTING FIRMS (IN PERCENTAGE POINTS)(1)



Sources: Berthou *et al.* (2015b), CompNet.

(1) The data for Spain are based on export data not adjusted for changes in the thresholds for declaring intra-European transactions during the observation period. For the other countries, the export data are adjusted for those changes. The data for Malta are not included in this chart.

reason for the dynamics of entry/exit and survival of firms on global markets. At the time of their exit, export firms that stop exporting exhibit a level of productivity relatively close to that of non-exporting firms. Conversely, firms that decide to start exporting have an intermediate level of productivity (higher than that of non-exporting firms but lower than that of exporters remaining in business).

Berthou *et al.* (2015b) likewise point out that the level of productivity also has a positive effect on export volumes and export growth. Since exports are heavily concentrated, the competitiveness of a small number of firms therefore becomes particularly crucial. If the productivity, and hence the competitiveness, of these few superstars deteriorates, that may have a serious impact on exports at macroeconomic level.

3. Price competitiveness

3.1 Role of unit labour costs: productivity or unit labour costs as an indicator of competitiveness?

Together with the level of productivity, the second determinant of competitiveness according to equation (1) is the average wage. While the debate among the general public emphasises the wage gap, and particularly the wage skid, to describe the deterioration in the competitiveness of Belgian firms, microeconomic studies focus on productivity and macroeconomic analyses look at unit labour costs. The microeconomic study by Decramer *et al.* (2014) assesses the role of unit labour costs for export performance of Belgian manufacturers over the period 1999-2010. Their findings indicate that the elasticity of net exports value to the firm's unit labour costs is between –0.2 and –0.4, the effect being more pronounced for the most labour-intensive firms. In addition, for a firm of a given size, the probability of starting to export declines as unit labour costs increase, while the probability of ceasing to export increases as unit labour costs rise. More specifically, a 10 % increase in unit labour costs reduces the probability of starting to export by 0.3 percentage point, whereas it increases the probability of ceasing to export by 0.7 percentage point. The effect is therefore relatively small.

The findings of Decramer *et al.* (2014) also show that differences between the export performance of two firms in the same sector during a given year – be it in regard to the intensive margin or the extensive margin – lie in productivity rather than wages(1). These results provide validation and retrospective justification for the dominance of a productivity-based approach in microeconomic research into questions of competitiveness.

In general, the sensitivity of exports to unit labour costs is relatively low. The elasticity of exports to unit labour costs depends on the price elasticity ε_p, of the exports and the elasticity of the selling prices to unit labour costs.

$$\varepsilon_p = \alpha\, p = \alpha.\mu.\beta.ULC \qquad (2)$$

The low estimated elasticity is due either to the fact that the price elasticity of exports α is not very high, e.g. because other product characteristics such as quality are also taken into account, or to the fact that unit labour costs represent only part of the marginal cost, in other words β is low(2). In the latter case, labour costs in fact represent only about a third of the total costs of firms in Belgium. These findings are borne out by other international studies.

3.2 Role of prices as an indicator of competitiveness

A firm's exports, profitability and market shares depend partly on its selling prices. As indicated by equation (1),

(1) That may be due to greater heterogeneity in terms of productivity rather than wages, e.g. because wage bargaining is relatively centralised at sectoral level in Belgium.

(2) The markup μ is in principle greater than or equal to 1.

those prices are equal to the marginal production cost up to the markup[1]. There are two advantages in considering prices rather than unit labour costs as a competitiveness indicator: first, that makes it possible to incorporate differences in terms of market power (markup); also, it means account can be taken of the fact that labour costs do not alone determine the marginal cost.

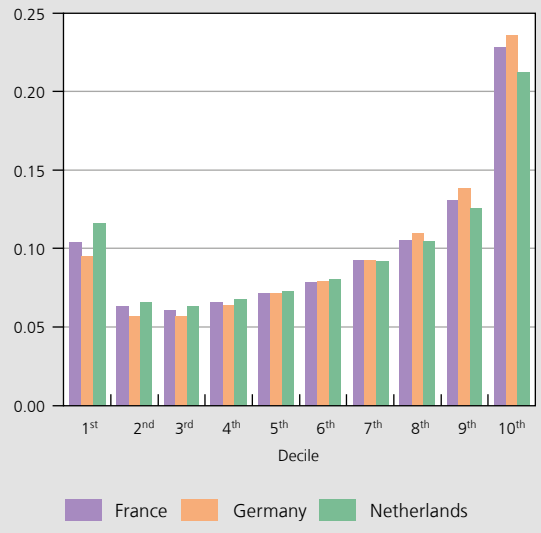
In this connection, the macroeconomic study by Giordano and Zollino (2015), conducted for Germany, France, Italy and Spain, in fact suggests that price-based indicators are more relevant than indicators based on unit labour costs.

At microeconomic level, the study by Dhyne *et al.* (2014) looks at the export performance of French firms on the Belgian market. This analysis proposes a new measure of competitiveness at microeconomic level, which compares the indicators of export firms with those of firms present on the destination market. The authors are particularly interested in the role of unit values (which, for simplicity, we shall call prices). By using French export data and Belgian production and import data, they can assess the position of the prices of French products exported to Belgium in the distribution of prices charged in Belgium by their (Belgian or foreign) competitors. Their results confirm that unit labour costs exert a negative influence on the probability of exporting, and that the relative prices of products exported by French firms to Belgium have a negative influence on their performance on the Belgian market. The estimated price elasticity of the quantities exported is close to 1.

Chart 4 illustrates this method of measuring competitiveness. It considers the unit values of products (defined in a relatively detailed way on the basis of a 6-digit classification) imported by Belgian firms. It ranks those prices in terms of their position in the distribution of prices charged in Belgium by all firms, whether domestic or exporting to Belgium. The chart shows only imports from Belgium's three main competitors. For example, it indicates that the prices of 23.5 % of products imported from Germany are among the highest (in the last decile) compared to those charged in Belgium for the same category of products.

It seems that two kinds of price strategies can be adopted by firms exporting to Belgium. The first consists of a policy of price competition. It appears to be more common for products from the Netherlands than for those from Germany (18 % of products imported from the Netherlands are in the first two deciles, compared to 15 % of German products). There is also an evident peak in the last two deciles of the distribution: a significant number of firms exporting to Belgium charge high prices. That may indicate a strategy of competing on quality or niche products. This second strategy is more common for German and French products (36 and 37 % respectively in the last two deciles of the price distribution) than for Dutch products (34 %). In fact, sales of these products at the top of the price distribution represent only a small proportion of imports in terms of value.

CHART 4 PERCENTAGES OF UNIT VALUES OF FIRMS EXPORTING TO BELGIUM IN THE DISTRIBUTION OF UNIT VALUES IN BELGIUM



Sources: NBB's calculations based on foreign trade data and PRODCOM survey.

3.3 Price elasticity of exports

As mentioned in the CompNet final report (see Di Mauro and Ronchi, 2015), the fact that many European countries had to adjust their current accounts in recent years, sometimes to a substantial extent, has generated renewed interest in assessing the response of a country's exports to changes in relative prices and hence in estimating the price elasticity of exports, defined by equation (2).

On this subject, the empirical findings are relatively divided. Macroeconomic assessments of that elasticity tend to indicate an export price elasticity of less than 1. Conversely, estimates based on disaggregated export data (firms or products) seem to indicate that the response to

(1) The markups are not observed but have to be estimated. Such an exercise was conducted by Amador *et al.* (2015) for 15 countries. The results reveal great heterogeneity in markups. On the one hand, they vary from one firm to another, being higher for older firms and export companies. Also, they may change over time. For example, they diminished during the crisis, particularly in the countries where the impact was greatest.

changes in relative prices is stronger (price elasticity higher than 1, often in the region of 5).

The microeconomic study by Berthou *et al.* (2015a) tries to reconcile the results of these two approaches. On the basis of the CompNet database, the authors show that large firms (or the most productive firms) which account for the bulk of exports are less sensitive to changes in the real exchange rate than smaller (or less productive) firms. That conclusion is consistent with the findings of Amiti *et al.* (2014) for Belgium, showing that the transmission of exchange rate variations to export prices is weaker for large firms because they are typically both exporters and importers. Therefore, an exchange rate depreciation drives up the cost of imported production inputs, partly neutralising the benefits of that depreciation.

This weak response to exchange rate movements on the part of large firms which, since exports are highly concentrated, represent the major part of those exports, permits an understanding of the implications of changes in relative prices for the export performance of European countries. In fact, since the impact of a reduction in the real exchange rate on a country's total exports is determined in the short and medium term mainly by the response of the largest or most productive firms, the adjustment of a country's trade balance requires large changes in relative prices in the euro area. However, these fluctuations in relative prices will have a bigger impact for small exporters. The decline in the exchange rate may compensate for the weak productivity of these small firms and enable them to gain a foothold on the international markets. Nevertheless, owing to their small size, the entry of these new exporters will have a limited impact on the trade balances, at least in the short term. In order to augment the contribution of the extensive margin to the adjustment of the trade balance, structural measures facilitating the entry and growth of young firms on the global markets could increase the macroeconomic response to changes in the real exchange rate.

4. Non-price competitiveness

At both macroeconomic level (see Benkovskis and Wörz, 2014, or Giordano and Zollino, 2015) and microeconomic level (see Decramer *et al.* 2014), the estimates reveal that prices or unit labour costs cannot on their own explain export performance, thus indicating that non-price competitiveness also plays a major role. For example, the analysis by Benkovskis and Wörz (2014) shows that market losses suffered by industrialised countries ("old" Europe, the United States and Japan) compared to those of emerging countries and new European Union Member States are attributable essentially to losses of non-price competitiveness. That non-price competitiveness includes the quality of the products and services offered, reputation, tailoring to consumer preferences on local markets, etc.

4.1 Product quality

The quality of a product is particularly hard to quantify in economics because it is not observable. Numerous studies have tried to propose a quality indicator for exported products. For example, we can simply take a product's price as an approximate measure of its quality. The research by Blinder (1991) on the causes of price stickiness showed that, since a product's price is its main observable characteristic for the consumer, firms use it to signal quality. Since the quality of the production factors (labour and material inputs) has a positive impact on the quality of the end product, a high price accompanied by a high production cost can be interpreted as a guarantee of quality. However, a high unit production cost may also be synonymous with lower productive efficiency. The price is therefore an imperfect indicator of the quality of the end product.

An alternative to the price criterion therefore consists in measuring the quality of a product by the excess demand for it, taking account of its price. On the basis of the estimation of a demand function, the quality of a product can be approximated by the difference between its market share and what that share should be taking account of the product's price. If that gap is positive, the demand for a product is greater than that generated by its price. Consumers therefore have a relative preference for that product, and that reflects high quality. Conversely, if the observed market share is smaller than the share implied by the price, that reflects mediocre quality. This approach underlies the quality measures proposed by Khandelwal (2010), for example.

Di Comite *et al.* (2014) introduce an additional refinement in Khandelwal's approach by taking account of local differences in demand, reflecting consumer tastes, as differences between the market shares of a product sold at the same price in two countries will reflect the fact that consumers may have different tastes. For example, if consumers in country A like chocolate while consumers in country B do not, then – if the price is the same – demand for brand X chocolate will be higher on market A than on market B, even though the product quality is the same. By comparing changes in market shares in a number of countries as a function of export prices, Di Comite *et al.* (2014) propose a method which can be used to construct a quality indicator adjusted for differences in consumer tastes.

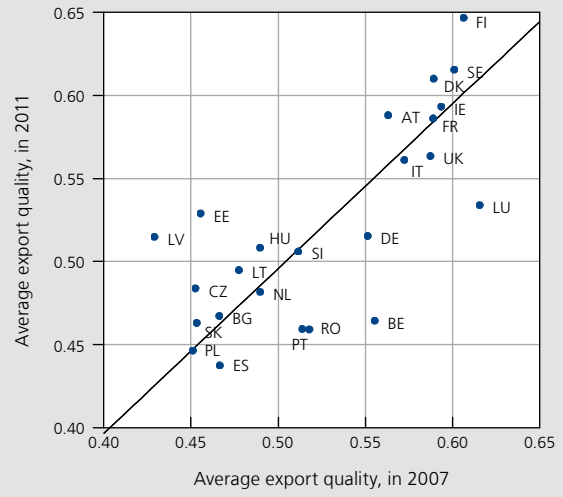
On the basis of that methodology, Vandenbussche (2014) assessed the position of the various European countries on a product quality scale. Her research concludes that Belgian producers, like producers from "old" Europe, tend to make products of intermediate quality while East-European and emerging countries specialise in low-quality segments, and the Nordic countries and Japan occupy the top-quality segments. Since the crisis, the average quality of the products of Belgian exporters – according to the author – has declined compared to other EU Member States, which could indicate a deterioration in the non-cost competitiveness of Belgian exporters. This decline in the relative quality of the products affects most of the advanced economies, but seems to be particularly marked in Belgium.

4.2 Managerial quality

Apart from product quality, one determinant of a firm's non-cost competitiveness is the quality of its management. CompNet has likewise addressed this component of competitiveness. For example, a microeconomic study by Mion and Opromella (2015) concerning Portugal shows that the past experience gained by managers in an export firm can prove beneficial for their new company, especially if the export market in question is of interest to that company, because the costs entailed in market entry and the expansion of market shares are specific to each destination. Firms have to adapt their marketing strategy and their product to each market according to the preferences of local consumers, specific regulations, etc. Knowledge of points specific to each market and the development of distribution channels and personal relationships are therefore a valuable advantage. The study shows that the manager's specific experience increases the probability that the firm begins exporting to that market and continues to do so, and that it has a positive impact on the amounts exported for companies which were already active in that market before the arrival of the experienced manager.

Another study by Berman *et al.* (2015) confirms that experience gained on an export market is a key to successful entry into that market. Exports to a new market are not in fact always successful. Many firms give up after just a few years. Firms which persist in their export business achieve strong growth on these markets, especially if they are young. This study's empirical findings highlight the importance of learning the characteristics of demand on a specific market during the initial years, because that enables firms to maintain and develop their position on those markets.

CHART 5 SHIFTS IN THE QUALITY RANKINGS DURING THE CRISIS[1]



Source: Vandenbussche (2014).

(1) The countries above the 45° line moved up the quality rankings between 2007 and 2011 while countries below the 45° line moved down the quality rankings between 2007 and 2011.

5. Dynamics of firms and resource allocation

5.1 Role of firms' dynamics and age in aggregate productivity

Of course, a country or sector's productivity, and hence its competitiveness, are not static concepts. They can be increased, e.g. by boosting the efficiency of existing firms (via technical progress, for instance). Two other ways of improving aggregate productivity are noteworthy. The first relates to the creation and destruction of firms: productivity increases if new firms are more productive than the ones going out of business. The second concerns the reallocation of resources between firms: aggregate productivity increases if the market share of the most productive firms expands while that of the least productive firms shrinks, in other words if the resources (be it in terms of jobs, capital or finance) are reallocated from the least productive to the most productive firms.

In this connection, as table 1 shows, the microeconomic study by Verschelde *et al.* (2014), covering seven European countries, indicates that in Belgium as in some neighbouring countries – Germany, France and the

TABLE 1 AVERAGE CONTRIBUTION BY FIRMS TO SECTORAL EFFICIENCY GROWTH IN MANUFACTURING

	Belgium	Germany	France	Italy	Espagne	Finland
	Average contribution by firm type (in percentage points)					
Active for more than ten years	0.60	1.14	1.22	0.91	0.68	0.76
Active for six to ten years	3.67	1.17	0.79	0.81	–10.40	0.77
Active for up to five years	–3.24	0.94	1.77	1.22	–1.31	–1.22
New firms	–0.04	–0.03	0.09	0.05	0.02	0.09
Firms ceasing their activity	0.00	0.01	0.02	0.01	0.02	0.04
	Proportion of firms (in % of firms staying in business)					
Active for up to five years	4	13	8	10	8	11
Active for six to ten years	8	14	11	13	16	13

Sources: Verschelde *et al.* (2014) and own calculations.

United Kingdom – the increase in firms' efficiency is the factor that does most to enhance the overall efficiency of the manufacturing sector. The impact of reallocation between firms and net company creations is smaller, and may be positive or negative.

Finally, their results suggest that young firms make a considerable contribution towards the increased efficiency of their sector of activity, as – on average – newly established firms have an efficiency deficit on entering the market. However, their efficiency increases over time and may even exceed that of firms in place for more than ten years. In particular, in Belgium, firms which have been operating for between six and ten years are about 10 % more efficient than those which have been in existence for more than ten years.

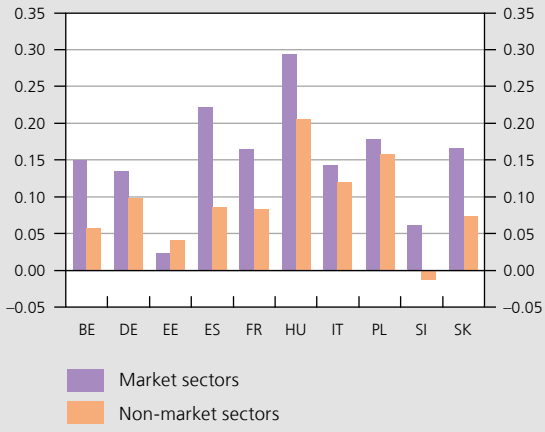
This finding is consistent with the analysis by Berman *et al.* (2015). Their microeconomic results for France show that young firms which manage to stay in business for several years after entering the market record high growth rates, and account for more than half of the exports after ten years.

However, the proportion of young firms (active for less than ten years) is relatively low in Belgium (12 %) compared to neighbouring countries (27 % in Germany).

5.2 Efficiency of resource allocation

As illustrated above, markets are constantly changing and the reallocation of resources between firms – if resources move to the most productive firms – can be a factor contributing to the growth of productivity. Conversely, it may have a negative impact on aggregate productivity if the resources are diverted to the least productive firms. In general, a poor allocation of resources between firms is sub-optimal. Obstacles to reallocation between firms therefore lead to low productivity and reduce the ability of economies to respond to a major economic shock.

CHART 6 RESOURCES ALLOCATION AND EFFICIENCY IN THE MARKET AND NON-MARKET SECTORS (1)



Source: CompNet database.

(1) Data calculated on the basis of samples of firms with 20 or more employees for the period 2003-2007. If the indicator has a positive value, that shows that productive resources are transferred from less productive firms to the most productive firms, and that the resources are being reallocated in the optimum way.

Beginning with the idea that, in theory, given equilibrium in a frictionless market, the allocation of resources is optimal, the signs of a poor allocation of resources are generally associated with the existence of market imperfections (concerning labour, products or financing). It should also be said that the restoration of equilibrium is not instantaneous.

CompNet has focused on an indicator of the sectoral allocation efficiency derived from the decomposition proposed by Olley and Pakes (1996). The average productivity of a sector, y_{st}, is the sum of each individual firm productivity, ω_{it}, weighted by the firm's size, θ_{it}. Olley and Pakes break down this sum into two components. The first is the unweighted average of the productivities of all firms in a sector, $\overline{\omega}_{st}$. The second is the sum of the productivity gaps with respect to the sector average, $\omega_{it}-\overline{\omega}_{st}$, weighted by the firm's size relative to the average size for the sector, $\theta_{it}-\theta_{st}$. This last term, called the OP gap, measures allocation efficiency. It makes a positive contribution to the sector's average productivity if the firms which are more (less) productive than the average are larger (smaller). Conversely, if the least productive firms are larger than the average for the sector, the contribution of this term is negative.

$$y_{st}=\sum_{i\in s}\theta_{it}\omega_{it}=\overline{\omega}_{st}+\sum_{i\in s}(\theta_{it}-\overline{\theta}_{st})(\omega_{it}-\overline{\omega}_{st}) \qquad (3)$$

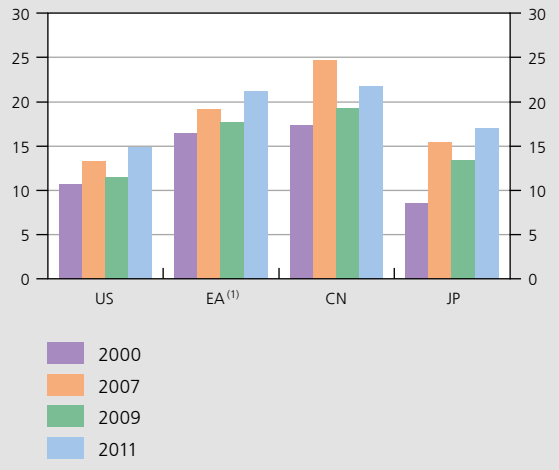
By way of illustration, the above chart shows the OP gaps for the market and non-market sectors. It is evident that allocation efficiency is similar in Belgium and Germany. Except in Estonia, it is systematically greater in sectors subject to competition.

6. Global value chains and the inter-firm network

In recent decades, declining transport and communication costs, technological progress and the lowering of political and economic barriers have led to growth of international trade and foreign direct investment. In a general movement away from compartmentalisation of production chains, firms have made greater use of inputs from other companies, sometimes located in other countries. In the past, the lack of statistics prevented any numerical analysis of this phenomenon, but the creation and recent dissemination of global input-output tables (in particular ICIO tables (OECD) and WIOD) have now rectified that.

Amador *et al.* (2015b) illustrated the fragmentation via the increase in foreign components contained in exports, both in the euro area and in the other main regions of the world[1]. A worrying question underlying these global

CHART 7 FOREIGN VALUE ADDED CONTENT OF EXPORTS (IN % OF EXPORT VALUE)



Source: Amador *et al.* (2015b).

(1) Here the euro area is defined as an entity in itself, i.e. flows within the euro area are disregarded.

trends concerns the repercussions on employment. In an increasingly global context, Timmer *et al.* (2013) show that the fragmentation of production is associated with a decline in industrial jobs in the advanced countries. However, that tendency is counterbalanced by expansion of employment in market services. Moreover, fragmentation seems to reinforce the comparative advantages, not by type of industry but by type of activity. Thus, European countries specialise in production segments requiring more skilled labour.

As pointed out by Richard Baldwin in his address at the CompNet conference, the globalisation of our economies has altered the nature of international trade. The emergence and growth of global production chains requires us to rethink how we measure competitiveness. For example, our reading of trade balances is modified by switching from the concept of trade in goods and services to the concept of traded value added, as one country's trade surplus with another country may be influenced by the composition of its export basket. If the latter contains many imported inputs, that naturally inflates the trade surplus. According to Nagengast and Stehrer (2015), the United States' trade deficit with China in 2011 shrinks by 17 % if it is calculated on the basis of trade in value added, whereas it increases by 39 % in relation to Japan. In addition, the imbalances within the euro area are smaller if they are assessed in terms of trade in value added.

(1) See Duprez (2014) for an analysis of Belgian exports.

Bilateral trade balances calculated from the point of view of trade in value added can shed new light on economic policy in two ways : by placing in perspective the finding concerning trade imbalances between euro area Member States, and by reappraisal of the impact of economic policies.

The crisis in fact revealed that the persistence of a trade deficit and a negative net external position may have unwelcome consequences in the event of serious financial shocks. The temptation to resort to protectionism by targeting the geographical origin of trade deficits with the aid of flows of goods and services may therefore prove dangerous. Not only are protectionist policies highly risky on account of the close direct links between economies, as testified by the many debates on the subject in the WTO, but in addition, insofar as a proportion of trade also comprises indirect trade between countries, a protectionist policy in one country could have repercussions on the production process in numerous countries by blocking the global production chain.

The fragmentation of production chains may explain why import growth has greatly exceeded the growth of GDP in the past three decades. Thus, Al-Haschimi *et al.* (2015) showed that the ratio between import growth and GDP growth averaged 2 between 1981 and 2007. However, that ratio fell sharply during 2011-2013, which could suggest that the fragmentation of production chains has come to a halt.

The analysis from the point of view of the globalised production process also helps to explain the scale of the decline in trade during the economic crisis. Altomonte *et al.* (2012) thus highlight the "bullwhip effect", which suggests that the adjustment of stocks at the various production stages magnifies an initial demand shock. Nagengast and Stehrer (2015) state that during the economic crisis the share of inputs from domestic suppliers increased to the detriment of foreign suppliers, causing a disproportionate slowdown in international trade.

