

The potential growth of the Belgian economy

R. Basselier
G. Langenus
P. Reusens

Introduction

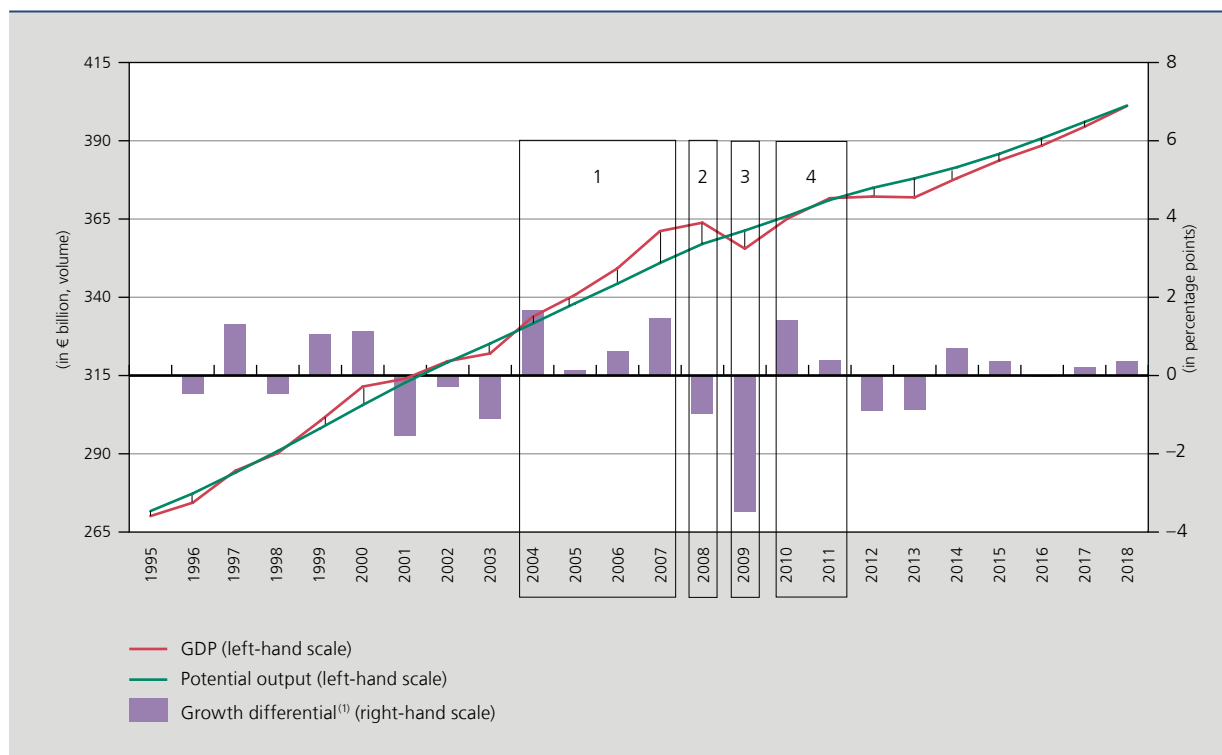
In the aftermath of the great recession, economic growth in many advanced countries, including Belgium, remained subdued for quite a long time. This gave rise to concerns that these economies had embarked on a structurally lower growth trajectory – known as secular stagnation (Mendieta-Muñoz, 2017). After all, deep recessions can have devastating long-term consequences for economic growth, due to lasting negative effects on the skills and motivation of the long-term unemployed and due to falling investment in capital and R&D, hampering future innovations (DeLong and Summers, 2012; ECB, 2011). In fact, growth in the advanced countries had been on a downward trend for some time, and more specifically since the beginning of the 21st century. Going forward, growth in economic activity is expected to be slowed down even further by population ageing exerting negative effects on both the size of the labour force and the average productivity growth. Against this backdrop, this article analyses the developments and determinants of the growth potential, focusing on Belgium and the 1995-2021 period. It also suggests policy measures to address the current and future impediments to this growth potential.

To this end, the article draws on the concept of "potential output", which differs from the "actual GDP". Potential output reflects the hypothetical output that may be produced through normal use of the available production factors, i.e. without causing inflationary pressures. When an economy is at its potential, there are no imbalances in goods, services and labour markets, implying stable

inflation. In the short run, by contrast, the economy is subject to a whole host of shocks and actual production may therefore temporarily diverge from its potential counterpart – creating an "output gap". If clearly positive, an output gap implies excess utilisation of production factors and may cause rising wages and prices, while a strongly negative output gap implies declining wage and price pressures. In addition to level differences between actual GDP and potential output, the difference in growth between the two series also matters. The rate at which potential output grows – i.e. potential growth – determines how fast an economy can grow in a balanced way. The difference between actual GDP growth and potential growth determines the evolution of the output gap. Four situations may emerge, depending on the difference between potential and actual GDP on the one hand and the difference between potential and actual growth on the other.

These situations can be illustrated using figures for Belgium released by the European Commission (EC), relating to the period between 1995 and 2018. A positive output gap emerged in the period between 2004 and 2007 (Situation 1), when GDP was growing faster than potential output. The onset of the financial crisis and its resultant recession pushed down GDP growth sharply, causing it to dip significantly below potential growth in 2008 and particularly in 2009. The positive output gap disappeared in the course of 2008 (Situation 2) and even turned negative in 2009 (Situation 3). In 2010-2011, GDP bounced back up and its growth was substantially larger than the potential growth, ending the negative output gap (Situation 4). Note that these four situations do not necessarily occur in the same order: in 2012-2013, another substantially negative output gap emerged, due this time to the advent of

CHART 1 POTENTIAL OUTPUT, GDP AND OUTPUT GAP



Source: EC.

(1) The difference between actual GDP growth and potential growth (in percentage points).

the European sovereign debt crisis, which proved to be the next squeeze on growth.

Potential output is not merely an interesting research field for academics but is also important to various policy-makers. First, the output gap is an important variable in the budget analysis and, more specifically, for determining the structural budget balance – i.e. the balance when the economy is at its potential and adjusted for temporary measures and factors. For Belgium, based on estimated elasticities of government revenues and expenditures, an increase in the output gap by one percentage point is expected to result in an improvement of the budget balance of nearly 0.61 percentage point of GDP (EC, 2014a). The structural balance is calculated by removing this cyclical impact from the actual general government balance. This structural balance is highly relevant to policy-makers, both to help assess current budget policies and to help draw up and evaluate medium-term objectives (MTOs). Second, the analysis of the output gap is important for the monetary authorities to gauge potential price pressures: a continued positive output gap may imply that the economy is about to overheat, which may push up inflationary pressures. Conversely, a negative output gap signals excess capacity in the economy, which may suggest

downward pressure on inflation. And lastly, potential output circumscribes the extent to which an economy can grow in a balanced way: a persistently low potential growth may hence point to the need for structural reforms.

Unlike actual GDP, potential output cannot be observed directly – it must be estimated. Several methods exist, which will be discussed in the next section. This article will focus specifically on the production function approach, a method applied by most international institutions. Section 2 will use this method to analyse Belgium’s potential growth developments and determinants, and compare these with its main neighbouring countries, the euro area and the United States. We will discuss factors that have influenced potential growth in the past, as well as impediments that could slow it down in the (near) future. Section 3 then turns to a broader concept of financially *sustainable growth*, which unlike traditional potential growth estimates, also explicitly factors in financial imbalances in the economy. Much like Borio (2012), this analysis factors out the unsustainable part of actual production that results from these financial imbalances. Section 4 draws conclusions and proposes policy measures that may offer a response to current and future challenges to potential growth in Belgium.