Use of firm data likewise provides lessons which can improve our understanding of global value chains. By refining the traditional gravity model, Altomonte *et al.* (2015) thus showed that exports (and each value added contribution, be it domestic or foreign) between two branches of activity in two countries are higher if the same multinational is established in both countries. On the basis of the Belgian data, Dhyne *et al.* (2015) also created a database reconstructing the inter-firm network for Belgium between 2002 and 2012. According to their findings, 82 % of Belgian firms are involved directly or indirectly in the production of goods and services destined for export, while only 5 % of firms are direct exporters.

Conclusion

One of CompNet's primary contributions is the development of two new tools for diagnosing competitiveness, namely the diagnostic toolkit on competitiveness and the CompNet database. The statistical information that they contain permits a better understanding of the essentially multi-faceted concept of competitiveness. While competing on price may certainly prove to be a vital strategy for withstanding international competition, particularly for certain (low-value or less differentiated) products, alternative strategies based on quality enhancement also play a considerable role (e.g. in the case of niche products). Moreover, it is worth pointing out that price competitiveness depends not only on labour costs but also on the costs of intermediate products, and that for a given cost level, firms can make a difference by improving their productivity. This therefore implies that boosting the competitiveness of a country or firm requires a multi-pronged approach using various instruments and measures. The competitiveness of the European economies must be based not only on wage-setting but also on non-cost factors. There is quite substantial scope for action since non-cost competitiveness concerns both innovation and the quality of goods and services, organisational, managerial and technological capability, the ability to absorb new technologies (which depends, for example, on workforce adaptability), and cumulative experience gained on export markets.

One advantage of the tools developed by CompNet is that they permit an international comparison of each country's performance via a range of competitiveness indicators. An economy's competitiveness is in fact measured in relation to that of its existing or potential competitors. Such an exercise requires the availability of information on other countries or firms which can be used to assess competitiveness. In this connection, the diagnostic toolkit is a single point of access to a series of macroeconomic and transnational statistics relevant for ranking a country in relation to its competitors. These aggregate data are supplemented by the CompNet database which, via the calculation of new indicators based on microeconomic data, permits international comparison of firms' individual performance. In particular, the database comprises the distribution characteristics of a set of variables, such as productivity or unit labour costs, in order to position a firm in relation to a destination market.

Among the many variables analysed in the CompNet database, the shape of the distribution of apparent labour productivity or total factor productivity is a key determinant of a country's competitiveness. On the basis of these

distributions, an improvement in a country's competitiveness does not only entail boosting the average level of productivity, even though that parameter is still important, but also concerns the capacity to increase the mass of firms to the right of the distribution average, because only the best-performing firms can afford to pay the price of entering the global markets and survive there in the long term.

One of the current macroeconomic issues concerns the correction of macroeconomic imbalances. In this connection, the research conducted by CompNet and that done elsewhere indicates that the use of traditional instruments such as exchange rates will not be sufficient on its own to eliminate the imbalances. In fact, this research has shown that exports are not very sensitive to exchange rate fluctuations, partly because exports are concentrated on a relatively small number of firms whose characteristics (size, productivity, involvement in importing as well) reduce their exports' sensitivity to changes in relative prices. It would therefore take very large changes in exchange rates to restore total equilibrium in the trade balances by means of the exchange rate instrument alone. For that reason, it is necessary to rethink other economic policy measures to solve this problem, notably by influencing the extensive margin of export growth (e.g. by encouraging new firms more responsive to changes in relative prices to enter foreign markets).

In order to increase the percentage of export firms in the total population, it is therefore appropriate to conduct structural policies which can either boost the firms' productivity (policies on innovation, training, etc.), or influence the non-cost components of productivity. It is likewise necessary to pursue policies aimed at improving the allocation of productive resources in favour of the most efficient firms.

Finally, via recourse to the databases now available (notably WIOD), CompNet has also contributed to the recent research on value chains. Since the imported content of exports may be significant, we now know that the use of export data on goods and services may be the wrong way to diagnose external competitiveness. By taking account of the globalisation of production processes, the concept of exported value added permits a more relevant measure of a country's competitiveness, in particular because that makes more sense when it comes to determining the impact on employment. More generally, value chain analysis sheds new light on the organisation of production chains. That permits a better understanding of how shocks spread from one economy to another. It likewise provides a better description of the background to any economic policy measures, such as import barriers or the adjustment of the trade balance.

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Results of the third wave of the survey on wage-setting in Belgium

D. Cornille (*)

Introduction

During the course of 2014 and 2015, twenty-five countries of the European Union took part in a harmonised survey of European firms' wage- (and price-) setting practices, within the framework of the Wage Dynamics Network (WDN), a European System of Central Banks (ESCB) research network that studies the characteristics of wage dynamics.

The survey focuses on the period 2010-2013 and includes questions on firms' perception of the nature of the changes in the economic environment that have resulted from the sovereign debt crisis, their reactions to these changes and the role of financial constraints. Two surveys had alrerady been carried out previously, respectively in 2007 and 2009. The first one, back in 2007, covered 17 countries and sought to gain a better understanding of how firms adjust wages and the volume of labour, and also of the interactions with price-setting. In 2009, a sub-group of ten countries carried out a more concise supplementary survey to get a better idea of companies' reactions in terms of wages and employment in the context of the great recession.

The survey that this article concentrates on seeks to update the analysis of firms' behaviour by assessing the impact of the latest economic and financial crisis, and in particular the influence of the reforms implemented. Even though that was not so much the case in Belgium, the period 2010-2013 was marked in many countries by reforms that deeply affected the functioning of the labour market. The comparative analysis of the survey results in the different countries is currently underway: it should shortly be available in the form of an ECB Occasional Paper. In the meantime, various national reports are expected to be published. This article contributes to this process. It presents the main results for Belgium of the 2014 survey (1).

Various more specific research projects using the survey data are underway in different countries. Their findings will be released in separate publications.

As had already been the case for previous editions, one of the survey's plus points is the harmonisation of the questionnaire compiled jointly through consultations between the 25 countries involved in the WDN. The network has nevertheless allowed for the inclusion or exclusion of some of the optional questions or, if necessary, certain specific questions, as the case may be. All but four of the optional questions have been incorporated into the Belgian questionnaire, with a view to reducing the length of the survey and, therefore, the risk of non-response which is usually commensurate with this kind of questionnaire. One of the difficulties encountered when the survey was being compiled was to select a common reference period for all countries. In fact, the periods of economic tension did not necessarily coincide from one country to another. It was therefore decided not to make any explicit link between the period selected, i.e. 2010-2013, and the term 'crisis'. For this reason, some countries extended the questionnaire by splitting up certain questions for different periods. This enabled those who did not take part in

(*) The author would like to thank the 1 000 or so Belgian firms that took part in the survey as well as the Business and Consumer Surveys Division of the Bank's General Statistics Department for conducting the survey itself.

(1) A preliminary draft version of this article was compiled with a view to publication of the results per country on the ECB's website. For an analysis of the findings of previous surveys, see Druant, Du Caju and Delhez (2008) or de Walque, Druant, Du Caju and Fuss (2010). For more information, see. http://www.nbb.be/wdn.

previous editions of the survey to supplement the results for earlier periods.

The questionnaire for Belgium, which can be consulted on the Bank's website[1], is split into four parts, as well as the general information describing the branch of activity and type of company. The first part broaches the changes that occurred in the economic environment during the course of the 2010-2013 period, by identifying the type and intensity of the shocks that might have affected companies. The second part deals with the structure and adaptation of labour forces in the companies questioned, while the third is devoted to wage adjustment. And finally, the fourth part, which participating countries could choose whether or not to add to the survey questionnaire, takes a look at price-setting and price adjustments.

The questionnaire comprises 35 questions of three different types. First of all, in just a few cases, companies had to fill in some figures. Then, certain questions required one or more options to be selected. Lastly, participants were asked to specify the intensity, degree of relevance or difficulty, or the relative importance of a particular statement. In the last two cases, the breakdown of the replies given below does even not take into consideration either the non-responses or any of the "Don't know" options.

The presentation of the survey findings comprises five parts. The first part deals with the production of the survey. The second gives an outline, from a macroeconomic point of view, of the general context of the labour market in Belgium during the survey reference period. The third part analyses in more detail how companies reacted and adjusted wages. The fourth section examines the question of price changes, while the fifth and final one summarises the main results.

1. The survey

The Belgian survey covers firms employing at least five workers in the manufacturing and building industries, trade, business services and the financial sector. The sectors covered by the survey together account for 52 % of employment in Belgian firms (excluding self-employed). The survey was conducted by the National Bank of Belgium in June and September 2014 after a trial phase with ten or so firms that helped to make the presentation of the questionnaire clearer. The questionnaire was sent out by surface mail, with the option of using an electronic format version.

(1) See www.nbb.be/en/wage-dynamics-network-wdn-3.

The final questionnaire was sent out to a total of 4 641 companies. The sample was partly based on the group of companies that responded to the previous WDN survey in 2007, which are to a large extent also companies included in the sample used for the Bank's monthly business survey of manufacturing industry, construction, trade and business services. The sample was then extended to include the energy sector and financial institutions in a bid to widen representativeness for the other sectors. Firms with fewer than five employees were omitted from the sample.

In total, 991 firms participated in the survey, giving a response rate of 21 %. Given the length of the questionnaire, this can be considered as satisfactory, even though it is lower than in the previous waves (which had a shorter questionnaire). Each firm taking part in the survey will be sent a summary of the results based on the responses for its sector. The sample was composed in such a way that large firms are over-represented. While the participating firms make up 1.7 % of the total number of firms, they account for 5.4 % of total employment. Unfortunately, the response rate for the energy sector was zero, while it was relatively high for the financial sector. However, interpretations of the results for the financial sector have to take into account the low number of participating firms. A detailed table describing the sample is provided below.

In terms of response behaviour by questions, the response rate is on average higher than 95 % and varies between 100 % and 83 % for the question on the coverage of collective pay agreements.

The answers are in general consistent with information from other sources. But there is one exception for the questions on the collective wage bargaining process – which are also among the questions with the lowest response rates. For example, only about 50 % of the firms indicated that a collective agreement signed outside the firm was in effect, whereas the expected figure should be above 90 % given the centralised component of the wage bargaining system in Belgium. One explanation for this inconsistency could be that in the periods 2011-2012 and 2013-2014 (as well as 2015-2016) the draft interprofessional agreements, which have not been approved by all social partners, have been enforced by the federal government. Companies surveyed may have considered this as a sign that there was no formal "agreement" even though a wage policy with all the features of an agreement was in force.

The survey results have had to be weighted in order to make them representative enough of the whole population of firms. To this end, the population has been sub-divided into strata according to sector of activity and number of

TABLE 1 SAMPLE

(4 641 firms contacted, 991 participated[1]: response rate 21 %)

	Population (more than 5 employees)		Participants (more than 5 employees		Representativeness (percentages)		Sample	
	Number of firms[2]	Employment[3]	Number of firms	Employment	Number of firms	Employment	Number of firms	Response Rate (%)
Total	**58 448**	**1 977 590**	**991**	**106 920**	**1.7**	**5.4**	**4 641**	**21.4**
Manufacturing industry	9 159	472 626	416	47 318	4.5	10.0	1 929	21.6
Energy	47	17 798	0	0	0.0	0.0	25	0.0
Construction	8 556	171 905	206	11 853	2.4	6.9	765	26.9
Trade	16 344	422 127	113	9 831	0.7	2.3	668	16.9
Business services	22 777	784 198	243	36 121	1.1	4.6	1 210	20.1
Financial institutions	1 565	108 936	13	1 797	0.8	1.6	44	29.5
From 5 to 19 employees	42 630	360 787	250	2 724	0.6	0.8		
From 20 to 49 employees	10 322	298 098	243	7 941	2.4	2.7		
From 50 to 199 employees	4 262	361 610	407	38 517	9.5	10.7		
200 employees or more	1 234	957 095	91	57 738	7.4	6.0		

Sources: DGS, NBB.
(1) Excluding firms with less than 5 employees, and firms with no NACE code.
(2) Firms active in Belgium in 2012, source: DGS.
(3) Firms submitting declarations to the NSSO and belonging to the sectors covered by the survey (in 2013Q1).

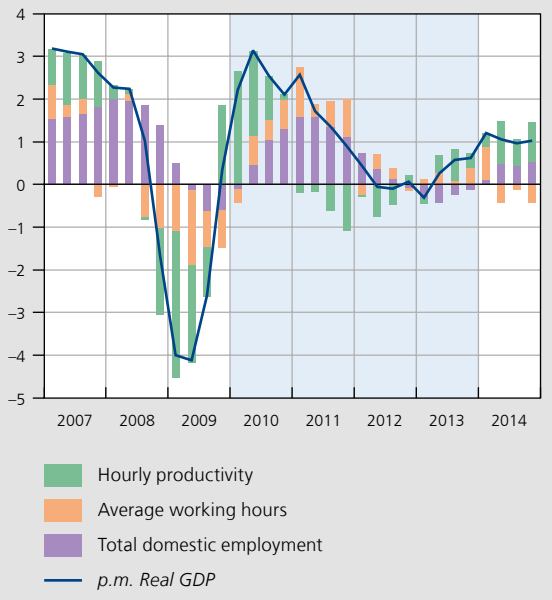
workers. The weighting coefficients have been calculated as the ratio of the population of firms within each stratum and the number of firms that replied to the survey questionnaire in each stratum. Unless otherwise mentioned, the results given in this article are weighted in this way, and missing replies are left out. This is the option initially selected by the WDN for publication of the national reports.

2. Economic context

The economic environment and labour market developments over the period 2010-2013 were still partly characterised by the repercussions of the financial and economic crisis that erupted in 2008. In Belgium, it resulted in a drop in domestic employment – and an increase in unemployment – which was initially of relatively limited scope compared with neighbouring countries such as France, the Netherlands and also with the EU average. This small drop in employment was combined with a sharp decline in hourly productivity and average working hours. The preservation of Belgian employment can be explained by various flexibility mechanisms. The system of temporary lay-offs played an important role, especially since it was extended at the beginning of the crisis to allow employers to adapt their workforces more easily to the drop in

CHART 1 EMPLOYMENT, WORKING TIME AND PRODUCTIVITY

(contribution to annual growth of GDP, percentage points, data adjusted for calendar effects)

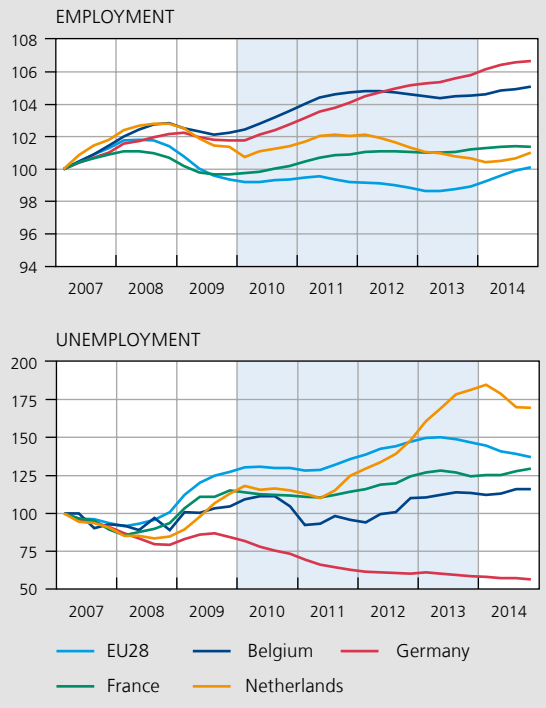


Source: NAI.

their activity, and thus avoid lay-offs. This option has been widely used, especially in the manufacturing industry, partly because at that time the crisis was seen as temporary and the financial situation of Belgian firms was quite sound. At the same time, domestic employment was also supported by intensive creation of subsidised jobs (notably under the service voucher system). The persistence of the crisis in 2012 and 2013 nevertheless led to a sharp decline in employment in 2013, except in the business services sector. The decline was largest in industry, even though in that sector the effect was smaller than in 2009. The deterioration in employment can broadly be explained by different factors. First, after having intensively used temporary lay-offs during the initial phase of the crisis, companies, facing deteriorating prospects and financial positions due to persistently stagnating economic activity, eventually had to reduce their workforces. Furthermore, the temporary lay-off system was adjusted to prevent misuse. Finally, subsidised job creation was more moderate than in 2008. In 2014, the labour market benefited from the fragile recovery that had started in 2013. Heightened economic activity led first to improved productivity, as is often the case in such a situation. The state of the labour market, in turn, picked up quickly and this was reflected in a rise in domestic employment in 2014.

CHART 2 EMPLOYMENT AND UNEMPLOYMENT

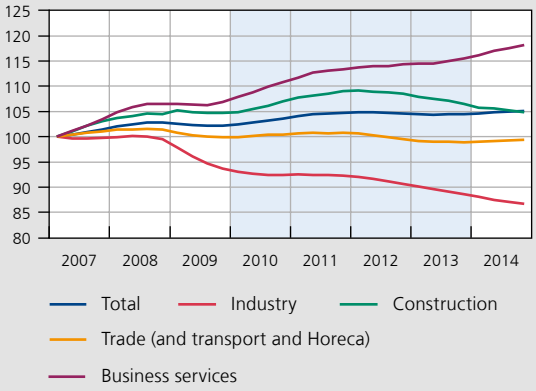
(data adjusted for seasonal effects, indices 2007 Q1 = 100)



Source: EC.

CHART 3 EMPLOYMENT ACCORDING TO THE SECTOR OF ACTIVITY

(data adjusted for seasonal effects, indices 2007 Q1 = 100)



Source: EC.

The wage moderation policy – involving constraints on conventional wage increases – that began in 2009 also contributed to enhancing the resilience of the economy. It helped firms to preserve their competitiveness by limiting cost increases, and ultimately contributed to the subsequent recovery. At the national level, the wage bargaining system in Belgium has wide coverage, but has recently been undermined by the difficulty in reaching agreements (see Box on wage formation). Its hierarchical structure also limits the adjustment capacity of firms in terms of wage policy, a feature that is well mirrored in the answers to the survey.

Otherwise, there has not been any radical reform of the labour market during the period under review. A good many of the measures taken were only of a temporary nature. However, changes has been recorded in many areas, such as more degressivity of unemployment benefits, the limitation of early exit from the labour market, increase in the retirement age and, albeit implemented in 2014, the harmonisation of blue- and white-collar status.

The macroeconomic environment over the period 2010-2013 is largely reflected in the answers given to the WDN survey. All in all, compared with other countries, Belgium has been characterised by relative stability, even though firms have been affected by the crisis to different extents depending on their characteristics. The WDN survey constitutes a unique opportunity to gain a better understanding of how firms were affected and how they reacted.

Box 1 – Wage formation in the private sector in Belgium

Private sector wage rises result from negotiations held successively at three levels: national, sector and firm level. These negotiations take place every two years within a characteristic institutional framework with an overall guaranteed minimum wage, with automatic indexation of employees' gross wages to a so-called "health index" [1] of consumer prices, as well as a wage norm (indicative or maximum, depending on the period) set at national level, according to the Law of July 1996 on the Promotion of Employment and the Preventive Safeguarding of Competitiveness.

At the national level, the wage norm constitutes a margin for the growth of nominal hourly labour costs in Belgian enterprises, taking into account expected nominal labour cost trends in the three main neighbouring countries (Germany, France and the Netherlands). In the absence of any agreement between social partners, the government can set the wage norm unilaterally, as has been the case since 2011.

In response to the crisis, no nominal wage norm was agreed for the two-year period 2009-2010. Pay increases, other than indexation and wage-scale adjustments, were set as one-off fixed amounts, which could not exceed € 125 in 2009 and € 250 in 2010. For 2011-2012, the wage agreement (which was enforced by the government) again allowed for a percentage hourly wage increase (0.3 % in 2012) on top of indexation and pay-scale adjustments, but the term "wage norm" was no longer used [2]. For 2013-2014 and more recently for 2015-2016, the wage bargaining agreement was again enforced by the government. For 2013-2014, it did not allow for any increase in hourly employee compensation except for indexation and pay-scale agreements in order to help close Belgium's wage handicap with respect to the three main neighbouring countries.

At the individual sector level, real wage increases are negotiated in the joint committees [3] organised per sector of economic activity (the number of joint committees exceeding 100), at the beginning of odd years, and with an agreement concluded in principle in the first half of the year. The outcome of these sector-specific negotiations cannot undershoot the legally determined guaranteed minimum wage. However, it can possibly be supplemented within agreements concluded at the firm level. Although such firm-level agreements have gained in importance, Belgium is traditionally regarded as a country where wages are predominantly determined at the intermediate (sector) level, as opposed to countries with more centralised or decentralised wage formation.

(1) National consumer price index, excluding products considered to be a health hazard (hence the name): alcohol, tobacco, petrol and diesel.
(2) This implies that the all-in clauses became irrelevant because they are based on the surpassing of the nominal wage norm.
(3) They are called joint committees ('comités paritaires'), because employers and employees share an equal representation in them.

3. Firms' reactions and wage adjustments

Different types of shocks

This section sets out how firms qualify the sources and size of shocks that affected them during the period 2010-2013. That period has been chosen so as to include the sovereign debt crisis, even though it is not explicitly mentioned in the survey. In Belgium, this period was not marked by very large employment effects, except in the manufacturing sector.

When asked how five different factors linked to prevailing economic conditions affected their business activity, firms indicated that "customers' ability to pay" and "level of demand" had the strongest negative effect on their activity in the period 2010-2013. This was particularly the case for firms from the manufacturing sector. "Volatility/uncertainty of demand" was also mentioned as a negative factor, but a larger share of firms indicated no effects or positive effects. This was also the case for "access to external financing" and "availability of supplies", even though the share of firms experiencing a positive impact was much lower, with the vast majority reporting no effects at all. Interestingly, the larger the company's size (in terms of number of employees), the smaller the perceived negative effect of "access to external financing", confirming the assumption that smaller firms are more sensitive to credit constraints.

TABLE 2 ECONOMIC CONDITIONS AND EFFECTS ON FIRM ACTIVITY IN THE PERIOD 2010-2013

(in %)

	Type of effects[1], share of firms reporting			Degree of persistence, share of firms reporting		
	Negative effects	No effects	Positive effects	Transitory effects	Only partly persistent effects	Long-lasting effects
Level of demand	51	20	28	19	39	41
Volatility / Uncertainty of demand	35	42	23	22	42	35
Access to external financing	24	67	10	36	38	27
Customers' ability to pay	51	41	8	23	41	36
Availability of supplies	22	74	4	36	37	27

Source: NBB.

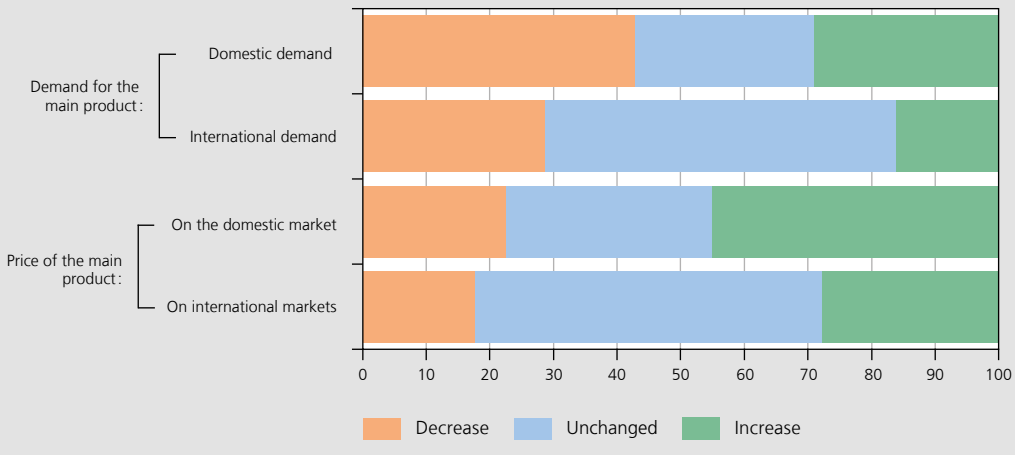
(1) Negative effects are defined as the sum of strong decrease and moderate decrease. Positive effects are defined as the sum of moderate increase and strong increase.

As for the temporary or persistent character of the shocks affecting the five different factors linked to prevailing economic conditions, most answers tended to suggest transitory or only partially persistent shocks. However, the factors generating the most negative effects were also those where the impact seemed the most long-lasting, namely "customers' ability to pay" and "level of demand", and again this was more marked in the manufacturing industry. A further, complementary analysis shows that negative effects are considered as less transitory and more persistent, and that this is even more so in the manufacturing sector.

Firms were also asked to assess price and demand trends for their main product in the period 2010-2013, and that assessment tended to differ according to the market considered. On the domestic market, a large share of firms suffered a fall in demand, but a large proportion also recorded price increases. On their foreign markets, however, demand and prices remained more often unchanged (for 6 out of 10 firms). When considering only firms that needed to adapt their labour costs during the crisis, a majority experienced a drop in demand, irrespective of the market, and more price changes (more price cuts on both markets, but also more price rises on foreign markets).

CHART 4 PRICE AND DEMAND TRENDS IN THE PERIOD 2010-2013

(in %)



Source: NBB.

TABLE 3 TREND IN TOTAL COSTS AND THEIR COMPONENTS IN THE PERIOD 2010-2013

(in %)

	Share of firms reporting		
	Decreasing	Unchanged	Increasing
Total costs	**11**	**14**	**75**
Labour costs	8	14	78
Financing costs	21	50	30
Cost of supplies	6	53	41
Other costs	5	52	43

Source: NBB.

How did firms react?

Over the period from 2010 to 2013, most companies recorded rising costs, which is generally explained by an increase in labour costs. This is the case regardless of the firms' size, although the proportion of firms mentioning a rise in their labour costs increases with size. In order of importance, other costs and supply costs also played a role. A rise in borrowing costs was also reported by 30 % of firms, but it is interesting to note that more than 20 % said their funding costs had come down. There is not much variation in replies to this question from one sector to another, except in industry, which more often mentions a rise in the cost of supplies and other costs.

By combining the replies received about movements in costs with those concerning shocks that firms have been affected by, it is possible to make assumptions about the strategies that they have used to cope with these times of crisis.

Based on this indirect approach, it transpires that, between 2010 and 2013, there were more firms whose business activity had been negatively influenced by one of the factors suggested in the questionnaire that recorded changes in their total costs. This is particularly the case for those that were hit badly by the level of demand for their product or by their customers' inability to meet contractual terms. Compared with firms that were less affected, this was generally reflected in less upward pressure on total costs, except in cases where the problem was the customer's inability to pay. In other terms, companies hit by the crisis more often than not had to resort to a

TABLE 4 ADJUSTMENT OF TOTAL COSTS AND LABOUR COSTS, ACCORDING TO THE TYPE OF SHOCK CONFRONTING FIRMS

(in %)

	According to the main types of shock: Firms affected negatively by the following factors:							
	Level of demand		Customers' ability to pay		Volatility / uncertainty of demand		Access to external financing	
	Yes [1]	No [1]	Yes [1]	No [1]	Yes [1]	No [1]	Yes [1]	No [1]
All firms	51	49	51	49	35	65	24	76
Changes in costs (2010-2013)								
Total costs								
Unchanged	9	19	10	18	12	15	15	14
Balance of replies up [2]	55	72	64	62	53	69	60	64
Labour costs								
Unchanged	11	17	13	15	12	15	13	14
Balance of replies up [2]	64	76	69	71	67	72	67	71
Financing costs								
Unchanged	48	51	42	58	47	51	35	54
Balance of replies up [2]	15	3	19	–1	20	3	32	2

Source: NBB.

(1) The Yes column gives the results for firms whose business activity has been negatively affected by the corresponding factor and the No column gives the results for those that have not been adversely affected.

(2) The balance of replies up is calculated as being the difference between the share of firms for which an increase (moderate or sharp) has been recorded and the share of firms for which a decrease (moderate or sharp) has been registered.

cost-cutting policy. This downward pressure on costs mainly concerned labour costs. But in all cases, firms that were badly affected by the crisis, for whatever factor mentioned, generally tended to record more increases than decreases in their financing costs. This is all the more true for firms confronted with a problem of access to external financing. Analysis of data taken from the Central Balance Sheet Office confirms that small firms whose risk profile deteriorated during the recession – those that are the most sensitive to the crisis – registered unfavourable developments in terms of loans granted.

The survey also helps to gain a better understanding of the components behind labour cost trends and, consequently, to decipher companies' responses in this area more accurately. These costs depend both on the volume of labour used as an input (number of employees, number of hours worked, etc.) and on the remuneration of the factor labour by the company. It turns out that (almost) no Belgian firms at all reported wage cuts during the period 2010-2013, a rather peculiar situation from an international perspective since wage reductions of varying degrees were recorded in all the other countries that took part in the survey. Although about 22 % of firms answered that they had kept base wages broadly unchanged in the period 2010-2013, the share of firms that explicitly mentioned having frozen wages in one of those four years is lower, at around 10 %. It was 5 % in 2010 and 2011, and rose to 9 % in 2013, essentially the same as during the 2009 crisis. The construction sector was slightly less likely to freeze or cut wages, whereas the opposite is true for trade. This was also the case in the first WDN survey in 2007, when 5 % of the firms questioned indicated that they had resorted to a wage freeze at least once during the 5 previous years (1 % did actually cut wages). Most firms do tend to avoid base wage cuts because of the belief that this would result in a reduction in morale or effort and the danger that the most productive workers would leave as a consequence. Another important factor, particularly relevant for Belgium, is the role of labour regulations and of collective bargaining agreements that limit the use of this option.

TABLE 5 FIRMS REPORTING WAGE CUTS OR WAGE FREEZES

(in %)

	Wage freezes	Wage cuts
At least once in the period 2010-2013	10.3	0.3
of which:		
in 2010	5.4	0.2
in 2011	4.8	0.0
in 2012	6.6	0.0
in 2013	9.1	0.3
p.m. During the period 2004-2008[1]	*5.1*	*1.0*
During the 2009 crisis[2]	*8.7*	*0.5*

Source: NBB.
(1) 2008 WDN1 survey.
(2) 2009 WDN2 survey.

Apart from base wages, firms can adapt the variable wage component. Only half of the firms questioned in the survey said they had not changed this component of remuneration. If a distinction is made between firms that were hit badly by the crisis and those that were not, we note paradoxically that base pay rises are more common in firms negatively affected by the crisis (with the exception of cases where that results from access to external finance), while, as far as the variable wage component is concerned, this is, on the contrary, not usually the case. More firms actually keep these benefits unchanged and, when they do adjust them, relatively fewer companies tend to increase them.

A majority of firms hit by a negative shock that are seeking to cut their costs, and more specifically their labour costs, are managing to do so for the variable wage component – an element over which they have more control – but not for base wages, which are more heavily dependent on institutional wage formation in Belgium. So, one may wonder whether the wage-setting is appropriate in these firms that are confronted with a greater need for adjustment. One hypothetical explanation for this kind of situation could be that, the worst affected firms would be more likely to reduce the less-skilled portion of the staff and only keep on the highly-skilled employees, who would then rise more quickly in the pay and promotion scales. The argument that firms are more likely to keep on senior employees who have been there much longer (and who are therefore relatively more costly, and more expensive to lay off) also tends to go against economic logic generally associated with firms undergoing restructuring. However, to assess the assumption of inadequate wage formation regulations for the firms in question, more extensive research will need to be done.

Inevitably, cutting wage costs in a situation where base wages are generally on an upward trend implies a reduction in the volume of labour, via cuts in permanent jobs, forms of temporary work, or in the number of hours worked. At an aggregate level, the proportion of companies recording respectively increases and decreases

TABLE 6 ADJUSTMENT OF LABOUR COSTS, ACCORDING TO THE TYPE OF SHOCK CONFRONTING FIRMS

(in %)

	According to the main types of shock: Firms affected negatively by the following factors:							
	Level of demand		Customers' ability to pay		Volatility / uncertainty of demand		Access to external financing	
	Yes[1]	No[1]	Yes[1]	No[1]	Yes[1]	No[1]	Yes[1]	No[1]
Changes in labour costs by component								
Base wages								
Unchanged	19	24	17	26	20	23	27	20
Balance of replies up[2]	79	75	81	73	78	77	70	79
Variable wage component (bonus, etc.)								
Unchanged	54	46	47	52	55	47	62	46
Balance of replies up[2]	42	53	49	45	40	51	34	51
Number of permanent employees								
Unchanged	42	43	44	40	49	39	46	41
Balance of replies up[2]	–32	32	–9	8	–26	13	–17	4
Number of temp agency workers								
Unchanged	72	80	74	78	77	75	70	78
Balance of replies up[2]	–3	10	1	6	–5	8	–9	7
Number of hours worked per person								
Unchanged	61	81	65	77	62	76	70	71
Balance of replies up[2]	–16	6	–10	0	–11	–2	–12	–3

Source: NBB.

(1) The Yes column gives the results for firms whose business activity has been negatively affected by the corresponding factor and the No column gives the results for those that have not been adversely affected.

(2) The balance of replies up is calculated as being the difference between the share of firms for which an increase (moderate or sharp) has been recorded and the share of firms for which a decrease (moderate or sharp) has been registered.

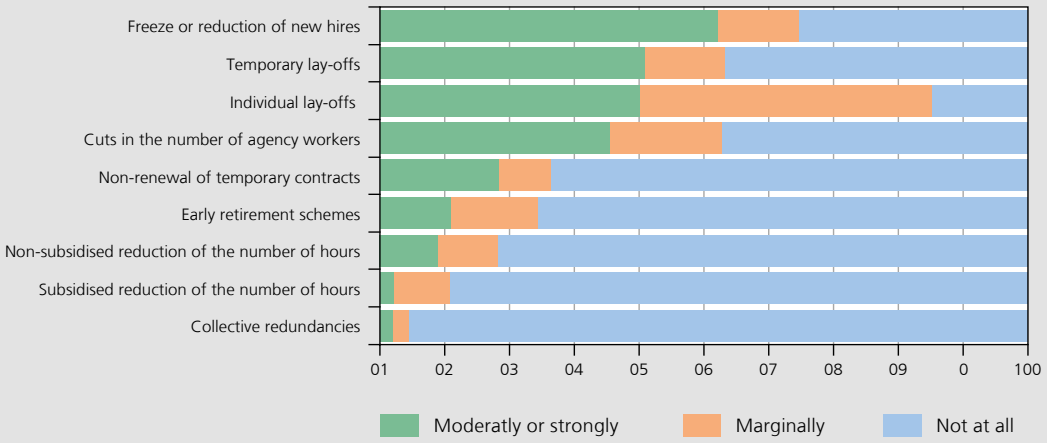
in permanent employment is identical, that is, roughly a quarter of all firms questioned in each case, with the others – more than 40 % – not reporting any change in their staff. This is quite consistent with the absence of any massive impact on employment at the macro-economic level (see above). However, firms that were badly affected by the crisis on average tend to show almost systematically more decreases than increases for the different components of the volume of labour, while this is hardly ever the case for the others. The relative decline in the number of permanent employees is significant, especially in the case of firms affected by a demand-level shock. This downward pressure is also exerted on the more flexible inputs (in terms of hours worked and temporary jobs), albeit to a lesser extent.

This indirect approximation of firms' reactions is confirmed by an analysis of more direct questions about their strategies, for example when they were asked whether they had to cut their wage costs over the period 2010-2013. Cross-matching their replies with answers to the questions about the shocks they have had to absorb reveals that those companies that needed to cut wage costs the most, i.e. almost one-third of the total, were more likely to have endured more substantial negative shocks in terms of level of demand, volatility of demand and access to financing. This also suggests that more attention should be paid to relationships between the various different types of shock in future research work, notably as far as external financing constraints are concerned. The degree of shock persistence is also higher for firms that have had to adapt their wage costs the most, with the notable exception of shocks with access to external financing, which generally seemed to be more short-lived.

To a large extent, these observations corroborate the conclusions drawn from the first wave of the survey in 2007, when firms had been questioned directly about their reactions to different hypothetical shocks. Here too, it was implied that cost-cutting efforts were mainly channelled through employment, especially in large

CHART 5 MEASURES TO REDUCE LABOUR INPUT USED BY FIRMS ANSWERING THAT THEY NEEDED TO SIGNIFICANTLY REDUCE OR ALTER THE COMPOSITION OF THEIR LABOUR INPUT DURING THE PERIOD 2010-2013 (i.e. 32 % OF THE TOTAL NUMBER OF FIRMS)

(in %)



Source : NBB.

enterprises, that is, by focusing on the number of permanent workers and, to a lesser extent, on temporary jobs.

Broken down by branch of activity, the findings confirm the "sector effect" observed at the macroeconomic level. In industry and, construction, just as in the trade sector, the results effectively show a large proportion of replies indicating a bigger drop in the number of permanent jobs, number of hours worked and, albeit to a smaller extent, the number of temporary and agency jobs.

For firms that declared having to reduce their labour input in volume terms, the most widely used measures to do so were the freezing or reduction of new hires, followed by the use of temporary lay-offs, notably in the manufacturing and the construction sectors. This last measure is generally regarded as a key feature of the relative resilience of employment in Belgium during the first phase of the crisis. Individual lay-offs and cuts in agency workers were also important tools for firms that needed to adapt their labour input. Non-renewal of temporary contracts upon expiry, reduction of working hours[(1)] and early retirement schemes were also used, although to a lesser extent. Collective redundancies were used only marginally in our sample.

(1) In Belgium, reductions in working hours generally refer to so-called time-credit schemes (that can be subsidised or not) or voluntary part-time work. They are not related to temporary lay-off measures. However, a specific "crisis time-credit" scheme (working time reduction of 1/2 or 1/5th) was temporarily introduced during the period 2009-2010 but concerned only 3 000 people.

By combining answers on whether firms had cut or frozen wages and answers on their need to reduce their labour input or alter its composition, it is possible to illustrate which combination was used the most often to reduce labour costs. About 40 % of firms used one of the two strategies, or the two together. The most widely used option was the reduction in labour input (31 %), while only 11 % applied a wage freeze for at least one year within the 2010-2013 period. The centralised nature of the wage-setting system in Belgium is probably a factor explaining the relatively infrequent use of wages as adjustment variables. Only a very small proportion of firms used the two strategies together (3 %).

TABLE 7 REDUCTION OF LABOUR COSTS: RELATIVE IMPORTANCE OF WAGES AND LABOUR INPUT

(in %)

	Reduction of labour input	No reduction of labour input	Total
Wages were frozen or cut	3	8	11
Wages were neither frozen nor cut	31	58	89
Total	34	66	100

Source: NBB.

TABLE 8 CHANGES IN COLLECTIVE WAGE AGREEMENTS

(in %, excluding never/not applicable)

	Total	Industry	Construction	Trade	Business services	Financial institutions
More than once a year	**9**	2	33	4	6	0
Once a year	**31**	34	18	36	33	13
Between one and two years	**15**	9	7	9	25	25
Every two year	**28**	39	24	23	25	50
Less frequently than once every two years	**18**	15	18	27	12	13

Source: NBB.

p.m. Never / Not applicable represents 51% of total answers.

Wage formation

Concerning the way collective wage bargaining agreements influence wages, a majority of firms answered "Never/Not applicable", and excluding these, 18% of firms indicated that wage agreements change less frequently than once every two years. However, as mentioned in section 2, this finding seems to be in contradiction with the institutional framework, which implies a very large coverage (about 90%) of workers by the national agreements which are revised every two years. Moreover, in the first WDN survey in 2007, 98% of firms mentioned that they were covered by a joint committee (in which wage agreements are generally concluded on the same two-year basis), and more than a quarter had a collective agreement at the level of the company. One explanation for this inconsistency could be that in the periods 2011-2012 and 2013-2014 the national draft agreements, which had not been approved by all social partners, were nevertheless enforced by the federal government. Respondents might have considered this as a sign that there was no formal "agreement" even though a wage policy with all the features of an agreement was actually in force. Finally, some of the firms surveyed might have used the option "Never/Not applicable" to indicate "Don't know".

Among the firms that mentioned a high frequency for collective wage agreement changes, there seems to be some variation depending on the sector: industrial firms tend to adapt collective agreements more on a yearly basis as is the case for companies in trade and business services, while those from the construction sector change more often than once a year. Financial institutions tend to change less often, generally once every two years.

One specific feature of wage-setting in Belgium is the automatic index-linking of wages to a so-called 'health index' of consumer prices. How the indexation is actually applied depends on the mechanism chosen by the relevant joint committee for each firm/worker.

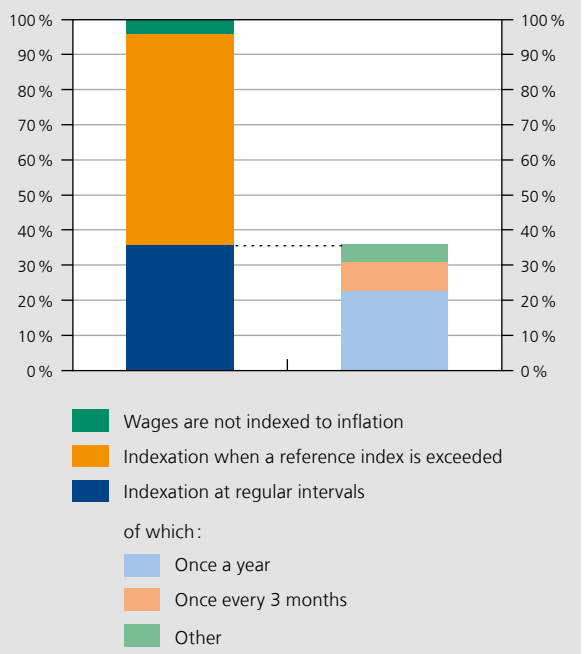
There are two large groups of systems: in the first one, wages are index-linked at the moment the health index four-month moving average exceeds a reference index. This system is used in the civil service based on increments of 2%, granted with a two-month time lag from the reference index overshoot. In the private sector, many variants coexist in terms of increments and reference index, so wage indexations are not necessarily synchronised. Systems of this type are more popular in industry.

In the other type of system, index-linking takes place at fixed intervals, either monthly, every two months, quarterly, every four months, half-yearly or, the most common frequency, on an annual basis.

The first system (indexation when a reference index is exceeded) is applied in about two-thirds of the firms in our sample, compared to one-third for the second system (indexation at regular intervals), a finding that is totally in line with results from the first WDN survey in 2007. However, data from administrative sources indicate the opposite proportion. This is not necessarily incompatible with the surveys as administrative sources refer to the private sector as a whole (also including sectors not covered by the survey) and are expressed in terms of employee numbers rather than number of firms (when weighted in terms of employees, the survey results tend to show similar proportions to the administrative data). The most common form of indexation at regular intervals is once a year, which is also what other sources reveal. This is particularly so in business services. It is

CHART 6 WAGE INDEXATION SYSTEMS

(in %)



Source : NBB.

also relatively widespread in the construction sector, albeit with a preference for index-linking every three months.

As expected given the presence of indexation mechanisms, base wage changes are more frequent than collective wage agreement changes. All the same, about 20 % of firms still say that base wages are changed every two years or even less frequently, which seems very infrequent. Moreover, that proportion increased somewhat (excluding the answers "Never/Not applicable") in 2010-2013 compared with the period before, even though at the same time the share of firms indicating high-frequency wage change (more than once a year) also increased. A similar question was included in the first WDN survey in 2007, which indicated a significantly higher frequency of base wage changes. The question formulation was quite different and stressed factors like indexation or seniority, which were not explicitly mentioned in the new survey. It is for instance not clear whether, in the new survey, firms interpreted changes resulting from the implementation of the indexation mechanism as a change in the base wage. If this is not the case, it would explain why the results are biased towards less frequent wage changes.

As for sector specificities, the replies concerning the frequency of base wage changes in business services is concentrated on the answer "once a year", and this is also partly the case in the construction sector for which "more than once a year" is even more common. These results correlate partly with the indexation frequency for these sectors. Nevertheless, it is hard to understand why the industrial sector is characterised by a higher share of firms responding "Never/Not applicable".

Intriguingly, when asked whether some measures, out of ten different suggested human resources policies, had become more or less difficult to apply than back in 2010, a sizeable share of firms (between 20 and 50 %) mentioned that these measures had become more difficult to implement. However, there are no obvious direct explanatory factors for this increased difficulty either in terms of institutional or labour market reform in Belgium. One possible reason might be that the wage moderation policy has left less room for flexibility at the firm level, especially to differentiate wages between workers. This probably explains in part why adjusting wages of incumbent employees is the policy that a larger proportion of firms considered more difficult to put into practice than before, especially in business services and trade. Other factors might relate to the reforms of early exit from the labour market schemes or the unification of blue- and white-collar status (although implemented in 2014), measures that could be perceived by firms as indirectly affecting their flexibility.

It is worth noting that, across sectors, a large consensus is emerging as to the policies that did not become more difficult to implement : temporary lay-offs for economic reasons, moving employees across different job positions, or moving employees to positions in other locations. At the other end of the spectrum, there is not a lot of divergence either, even though in industry and construction,

TABLE 9 FREQUENCY OF BASE WAGE CHANGES

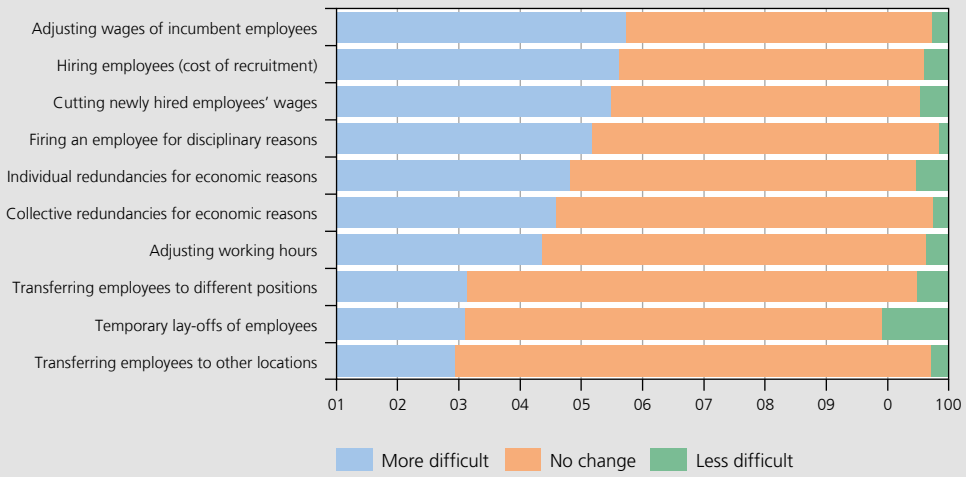
(in %)

	Before 2010	During 2010-2013
More than once a year	13	16
Once a year	35	33
Between one and two years	15	13
Every two year	5	7
Less frequently than once every two years	15	15
Never / Not applicable	17	16

Source : NBB.

CHART 7 HAVE SOME HR POLICIES BECOME MORE OR LESS DIFFICULT TO APPLY THAN IN 2010?

(in %)



Source: NBB.

dismissals and lay-offs were also among the human resources policies that were considered more difficult to implement, as well as lowering the wages for new hires.