1. Potential output estimation methods

As an economy's potential output cannot be observed directly, it must be estimated. Several estimation methods are available, varying from purely statistical and semi-structural econometric methods to structural production function methods.

1.1 Overview of the different methods

Statistical trend decomposition methods extract a trend component from the evolution of actual GDP, using some form of statistical filtering, with the Hodrick-Prescott (HP) filter the most prevalent. The method's underlying hypothesis is that the trend component around which actual GDP varies equals the potential output. The biggest drawbacks are that this trend component approach relies on an arbitrary choice of the amount of trend smoothing, that it comes with statistical inaccuracies at both the beginning and end of the observed period and, most importantly, that the method disregards the economic relationships underpinning the potential output (IMF, 2015; Hamilton, 2017).

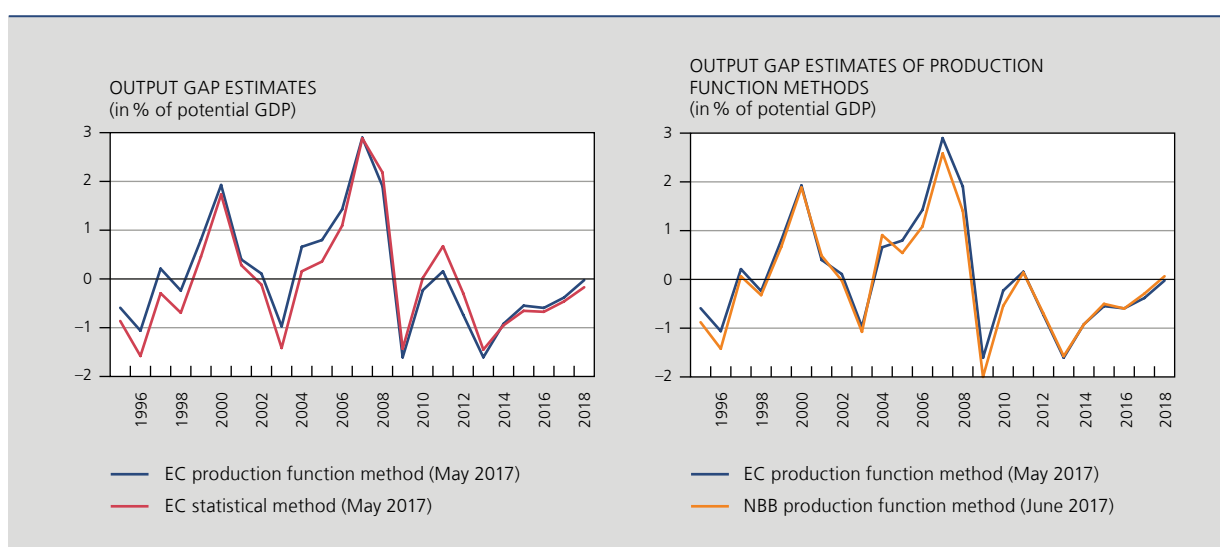
Semi-structural econometric models extract a trend in output based on economic relationships such as the Phillips curve (relationship between inflation and unemployment) and the Okun relationship between output and unemployment. These relationships are factored into econometric unobserved component models, but, here too, estimated potential output

heavily relies on the precise choice of parameters and the model used.

Lastly, structural production function methods estimate potential output based on total factor productivity and the production factors labour and capital. With potential output driven by the production factors' structural components, the observed production factors still need to be adjusted for cyclical and erratic short-term fluctuations. This is achieved by a combination of statistical and econometric methods. It should be noted that, in this approach, the issue related to the extraction of the structural component is shifted to the level of the production factors, such that those results are also sensitive to the precise method of extraction. The main advantage of the production function method is that it is economically grounded in bottom-up or growth accounting principles, allowing for a breakdown into the contribution of each production factor. It is for this reason that this method is traditionally favoured by policy institutions such as the NBB, the EC, OECD and IMF.

Of course, the existence of such a broad range of estimation methods results in different estimates of potential output and the corresponding output gap. It is not possible to establish unambiguously which method produces the most accurate results, as potential output is never observed. A visual comparison of the outcomes of two different methods – i.e. the production function method and the statistical method of the EC – shows estimates for the Belgian output gap to be relatively similar, but still to diverge in some years by up to 0.5 percentage point.

CHART 2 OUTCOMES OF VARIOUS OUTPUT GAP ESTIMATES



Sources: EC, NBB.

The differences in the estimates produced by the NBB and the EC, both the result of a production function method, are in the same range.

1.2 Production function method

In a production function, the level of production (Y) is determined by three factors: labour (L), capital (K) and total factor productivity (TFP). Just like actual output, potential output may also be modelled using a production function of the structural production factors: structural labour (L^*), structural capital stock (K^*) and structural total factor productivity (TFP^*). Most growth analyses opt for the Cobb-Douglas production function with constant returns to scale, obtaining potential output (Y^*) via

$$Y^* = TFP^* (L^*{}^\alpha K^{*1-\alpha})$$

where α and $1-\alpha$ equal the output elasticities of labour and capital, which can be estimated based on the percentage of income spent on labour and capital, respectively⁽¹⁾. Potential growth g_{Y^*} is then written as the weighted sum of growth in the production factors

$$g_{Y^*} = g_{TFP^*} + \alpha g_{L^*} + (1 - \alpha) g_{K^*}$$

The structural labour component (L^*) reflects the potential volume of hours worked and equals the product of structural employment – as expressed in number of people – and a structural number of hours worked per person. To determine structural employment expressed in number of people, the number of structurally inactive and unemployed people are removed from the working-age population, using the structural participation and unemployment rates. The actual way in which these structural components are estimated may differ from one economic institution to the next. The estimated structural unemployment rate, for example, can be the statistically adjusted unemployment rate, the non-accelerating inflation rate of unemployment (NAIRU) or the non-accelerating wage rate of unemployment (NAWRU).

The structural capital stock (K^*) is typically assumed to equal the observed capital stock, although the definition of capital stock is not necessarily uniform across the various economic institutions. Projections of the future capital stock draw on the formula

$$K_t = (1 - \delta_t) K_{t-1} + I_t$$

(1) The EC assumes output elasticities of labour and capital of 0.65 and 0.35 for all European countries (EC, 2014b).

CHART 3 BELGIAN POTENTIAL GROWTH AND ITS DETERMINANTS

(contributions in percentage points, unless otherwise stated)



Source: EC.

where δ_t is the depreciation rate and I_t represents new fixed capital formation.

Total factor productivity (*TFP*) is highly volatile and derived as a residual, as it reflects the remaining part of output that cannot be explained by capital and labour. The structural total factor productivity (*TFP**) is calculated by smoothing, usually by means of statistical filtering.

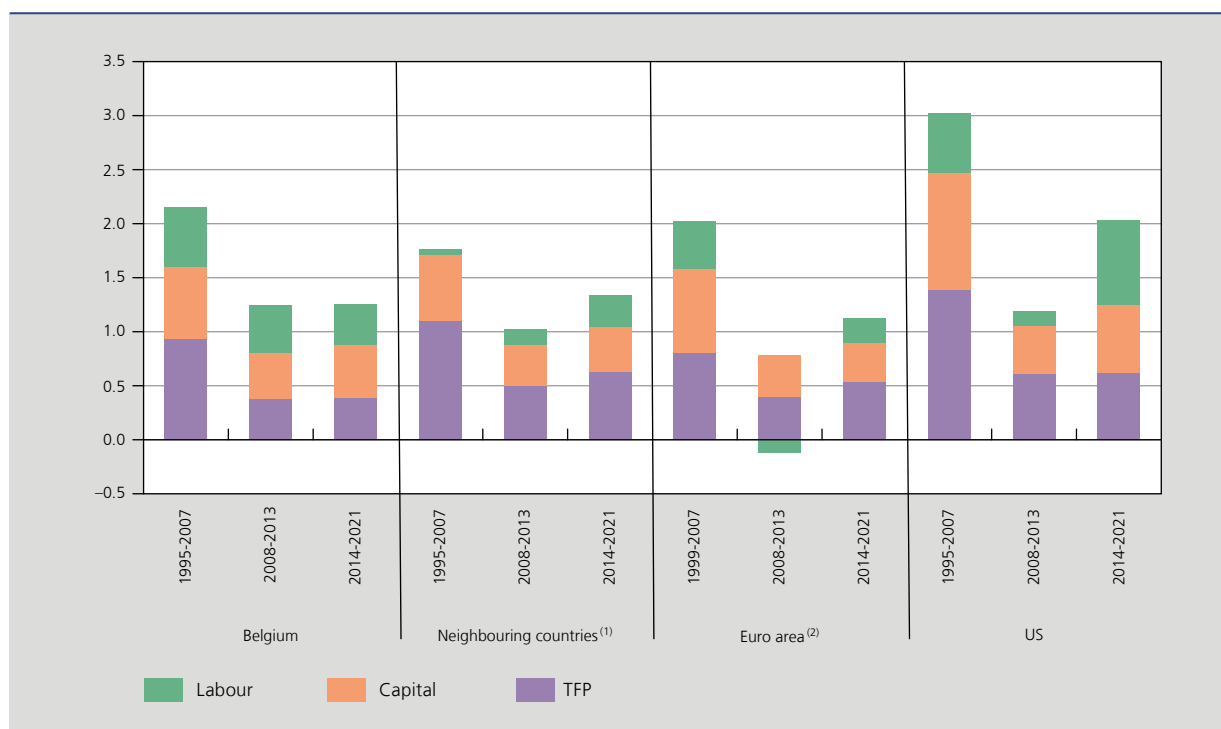
2. Potential growth in Belgium

This section analyses the development of Belgium’s potential growth and its determinants between 1995 and 2021, drawing on the EC’s most recent spring estimates. Using the production function, the evolution of potential growth may be explained by its economic determinants. As discussed in section 1.2, potential growth equals the sum of (i) the structural growth rate of TFP, (ii) the product of output elasticity of labour and the growth rate of potential labour, and (iii) the product of the output elasticity of capital and the growth rate of the capital stock.

Roughly three major sub-periods can be discerned: the pre-crisis period between 1995 and 2007, the crisis period between 2008 and 2013 comprising both the financial crisis and the European sovereign debt crisis, and the post-crisis period from 2014 up to 2021. The first period shows a rather high potential growth of up to 2.5% in some years, which is largely driven by the contribution of total factor productivity. However, this contribution had clearly been declining since the early 2000s, causing a gradual contraction in potential growth to an average 2% in the five years leading up to the crisis. During the crisis period, the TFP contribution continued to shrink and the contributions of capital and labour were also down, albeit to a lesser degree, leading to potential growth halving in the period and hitting a record low of 0.8% in 2013. Since 2014, all three components’ contributions have been trending upwards. That said, the recovery has been slow and Belgium’s potential growth has so far failed to return to its average 2% pre-crisis rate.

Chart 4 compares the average contributions of the determinants of potential growth, as calculated for the three periods defined above, to the weighted average of

CHART 4 AVERAGE CONTRIBUTIONS TO POTENTIAL GROWTH BY PERIOD
(in percentage points)



Source: EC.

(1) Weighted average for Belgium’s three main neighbouring countries.

(2) Data for the euro area are only available from 1999.

Belgium's three main neighbouring countries, the euro area and the United States. Potential growth in Belgium typically evolves similarly to that of its neighbouring countries and the euro area. In the 1995-2007 pre-crisis period, its potential growth averaged 2.1 %, on a par with the euro area, but 0.4 percentage point higher than in its three neighbouring countries. A comparison with the United States reveals that American potential growth was a lot higher still – at 3 % on average – thanks to significantly larger contributions of both TFP and capital.

All (groups of) countries suffered major losses during the crisis period and potential growth nearly halved in Belgium (–0.9 percentage point) and in its neighbouring countries (–0.7 percentage point). In the euro area and in the United States, the decrease was even more dramatic, equalling –1.4 and –1.8 percentage point respectively. For Belgium, the drop was mainly due to a reduced contribution from TFP (–0.5 percentage point), while those from capital (–0.25 percentage point) and especially labour (–0.1 percentage point) were relatively minor when compared with the figures for the euro area.

As for the post-crisis period between 2014 and 2021, Belgium, its neighbouring countries and the euro area are all projected to be looking at a very subdued average potential growth of around 1.2 %. For Belgium, this implies a stabilisation relative to the crisis period, while for its neighbouring countries this means an uptick by 0.3 percentage point and for the euro area an even stronger improvement of 0.5 percentage point. The United States is expected to enjoy a much more robust recovery: potential growth is projected to revert back to 2 % on significantly higher contributions of capital and particularly labour. However, potential growth, which about halved in the crisis period, would not return to pre-crisis levels in any country or group of countries, mostly because TFP growth remains relatively low when compared with the pre-crisis period.

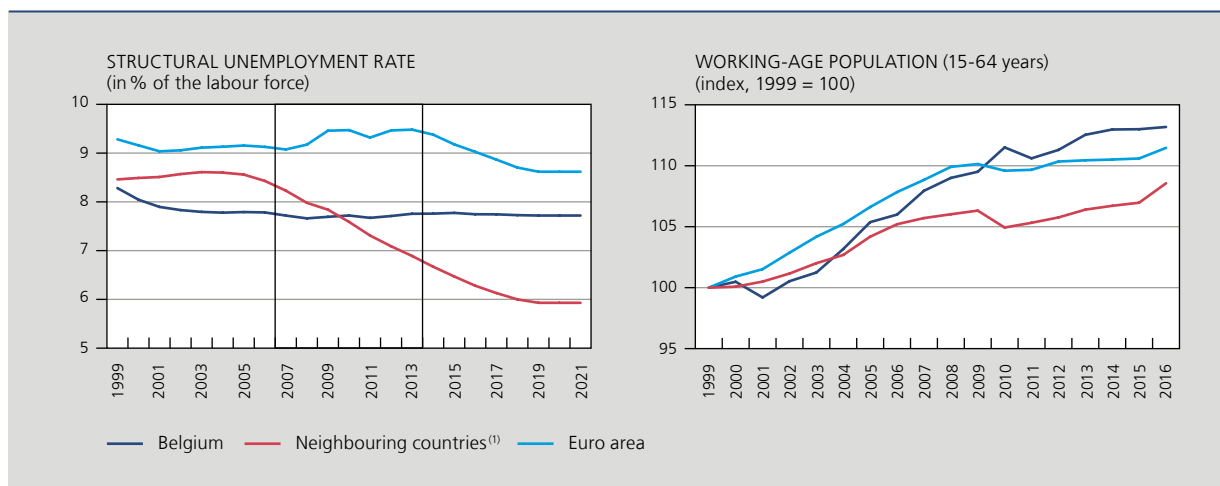
2.1 Labour

Even during the crisis, labour continued to make a robust contribution to potential growth in both Belgium and its neighbouring countries, unlike in the euro area and the United States, which both saw the component's contribution shrink substantially. In part, this observation is reflected in the diverging trends of the labour force and actual unemployment rates, which to some extent may translate into structural unemployment due to hysteresis effects. In particular, the long-term unemployed typically lose part of their knowledge, skills and motivation, causing a permanent destruction of human