Obstacles to hiring new staff

Recruiting and setting lower wages for newly hired employees feature among the policies that many firms claim have become more difficult to pursue than in 2010, although a small majority of companies said they had not seen any significant change. For firms needing to expand their workforce or alter the composition of their existing workforce, this can be an important impediment to the development of their business activity. The main obstacles to hiring new workers on permanent contracts are in fact high payroll taxes and high wage levels, as well as firing costs. For these three aspects, Belgium ranks among the most expensive countries: in 2013, it had one of the highest wage levels, and a heavy tax burden on labour. According to a survey[1] conducted by a private consulting firm, Laga, Belgium is amongst those countries with the highest firing costs. Moreover, when comparing the situation in 2010-2013 with that before 2010, the cost of newly hired workers is more often cited as being higher than the cost of incumbents, and is also more rarely cited than before as being lower, indicating that the relative average cost of new hires compared to incumbents is rising[2]. This is a common feature observed in the different sectors,

TABLE 10 OBSTACLES IN HIRING WORKERS WITH A PERMANENT, OPEN-ENDED CONTRACT IN THE PERIOD 2010-2013

(in %)

	Not relevant	Of little relevance	Relevant or very relevant
High payroll taxes	5	11	84
Uncertainty about economic conditions	7	13	80
High wages	6	15	79
Insufficient availability of labour with the required skills	8	18	74
Firing costs	12	16	72
Risks that labour laws are changed	11	30	60
Costs of other inputs complementary to labour	21	34	45
Hiring costs	16	40	44
Other	54	15	31
Access to finance	35	39	27

Source: NBB.

(1) See http://www.laga.be/newsroom/whats-new-about-laga/International-Dismissal-Survey-2015.

(2) The harmonisation of the legislation between blue-collar and white-collar workers might also raise the perceived cost of new hires (abolition of the trial period for open-ended contracts, etc.), but it was only brought into force in January 2014, despite having been negotiated in 2013.

but is particularly evident in the construction sector. Putting these findings into perspective with the large proportion of firms considering insufficient availability of labour with the required skills as a relevant or very relevant obstacle to hiring might indicate a growing degree of labour mismatch. As a result, one of the alternative policies favoured by firms to reduce labour costs, according to the first WDN survey, namely the policy of replacing incumbent employees who had left voluntarily with newly hired employees, has probably become less effective.

The other most relevant obstacles to hiring mentioned by the companies surveyed are uncertainty about economic conditions – the first factor mentioned by firms in industry as well as by those that needed to adjust their labour costs – and risks of labour laws changing. It is interesting to note that access to finance is one of the less relevant factors for many firms, even though more than a quarter still single it out as a relevant or very relevant obstacle.

TABLE 11 PRICE-SETTING POLICY
(in %)

	Domestic market	Foreign markets
The price is set entirely on the basis of costs and a pre-determined profit margin	37	37
The price is negotiated with each customer	25	29
The price is set in accordance with the main competitors' prices	22	20
There is no autonomous price-setting policy	13	12
Other	2	2

Source : NBB.

4. Price adjustments

This part of the article comments on the survey results concerning the questions on setting and adjusting prices. This is an optional section of the harmonised questionnaire, in that each participating country could choose whether or not to include it in the national questionnaire. The objective here is to assess how price adjustment has been affected by the new economic environment.

When asked how they set the prices of their flagship products, more than a third of the companies surveyed replied that they could fix prices entirely on the basis of costs and a pre-determined profit margin, which tends to suggest a relatively dominant position on their market. For between one-quarter and one-third of all firms questioned, prices were negotiated with each customer. And one-fifth of the respondents declared that prices were fixed depending on their principal competitors, a particularly important strategy in the trade and business services sectors, and even more so in the financial intermediation sector, where this is by far the main price-setting policy. Overall, the vast majority of firms reported some degree of autonomy when it comes to price-setting. Only slightly over 10 % of them had not been able to follow an independent policy, mainly because the price is regulated (notably in the case of the business services sector or for non-exporting companies) or because it is set by the principal clients, and less often because it is fixed by a parent company. There are no major differences in importance between the domestic market and foreign markets, except for construction and business services sectors, which rely more on negotiating prices with each customer on foreign markets.

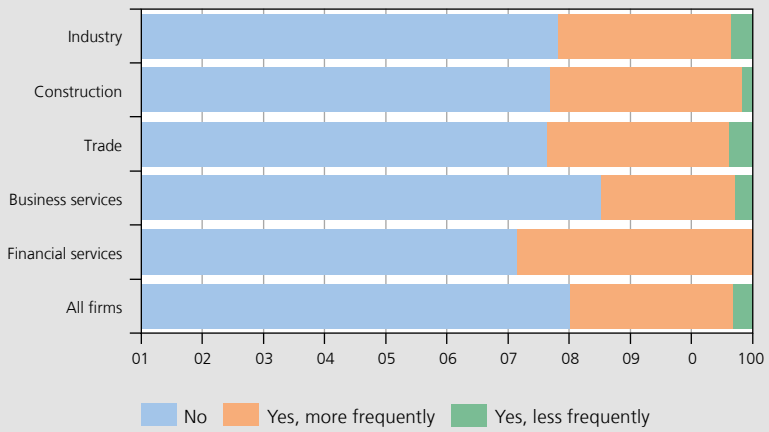
With regard to the frequency of price changes, most firms from the business services sector tend to change their prices once a year or less than once a year, while in the manufacturing, construction and trade sectors, most of them adjust their prices more than once a year. For all companies taken together, the most common frequency of price changes is once a year, followed by more than once a year. This observation confirms the findings of the first WDN survey carried out in 2007, taking account of the fact that the question formulation was not the same : this survey did not offer the "Don't know" option, which probably explains the higher proportion of firms recorded as replying "Never" at the time.

Compared with the pre-2008 period, more than a quarter of the firms surveyed tended to change their prices more often over the 2010-2013 period. But this was not so much the case for the business services sector as for the other sectors. This suggests that the price-setting mechanism in the business services sector may have specific features, for instance in terms of competition or market organisation, that differ from the average.

The firms surveyed were also asked to select and rank in order of importance the reasons behind changes in the frequency of price adjustments. The key motives cited to explain more frequent price adjustments are related to competition, either because it had got much tougher, or because the main competitors had changed their prices more often. Three-quarters of the firms surveyed reported that competitive pressure on the market for their main product was stronger than before 2008, and that goes for both domestic and foreign markets. Changes in costs and volatility of demand are also regarded as important explanatory factors for the higher

CHART 8 CHANGES IN THE FREQUENCY OF PRICE ADJUSTMENTS

(proportion of firms indicating a change during the period 2010-2013 from the pre-2008 period, in %)



Source: NBB.

frequency of price changes, but not so important as competition. As for the elements cited as justifying a drop in the frequency of price changes, a much less common situation according to the survey, more subdued competition is the key factor mentioned by companies, while fewer changes in costs and less volatile demand play a more minor role.

One general observation is that firms facing heavier competitive pressure also mentioned that their business activity had been very adversely affected (for at least one of the five factors proposed by the questionnaire). Those whose business suffered in this way are also much likely to have changed the frequency of price adjustments compared with the pre-2008 period. 40 % of them reported this, compared with 25 % for those whose business activity was less badly affected. This suggests that, besides wage policies and strategies for adapting labour input, price adjustment policy also played a role in companies' own adjustment process over the period 2010-2013.

Conclusion

The article describes the main results of the survey conducted in 2014 on wage formation and on price adjustments within companies over the period from 2010 to 2013. This is a survey carried out within the framework of the Wage Dynamics Network (WDN), an ESCB research project network.

TABLE 12 REASONS FOR CHANGES IN THE FREQUENCY OF PRICE ADJUSTMENTS

(proportion of firms regarding this factor as important or very important)

Higher frequency of price adjustments		Lower frequency of price adjustments	
More frequent price changes by the main competitors	77	Less frequent price changes by the main competitors	61
Fiercer competition on the market for main product	79	Less competition on the market for main product	49
More frequent changes in costs of other inputs	58	Less frequent changes in costs of other inputs	44
More volatile demand	52	Less volatile demand	37
More frequent changes in labour costs	46	Less frequent changes in labour costs	31

Source: NBB.

Generally speaking, the lessons drawn from this analysis tend to confirm the already known features of the Belgian labour market and its institutional set-up. They also provide unique insight into the way in which firms perceive the labour market and how they react to the crisis. For instance, they reveal that the most negative impact on their business activity over the period from 2010 to 2013 came from the level of demand and customers' inability to pay and meet contractual terms. Although companies point out that there has not been any widespread rationing of credit (borrowing constraints were not cited as a major source of adverse impact), this is still a significant factor, especially for some small firms.

Companies are adapting via different channels. As far as the price channel is concerned, business strategies show quite a high degree of autonomy, which is nevertheless limited in practice by ever-increasing competitive pressure. This probably goes some way towards explaining the accelerating frequency of price adjustments, although this is only observed among a minority of companies. Costing policies are another channel that firms can use. They say they generally tend to be confronted with rising costs, in particular wage costs. The two main components of these costs are the volume and remuneration of labour.

When it comes to adjusting the volume of labour, the proportion of companies recording respectively increases and decreases in permanent employment is the same at aggregate level. This is in line with the absence of any massive impact on employment at the macroeconomic level. However, firms whose business activity has been adversely affected on average tend to show almost systematically more decreases than increases for the various components of the volume of labour, while this is almost never the case for the others. The survey also confirms that the use of temporary lay-offs was also an important factor in explaining the resilience of employment in Belgium.

As for the remuneration of labour, the survey confirms that, in the context of wage moderation, there have been almost no wage cuts at all. This is a feature, linked to the wage-setting process in Belgium, that is not seen nearly so much in the other European countries. Companies also emphasise the fact that tax and wage levels are major obstacles to hiring new staff, just like the uncertainty that is tainting the economic situation. Measures designed to reduce these barriers, such as the labour-cost-cutting measures taken by the federal government as part of the tax shift, would therefore help to alleviate this constraint. Strategies seeking to reduce uncertainty would also appear to be adequate, especially since a large proportion of firms share the perception that the labour market may have become less flexible, a sentiment that nevertheless does not seem to be explained by regulatory changes or reforms to the institutional framework in Belgium.

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Results and financial situation of firms in 2014

I. Rubbrecht (*)
D. Vivet

Introduction

Each year, in the December issue of the Economic Review, the National Bank describes the developments reflected in the annual accounts of non-financial corporations. By the autumn, the Central Balance Sheet Office already has a representative sample of annual accounts for the previous year. The conclusions based on that sample can therefore be fairly reliably extrapolated to the population as a whole.

This article is in four parts. The first part briefly describes the method used and the population studied. The second part presents an extrapolation of the main items in the operating account for the 2014 financial year, focusing mainly on value added, staff costs, depreciation and the operating result. The extrapolations are presented according to company size and according to the main branches of activity. The third part assesses the financial position of companies in terms of profitability and financial structure. This analysis is based on the theory of the interpretation of annual accounts, and provides both a macro- and mesoeconomic view (with globalised figures) and a microeconomic picture (medians and other distribution measures). The analysis is supplemented by an examination of the financial leverage effect and the ability to repay interest charges ('times interest earned').

Finally, the fourth part looks at developments concerning the payment terms of customers and suppliers, ascertained on the basis of the annual accounts. That is followed by an examination of the link between these ratios and the risk of default.

(*) The author expresses her gratitude to François Coppens and George Van Gastel for their valuable comments.

1. Method and description of the population

1.1 Method

The Central Balance Sheet Office has collected the accounts of non-financial corporations since the late 1970s. To that end, firms are required to file their annual accounts in a standardised form no later than seven months after the end of the financial year. The data are then checked and corrected if necessary in order to meet the required quality standards, following which an initial analysis is possible from September onwards.

However, it is always the case that the annual accounts for the latest year considered – in this case 2014 – are not yet all available. That is because a significant number of accounts are filed late or fail the arithmetical and logical checks conducted by the Central Balance Sheet Office. That is why the data for 2014 are estimated on the basis of a constant sample. The sample comprises firms which have filed annual accounts covering a 12-month financial year for both 2013 and 2014. The method consists in extrapolating the 2014 results according to developments observed in the sample, which are presumed to be representative of trends affecting the population as a whole. As verified in previous editions of this article, that assumption is broadly correct: in the great majority of cases, the extrapolations give a good indication of the direction and scale of the real movements.

This year's sample was drawn on 10 September 2015. It comprises 254 721 sets of annual accounts, or 73.5 %

of the total number filed for the 2013 financial year. In terms of value added its representativeness is much higher, at 87 %. The sample has become significantly more representative over the past ten years: in 2005, it only represented 52.6 % of the number of companies, and 82.4 % of value added. This improvement is due mainly to the technical progress achieved at the Central Balance Sheet Office (electronic filing, datawarehouse, etc.) and to the introduction of surcharges in the event of late filing of the annual accounts (see the previous edition of this article in the December 2014 Economic Review).

1.2 Description of the population studied

The population studied corresponds to all non-financial corporations as defined by the Central Balance Sheet Office. However, the "head office activities" branch (NACE-BEL 70 100) is excluded from this population because it comprises companies which generally provide internal banking or cash management services for corporate groups, and are therefore comparable to financial corporations.

Annex 1 itemises the NACE-BEL codes for the branches of activity covered. The sectoral groupings are based on the NACE-BEL 2008 nomenclature. However, for presentation and interpretation purposes, the structure used here differs slightly from the official structure of the nomenclature.

The article also distinguishes between companies according to their size. This distinction is based on the kind of annual accounts format used. Under the Company Code, small non-listed companies have the option of filing their annual accounts in the abridged format, while large firms and small listed companies must use the full format.

The Company Code defines a small company as one which has not exceeded more than one of the following limits in the last two financial years:
- annual average number of employees: 50;
- turnover (excluding VAT): € 7 300 000;
- balance sheet total: € 3 650 000;

unless the number of employees exceeds an average of 100 units per annum [1].

(1) If the financial year covers either more or less than 12 months, the turnover criterion is calculated on a pro rata basis. If the enterprise is affiliated to one or more companies, the criterion for the annual average workforce is calculated by adding up the average annual number of workers employed by all the enterprises concerned, and the turnover and balance sheet total criteria are calculated on a consolidated basis. For more details, see the advisory opinion CNC 2010-5 of the Belgian Accounting Standards Commission (www.cnc-cbn.be).

(2) In 1996, manufacturing industry still represented 38 % of value added and 36 % of employment.

In all other cases the company is regarded as large.

According to these criteria, companies filing full-format accounts are defined as large firms. Other companies, i.e. those using an abridged format, are regarded as SMEs.

Table 1 presents the breakdown of the number of companies, value added and personnel by branch of activity and by firm size for the last full financial year, i.e. 2013. This reveals a number of structural characteristics of the population, such as:
- Large firms represent the bulk of value added (74 % of the total) and employment (70 %), while being very much in the minority in terms of the number of companies (6 %).
- 15 % of industrial companies are large firms, compared to just 5 % of service companies. The proportion of large firms is particularly high in the chemicals industry (43 %) and the pharmaceutical industry (37 %), and in the "energy, water and waste" branch (31 %).
- The branches with the highest proportion of small or very small firms are the service branches focusing mainly on domestic demand, such as the hotels, restaurants and catering sector (99 % SMEs), the retail trade (97 %) and construction (6 %).
- While being very much in the minority in terms of the number of companies (96 % of the total), manufacturing industry is still a significant source of value added (27 %) and jobs (24 %) for the Belgian economy, even though these proportions have fallen considerably over the past 20 years [2].

2. Trend in components of the operating account

2.1 Economic climate in 2014

In 2014, GDP was up by 1 %, a growth rate well in excess of the 2013 and 2012 figures, but relatively moderate in a long-term perspective. This increase in activity was accompanied by renewed uncertainty. Thus, business confidence deteriorated sharply in the spring of 2014 before stabilising at a relatively low level in the summer, then picking up to some extent in the final months of the year.

The relatively better economic climate had a beneficial effect on business failures: over 2014 as a whole the number of bankruptcies came to 10 736, compared to 11 740 in 2013, a decline of 9 %. This downward trend applied to all branches of activity, but it was the hotels,

TABLE 1 BREAKDOWN OF THE POPULATION STUDIED BY BRANCH OF ACTIVITY
(2013 financial year)

	Number of companies		Value added (in € million)		Employment[1]	
	Large firms	SMEs	Large firms	SMEs	Large firms	SMEs
Manufacturing industry	**3 392**	**18 759**	**42 396**	**5 046**	**369 677**	**75 864**
of which:						
Agri-food industries	627	3 283	6 743	854	60 990	14 794
Textiles, clothing and footwear	222	1 270	1 160	272	17 078	4 756
Wood, paper and printing	354	3 316	2 303	652	24 978	9 274
Chemicals industry	266	355	6 698	116	39 821	1 367
Pharmaceuticals industry	55	93	5 752	27	21 344	508
Metallurgy and metalworking	552	4 092	5 072	1 347	59 197	20 092
Metal manufactures	565	1 897	8 548	627	86 399	8 473
Non-manufacturing branches	**17 496**	**306 930**	**90 959**	**40 613**	**933 820**	**491 339**
of which:						
Trade in motor vehicles	903	10 388	2 763	1 562	31 136	21 648
Wholesale trade[1]	4 453	28 447	18 003	4 338	127 137	47 577
Retail trade[1]	1 247	37 110	7 863	4 509	116 166	72 405
Transport and storage	1 594	9 773	12 114	2 524	157 069	35 953
Hotels, restaurants and catering	276	21 232	1 256	2 360	20 875	47 996
Information and communication	1 046	17 004	10 094	1 884	67 196	16 234
Real estate activities	1 966	31 768	2 517	3 084	7 311	7 964
Business services	3 003	78 098	16 588	9 586	258 411	91 923
Energy, water and waste	472	1 055	8 854	320	40 154	2 500
Construction	1 852	45 727	6 897	7 112	82 490	106 275
Total	**20 888**	**325 689**	**133 355**	**45 659**	**1 303 497**	**567 203**

Source: NBB.
(1) Average workforce in full-time equivalents.

restaurants and catering sector (–11 %), transport (–9 %) and trade (–8 %) that made the biggest contribution to that trend (see table 2). As is evident from the data for the first six months, the decline continued in 2015, but at an ever slower pace (–2 % compared to the first half of 2014).

The decline in the number of bankruptcies in 2014 contrasts with the sometimes very sharp increases in previous years. However, it should not mask the fact that the bankruptcy statistics remain at historically high levels: in the first half of 2015, the number of business failures totalled 5 555, or 38 % more than in the first half of 2007 (4 020). Furthermore, several years after the start of the financial crisis, it is likely that the most vulnerable firms have finally disappeared, automatically contributing to a decline in bankruptcies.

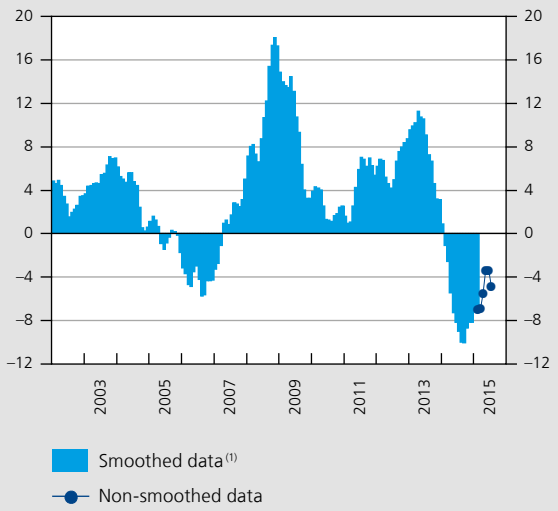
Finally, it should be noted that some recent fluctuations are due to the activity of the commercial courts. For instance, the reduction in bankruptcies in 2014 is due partly to the increase in business investigations and the speedier conclusion of cases in Brussels in 2013, which had driven up the number of bankruptcies in the Region in that year.

2.2 Global trends in the operating account

Over 2014 as a whole, the total value added created by non-financial corporations, i.e. the difference between

CHART 1 NUMBER OF BUSINESS BANKRUPTCIES IN BELGIUM

(percentage change in the number of bankruptcies compared to the corresponding month of the previous year)



Sources: FPS Economy, SMEs, Self-employed and Energy, own calculations.
(1) Data smoothed by a twelve-month centred moving average.

sales revenues and the cost of goods and services supplied by third parties, increased by 0.5 % at current prices (see table 3). Leaving aside 2009, that is the lowest growth rate in more than 15 years, and is due to the stagnation of both sales and purchases. The growth of value added has in fact been falling steeply for the past four years.

The value added that a firm creates enables it to cover its operating expenses and to record any excess as its net operating profit.

Staff costs usually make up the major part of the operating expenses. After having outpaced the growth of value added in previous years, they decreased by 0.6 % in 2014. That decline in the wage bill was due mainly to two factors: the marked fall in inflation, which was largely reflected in labour costs via the indexation mechanism, and the freezing of real pay increases imposed by the government. In addition, the number of workers declined in 2014 (–1 % in full-time equivalents).

After staff costs, the biggest operating expenses comprise item 630 in the annual accounts, namely depreciation and write-downs on tangible fixed assets, intangible fixed assets and start-up costs. In 2014, their growth slowed for the third consecutive year, dropping to 2.2 %, which is well below the average for the past ten years (3.9 %); that reflects an investment policy which has become far more conservative in recent years.

In the annual accounts, corporate investment spending can be ascertained from the ratio of new tangible fixed assets. That ratio divides acquisitions of tangible fixed assets during the year by the stock of tangible fixed assets at the end of the previous year. Whatever the yardstick applied, the ratio contracted very sharply in the wake of the 2008-2009 recession, and has since remained at levels well below those prevailing before the financial crisis (see chart 2). This downward trend has affected almost all branches of the Belgian economy.

TABLE 2 NUMBER OF BANKRUPTCIES BY BRANCH OF ACTIVITY

							1st half	
	2009	2010	2011	2012	2013	2014	2014	2015
Manufacturing industry	544	541	563	611	619	585	322	273
Construction	1 442	1 560	1 693	1 802	2 065	1 977	1 065	1 027
Trade	2 603	2 649	2 691	2 744	2 993	2 766	1 459	1 435
Hotels, restaurants and catering	1 798	1 788	1 987	2 062	2 261	2 011	1 033	1 005
Transport and communications	851	858	907	942	948	859	444	421
Business and real estate services	1 147	1 396	1 573	1 507	1 786	1 658	878	971
Other	1 035	778	810	919	1 068	880	488	423
Total	**9 420**	**9 570**	**10 224**	**10 587**	**11 740**	**10 736**	**5 689**	**5 555**

Sources: FPS Economy, SMEs, Self-employed and Energy, own calculations.

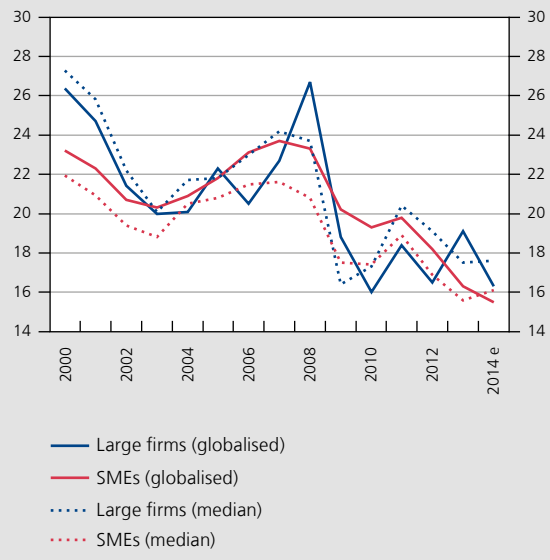
TABLE 3 TRENDS IN THE MAIN COMPONENTS OF THE OPERATING ACCOUNT
(current prices)

	Percentage changes compared to the previous year					In € million	In % of value added
	2010	2011	2012	2013	2014 e	2014 e	2014 e
Value added	**5.5**	**3.7**	**1.4**	**1.5**	**0.5**	**179 833**	**100.0**
Staff costs (–)	0.6	5.3	3.0	1.6	–0.6	102 976	57.3
Depreciation and write-downs[1] (–)	2.1	4.1	3.4	2.6	2.2	34 586	19.2
Other operating expenses (–)	3.0	4.7	2.5	–0.4	–5.2	10 414	5.8
Total operating expenses	*1.1*	*5.0*	*3.0*	*1.7*	*–0.3*	*147 976*	*82.3*
Net operating result	**28.6**	**–1.7**	**–5.7**	**0.6**	**3.9**	**31 857**	**17.7**

Source: NBB.
(1) On tangible and intangible fixed assets and start-up costs (item 630).

Total operating expenses, determined largely by staff costs and depreciation, decreased by 0.3 % in 2014, the first reduction in over 20 years. Combined with the small rise in value added, this led to a modest increase (+3.9 %) in the operating result in 2014, which was up by € 32 billion. Over the past four years, the operating result has been generally very stable, remaining below the peak level prevailing before the 2008-2009 recession (€ 36 billion).

CHART 2 RATIO OF NEW TANGIBLE FIXED ASSETS
(in %)



Source: NBB.

The analysis by size shows that it was mainly SMEs that contributed to the expansion of the operating account in 2014: during the year they recorded a 3 % increase in value added and a 5.2 % increase in the operating result, compared to –0.4 % and 3 % respectively for large firms. Overall, SMEs' results are up in almost all the branches of activity studied, and more especially in business services, the wholesale trade, real estate and construction. The situation is more variable in large firms: their growth in certain branches such as chemicals, metallurgy or the wholesale trade is offset by a contraction in the retail trade, transport, pharmacy and telecommunications.

2.3 Developments per branch of activity

Table 4 describes the movements in the operating account for each branch of activity over the past two years under review.

In 2014, in contrast to the long-term trend, the manufacturing branches performed more strongly than the non-manufacturing branches.

The main reason for the relatively favourable position of the manufacturing branches was the decline in costs: apart from the reduction in labour costs, industry benefited from the fall in commodity prices (see chart 3). Energy commodities displayed the most pronounced movements; in particular, the price of Brent crude slumped by 50 % in

TABLE 4 VALUE ADDED AND OPERATING RESULT PER BRANCH OF ACTIVITY

(percentage changes compared to the previous year)

	Value added		Net operating result		*p.m. Branch's share in % of total value added in 2014 e*
	2013	2014 e	2013	2014 e	
Manufacturing industry	**1.4**	**4.2**	**3.9**	**16.6**	***27.5***
of which:					
Agri-food industries	4.6	3.8	15.8	4.5	4.4
Textiles, clothing and footwear	–1.3	10.4	2.7	57.5	0.9
Wood, paper and printing	–2.8	2.5	–21.9	26.5	1.7
Chemicals industry	1.2	7.2	0.6	41.3	4.1
Pharmaceuticals industry	12.1	0.7	42.5	–32.9	3.2
Metallurgy and metalworking	1.1	4.4	233.2	167.3	3.7
Metal manufactures	–2.1	4.3	–6.0	6.6	5.3
Non-manufacturing branches	***1.6***	***–0.9***	***–0.4***	***–2.6***	***72.5***
of which:					
Trade in motor vehicles	–1.1	7.2	–5.6	28.4	2.6
Wholesale trade[1]	–0.5	1.5	–7.8	19.5	12.6
Retail trade[1]	1.6	–0.3	–1.6	–9.3	6.6
Transport and storage	–0.2	–14.0	–16.3	–84.9	7.0
Hotels, restaurants and catering	3.8	3.6	17.3	36.6	2.1
Information and communication	–2.5	1.3	–23.5	–9.5	6.7
Real estate activities	2.6	3.6	3.8	3.0	3.2
Business services	4.6	3.4	11.9	–4.1	15.0
Energy, water and waste	–3.1	–6.1	–29.9	2.9	4.8
Construction	0.8	–1.5	3.2	–11.8	7.7
Total	**1.5**	**0.5**	**0.6**	**2.1**	***100.0***

Source: NBB.
(1) Excluding trade in motor vehicles.

2014. The anaemic global demand also depressed the prices of industrial and food commodities. Manufacturing industry itself recorded modest expansion, as is evident from the sales figures (+0.6 % in 2014) and from the industrial output indices calculated by FPS Economy: while the movements varied between branches, the overall index of manufacturing output was up from 106.1 in December 2013 to 107.6 in December 2014. The branches where lower costs had the most impact were metallurgy, basic chemicals and metal manufactures.

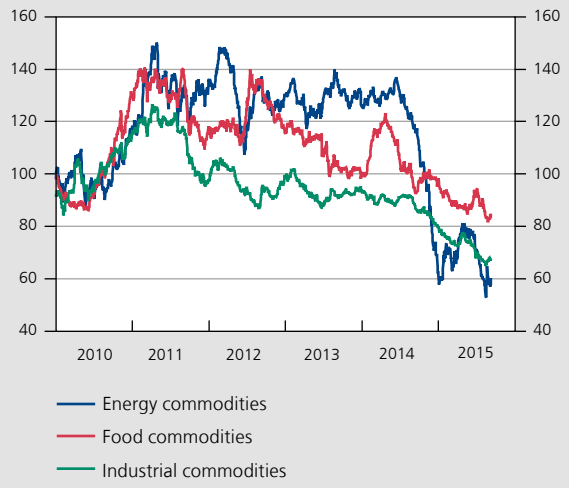
The pharmaceuticals industry is one of the few manufacturing branches to have recorded a fall in its operating result in 2014 (–32.6 %). That is very largely due to the increased write-down of R&D costs and licences associated with new drugs.

In the non-manufacturing branches, developments varied widely and were sometimes very dependent on situations specific to certain large firms. The most positive variations were seen in the wholesale trade (mainly owing to the branch's close links with industry) and in trade in vehicles and ancillary equipment, which benefited in particular from the fall in commodity prices in the tyre sector. Conversely, the retail trade and telecommunications suffered further erosion of their margins against the backdrop of continuing fierce competition.

The decline in the results in construction is due mainly to the completion of major projects or specific property deals and to the reduction in public investment in the light of fiscal consolidation. Finally, the "transport and storage"

CHART 3 COMMODITY PRICES

(indices 2010 = 100, daily data in US dollars)



Source: HWWI.

branch was greatly affected by specific events, namely the reorganisation of one operator and a very substantial reduction in the value of inventories in a company specialising in the storage of petroleum products.

3. Trends in the financial situation of firms

The financial analysis which follows is based on the theory of interpretation of the annual accounts, from which several ratios have been borrowed. They are defined in detail in Annex 2.

The financial ratios are presented in the form of global figures and medians. The globalised ratios are obtained by taking the sum of the numerators of all companies and dividing it by the sum of their denominators. The globalised ratio is therefore the weighted average of each ratio at the level of each firm, whose weight is each firm's share in the total value of the ratio's denominator. Thus, the globalised average represents the situation of those firms having the largest value in the denominator. The median is the central value in an ordered distribution in which 50 % of firms have a ratio above the median and 50 % have a ratio below the median. These two measures are used in order to permit a complementary analysis. Since the averages, and hence the globalised ratio, are influenced by extreme values (outliers), the median value is important to neutralise those extremes. Also, the globalised average presents the situation from the macro- and mesoeconomic angle, while the median reflects the microeconomic situation.

3.1 Profitability

This section analyses a company's profitability first in relation to sales and then in relation to the equity and the balance sheet total.

3.1.1 Net margin on sales

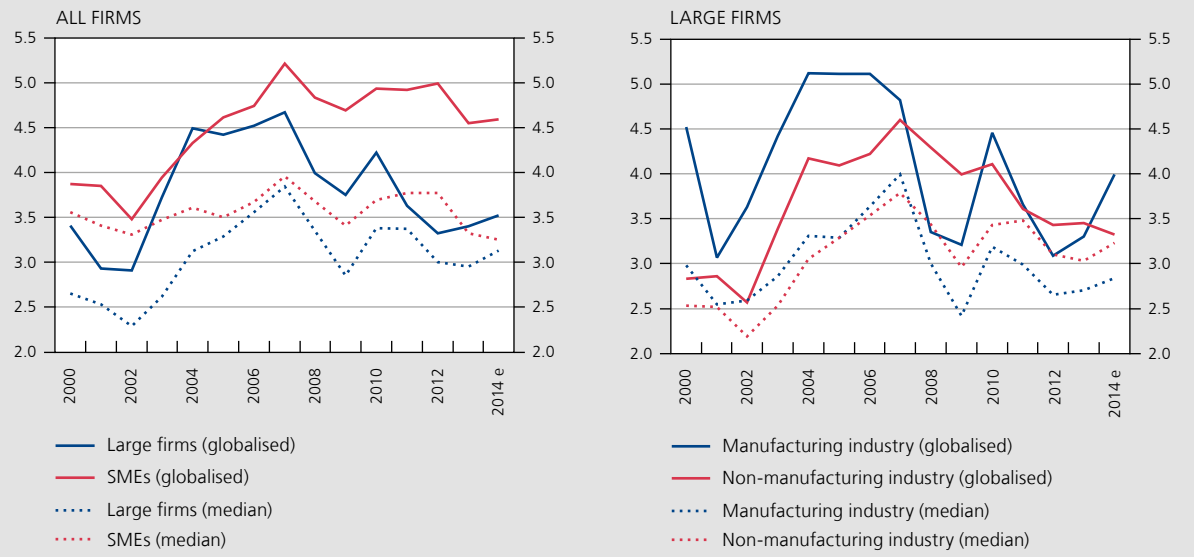
The profitability of sales can be measured by the net margin on sales, which is the ratio between the net operating result and sales. The net margin on sales gives an idea of the firm's relative efficiency after deduction of all operating expenses including depreciation, write-downs and provisions. It provides an indication of the firm's ability to achieve a positive operating result from the proceeds of sales after deduction of all operating costs and excluding financial and exceptional items and taxes.

The net margin on sales achieved by SMEs exceeded that of large firms for almost the whole of the period (see chart 4), which means that SMEs get a bigger operating profit per € 100 of sales. In this connection, it should be noted that the analysis takes account only of SMEs for which a net margin on sales can be calculated, which is not possible unless their turnover is stated in their annual accounts. In addition, the difference between the globalised net margin on sales of SMEs and that of large firms has widened over the years. There are various possible reasons for that. Large firms generally create more jobs, leading to increased staff costs, an expense item which has risen faster than value added in recent years, except for last year. As already mentioned, that exception was due to falling inflation in 2014, which had an impact on the automatic wage indexation, and due to a freeze on real wage increases for 2013-2014. Moreover, bigger firms face increased international competition, which compresses their margins.

Up to the end of 2007, large firms in manufacturing industry had a higher net margin on sales than non-manufacturing industry. That difference was due to bigger margins in chemicals, pharmacy, wood, paper and printing, metallurgy and metalworking. Conversely, since 2008, the net margin on sales of large industrial firms has been harder hit by the downturn in activity following the financial crisis. The sharpest falls were recorded in those same branches of activity, which are not only particularly sensitive to the business cycle but are also considerably influenced by the international environment.

CHART 4 NET MARGIN ON SALES

(in %)



Source : NBB.

According to the estimates for 2014, the globalised net margin on sales is recovering very slightly in both large firms (3.5 %) and SMEs (4.6 %). The hesitant revival is measurable in most industrial branches thanks to a decline in their operating costs, due largely to the fall in commodity prices. The exception is the pharmaceuticals industry : it recorded a reduction in its net margin on sales (down from 8.5 % in 2013 to 5.7 % in 2014), owing to a rise in the amortisation of capitalised R&D costs and licences for new drugs.

3.1.2 Economic and financial profitability

In the analysis of profitability in relation to the equity capital and the balance sheet total it is possible to distinguish between a company's economic profitability and its financial profitability. Economic profitability is measured by the ratio between the net result before tax and interest charges and the balance sheet total. In that connection, exceptional results were deliberately excluded because they are non-recurring and the analysis only concerns the net result of normal activities. The ratio is an indicator of the firm's economic health, regardless of how it finances its business. In contrast, financial profitability takes account of the funding method and is estimated in this study by the net return on equity, which is the pre-tax profit divided by the total equity. This ratio therefore indicates the return that shareholders receive on the firm's current activities, once again excluding exceptional results and taxes. These two profitability ratios are calculated before deduction of taxes in order to permit comparison.

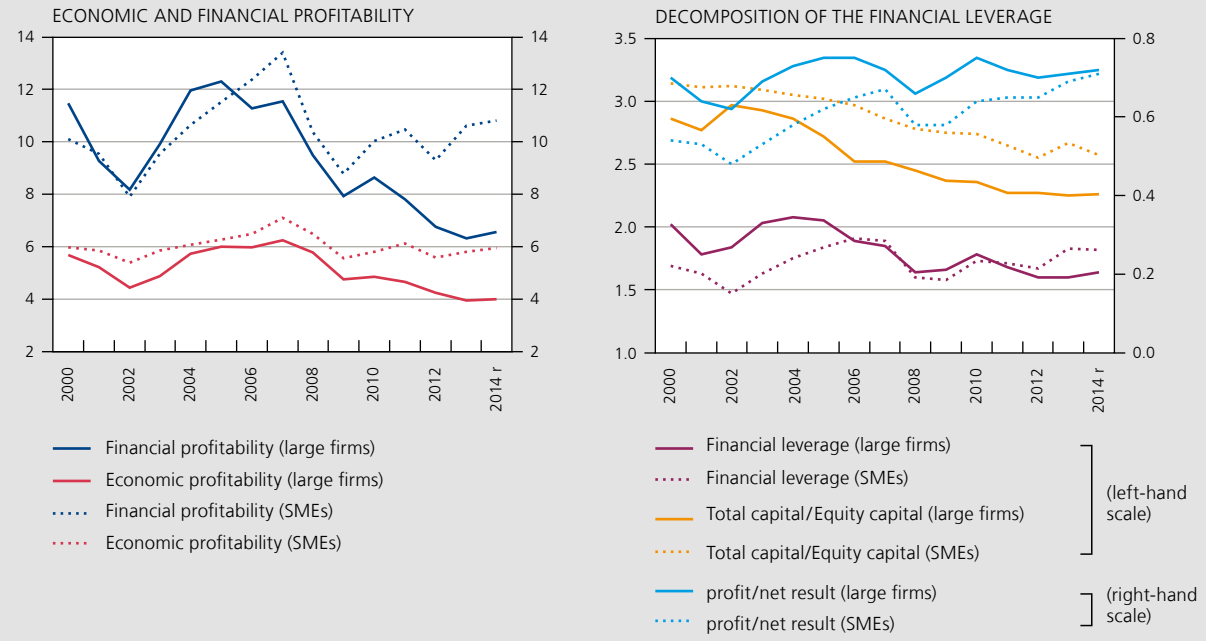
The differences between these two forms of profitability can be explained by the financial leverage effect. If a firm can borrow funds at a rate lower than its economic profitability, it can augment its financial profitability. The reason is that debts to third parties are generally less expensive than equity capital, because shareholders expect not only the normal return on investment, but also a higher risk premium (1) for their capital contribution. The firm's financial profitability is therefore determined by its economic profitability multiplied by its financial leverage effect (2), which is influenced by the degree to which the firm is funded by borrowings, and by the associated interest rates. This concerns not only the interest charges on bank loans and bonds, but also any costs associated with debt to suppliers or to other group companies. A leverage ratio higher than 1 indicates that the debt amplifies the net return on equity, while a ratio of less than 1 indicates that the debt has a negative effect on the company's financial profitability.

(1) In the event of bankruptcy, the firm will first repay its creditors followed by its subordinated creditors, and then pay out the balance to the shareholders. This last group therefore runs the biggest risk, which explains the higher risk premium.

(2) The financial leverage effect = (pre-tax profit/net result before tax and interest charges) x (total assets/equity capital).

CHART 5 GLOBALISED ECONOMIC AND FINANCIAL PROFITABILITY, AND FINANCIAL LEVERAGE BY FIRM SIZE

(in %)



Source: NBB.

Chart 5 compares the theory with the statistical data from the annual accounts.

The globalised economic profitability of large firms has been falling since the 2008 financial crisis, whereas that of SMEs has been more resilient. SMEs are less sensitive to the business cycle since they are less centred on industrial activities and international trade. Large firms have been more affected by the adverse economic climate, so that in 2013 they recorded their lowest level of economic profitability (3.9 %) in 15 years. The sharpest decline occurred in manufacturing industry. All branches of manufacturing industry suffered a fall between 2007 and 2013, with metallurgy and metalworking seeing the biggest decline. The influence of the less favourable international environment led there to the temporary suspension or even closure of production units. The agri-food industries and the chemicals industry likewise recorded a sharp fall in their economic profitability. In the latter case, that was due mainly to the squeezing of margins and to fluctuations in commodity prices. The slow economic growth revival in 2014 seems to be cautiously reflected in a modest improvement in the economic profitability of large firms, but only in manufacturing industry, and more particularly in all branches other than the pharmaceuticals sector. The strongest recovery was seen in the agri-food industries, metallurgy and metalworking, and in chemicals.

Chart 5 shows that financial profitability exceeded economic profitability over the period considered, indicating that firms – regardless of size – are able to contract debts at a rate below their economic profitability. The globalised financial profitability of SMEs recovered after 2008 thanks to a relatively constant economic profitability and increased financial leverage. The latter may be due to the fact that, over this period, compared to large firms, SMEs have made relatively more use of borrowed capital to finance their assets, so that the substantial reduction in the cost of bank credit since 2008 (see chart 8) had a bigger impact. Moreover, the financial profitability of large firms has declined steadily, year after year, reaching a 15-year low in 2013 (6.3 %). That decline was due to a fall in economic profitability and to a decline in the leverage effect (though it remained higher than 1). The smaller leverage effect was due to a relatively big increase in the equity ratio[1] in case of large firms compared to that of SMEs, which partly offset the positive effect of lower interest charges on borrowings. That is evident in a smaller rise in the ratio between the pre-tax profits and

(1) The equity ratio is the ratio between equity capital and total assets.

the net result after tax and interest charges. According to the estimate for 2014, the trend in the financial profitability of large firms appears to be turning around, thanks to the cautious recovery of their economic profitability. To sum up, this means that an investment in a large firm currently gives shareholders a smaller real return than it did ten years ago.

However, what matters to investors is whether shares still offer a bigger return than a risk-free investment, such as the yield on ten-year Belgian government bonds (OLOs). More specifically, it is necessary to consider a variant of financial profitability, namely the return on equity after tax. This is the profit after interest charges and taxes on the equity, excluding exceptional items which are, by definition, non-recurring. Chart 6 compares the globalised return on equity after tax of large firms with the yield on government bonds. The benchmark considered for that purpose is the ten-year OLO yield. The difference between the net return on equity and the yield on government bonds can be regarded as an indication of the risk premium offered to shareholders in large firms. This must be interpreted with due caution since the vast majority of large firms are not listed on the stock market. Unsurprisingly, it emerges that an equity investment was much more attractive before the financial crisis than after it, although the difference between sovereign bond yields and the globalised return on equity has increased in recent years. Following the crisis the yield on sovereign bonds also declined sharply, not only in Belgium but similarly elsewhere in Europe, owing to the monetary measures taken at European level to address the problem of heavy sovereign debts in Europe, a problem caused by the financial crisis.

3.2 Solvency

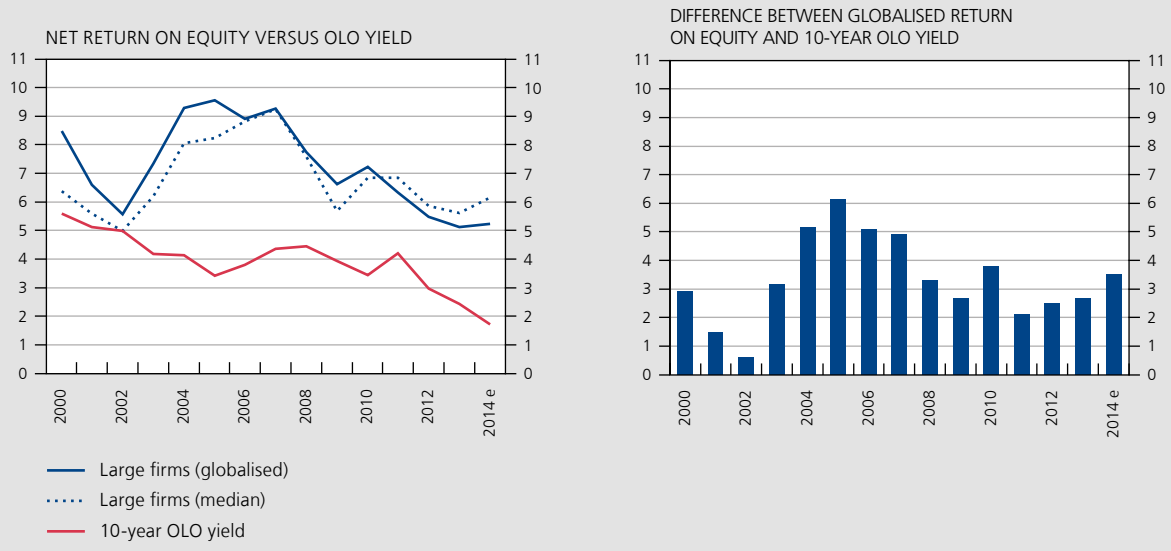
The main aim of the solvency ratios is to see the extent to which the firm can meet its financial liabilities, i.e. its interest charges and debt repayments.

The solvency ratios play a crucial role in the bankruptcy prediction models developed by the Bank, particularly in the financial health model included in the Central Balance Sheet Office company file and in the In-house Credit Assessment System (ICAS), which the NBB has officially applied since 2013 to IFRS firms, and since 2015 to BE GAAP entities. The ICAS system is an instrument for analysing the credit quality of Belgian non-financial corporations in the context of the Eurosystem's monetary policy (see section 3.3).

3.2.1 Degree of financial independence and degree of self-financing

The main measurement of solvency is the firm's degree of financial independence. That is the ratio between the

CHART 6 RETURN ON EQUITY AFTER TAX COMPARED TO THE YIELD ON BELGIAN GOVERNMENT BONDS
(in %)



Source : NBB.

equity and the total assets. The greater the financial independence, the lower the firm's debt ratio and the larger the buffer – comprising equity capital – for repaying the creditors. In other words, the degree of financial independence measures the robustness of the firm's capital structure.

A higher ratio implies a bigger chance that, in the event of bankruptcy, the equity will be sufficient to absorb the liquidation losses and repay much of what is owed to creditors. Companies with a higher degree of financial independence will generally pay lower interest charges on their debts (because the risk is lower), and that enables them to retain more funds for investment or for the distribution of dividends. That makes it easier for firms with greater financial independence to obtain bank loans or to raise funds on the capital market.

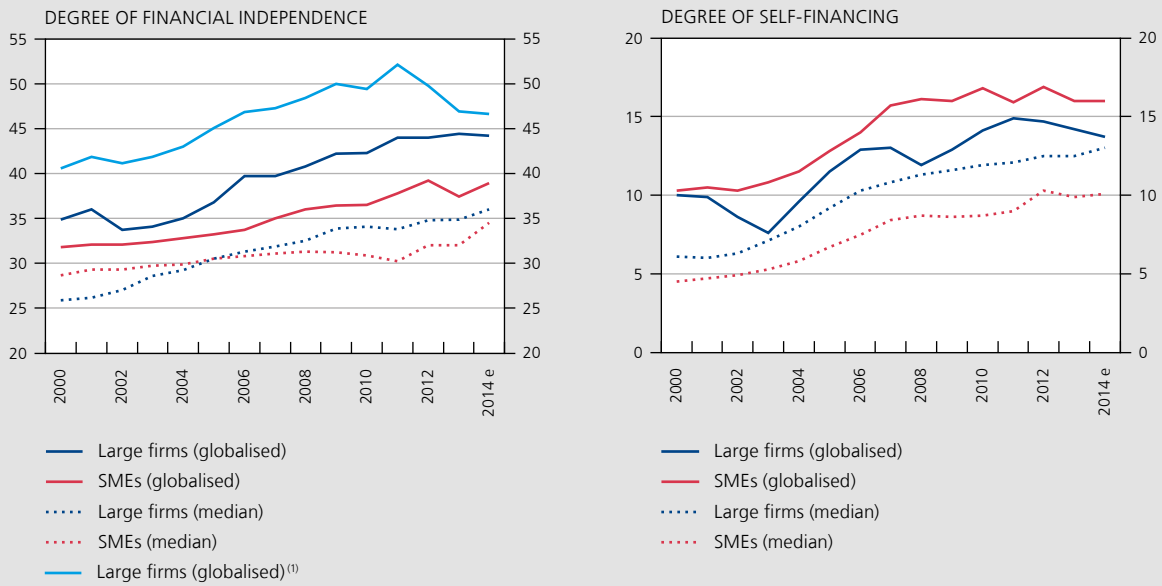
A slightly less traditional solvency ratio is the degree of self-financing, i.e. the reserves and profits/losses carried forward as a ratio of the total assets. That ratio determines the degree to which a company can accumulate equity capital out of its profits. The ratio thus represents an indicator of cumulative profitability over preceding years and the year under review. At the same time, the degree of self-financing tells us something about the firm's dividend and reserve policy. A high degree of self-financing means that the firm's growth is largely funded out of its own profits and that there is less risk that any losses will compromise the firm's stability.