capital. Even when the economy recovers and employers are willing to hire again, this group of long-term unemployed is often no longer in demand (EC, 2009). In the euro area, both actual and structural unemployment rates moved noticeably higher during the crisis, while they remained relatively stable in Belgium. Combined with its system of temporary unemployment which was expanded to include white-collar workers during the crisis, Belgium's fairly rigid labour market, marked by a high measure of labour protection, resulted in labour hoarding (De Mulder and Druant, 2011). What is more, Belgian employment in the public sector remained more or less stable, whereas it shrank in the neighbouring countries. Finally, it is remarkable that, on average, the structural unemployment rate continued to decline during the crisis in the neighbouring countries, but this was completely driven by Germany which introduced its Hartz reforms between 2002 and 2005 to make its labour market more flexible and to activate the unemployed. More recently, Germany imposed additional structural reforms under its Agenda 2010 programme. Despite the spectacular fall in structural unemployment rates, it were labour force trends that caused the contribution of the structural labour component in the neighbouring countries (see chart 4 above) to remain rather limited on balance: the labour force grew quite slowly during the entire period and even shrank in 2010. This may be down to important ageing effects, in Germany in particular, but also to endogenous factors dampening labour supply. Germany experienced a net outflow of migrants in 2010 and in the Netherlands, in particular, many unemployed left the workforce altogether, two phenomena likely to have been accelerated by poor labour market prospects.

Like many other advanced economies, Belgium faces an ageing population, which will increasingly depress the labour component's contribution to potential growth. As the latest demographic outlook by the Federal Planning Bureau (FPB) suggests, the country's working-age population will start to shrink as early as 2021. Participation and employment rates will need to be boosted in order to keep employment levels steady. Although both rates are expected to continue to edge up in the next few years on the back of recent measures to reduce early retirement, the EC estimates that the structural employment gap between Belgium and its neighbouring countries may widen up to 10 percentage point on the assumption of no policy change. Closing this gap offers a major potential to raise the employment rate and to combat the negative effects of population ageing. Table 1's breakdown of the employment rate shows there is still plenty of scope to bolster the employment rate, especially in targeted groups at risk such as older

CHART 5 DETERMINANTS OF THE STRUCTURAL LABOUR COMPONENT

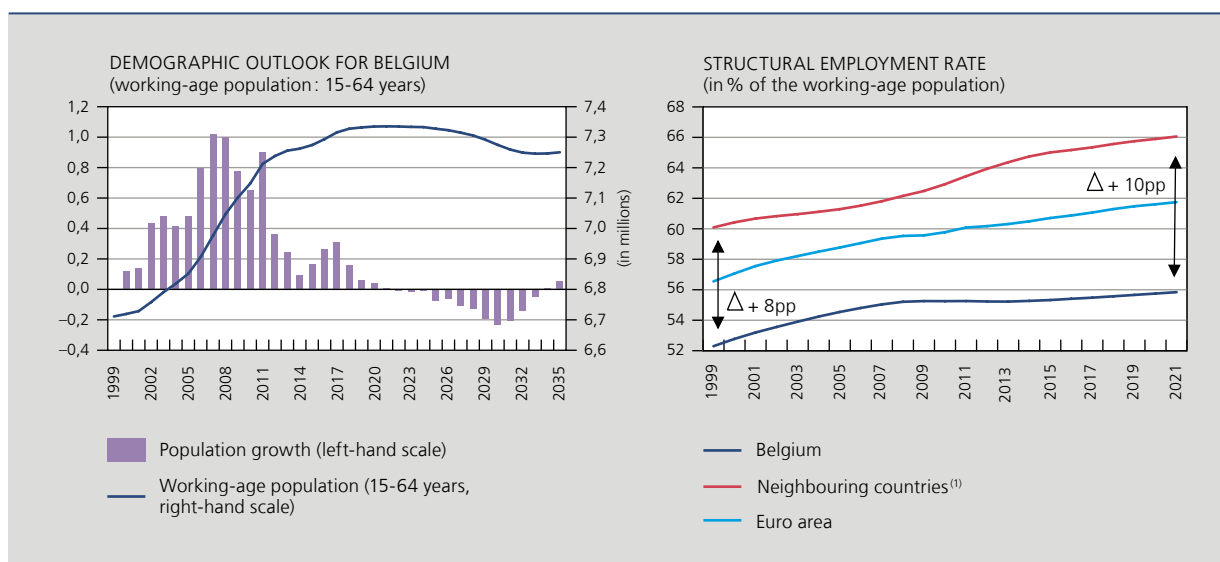


Source: EC.
 (1) Weighted average for Belgium's three main neighbouring countries.

workers, women, the low-skilled and non-EU citizens. Note also that tighter conditions for early retirement have already sparked a sharp increase in the employment rate of older workers compared with 2010 and that this upward trend is expected to continue in the coming

years. Finally, Belgium's percentage of young people not in work and not in any type of education or training continues to surpass the EU 2020 target of 8.2 %, although a recent fall in the number of early school leavers has helped to improve the percentage to 9.9 %.

CHART 6 CHALLENGES TO THE BELGIAN STRUCTURAL LABOUR COMPONENT



Sources: EC, FPB.
 (1) Weighted average for Belgium's three main neighbouring countries.

TABLE 1 EMPLOYMENT RATE FOR TARGETED GROUPS (AT RISK) AND 2020 OBJECTIVES
(in % of the corresponding population group)

	Belgium		Objectives
	2010	2016	2020
Working-age population (20-64 years)	67.7	67.7	73.2
Women (20-64 years)	64.6	63.0	69.1
Older workers (55-64 years)	37.3	45.4	50.0
Low-skilled	48.9	45.6	n.
Difference between residents and non-EU citizens	28.5	27.3	16.5

Source: EC.

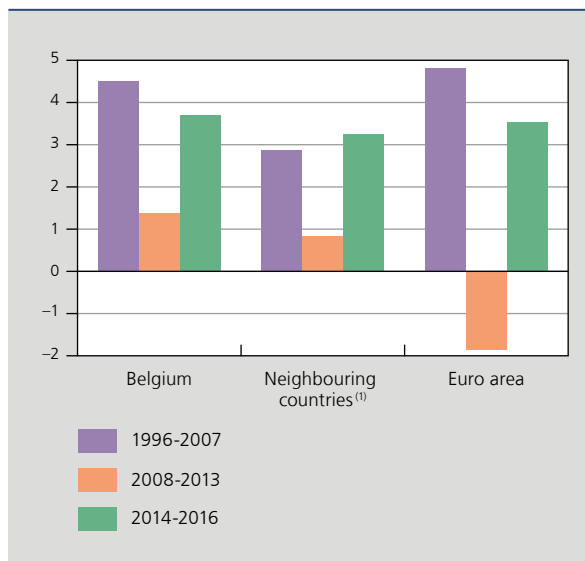
2.2 Capital

In the pre-crisis period, the capital component represented just over a quarter of total Belgian potential growth. Although this contribution also came down during the crisis period, it gained in importance in the overall breakdown of total potential growth as the contribution of the total factor productivity came down even more strongly. During the crisis, the contribution by the capital stock was eroded by sharply lower investment growth in the wake of falling general demand, increased uncertainty and tighter borrowing conditions, particularly for companies with weak balance sheets (see section 2.3). However, compared with the euro area at large, Belgium's investment growth and, hence, its capital component declined to a lesser extent. Investment has been recovering since 2014 though growth rates have remained below their pre-crisis levels to date. All in all, capital's expected contribution in the post-crisis period between 2014 and 2021 remains below pre-crisis figures on average.