However, this ratio may give a distorted view in the case of purely accounting transactions between reserves and profits carried forward, on the one hand, and capital and issue premiums on the other. If a part of the reserves is transferred to the capital, the company's degree of self-financing is reduced without any decline in the total equity. That is why the degree of self-financing has to be considered in conjunction with the degree of financial independence.

In 2014, the globalised average degree of financial independence of large firms remained more or less stable, at 44.2 %, while in the case of SMEs the ratio recovered, regaining its 2012 level (39 %), after having fallen sharply in 2013 following the reduction in operating profits, which meant a smaller transfer to the equity. Since 2011, the globalised financial independence of large firms has remained fairly constant, whereas it had previously risen steadily and was boosted from 2005 by the introduction of the tax allowance for risk capital, also known as the notional interest deduction. This notional interest scheme brought an inflow of foreign capital into Belgium, primarily in the "head office activities" branch which is not

CHART 7 FINANCIAL INDEPENDENCE AND DEGREE OF SELF-FINANCING FOR BELGIAN COMPANIES

(in %)



Source: NBB.

(1) Including the "head office activities" branch.

included in the population of this study. However, to illustrate recent developments in head office activities, the sector is included in an additional ratio in the first part of chart 7. In recent years, the notional interest deduction has become less attractive, partly because the basic interest rate used for the deduction has declined year by year (more specifically falling to 1.630 % for the 2016 tax year, compared to 4.473 % for the 2010 tax year) and partly because, since the 2013 tax year, firms have no longer been able to carry forward to a later year any interest in excess of the tax base. The less favourable notional interest conditions are reflected in a more stable globalised average degree of financial independence of companies. In the "head office activities" branch, financial independence actually decreased, because those companies are now less inclined to hold their capital in Belgium.

Over the past two years (2013-2014e), the globalised ratio of the degree of self-financing of large firms declined while the median continued to rise. The fall in the globalised average is probably due to an accounting transaction whereby the reserves were cut by an amount allocated to the capital. That transaction was applied under a transitional arrangement in the context of the increase in the withholding tax on liquidation surpluses, decided on by the former Finance Minister Koen Geens in November 2013. At the time of the March 2013 budget review, it was decided to raise the rate of the withholding tax on liquidation surpluses from 10 to 25 % with effect from 1 October 2014. A liquidation surplus corresponds to the funds that a dissolved company assigns to its shareholders in addition to the repayment of the paid-up capital, which is in principle tax free. In order to prevent a spate of active companies going into liquidation, Minister Geens devised a transitional arrangement in November 2013 whereby a firm could distribute a part of its taxed reserves as they stood at 31 March 2013 at the lower rate of withholding tax (10 %) prevailing at that time, provided they were immediately incorporated in the paid-up capital. That part of the paid-up capital can subsequently [1] be distributed free of tax as if it had always been part of the paid-up capital. This was a way of avoiding the higher rate of 25 %. Under this scheme, the distribution of dividends and the simultaneous increase in the capital could take place respectively after 1 July 2013 and before 1 October 2014, depending on whether the company's financial year conformed to the calendar year. Companies used this transitional arrangement, triggering a reduction in the degree of self-financing in 2013 and in 2014 (estimate). That fall is not very meaningful, especially as it was not accompanied by any decline in the level of equity capital, since shareholders immediately had to pay back the dividends received (which were deducted from the reserves) into the company's capital.

According to the notification by the Council of Ministers dated 15 October 2014, the current government decided, when preparing the 2015 budget, that SMEs (as defined in Article 15 of the Company Code) could retain the option of avoiding the higher rate of withholding tax if they created a liquidation reserve [2].

TABLE 5 NOTIONAL INTEREST DEDUCTION RATES
(in %)

Tax year	Basic rate	Higher rate for SMEs
2007	3.442	3.942
2008	3.781	4.281
2009	4.307	4.807
2010	4.473	4.973
2011	3.800	4.300
2012	3.425	3.925
2013	3.000	3.500
2014	2.742	3.242
2015	2.630	3.130
2016	1.630	2.130

Source : FPS Economy.

3.2.2 Average interest charges on financial debts and breakdown by type of financial debts

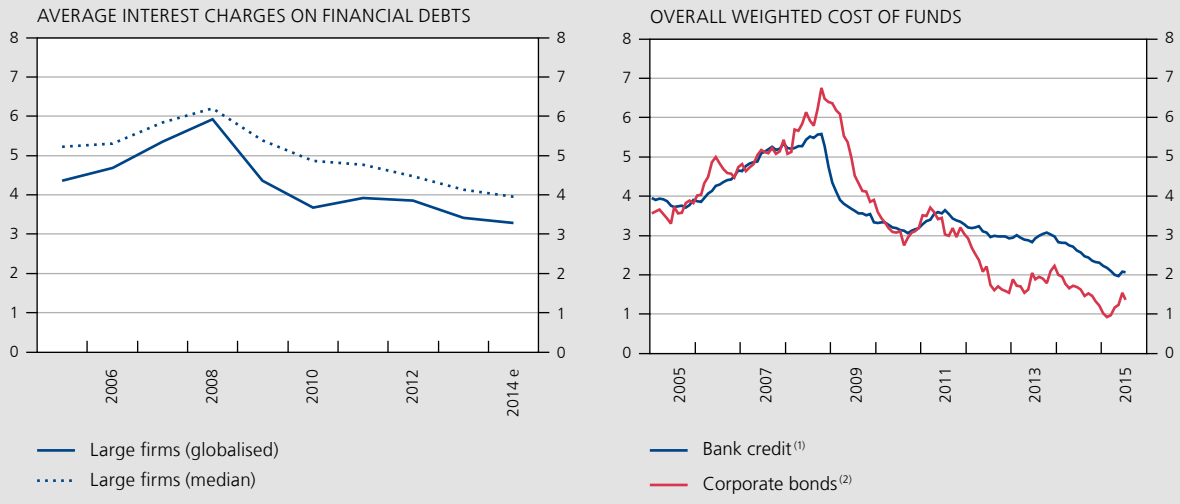
Chart 8 shows the trend in average interest charges on financial debts contracted by large firms, calculated as the ratio between the cost of the debts and the sum of the short- and long-term financial debts. That ratio is only estimated for large firms because SMEs do not provide detailed information on the interest charges on their debts. The average interest charges, in terms of both globalised figures and medians, peaked in 2008 and then subsided to their lowest level in 2014 (3.3 % for the globalised average, 4 % for the median). The ratio follows the same pattern as the weighted average cost applied by Belgian banks to new business loans, and also tracks

(1) The period for which the sums incorporated in the capital must be kept there before being distributed free of tax is four years for SMEs and eight years for large firms, with effect from the date of the capital increase.

(2) From the 2016 tax year onwards, instead of distributing profits to their shareholders, SMEs can retain the profits in the business and pay a 10 % advance withholding tax on those gains. In so doing, they avoid paying any additional withholding tax on liquidation. However, they have to keep the retained profits in the business until the company is wound up. If the retained profits are distributed in the form of dividends within five years, an additional 15 % withholding tax will be levied. If they are distributed after five years, an additional 5 % withholding tax is payable.

CHART 8 FINANCING COSTS

(in %)



Sources: NBB, Thomson Reuters Datastream.

(1) Weighted average rate charged by Belgian banks on new loans to businesses. The weighting is based on amounts outstanding for the various types of credit.

(2) Yield of an index of euro-denominated bonds issued by Belgian non-financial corporations, all maturities combined; index weighted by outstanding amounts.

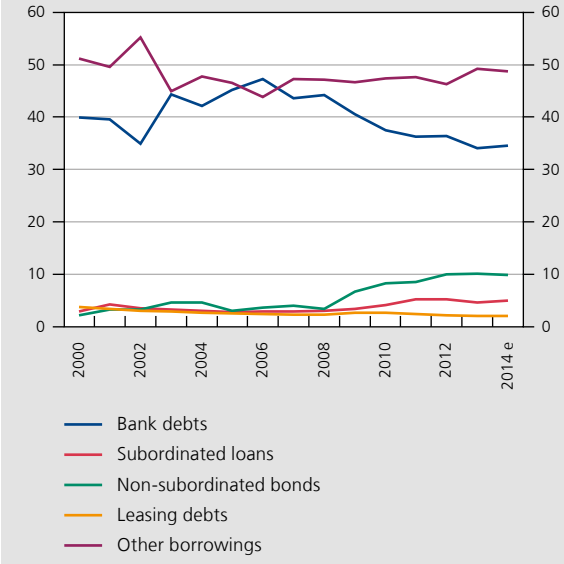
the corporate bond yield (see part 2 of chart 8). In 2014, both the cost of bank credit and the yield on corporate bonds fell sharply, largely as a result of a new cut in the ECB's key interest rate and a continuing decline in money market rates (particularly long-term rates).

Although the cost of financing bank loans has fallen to a historically low level in recent years, not all entrepreneurs took an equally favourable view of the non-monetary conditions attached to new bank loans.

According to the NBB's quarterly survey on the assessment of credit conditions, it emerges that, since 2014, the average business leader has become more optimistic about the general conditions governing access to new bank loans, for the first time since the second quarter of 2011. The easing of conditions was more evident for large firms than for SMEs. This favourable trend resulted mainly from the decline in interest rates, whereas the assessment of the non-monetary conditions deteriorated, albeit less significantly. According to the SAFE survey ("Survey on the Access to Finance of small and medium-sized Enterprises in the euro area"), a poll of Belgian SMEs reveals that it is mainly firms with a better balance sheet position which have found it easier to attract external funding. These two surveys indicate that the "non-monetary conditions for obtaining a new bank loan" are more rigid in the case of SMEs. This is a key point for attention, since the

CHART 9 SHARE OF THE VARIOUS TYPES OF FINANCIAL DEBTS, IN THE CASE OF LARGE FIRMS

(in %)



Source: NBB.

Belgian economy has a high concentration of SMEs and, for those firms, bank loans are by far the main source of debt financing.

For large firms, it is easier to obtain not only bank loans but also other forms of external funding (see chart 9). Thus, since 2006, large firms have steadily reduced their recourse to bank debts: their proportion has fallen from 47 % in 2006 to 34 % in 2014. External funding was raised by issuing corporate bonds (4 % in 2006, compared to 10 % in 2014) and contracting "other loans" (up from 44 % in 2006 to 49 % in 2014), mainly intra-group loans.

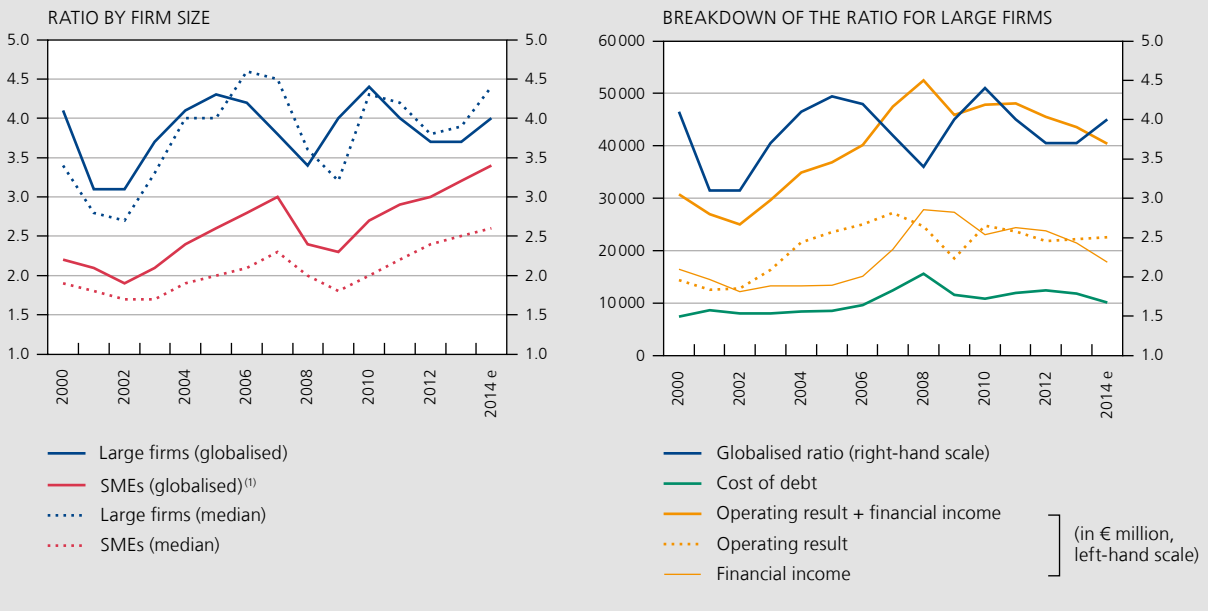
3.2.3 Times interest earned ratio

As stated above, a firm's solvency position can be determined by the degree to which it can afford the fixed interest charges on borrowings, even when its operating result and financial income are less favourable. That can be measured by the times interest earned ratio, which is the ratio between the company's net operating result plus financial income and the interest charges on its bank debts and bond loans. We choose to take account of financial income as well because that can be fairly substantial in the case of some large firms, especially if they hold shares in other firms or if the company lends funds to other firms in the same group, notably in the form of cash pooling.

If the coverage ratio is less than 1, the company does not generate sufficient operating profits or financial income to honour its interest liabilities. In both globalised and median terms, the times interest earned ratio is higher than 1 for both large firms and SMEs during the period considered (2000-2014e). The ratios of large firms are considerably higher than those of SMEs. There are two reasons for that difference: first, large firms receive more financial income from participating interests or cash pooling remuneration than SMEs, and second, debt charges are relatively higher for SMEs, especially as their debt ratio exceeds that of large firms (see chart 7).

In the period 2000-2006, the globalised coverage ratio of large firms tracked the trend in the total operating result realised and the financial income. After 2006, the coverage ratio was driven down by the rise in interest charges, attributable to the increased cost of external funding in the case of both bank credit and corporate bonds (see chart 8). The coverage ratio dropped to a low point in 2008 following the financial crisis. From 2009 onwards, the ratio recovered thanks to a sharp fall in the cost of bank loans and corporate bonds which outweighed the decline in the operating results. In 2010, the operating results picked up thanks to a revival in economic activity which reinforced the rise in the coverage

CHART 10 THE TIMES INTEREST EARNED RATIO AND ITS COMPONENTS



Source: NBB.
(1) The times interest earned ratio of SMEs includes in the denominator "all financial charges" since the SMEs' abridged formats do not give any details on "the cost of debt".

TABLE 6 TIMES INTEREST EARNED RATIO AT THE LEVEL OF BRANCHES OF ACTIVITY, FOR LARGE FIRMS

	2007	2008	2009	2010	2011	2012	2013	2014 e	Share of "cost of debt" in 2014 e (in %)
Manufacturing industry	**4.17**	**3.53**	**4.52**	**5.49**	**4.60**	**4.28**	**4.12**	**5.55**	**28**
of which :									
Agri-food industries	3.97	2.57	4.55	3.69	3.36	3.39	3.11	4.56	8
Textiles, clothing and footwear	3.22	1.56	2.61	3.80	3.18	3.98	3.88	6.23	1
Wood, paper and printing	2.84	2.69	2.55	3.77	3.96	3.16	2.96	2.90	2
Chemicals industry	3.44	2.50	3.39	4.96	4.33	4.44	3.74	5.88	7
Pharmaceuticals industry	5.11	7.83	13.27	9.94	7.49	6.39	7.46	7.32	1
Metallurgy and metalworking	6.11	2.85	1.60	4.04	2.79	0.97	2.48	4.10	3
Metal manufactures	7.71	6.18	5.07	7.09	6.96	7.13	8.09	9.15	3
Non-manufacturing branches	**3.58**	**3.25**	**3.65**	**3.87**	**3.77**	**3.39**	**3.51**	**3.35**	**72**
of which :									
Trade in motor vehicles	4.94	2.24	2.88	4.21	5.72	4.24	4.64	6.27	1
Wholesale trade	3.65	3.48	3.93	5.58	4.94	4.49	5.17	6.78	7
Retail trade	5.55	3.98	4.38	4.42	5.11	4.57	4.26	3.07	3
Transport and storage	4.02	4.53	4.49	3.15	2.22	3.01	2.98	2.15	7
Hotels, restaurants and catering	2.12	1.89	1.78	2.40	2.57	1.58	2.30	4.41	1
Information and communication	3.86	4.43	4.36	4.08	4.40	3.75	3.03	2.84	7
Real estate activities	1.80	1.73	1.51	1.31	1.66	1.66	1.60	1.52	9
Other business services	3.32	3.09	2.69	3.76	3.64	3.62	4.16	4.56	8
Energy, water and waste	2.99	2.31	3.60	3.39	3.29	2.81	2.48	2.06	17
Construction	5.04	4.57	4.72	4.81	4.42	4.17	4.62	4.27	4
Total	**3.81**	**3.36**	**3.96**	**4.40**	**4.04**	**3.66**	**3.70**	**3.98**	**100**

Source : NBB.

ratio. In 2011-2012, the ratio dipped as a result of an economic downturn. The past two years have brought a very cautious recovery in both economic growth and the operating results. That improvement, associated with a new fall in the cost of bank credit and an even bigger decline in the cost of bond loans, in a situation where that type of borrowing is increasingly used as a form of external funding (see chart 9), accounts for the positive trend in the coverage ratio of large firms.

The trend in the globalised coverage ratio of SMEs matches that of large firms, except in 2011 and 2012 when the economic recession made less impact on the operating profits of SMEs.

Table 6 shows that the coverage ratio of large firms in manufacturing industry is higher than that in non-manufacturing industry. In addition, the difference in value increases after the financial crisis. The explanation lies in a bigger reduction in interest liabilities in industrial firms following a sharper rise in the degree of self-financing in industrial companies and a more substantial fall in the rate of investment in tangible fixed assets in manufacturing industry since 2008.

The "times interest earned ratio" is persistently low in the "real estate activities" branch because firms in the property sector have a fairly high financial debt ratio (short- and long-term financial debts in relation to the balance sheet total), averaging 41 % over the period 2007-2014e, while the average figure for large firms is 32 % over the same period. The pharmaceuticals and metalworking industries tend to have a fairly high coverage ratio because these sectors opt to make limited use of financial debts to fund their activities (13 % and 20 % respectively).

The industrial branches with the highest "cost of debt" ratio are the agri-food industry and the chemicals industry. In these two sectors, the times interest earned ratio is influenced mainly by the operating profits and financial income. The sharp rise in the coverage ratio in the agri-food industry in 2009 and 2014e is due on both occasions to the exceptional increase in dividends on participating interests in a few large firms, whereas in the chemicals sector the estimation of the ratio for 2014 reveals a marked rise in the operating profits thanks to the reduction in operating costs resulting from the fall in commodity prices. In addition, a large firm in the basic chemicals sector exerted further influence on the coverage ratio as a result of increased income from participating interests.

The main branches (in terms of cost of debt) of the non-manufacturing industry, present a varied picture for the coverage ratio. Here, too, the divergences in the times interest earned ratio were determined mainly by fluctuations in the operating results and financial income. As a capital-intensive sector, the "energy, water and waste" branch represents a large proportion of the total "cost of debt" of large firms. This branch of activity has posted lower operating results since 2012 owing to the sluggish economic climate, increased competition, the persistent decline in margins on sales of electricity and natural gas, and the heavy regulatory pressure imposed by the government. Furthermore, in 2014, the financial income of the biggest Belgian electricity producer diminished owing to the disappearance of dividend income which had been exceptionally high in 2013. That explains the reduction in the coverage ratio in the energy sector during the past few years.

According to the estimates, the coverage ratio of the "transport and storage" branch dropped to its lowest level in 2014, as a result of specific events such as the radical reorganisation of one operator and a substantial write-down of inventories by one firm managing natural gas reserves.

Since large firms in the wholesale trade use financial debts to fund a constant proportion (22 %) of their total assets, the reduction in interest charges on bank debts and corporate bonds accounts for a decline in the cost of debt. At the same time, the operating profits realised in the wholesale trade were significantly influenced by the results in manufacturing industry, owing to the close link between the two branches of activity.

(1) See https://www.ecb.europa.eu/paym/coll/risk/ecaf/html/index.en.html.
(2) An article on the Bank's in-house credit assessment system will be published at a later date.

3.3 Credit risk

In 2015, the ECB approved the Bank's In-house Credit Assessment System (ICAS)[1][2], so the system can now be used to assess the credit quality of Belgian non-financial corporations in the context of the Eurosystem monetary policy. Credit quality is a measure of the default risk. It also permits the calculation of a risk indicator per branch of activity. Chart 11 illustrates, for the various branches, the movement in the quartiles (first quartile, median and third quartile) of the sectoral credit risk for SMEs and large firms. The quarterly data show the changes from mid-2012 up to the second quarter of 2015. The higher the upper (third quartile) and lower (first quartile) lines, the higher the estimated credit risk. Consequently, the chart indicates that this risk is more dispersed, and therefore greater, for SMEs than for large firms. It is also possible to deduce that large firms operating in the pharmaceuticals industry had the lowest credit risk over the period as a whole. Similarly, in chemicals, the food industry and the "energy, water and waste" branch, the credit risk of large firms is relatively low. Unsurprisingly, firms in the hotels, restaurants and catering sector have a fairly high default risk.

For SMEs with a higher default risk (within the coming year) (third quartile), the credit risk seems to have declined in most branches of activity in the second quarter of 2015. More recent data will confirm whether that trend is continuing.

The findings presented briefly above on the basis of the trend in the credit risk broadly confirm the results of the ratio analysis discussed in the preceding sections. Thus, the higher rate of self-financing in large firms suggests that their credit risk is lower, and chart 11 confirms that. The observation that large firms in the pharmaceutical and metalworking industries make less use of financial debts to fund their activities also implies that those firms have a lower credit risk. Another point worth noting is that, in order to calculate the credit risk indicator, several ratios are combined and in some cases they are even supplemented by expert analysis. Unlike the ratios, which are calculated solely from the annual accounts, the risk indicator is also available for more recent periods, implying a significant advantage for this indicator and making it possible to enhance traditional analysis

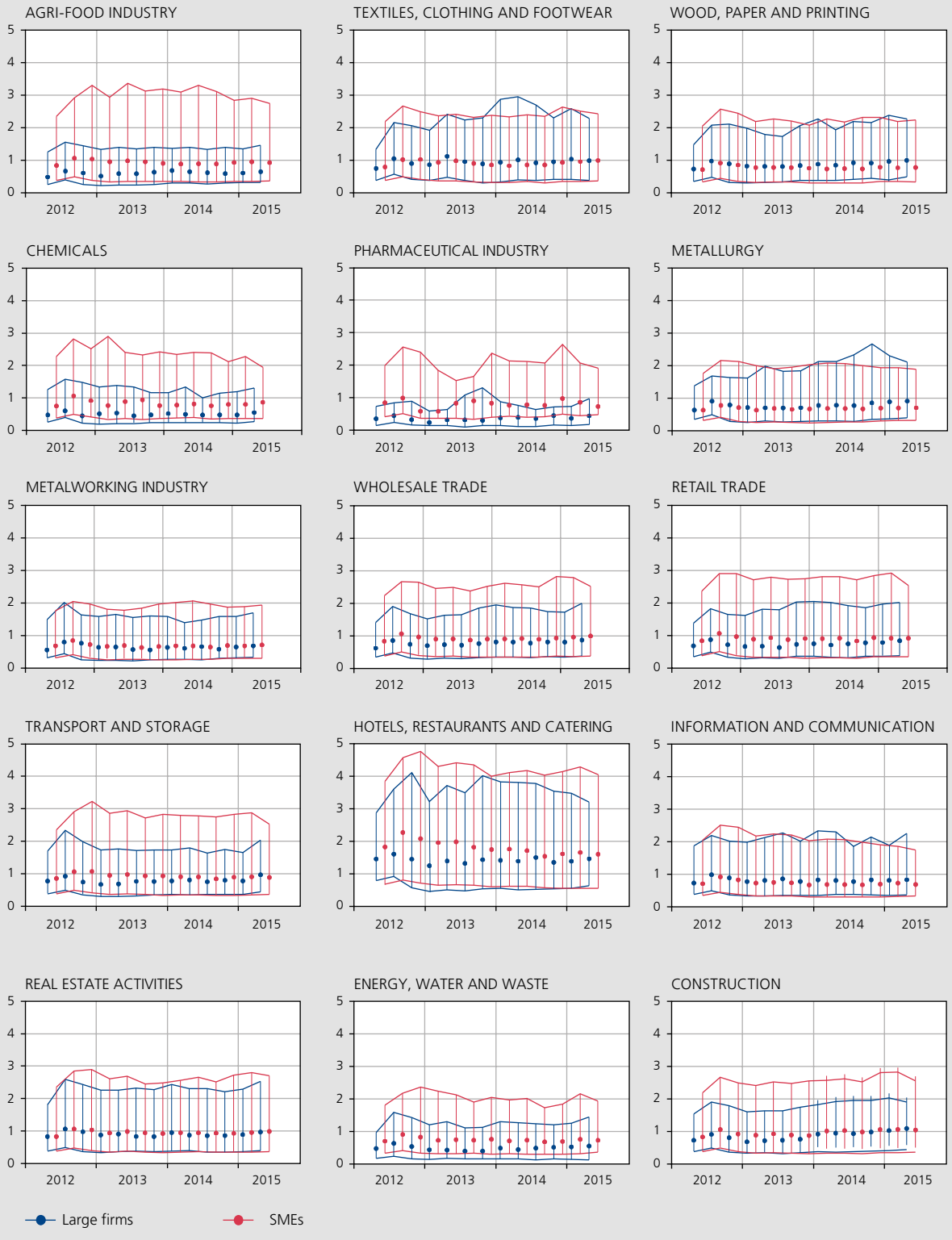
4. Payment periods and default risk

4.1 Recent developments

This section discusses the recent developments concerning the payment periods of customers and suppliers in so

CHART 11 CREDIT RISK BY BRANCH OF ACTIVITY AND FIRM SIZE

(in %, showing quartile 1, the median and quartile 3)



Source: NBB.

far as they can be calculated from the annual accounts. These two ratios offer an indication of the liquidity of trade debts and receivables. They are defined in full in Annex 2. Broadly speaking, they can be interpreted as follows:

– The days sales outstanding (DSO) is the ratio between trade receivables and sales, multiplied by 365. The lower this ratio, the sooner the firm is paid by its customers, and vice versa.
– The days payable outstanding (DPO) is the ratio between trade debts and purchases, multiplied by 365. The lower this ratio, the sooner the firm pays its suppliers, and vice versa.

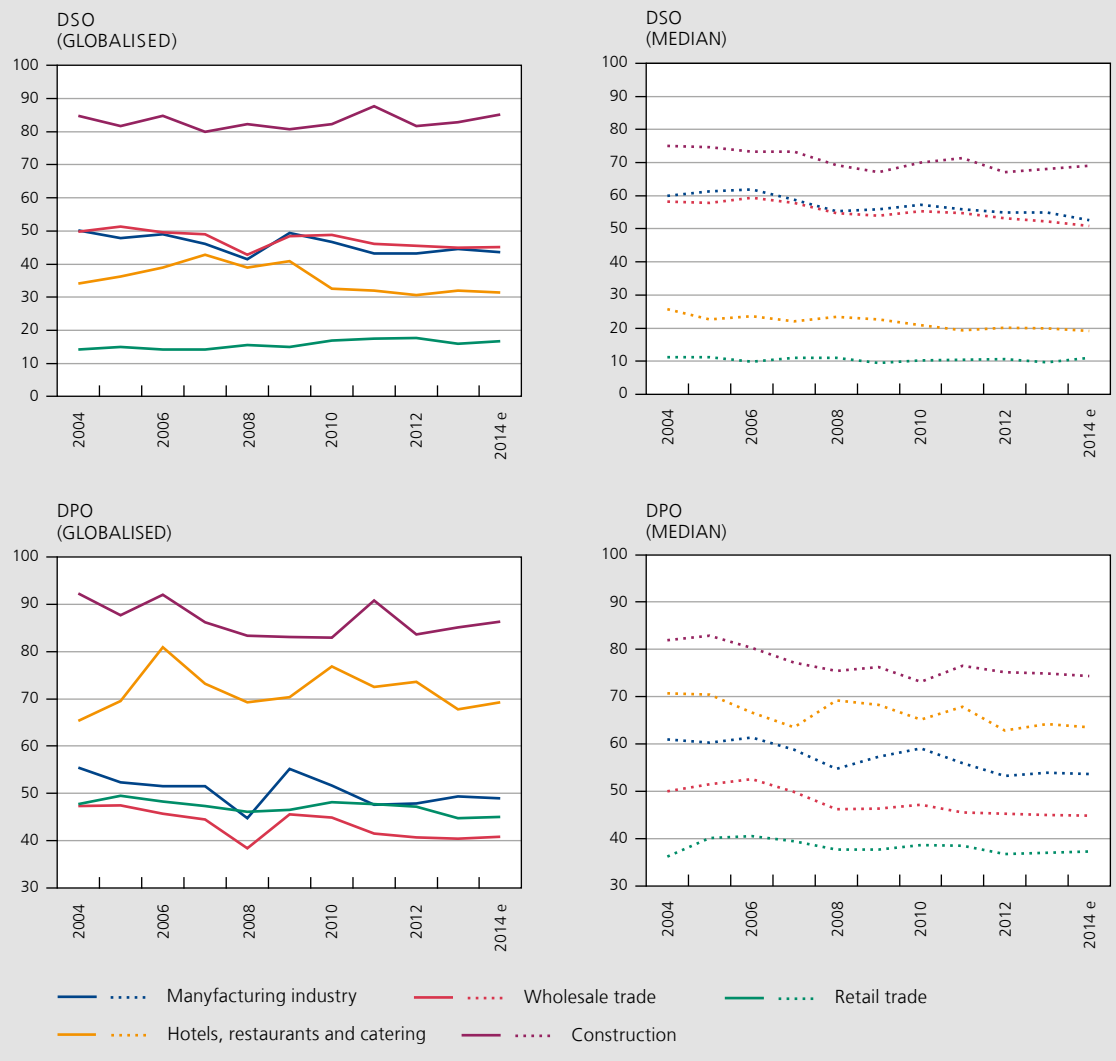
These ratios are discussed here only in the case of companies filing full-format accounts. They could be calculated in the case of abridged formats stating figures for turnover and purchases; however, such statistics would cause considerable bias since the number of abridged format accounts including that optional information has fallen sharply in recent years[1].

Another important point is that the payment period ratios compare flows (sales or purchases made over the financial year as a whole) with stocks which tend to fluctuate

(1) For example, the number of abridged format accounts for which the DSO can be calculated declined from 55 351 in 2004 to 27 329 in 2013.

CHART 12 AVERAGE DSOs AND DPOs

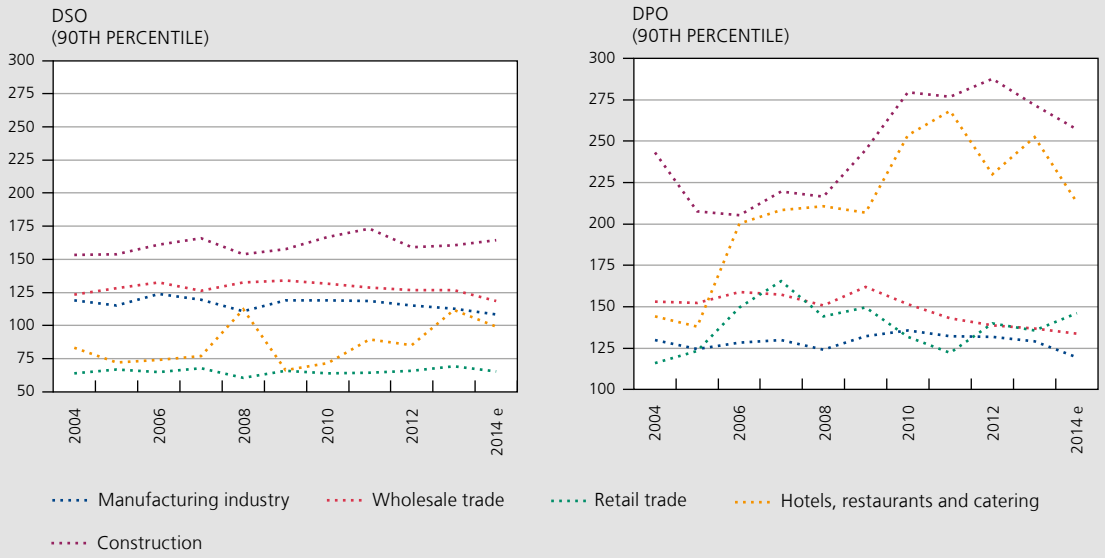
(number of days, large firms)



Source: NBB.

CHART 13 90TH PERCENTILE OF DSOs AND DPOs

(number of days, large firms)



Source: NBB.

(trade debts or receivables as at the end of the financial year), and which are not necessarily representative[1].

Chart 12 shows the trend in the ratios for a selection of fairly homogenous branches of activity. It emerges that, in terms of both medians and globalised figures, payment periods have displayed a slight downward trend overall during the past ten years. The business cycle causes hardly any variation in the values. Only the globalised DPO lengthened in certain branches following the 2008-2009 recession, but the increase was very small. Chart 12 also reveals certain specific, sectoral characteristics, including more especially the prompt payments in the retail trade and, conversely, the longer payment periods in construction. It is evident that, since households make up a large part of the clientele, the retail trade and the hotels, restaurants and catering sector use inter-firm credit as a structural source of funding, since suppliers' payment periods are much longer than those of customers.

In order to isolate the companies postponing their payments the longest, chart 13 shows developments at the extreme of the distribution. In the case of DSO, the 90th percentile of the ratio has been very stable over the past ten years, indicating that the proportion of companies paid (very) late by their customers has not risen despite the adverse economic conditions. The situation is more mixed at the extremity of the distribution of DPO: while the 90th percentile has fluctuated very little in industry and trade, it increased sharply in construction and in hotels, restaurants and catering, particularly after the 2008-2009 recession, before subsiding again in recent years.

Except in a few cases, credit periods therefore vary little according to the economic climate. That seems at odds with the sharp rise in bankruptcies over the recent period (see chart 1), since payment delays are commonly acknowledged as a cause of bankruptcy[2]. It should also be remembered that the ability to repay creditors is central to the legal definition of bankruptcy: Article 2 of the Law of 8 August 1997 stipulates that "any trade who persistently fails to effect payment and who is no longer considered creditworthy is in a bankruptcy situation."

4.2 Link with default risk

In view of this counter-intuitive pattern of credit periods as calculated on the basis of the annual accounts, it was necessary to examine whether those periods are genuinely a symptom of financial vulnerability. To that end,

(1) A number of remarks concerning accounts can be made in connection with these ratios. See for example Ooghe and Van Wymeersch (2006), Traité d'analyse financière, Intersentia, Antwerp-Oxford.

(2) See for example Graydon (2008), Het bedrijf in moeilijkheden voorbij, www.graydon.be.

TABLE 7 DSOs, DPOs AND RISK OF FAILURE
(2011 financial year)

	Number of observations	Average	Confidence interval of the average (95 %)	
DSO				
Manufacturing industry (p = 0.92)				
Non-failing firms	3 058	68.7	66.8	70.6
Failing firms	53	69.4	53.8	85.1
Construction (p = 0.40)				
Non-failing firms	1 366	85.1	81.5	88.8
Failing firms	29	92.3	75.5	109.1
Wholesale trade (p = 0.77)				
Non-failing firms	3 907	68.3	66.6	70.1
Failing firms	40	65.7	45.7	85.8
Retail trade (p = 0.65)				
Non-failing firms	1 032	27.8	24.9	30.8
Failing firms	15	24.3	7.9	40.7
DPO				
Manufacturing industry (p = 0.13)				
Non-failing firms	3 058	67.7	65.8	69.7
Failing firms	53	79.4	65.7	93.2
Construction (p = 0.78)				
Non-failing firms	1 366	93.5	89.6	97.5
Failing firms	29	89.6	68.8	110.5
Wholesale trade (p = 0.38)				
Non-failing firms	3 907	60.2	60.2	64.0
Failing firms	40	72.7	48.6	96.9
Retail trade (p = 0.92)				
Non-failing firms	1 032	54.3	51.0	57.7
Failing firms	15	55.8	16.5	95.1

Source : NBB.

we analysed the differences between failing and non-failing companies, a company being regarded as failing if bankruptcy proceedings are brought against it within 1 095 days (i.e. three times 365 days) following the year-end date of its annual accounts. All other companies are regarded as non-failing. This was the definition used for developing the financial health indicator included in the Central Balance Sheet Office company files.

Table 7 presents various statistics on the average credit periods for the 2011 financial year, enabling us to examine the bankruptcies which occurred in 2012, 2013 and 2014. The first point to be made is that the proportion of failing companies after three years is small : it comes to 1.6 % in industry, 2.1 % in construction, 1 % in the wholesale trade and 1.4 % in the retail trade[1]. As pointed out in the previous section, these findings only concern large firms for which credit periods can be calculated. The failure rate after three years is considerably higher for non-financial corporations in general (2.9 % in 2011).

The data are winsorised for the 5th and 95th percentiles in order to neutralise the impact of extreme values on the calculation of the average : values below the 5th percentile were equalised at the 5th percentile, while values above the 95th percentile were equalised at the 95th percentile. On that basis, the averages and corresponding confidence intervals were calculated. The difference between the averages of the two groups was also tested by means of the Student's

(1) Hotels, restaurants and catering were excluded from the analysis because there were insufficient observations in the branch (namely 229, with only one failure).

t-test. The result of that test is synthesised by the value p, which represents the probability of an error in the event of rejection of the assumption that the two averages are equal. In simple terms, that means that the lower the probability, the more credible it is that the two averages diverge.

In regard to DSOs, table 7 shows that the average of the failing firms is higher than that of non-failing firms in industry and construction, whereas it is lower in the wholesale and retail trade. This means that, on average, firms at risk are paid later in some branches and earlier in others. However, the dispersion is very considerable in the case of failing firms, as is evident from the very wide confidence intervals for those firms. In all the branches analysed, the confidence interval of failing firms overlaps with that of non-failing firms, and the result of the Student t-test also indicates that the averages do not differ significantly.

These results point to a wide variety of payment situations concerning customers, and the ambivalence of the variable for the financial diagnosis. On the one hand, firms in difficulty ought to insist on being paid more promptly in order to resolve their cash flow problems; on the other hand, their financial difficulties could actually be due to late payment by their customers. Vulnerable firms may be placed at a disadvantage by a range of factors that hamper the speedy collection of sums due, such as a lack of bargaining power, a poor image or an inefficient organisation. In general, the time taken to pay trade receivables is partly exogenous to the firm, in that it depends on customers' behaviour.

In regard to the time taken to pay suppliers, the average of failing firms is higher in three out of four branches, but as the t-test indicates, the difference is not statistically significant, except in industry. The values are also very widely dispersed for failing firms, which again suggests a great variety of situations: while firms in difficulty tend in principle to pay their suppliers late, that may also apply to sound firms which, owing to their bargaining power or reputation, are able to obtain an extended credit period from their trading partners. Conversely, the suppliers of firms in difficulty may be inclined to insist on payment in cash, which in that case contributes to a reduction in payment periods.

In conclusion, DSOs and DPOs are of little statistical significance for the purpose of detecting firms in difficulty. That explains why the recent economic climate has had very little impact on them overall. Nor are these variables included in the failure prediction models developed by the Bank. It should be remembered that this conclusion only concerns payment periods which can be calculated from the annual accounts, which implies a number of assumptions and accounting reservations (see section 4.1).

For comparison, table 8 presents the same statistics for a solvency ratio (financial independence) and a profitability ratio (net return on assets), two dimensions of financial analysis which traditionally play a leading role in default models. It is evident that, on average, failing firms are systematically and significantly less solvent and less profitable than non-failing firms. Moreover, in almost all cases the confidence intervals do not overlap. These results are a little less transparent in the retail trade, notably in regard to financial independence, and that is due partly to the very small number of failing firms observed in that branch.

Finally, chart 14 illustrates the financial dynamics of failure on the basis of the four ratios mentioned above. For that purpose, the annual accounts are identified according to the failure's proximity in time, the failure period being defined as the difference between the bankruptcy date and the closing date of the financial year. All the annual accounts are given one of the following codes:

- DEF01: if the failure period is ≤ 365 days;
- DEF02: if 365 days < failure period ≤ 730 days;
- DEF03: if 730 days < failure period ≤ 1 095 days;
- ...
- DEF10: if 3 285 days < failure period ≤ 3 650 days;
- NODEF: if the annual accounts relate to a non-failing company (in the 3 650 days following the closing date of the financial year).

Using this typology, it is possible to observe changes in the statistical distribution of the ratios as the bankruptcy approaches, illustrated in the form of box plots in chart 14. It emerges that the distribution of the DSO does not change significantly either up or down in the transition from group NODEF to group DEF01. The distribution of the DPO moves upward overall, with a gradual increase of around twenty days for all parameters of the distribution, except for the 10th percentile, which remains very stable. However, as in the case of the DSO, the dispersion is very marked and the distributions overlap to a considerable degree: in the non-failing group, the DPO of 90 % of firms falls between 17 (10th percentile) and 178 days (90th percentile); in the group of failing firms at one year, the 10th percentile comes to 23 days and the 90th percentile to 200 days.

In contrast, the dynamics are much more obvious in regard to profitability and financial independence: when failure is approaching, the two ratios deteriorate and that affects the whole of the distribution. The deterioration

TABLE 8 SOLVENCY, PROFITABILITY AND FAILURE RISK
(2011 financial year)

	Number of observations	Average	Confidence interval of the average (95 %)	
Degree of financial independence				
Manufacturing industry (p = 0)				
Non-failing firms	3 058	40.8	39.7	41.8
Failing firms	53	14.7	6.3	23.2
Construction (p = 0)				
Non-failing firms	1 366	32.5	31.0	34.0
Failing firms	29	0.9	–10.1	11.9
Wholesale trade (p = 0)				
Non-failing firms	3 907	36.2	35.2	37.2
Failing firms	40	8.0	–2.5	18.5
Retail trade (p = 0.16)				
Non-failing firms	1 032	30.4	28.2	32.7
Failing firms	15	17.0	–5.1	39.2
Net return on assets				
Manufacturing industry (p = 0)				
Non-failing firms	3 058	5.6	5.2	6.0
Failing firms	53	–3.2	–7.2	0.8
Construction (p = 0.03)				
Non-failing firms	1 366	6.5	5.9	7.1
Failing firms	29	–0.9	–7.7	5.8
Wholesale trade (p = 0)				
Non-failing firms	3 907	7.7	7.3	8.0
Failing firms	40	–1.2	–5.5	3.2
Retail trade (p = 0.01)				
Non-failing firms	1 032	5.7	4.9	6.5
Failing firms	15	–3.2	–12.5	6.0

Source : NBB.

is particularly marked in the years preceding the failure. Moreover, the dispersion of solvency and profitability tends to increase with the approach of the bankruptcy, once again testifying to the variety of situations applicable to failing firms.

The above findings indicate that the same value of a financial ratio may correspond to a multitude of real economic situations for a firm, in terms of the outlook for development, competition, management quality, or shareholders' inclination to provide financial support. They also mean that a strictly financial analysis based on the annual accounts must always be supplemented by a qualitative analysis which can take account of a firm's overall situation.

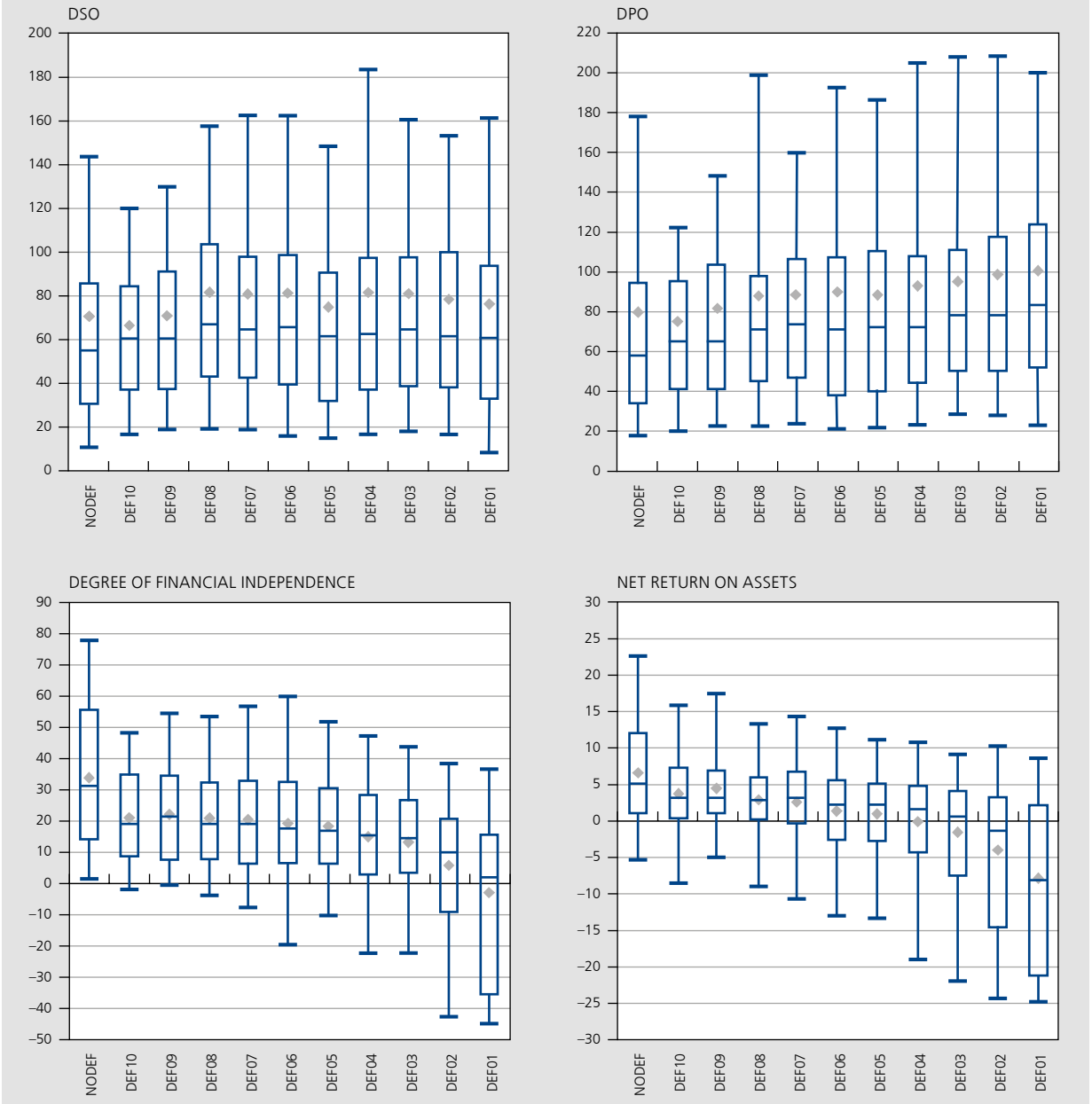
Conclusion

Over the year 2014 as a whole, the total value added created by non-financial corporations grew by 0.5 % at current prices. That was the lowest growth rate for more than 15 years, with the exception of 2009, and was due to the stagnation of both sales and purchases. In fact, the growth of value added has been clearly declining over the past four years.