2.3 TFP growth

TFP growth in Belgium has been weakening already since the beginning of this century. However, this is quite a widespread phenomenon, and is also happening in the rest of the euro area and in the United States. Further on in this section, this global structural decline in TFP growth is explained by the phasing-out of favourable global factors from the past and by the emergence of global structural barriers. Since 2013, there has been evidence of a limited recovery, but Belgian TFP growth nonetheless has remained rather low compared with other countries. This

CHART 7 AVERAGE ANNUAL INVESTMENT GROWTH
(in %, at current prices)



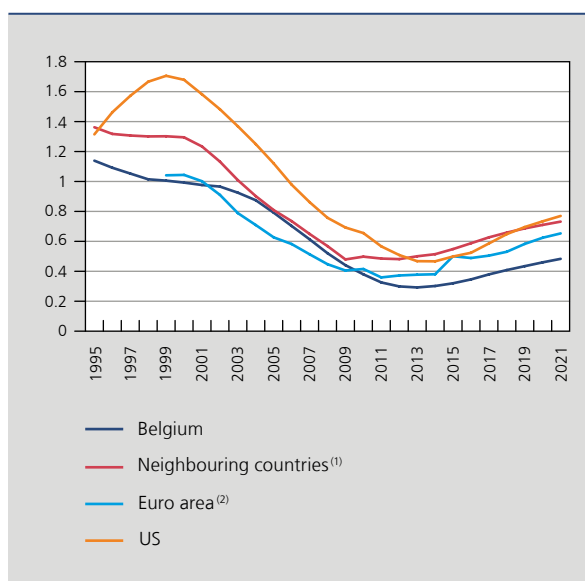
Sources: EC, NAI, NBB.

(1) Weighted average for Belgium's three main neighbouring countries.

section therefore also investigates more closely several structural barriers specific to Belgium.

One key driver for the general decline in TFP growth in the advanced economies is the weakening stimulus of certain

CHART 8 STRUCTURAL TFP GROWTH
(in %)



Source: EC

(1) Weighted average of Belgium's three main neighbouring countries.

(2) Data for the euro area are only available from 1999 onwards.

favourable global factors that had strongly boosted productivity growth in the past. First, trade liberalisation after the Second World War, which was accompanied by a fall in trading costs and thus had a productivity-enhancing effect, has slowed down or even ground to a halt (Crafts, 2012). Indeed, interest in trade liberalisation is dwindling, with policy-makers in some major economies even advocating a return to protectionism. In their article earlier in this edition of the Economic Review, Dhyne and Duprez warn of the damage that increased protectionism could cause, as the most productive companies, which are often the most integrated in the global economy, would be predominantly affected. Second, substantial productivity gains had been recorded since the middle of the 1990s thanks to rapid ICT developments. This was evident in the ICT sectors themselves, but also in sectors that started deploying new ICT products or software that made the use of labour and capital more efficient (Rigo, 2005). However, the positive impact of this on TFP growth seems to have started to gradually fade away since the beginning of the 2000s (IMF, 2017a). Surprisingly, whereas the rapid roll-out of computer technology in the 1990s provided a sharp boost to TFP growth, today's state-of-the-art technology – e.g. smartphones, 3D printing, artificial intelligence – has so far not had any similar effect. Gordon (2016) believes the reason is that recent innovations, such as the switch from one type of smartphone to another, are relatively less revolutionary than, say, the advent of electricity, the car and the computer, and are more aimed at communication or entertainment. By contrast, Mokyr (2014) argues that the added value of these new forms of production as measured in the national accounts are underestimated, as new technologies, such as apps and platforms, are not yet adequately captured in the statistics. Also, a similar development has occurred in the accumulation of human capital. Previously, the improved quality of education sparked a much more rapid growth in labour productivity, as higher education levels generate greater innovation and facilitate the integration of these innovations in the production process (Rigo, 2005). However, the creation of additional human capital through a further broadening of education is reported to have slowed down in the course of the previous decade (IMF, 2017a).

Furthermore, there are global factors that have been hampering productivity structurally for quite some time. One is the impact of population ageing, which weighs on productivity gains because older workers are typically less productive (IMF, 2017a). According to a study by Ariu and Vandenberghe (2014) based on Belgian firm-level data, the ageing labour force is believed to have dented TFP growth by an annual average of about 0.2 percentage point over the 1991-2013 period. Given that the average age of the labour force will continue to rise in the near future, this will probably lead to an

additional future loss of TFP growth. In addition, the advanced economies are seeing a gradual shift away from a production economy to a services economy, which is also reflected in the increasing allocation of the labour and capital factors of production towards the services sector, where TFP is growing at a slower rate (Dhyne and Fuss, 2014). The transformation into a services economy is also clearly evident in Belgium: in 2016, no less than 77 % of value added was generated by the services branches, compared with 70 % in 1995.

Moreover, the recent financial crisis has had an additional negative impact on TFP growth in the advanced economies. First, low general demand and high economic and political uncertainty during the crisis caused a sharp drop in investment growth, as discussed in Section 2.2⁽¹⁾. This had a negative feedback effect on TFP growth because the implementation of new innovations may sometimes require new capital, one example being the need for more efficient computers to implement certain new ICT applications (IMF, 2017a). Second, the misallocation of capital across companies has increased considerably since the crisis (IMF, 2017a). This can be partly explained by tighter borrowing constraints, especially for firms with a high refinancing risk, which have resulted in less investment in R&D and, consequently, in lower TFP growth at these firms (Aghion *et al.*, 2012; IMF, 2017b). The increasing misallocation of capital has also been driven by the rise in the number of “zombie firms”⁽²⁾ since the mid-2000s. This can be explained, *inter alia*, by the fact that banks have granted payment delays and even further credit lines to these zombie firms in order to avoid incurring losses on their loan portfolios (McGowan *et al.*, 2017). Inefficient insolvency rules may have contributed to this, along with the fact that accommodative monetary policy with historically low interest rates implies low opportunity costs for banks. The rise in the number of zombie firms is bad for productivity not just because these firms have a low productivity, but also because their long-term survival impedes the growth of the more productive firms.