Staff costs were down by 0.6 % in 2014 after having outpaced the growth of value added in the preceding years. This reduction in the wage bill is due essentially to the sharp fall in inflation (which was largely passed on in labour costs via the indexation mechanism),

CHART 14 DISTRIBUTION OF THE FINANCIAL RATIOS AND PROXIMITY OF FAILURE

(financial years 2003 to 2011, large firms, 147 666 observations)



Source : NBB.

The box plots are interpreted as follows. The lower and upper edges of the box correspond respectively to the 1st and 3rd quartiles. The line inside the box represents the median. The upper and lower ends of the whiskers correspond respectively to the 1st and 9th deciles. The grey dot indicates the average.

the freezing of real wage increases imposed by the government, and the decline in the number of workers (1 % in full-time equivalents in 2014). At the same time, the increase in depreciation slowed for the third consecutive year, confirming the cautious attitude towards investment that firms have been displaying now for several years.

Total operating expenses were down by 0.3 % in 2014, the first reduction in more than 20 years, largely as a result of the movement in staff costs and depreciation. Combined with the modest rise in value added, this led to a slight improvement (+3.9 %) in the operating result in 2014 to € 32 billion. In the past four years the operating result has been very stable overall, remaining at a level

which is still below the pre-recession peak of 2008-2009 (€ 36 billion).

In contrast to the long-term trend, the results of the manufacturing branches were more dynamic than those of the non-manufacturing branches in 2014, the main reason being a decline in costs: apart from the fall in labour costs, industry benefited from the drop in prices of commodities, particularly oil. The branches where lower costs had the most impact are metallurgy, basic chemicals and metal manufactures. Manufacturing industry itself achieved only very modest growth, as is evident from the sales figures (+0.6 % in 2014) and industrial production indices.

According to the estimate for 2014, the profitability ratios considered, exhibit a small increase for all firms, regardless of size. The profitability of large firms, greatly affected by the downturn in economic activity, declined in 2013 to its lowest level for ten – or in some cases even 15 – years. The cautious recovery in large firms in 2014 was due to an improvement in manufacturing industry. In recent years, SMEs' profitability has stood up better, as SMEs are not only less sensitive to the economic climate but are also less concentrated on industrial activities and international trade. Despite the lower level of net profitability of large firms in recent years, equities continue to offer a higher yield than Belgian government bonds.

Since 2011, the overall financial independence of large firms has remained fairly constant following the additional limits introduced by the government to reduce the attraction of using the notional interest deduction. Moreover, in the past two years there has been a decline in the rate of self-financing among large firms; that is no cause for concern, especially as there is no accompanying reduction in the level of their own funds. The lower rate of self-financing in 2013-2014 was due mainly to an accounting operation whereby the reserves were reduced by an amount which was added to the capital, via the application of the transitional measure in the context of the increase in the withholding tax on liquidation surpluses from 1 October 2014.

While the cost of financing bank loans has dropped to a historically low level in recent years, the non-monetary conditions for obtaining a new bank loan are tougher for SMEs than for large firms. This is an important point for attention, especially as SMEs are heavily represented in Belgium and bank loans are often the sole means of financing their debts. Large firms can more easily replace bank loans with other forms of borrowing, by issuing corporate bonds or contracting intra-group loans.

Whatever the firm's size and activity, the globalised "times interest earned ratio" is greater than 1 during the period 2000-2014e considered, which indicates that firms are able to pay their fixed interest charges out of the resources obtained from their operating profits and financial income. While the property sector has a permanently low coverage ratio owing to its high financial debt ratio, the pharmaceuticals and metallurgical industries record a constantly high ratio, as they fund their activities without incurring substantial financial debts. In the past two years, there has been a very hesitant recovery in both economic growth and operating results. That combined with a further fall in the cost of bank loans and corporate bonds explains the recovery of the globalised coverage ratio in 2014e, for both large firms and SMEs.

For Belgian non-financial corporations, the In-house Credit Assessment System (ICAS) can estimate the risk of default during the coming year. The ICAS findings broadly confirm the results obtained by the ratio analysis mentioned above. The risk indicator shows that SMEs with a higher risk of default (within one year) saw their default risk decline in the second quarter of 2015 in most branches of activity. More recent data will confirm whether that trend is persisting.

Finally, the last part of the article describes developments concerning the payment periods of customers and suppliers according to calculations based on the annual accounts. Except in a few cases, it is evident that payment periods hardly vary according to the economic situation, which seems at odds with the sharp rise in bankruptcies in the recent period, considering that it is commonly acknowledged that payment arrears are a cause of bankruptcy. In order to verify whether these variables constitute a genuine sign of financial vulnerability, a statistical comparison was conducted between failing and non-failing companies. Among other things, this revealed non-significant differences of average between the two categories of firms, and a very marked dispersion of values for failing firms, testifying to the wide variety of situations and explanatory factors. For example, as regards the payment of suppliers, while firms in difficulty are theoretically the most likely to delay paying their trading partners, that may also apply to sound businesses which, owing to their bargaining power or reputation, are able to secure extended credit periods. Conversely, suppliers of risky firms may be inclined to require them to pay cash, and that may tend to shorten the payment periods.

Annex 1

SECTORAL GROUPINGS

	NACE-BEL 2008 divisions
Manufacturing industry	**10-33**
of which :	
Agri-food industries	10-12
Textiles, clothing and footwear	13-15
Wood, paper products and printing	16-18
Chemicals industry	20
Pharmaceuticals industry	21
Metallurgy and metalworking	24-25
Metal manufactures	26-30
Non-manufacturing branches	**01-09, 35-82, 85.5 and 9** (1)
of which :	
Trade in motor vehicles	45
Wholesale trade (2)	46
Retail trade (2)	47
Transportation and storage	49-53
Accommodation and food service activities	55-56
Information and communication	58-63
Real estate activities	68
Business services (3)	69-82
Energy, water supply and waste	35-39
Construction	41-43

(1) Except 64, 65, 70100, 75, 94, 98 and 99.
(2) Excluding motor vehicles and motor cycles.
(3) Excluding head office activities (70100).

Annex 2

DEFINITION OF THE RATIOS

	Item numbers allocated	
	in the full format	in the abbreviated format
1. Ratio of new tangible fixed assets		
Numerator (N)	8169 + 8229 – 8299	8169 + 8229 – 8299
Denominator (D)	8199P + 8259P – 8329P	8199P + 8259P – 8329P
Ratio = N/D × 100		
Conditions for calculation of the ratio:		
12-month financial year		
8169 + 8229 – 8299 > 0 (1)		
2. Net margin on sales		
Numerator (N)	9901 + 9125	9901 + 9125
Denominator (D)	70 + 74 – 740	70
Ratio = N/D × 100		
Condition for calculation of the ratio:		
Simplified format: 70 > 0		
3. Net return on total assets before tax and debt servicing, excluding exceptional result		
Numerator (N)	9904 + 650 + 653 – 9126 + 9134 – 76 + 66	9904 + 65 – 9126 + 67/77 – 76 + 66
Denominator (D)	20/58	20/58
Ratio = N/D × 100		
Condition for calculation of the ratio:		
12-month financial year		
4. Return on equity, before tax, excluding the exceptional result		
Numerator (N)	9904 – 76 + 66 + 9134	9904 – 76 + 66 + 9134
Denominator (D)	10/15	10/15
Ratio = N/D × 100		
Conditions for calculation of the ratio:		
12-month financial year		
10/15 > 0 (1)		
5. Return on equity after tax, excluding the exceptional result		
Numerator (N)	9904 – 76 + 66	9904 – 76 + 66
Denominator (D)	10/15	10/15
Ratio = N/D × 100		
Conditions for calculation of the ratio:		
12-month financial year		
10/15 > 0 (1)		

(1) Condition valid for the calculation of the median but not for the globalised ratio.

DEFINITION OF THE RATIOS (continued)

	Item numbers allocated	
	in the full format	in the abbreviated format
6. Degree of financial independence		
Numerator (N)	10/15	10/15
Denominator (D)	10/49	10/49
Ratio = N/D × 100		
7. Degree of self-financing		
Numerator (N)	13 + 14	13 + 14
Denominator (D)	10/49	10/49
Ratio = N/D × 100		
8. Average interest expense on financial debts		
Numerator (N)	650	
Denominator (D)	170/4 + 42 + 43	
Ratio = N/D × 100		
Condition for calculation of the ratio:		
12-month financial year		
9. Times Interest Earned Ratio		
Numerator (N)	9901 + 75	9901 + 75
Denominator (D)	650	65
Ratio = N/D		
Conditions for calculation of the ratio:		
Full format: 650 > 0		
Abridged format: 65 > 0		
10. Customers' payment period		
Numerator (N)	40 + 9150	
Denominator (D)	70 + 74 – 740 + 9146	
Ratio = N/D × 365		
Conditions for calculation of the ratio:		
12-month financial year		
(40 + 9150) > 0		
11. Suppliers' payment period		
Numerator (N)	44	
Denominator (D)	600/8 + 61 + 9145	
Ratio = N/D × 365		
Conditions for calculation of the ratio:		
12-month financial year		
44 > 0		

Summaries of articles

Economic projections for Belgium – Autumn 2015

The article presents the new macroeconomic projections for Belgium for the period from 2015 to 2017, produced by the Bank as part of the Eurosystem's projection exercises.

Following the decline in foreign demand in the first part of the year, the recovery in the euro area has lost some momentum recently but the slowdown has remained contained as growth is still bolstered by the steep fall in oil prices, the depreciation of the euro and low interest rates, in a context of fiscal policies becoming less restrictive. According to the Eurosystem projections, real GDP in the euro area is set to expand by 1.7 % in 2016 and by 1.9 % in 2017. As for Belgium, the economic recovery continued at a modest pace in the first half of 2015 before running out of steam somewhat from the summer, against a backdrop of deteriorating business and household confidence.

According to our projections, after reaching 1.4 % in 2015, GDP growth in Belgium is likely to fall to 1.3 % in 2016 before reviving to 1.6 % in 2017. Growth in economic activity and the reduction in labour costs are expected to support net job creation which are set to reach a cumulative figure of 114 000 units over the period from 2015 to 2017, with the unemployment rate dropping to 8.1 % in 2017. Inflation has been heavily influenced by the fall in energy prices in 2015 and should amount to only 0.6 % this year. Inflation is expected to rise next year (to 1.9 %), owing to the rise in commodity prices, but primarily on account of the increase in indirect taxes. Under the impact of measures taken to boost competitiveness via wage moderation, unit labour costs growth in the private sector should remain very weak at least until 2016. Only taking account of the fiscal measures subject to the guidelines for the Eurosystem projections exercises, the public deficit is expected to fall only modestly over the projection horizon, from 3.1 % of GDP in 2014 to 2.5 % in 2017. Government debt is projected to stabilise at around 107 % of GDP.

JEL codes : E17, E25, E37, E66

Key words : Belgium, macroeconomic projections, Eurosystem

Sensitivity to the crisis of SME financing in Belgium

The article uses various qualitative and quantitative data sources to investigate how bank loans granted to Belgian SMEs were affected in the wake of the recent economic and financial crisis. Credit demand from SMEs declined, albeit to a lesser extent than demand from larger firms, which made more use of alternative instruments owing to their easier access to financial markets. On the supply side, survey data indicate that banks perceive SMEs as presenting a higher risk, so that they

apply tighter credit conditions to this type of firm. Firm-level data suggest that the increase in credit risk was mostly concentrated within a relatively small fraction of Belgian SMEs whose financial health deteriorated somewhat faster after the onset of the crisis. These divergent risk profiles seem to have been taken into account by Belgian banks in their credit policy. This is confirmed by an econometric analysis that links the financial situation of the SMEs to their access to bank credit. It shows that Belgian banks do indeed take account of the SMEs' financial situation but did not become more risk-averse after the onset of the crisis as far as existing lender-borrower relationships are concerned. However, they tended to favour lower risk profiles when granting loans to SMEs which were not part of their existing corporate clientele.

JEL codes: G21, G32

Key words: SME financing, bank lending, financial risk

Macroeconomic determinants of non-performing loans

The article analyses the credit risk in Belgium on the basis of bank asset quality indicators (i.e. non-performing loans, NPLs) and Central Credit Register data (i.e. payment arrears). These indicators show a relatively high asset quality in Belgium notwithstanding the further increase of the debt ratio of the non-financial private sector over the last years. Moreover, the distribution of households' assets and debt reveals some 'pockets of risk' as a significant proportion of households spend a large part of their income on debt payments and that part of outstanding debt is not well covered by financial assets. Against this background, the article aims to explain the variation in (mortgage) credit risk by means of both macroeconomic and structural determinants such as the business cycle and loan or bank characteristics. The findings show a clear link between macroprudential instruments – such as the debt-service-to-income (DSTI) ratio – and the probability of default (PD). Econometric results confirm that both structural and macroeconomic variables explain the variation in default rates on mortgage loans. Finally, there seems to be a feedback effect of NPLs on macroeconomic conditions in countries where the NPL ratio is high. While a deleveraging process and a reduction in the non-financial private sector's interest charges could help to reduce the NPL stock, additional structural reforms in those countries might be needed.

JEL codes: D31, C25, G20, G21, G32

Key words: non-performing loans, credit risk, debt distribution, macroprudential policy

Has the reorganisation of global production radically changed demand for labour?

The organisation of global production has undergone profound changes. Technological progress has spread widely through all sectors of the economy and has also helped to open up the production chains. The emerging – essentially Asian – countries have taken advantage of this trend towards globalisation and have gradually become the biggest manufacturers in the world. It is mainly capital and, to a lesser extent, highly-educated workers, that have gained from the growth of their industrial segment.

In Europe, there is also an evident impact on activity and employment. The composition of demand for labour has changed greatly over the past fifteen years. Medium-skilled occupations have come under pressure. These jobs have a foreseeable, repetitive content threatened by technological progress, or they belong to industrial segments which have been relocated in emerging countries. On the other hand, the reorganisation of global production has had less impact on highly-skilled and low-skilled jobs. The former are often ancillary to information and communication technologies, while the latter generally entail repeated interaction between the service provider and the recipient. These developments therefore point to a polarisation of demand for labour.

The article describes this dual tendency towards the reorganisation of global production and the polarisation of demand for labour, and examines the link between them in the recent period, by using new measures of the fragmentation of production.

JEL codes: E23, E24, J2, O33.

Key words: polarisation, labour demand, globalisation, technological progress

Monetary policy communication in the wake of the great recession

Central banks' transparency and openness have been given fresh impetus in the wake of the great recession. In that context, this article seeks to summarise the latest initiatives concerning communication by the Federal Reserve, the Bank of Japan, the Bank of England, and more particularly the Eurosystem. It also focuses on an aspect of central bank communication which is sometimes hidden but is no less important, namely its accessibility.

The article finds that the economic and financial crisis which erupted in 2008 prompted not only wider use of the existing tools but also the development of new means of communication. In addition, the crisis triggered a veritable revolution in the use of communication as a monetary policy instrument. Finally, it undeniably led to closer convergence in the way central banks conduct monetary policy and hence in their communication on the subject.

Except in the case of the Federal Reserve, it seems that the readability of monetary policy committee statements has not been impaired by the complexity of the economic environment and monetary policy decisions over the recent period. Communication by both the Bank of Japan and the Eurosystem would even appear to have become a little clearer in recent years. Monetary policy statements are nevertheless still far from being accessible to everyone, and there appears to be considerable scope for improving their readability.

JEL codes: E520, E580, N10

Key words: monetary policy, communication, effectiveness, accountability, central banks

Main CompNet research results

The Competitiveness Research Network (CompNet) was set up back in 2012 by the European System of Central Banks. Its initial objectives were to identify the determinants of European countries' and firms' competitive positions as well as their productivity and to set out the relationship between these different competitiveness factors and macroeconomic performance (exports or growth, for instance). It brought together more than a hundred research workers from fifty or so institutions (including central banks, the European Commission, international organisations, universities), leading to an in-depth study of the theme of competitiveness, as well as an analysis and better understanding of the development of global production chains. Particular effort has been devoted to establishing new competitiveness indicators. The objective of this article is to present the main findings of their work.

JEL codes: D22, E23, F14

Key words: survey, euro area, competitivity

Results of the third wave of the survey on wage-setting in Belgium

The article presents the main results for Belgium of the 2014 survey on firms' wage- and price-setting practices in the period 2010-2013, within the framework of the Wage Dynamics Network (WDN), an ESCB research project network. The results are generally in line with known characteristics of the labour market in Belgium and provide interesting insight into firms' perception of that market and on their reactions during the crisis. Firms indicated that customers' ability to pay and the level of demand had the strongest negative effect on their activity in the 2010-2013 period. Although credit constraint was not mentioned as a preponderant source of negative effects, it is still a significant factor, especially for some smaller firms. Even though the survey reveals relatively wide autonomy in price-setting, it is in practice limited by the strong effect of competition. Firms therefore have to use various adjustment channels. The survey confirms that the use of temporary lay-offs was also an important tool that explained the relative resilience of employment in Belgium. Moreover, firms highlight high taxes and high wages as major obstacles to hiring, together with uncertainties about economic conditions. A large proportion of firms – though not the majority – seem to share the perception that the labour market has become less flexible, which is intriguing as it cannot be directly related to labour market reform or institutional changes. In contrast to most other European countries, a specific feature of wage formation in Belgium is that, notwithstanding the wage moderation policy, there have been almost no wage cuts, and this is confirmed by the survey.

JEL codes: D21, E31, J31

Key words: survey, wages, prices, employment

Results and financial situation of firms in 2014

The article looks at the financial situation of non-financial corporations in Belgium over the period from 1 January to 31 December 2014. After briefly describing the methodology and the population studied, it presents an extrapolation of the main operating result items for 2014, with a sectoral and size breakdown. The article then assesses the financial situation of companies as regards profitability, solvency and investment. This year, a separate section presents an analysis of days sales outstanding and days payable outstanding.

JEL codes: G30, G33, L60, L80

Key words: firms' results, financial structure, financial leverage, credit risk, sectoral analysis, treasury

Abstracts from the Working Papers series

288. The Belgian production network 2002-2012, by E. Dhyne, G. Magerman; S. Rubínová, October 2015

The paper presents the Belgian inter-firm network for the years 2002 to 2012. Combining raw data from VAT listings, VAT declarations and annual accounts information, the authors build a unique and consistent database containing values of transactions between enterprises in the Belgian economy. The dataset spans Primary Industries, Manufacturing, Utilities, Market Services and Non-Market Services. This dataset, unparalleled in coverage at the firm-to-firm level and its panel dimension, allows to analyze a broad spectrum of research questions in industrial organization, international trade, network theory etc. As a simple example of the potential of this dataset, the authors evaluate the position of enterprises in the Belgian network, their distance to final demand and their relationship with exports and imports. The degree of upstreamness, defined as a weighted distance to final demand, of the average enterprise is 1.6, ranging between 1 and 9.5. While only 5 % of enterprises export, 82 % of the enterprises in the Belgian network are producing goods and services that are either directly or indirectly exported after transformation or use. On the import side, only 9 % of enterprises are importers but 99 % of firms are either importers or have importers in their supply chain and therefore consume imported inputs indirectly. However, the authors find large inter- and intra-sectoral as well as inter-regional heterogeneity in entreprise positions in the Belgian production network.

289. Portfolio choice and investor preferences: A semi-parametric approach based on risk horizon, by B. Hubner, T. Lejeune, October 2015

The paper proposes an innovative framework for characterizing investors' behavior in portfolio selection. The approach is based on the realistic perspective of unknown investors' utility and incomplete information on returns distribution. Using a four-moment generalization of the Chebyshev inequality, an intuitive risk measure, risk horizon, is introduced with reference to the speed of convergence of a portfolio's mean return to its expectation. Empirical implementation provides evidence on the consistency of the approach with standard portfolio criteria such as, among others, the Sharpe ratio, a shortfall probability decay-rate optimization and a general class of flexible three-parameter utility functions.

Conventional signs

e	estimate
e.g.	*exempli gratia* (for example)
etc.	*et cetera*
i.e.	*id est* (that is)
n.	not available
p.m.	*pro memoria*

List of abbreviations

Countries or regions

BE	Belgium
DE	Germany
EE	Estonia
IE	Ireland
EL	Greece
ES	Spain
FR	France
IT	Italy
CY	Cyprus
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	Netherlands
AT	Austria
PT	Portugal
SI	Slovenia
SK	Slovakia
FI	Finland
EA	Euro area
BG	Bulgaria
CZ	Czech Republic
DK	Denmark
HR	Croatia
HU	Hungary
PL	Poland
RO	Romania
SE	Sweden
EU	European Union
EU15	European Union of 15 countries, before the 2004 enlargement
UK	United Kingdom

CN	China
JP	Japan
US	United States

Other

AQR	Asset Quality Review
BE GAAP	Belgian Generally Accepted Accounting Principles
BLS	Bank lending survey
CA	Comprehensive assessment
CICR	Central Individual Credit Register
CME	Comprehensive monetary easing
CPB	Central Planning Bureau (the Netherlands)
CPI	Consumer price index
DGS	Directorate General Statistics
DPO	Days payable outstanding
DSO	Days sales outstanding
DSTI	Debt-service-to-income
EAD	Exposure at default
EBA	European Banking Authority
EC	European Commission
ECB	European Central Bank
EL	Expected loss
EMU	Economic and Monetary Union
ESA	European System of Accounts
ESCB	European System of Central Banks
EU KLEMS	European database on Kapital, Labour, Energy, Material and Services
FISIM	Financial intermediation services indirectly measured
FOMC	Federal Open Market Committee
FPB	Federal Planning Bureau
FPS	Federal Public Service
GDP	Gross domestic product
HFCS	Household Finance and Consumption Survey
HICP	Harmonised index of consumer prices
ICAS	In-house credit assessment system
ICIO	Inter-Country Input-Output
ICT	Information and communication technologies
IFRS	International Financial Reporting Standards
ILO	International Labour Office
IMD	International Institute for Management Development
IMF	International Monetary Fund
IRB	Internal ratings-based
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
IT	Information technology

ITU	International Telecommunication Union
LATD	Liquid-assets-to-debt
LFS	Labour force survey
LGD	Loss given default
LTV	Loan-to-value
MIR	Monetary financial institutions interest rates
NACE	Nomenclature of economic activities in the European Community
NACE-Bel	Nomenclature of economic activities in the European Community, Belgian version
NAI	National Accounts Institute
NBB	National Bank of Belgium
NCPI	National consumer price index
NEO	National Employment Office
NFC	Non-financial corporation
NPE	Non-performing exposures
NPI	Non-profit institution
NPL	Non-performing loan
NSSO	National Social Security Office
OECD	Organisation for Economic Cooperation and Development
OLO	Linear bonds
OMT	Outright monetary transactions
PCE	Personal consumption expenditure
PD	Probability of default
PHL	Mortgage loans
PRODCOM	PRODucts of the European COMmunity
QE	Quantitative easing
QQE	Quantitative and qualitative easing
R&D	Research and development
SAFE	Survey on the access to finance of enterprises
SME	Small and medium-sized enterprise
S&P	Standard and Poor's
SURE	Seemingly Unrelated Regression Equation
TFP	Total factor productivity
TLTRO	Targeted longer-term refinancing operations
UNCTAD	United Nations Conference on Trade and Development
UNESCO	United Nations Education, Scientific and Cultural Organization
VAR	Vector autoregression
VAT	Value added tax
WDN	Wage Dynamics Network
WIOD	World Input-Output Database
WTO	World Trade Organisation
XBRL	Extensible business reporting language

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