There are also several structural factors specific to Belgium that weigh on TFP growth. The relatively high R&D expenditure is not yet being sufficiently translated into the actual creation of profitable new products. While R&D expenditure in Belgium (2.5 % of GDP in 2015) is above the euro area average (2.1 %), sales of new innovations, exports of medium & high tech products and the number of international patent applications are well below the EU average. Next, Belgium scores above average when

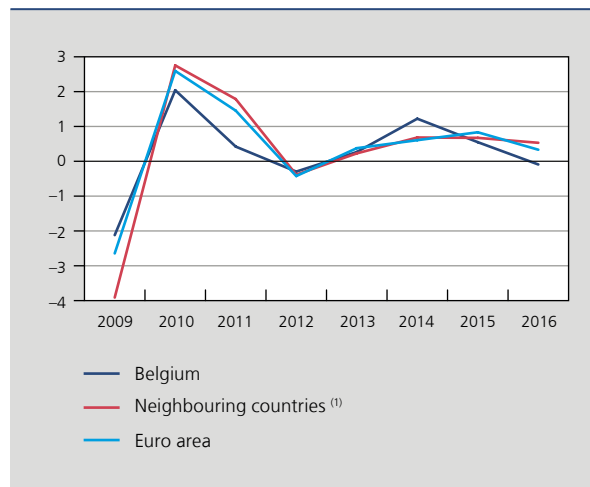
(1) As far as investment in R&D is concerned, it was mainly in 2009 that companies in Belgium and the euro area cut back their investment spending.
 (2) In the literature, zombie firms are defined as firms that are more than ten years old with a ratio of operating income to interest expenditure that is less than one over three consecutive years (McGowan *et al.*, 2017). In the case of Belgium, this group should be interpreted rather cautiously, since interest charges are to a certain extent influenced by intra-group loans.

it comes to the quality of education, even though the PISA test⁽¹⁾ does indicate differences between the Belgian regions. However, training is not just relevant for young people as longer careers and continuing technological changes also necessitate further education in the form of permanent training. Belgium scores less well on this last item: in 2016, barely 7.5% of workers aged 18-64 had recently received training, whereas the average percentage for the euro area is almost twice as high, according to figures from the EC. In comparison with its neighbouring countries, Belgium also has a poor public infrastructure, and in particular a highly saturated road and rail network, which leads to severe mobility problems. In a recent survey conducted by the international consultancy CSA on behalf of Ernst & Young (2017), as many as 65% of the 116 Belgium-based companies surveyed report that these mobility issues have a negative impact on their investment decisions in Belgium. Also, firms in Belgium express their concerns about the heavy administrative burden for companies, excessive regulation and the complex tax system (Ernst & Young, 2017; EC Country Report, 2017)⁽²⁾. Moreover, the average Belgian seems to be less entrepreneurial and more risk averse than their EU counterparts,

(1) The Programme for International Student Assessment (PISA), an international survey commissioned every three years by the OECD, examines the knowledge and skills of 15-year-olds. The most recent PISA survey dates back to 2015 and focused on students' scientific literacy.

(2) According to an "Ease of Doing Business" indicator compiled by the World Bank, Belgium was only 42nd in the ranking in 2016. By way of comparison: the United States lies in 8th place, while Germany, the Netherlands and France hold the 17th, 28th and 29th spots, respectively.

CHART 10 LABOUR PRODUCTIVITY PER EMPLOYEE IN THE TOTAL ECONOMY (year-on-year percentage changes)



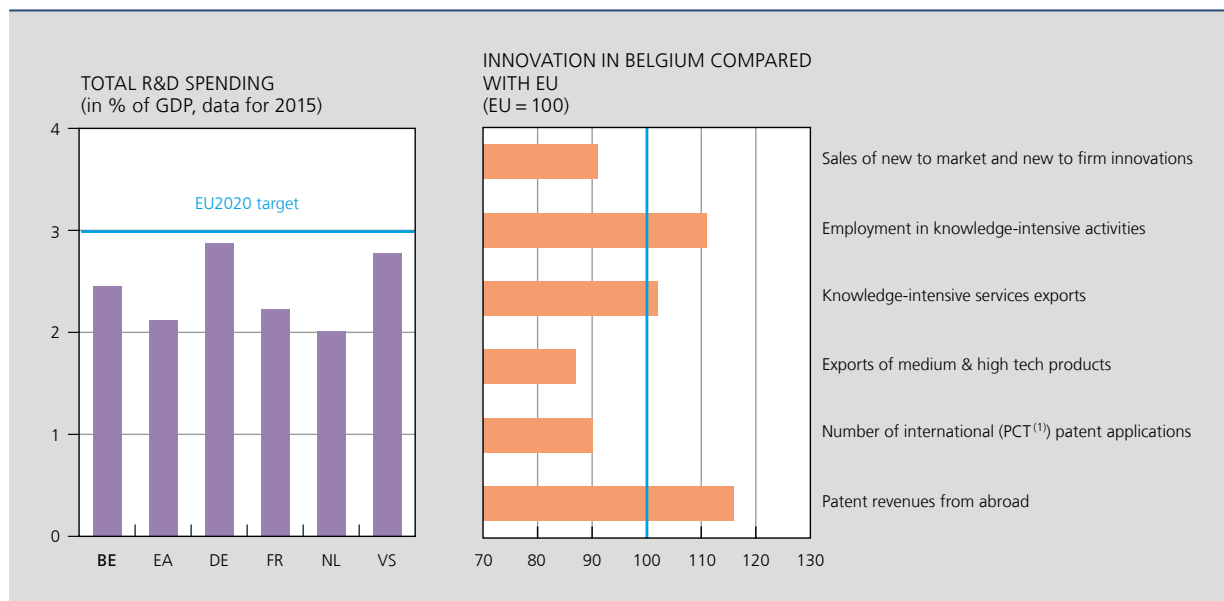
Sources: EC, NAI, NBB.

(1) Weighted average for Belgium's three main neighbouring countries.

which translates into a smaller number of start-ups, hence making the reallocation of resources more difficult (NBB, 2017).

Finally, the fact that the TFP recovery since 2013 has remained relatively weak in Belgium compared with the

CHART 9 R&D SPENDING AND MEASURES OF INNOVATION IN BELGIUM



Sources: EC, 2016 European Innovation Scoreboard.

(1) The Patent Cooperation Treaty (PCT) provides the recognition of patent rights in the member countries.

neighbouring countries, the euro area and the United States, could perhaps be partly associated with the recent policy of wage cost moderation. That policy has had a positive impact on job creation, which has proved to be very significant in the last few years, but seems to have supported economic growth only to a lesser extent. The combination of the two has resulted by definition in a high labour intensity of growth, the downside being weaker labour productivity, such that the higher labour contribution to the growth is partly offset by a lower TFP contribution.

3. From potential to sustainable growth? ⁽¹⁾

Traditional methods to estimate the output gap can sometimes produce inaccurate results in real time, which are then substantially revised in the subsequent years. In 2007, for instance, EC estimates pointed to a slightly negative output gap between 2005 and 2008, for both Belgium and the euro area. Afterwards, those estimates were drastically revised and the output gap turned out to be highly positive, meaning that growth during that period was unsustainable.

This pattern of a severely underestimated output gap in the run-up to the recent financial crisis was even more relevant for countries such as the United States and Spain, where GDP was driven by bubbles in credit and residential

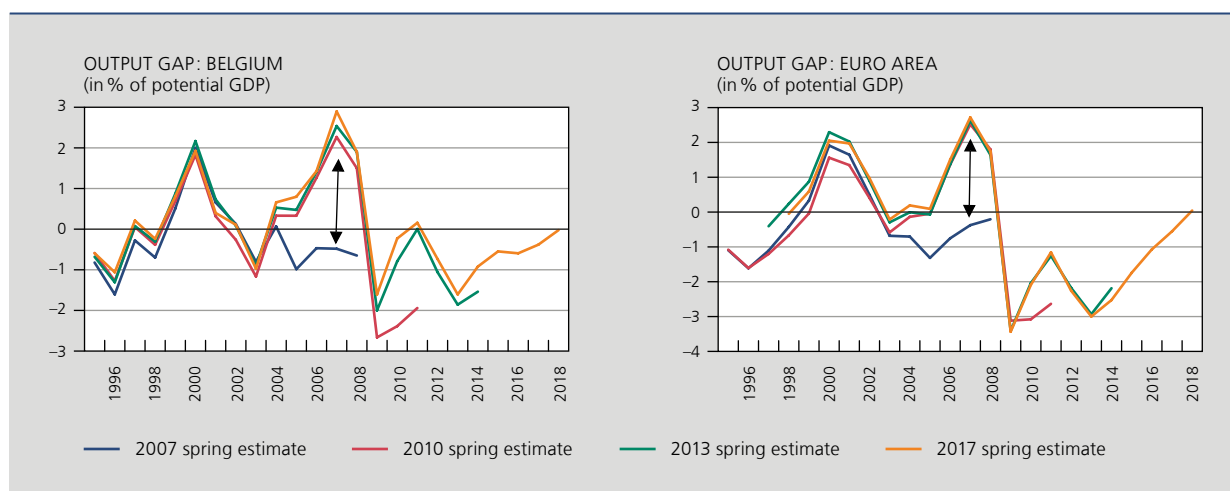
property prices. It only became clear later, after the burst of these financial bubbles and the corresponding plunge in GDP, that the output gap had been strongly positive and that the economy had been on an unsustainable trajectory. Thus, in the run-up to the financial crisis, the financial imbalances caused the potential growth to be overestimated.

In the aftermath of the financial crisis, the revealed importance of financial imbalances for the real economy prompted policy-makers to put control mechanisms in place, their aim being to counter major imbalances and their adverse effects on the economy. The countercyclical capital buffer (CCyB), which was introduced into the Basel III framework, obliges banks to retain additional capital at times when credit grows too fast with the goal to counter the build-up of the credit bubble, as well as to make banks themselves more resilient to a potential financial crisis. Also the Macroeconomic Imbalance Procedure (MIP), introduced by the EC in 2011, factors in some financial indicators, in addition to the traditional macroeconomic variables, in order to timely detect and correct potential imbalances in the EU countries.

Also, starting with Borio (2012), several researchers expanded the concept of potential growth to one of *sustainable growth*, which adjusts for the unsustainable part of GDP that is driven by financial imbalances. Compared with traditional potential output measures, this new indicator should evolve more steadily during crisis times, implying that its corresponding finance-neutral output gap shows a more positive output gap and hence a greater degree

(1) The model and results presented in this section are drawn from an ongoing research project in collaboration with Gerdie Everaert (Ghent University) and Tino Berger (University of Göttingen).

CHART 11 OUTPUT GAP ESTIMATES OVER TIME



Source: EC.

of overheating in the buildup of the financial imbalances and vice versa after the reversion of the financial imbalances (IMF, 2015). Finance-neutral estimates of the output gap should therefore be less prone to ex-post revisions, enabling policy-makers to better assess the structural government budget balance in real time. For example, if an increase in GDP is driven by a bubble in credit and residential property prices, the structural balance calculated on the basis of the financial neutral output gap would not improve, because it would correctly identify the GDP increase as being only temporary (IMF, 2015). In this respect, it is important that sustainable output models are able to distinguish between growth in residential property prices and credit underpinned by healthy economic fundamentals on the one hand and unsustainable increases reflecting financial imbalances on the other – a tough job in real time as boom-and-bust episodes are often detected only with the benefit of hindsight (Turner *et al.*, 2013, IMF, 2015).

3.1 Modelling sustainable production

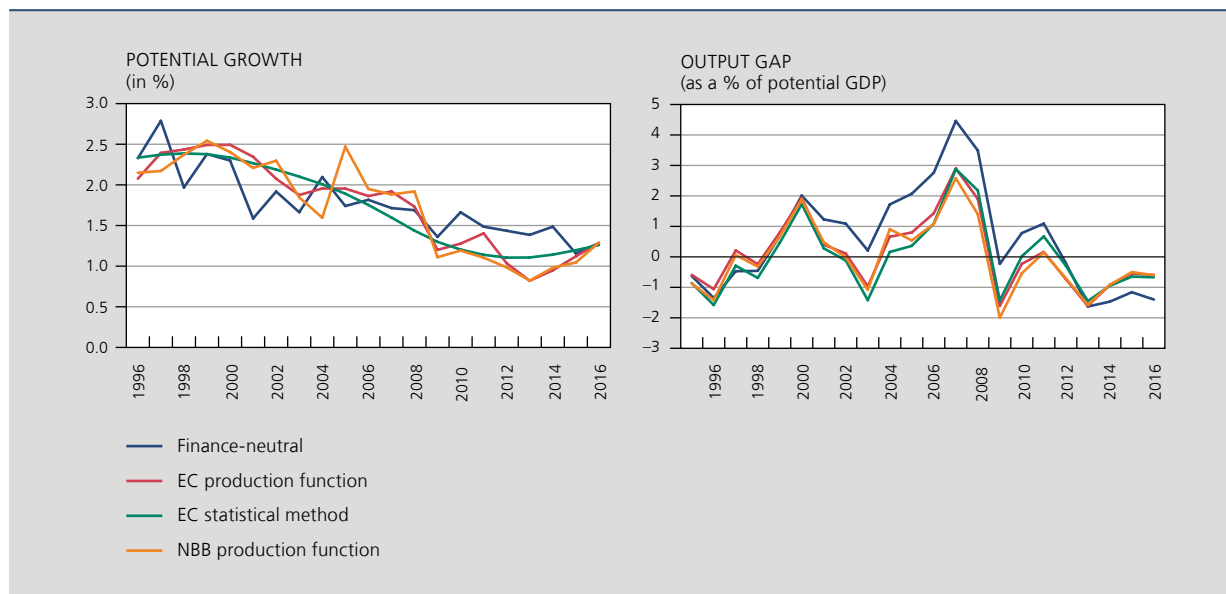
To estimate sustainable output, we have developed a multivariate econometric model combining two approaches from the literature: (i) the literature about "semi-structural econometric methods" in which the output gap is estimated based on the evolution of several macroeconomic variables such as GDP, unemployment and inflation (e.g. Domenech

and Gomez, 2006 and Basistha and Nelson, 2007) and (ii) the literature in which financial cycles are estimated based on financial variables such as credit growth and residential property prices (e.g. Claessens *et al.*, 2012 and Koopman *et al.*, 2016). This model decomposes all variables into a trend component, a financial cycle component, a business cycle component and a residual component. The financial cycle component is largely driven by the cyclical part of the financial variables and is assumed to have a lower frequency than the business cycle, in line with Borio (2012) and Koopman *et al.* (2016).

The model's crucial assumption is that the trend component of each variable in the model has a lasting effect and is therefore sustainable, whereas the financial and business cycle component of each variable will eventually disappear, making them currently unsustainable. For that reason, sustainable output is defined as the trend component of GDP, which equals the output level at which both financial and business cycles are neutral. The finance-neutral output gap is the difference between GDP and the sustainable output.

Subsequently, the gap in each of the financial variables – i.e. the deviation between the financial variable and its trend component – is interpreted as a measure of financial imbalance. The literature also focuses on similar measures to capture cyclical financial risks. Borio *et al.* (2016),

CHART 12 COMPARISON OF THE FINANCE-NEUTRAL GROWTH AND OUTPUT GAP ESTIMATE TO THE TRADITIONAL POTENTIAL GROWTH AND OUTPUT GAP ESTIMATES FOR BELGIUM⁽¹⁾



Sources: EC, NBB.

(1) Although the finance-neutral output gap is estimated on a quarterly basis, the output gap is presented here as an annualised figure to allow for easier comparison with the other methods. More specifically, the annualised finance-neutral output gap is calculated as the difference between actual annual GDP and the estimated sustainable production. Note that the outcomes for 2016 were obtained by extrapolating the estimates of the first three quarters.

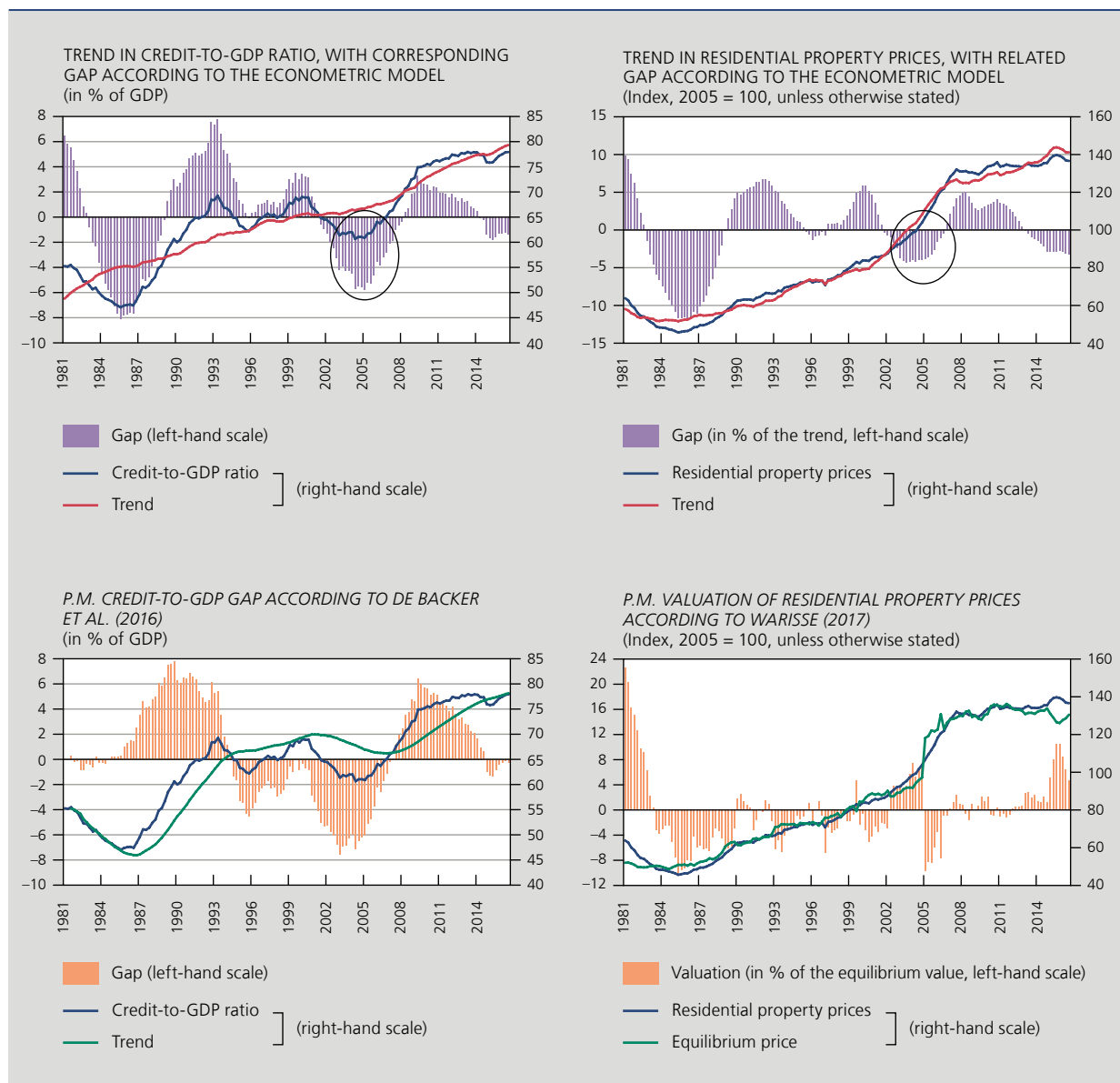
IMF (2015) and Turner *et al.* (2013), for instance, use deviations of the growth of real credit and residential property prices from their long-term trend or their average, as indicators of financial imbalances in credit and residential property prices. De Backer *et al.* (2016) compute Belgium's credit gap as the deviation of the credit-to-GDP ratio from the Hodrick-Prescott filtered trend, which is in line with the ESRB recommendations for the calculation of the countercyclical capital buffer discussed above. In addition to the often studied cyclical financial risks, there also exist structural systemic risks, such as a possibly unsustainable structural trend trajectory in the credit-to-GDP ratio (De Backer *et al.*, 2016). However, this article does not take

into account such risks as it is assumed that the trend component of the credit-to-GDP ratio and residential property prices coincide with their equilibrium values.

To estimate the finance-neutral output gap for Belgium, we use seasonally-adjusted quarterly series for the period from 1981 up to the third quarter of 2016 for real GDP (in logs), inflation, unemployment, real bank⁽¹⁾ credit to private non-financial firms (in logs), real residential property prices (in logs) and the real credit ratio (as a % of GDP).

(1) Like De Backer *et al.* (2016), we use bank credit rather than a more general credit measure that also includes debt securities, as the data on this latter category are greatly influenced by inter-company loans and are only available as from 1995.

CHART 13 MEASURES OF FINANCIAL IMBALANCES IN THE CREDIT-TO-GDP RATIO AND RESIDENTIAL PROPERTY PRICES IN BELGIUM



Sources: De Backer *et al.* (2016), Warisse (2017), NBB.

3.2 Results

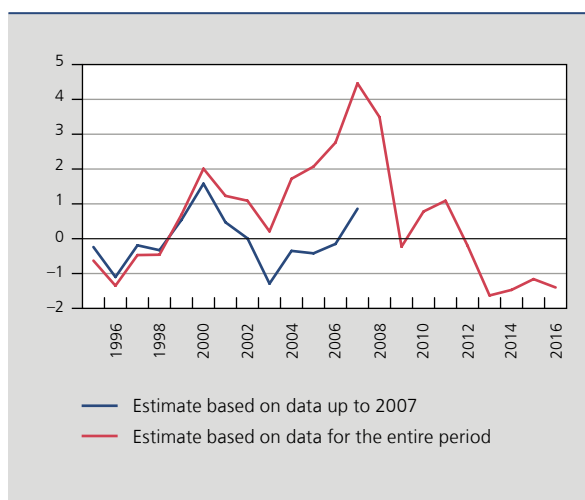
Compared with traditional estimates of the output gap for Belgium, the estimates of the finance-neutral output gap point to a more positive gap exceeding the traditional estimates by around one percentage point between 2001 and 2011. The opposite is true for the most recent period (2014-2016): the finance-neutral estimate of the output gap is around 0.5 percentage point more negative than the traditional estimates.

The upper part of Chart 13 shows the model estimates for the gap in the credit-to-GDP ratio and residential property prices, calculated as the deviation of the financial variable from its trend component. The lower part of the chart shows two alternative indicators: the credit-to-GDP gap as calculated by De Backer *et al.* (2016), obtained using a one-sided Hodrick-Prescott method, and Warisse's (2017) estimate for the valuation of the residential property prices, obtained using an econometric method based on the fundamental economic determinants of the residential property prices.

The estimated measures of the financial imbalances are relatively similar to the alternative indicators. In particular, the estimated credit-to-GDP gap of the econometric model and that of De Backer *et al.* (2016) move particularly closely in step for the period from 2000: both estimates identify a negative gap rising up to around 6% for the 2001-2006 period, a positive gap of up to 4% for the 2008-2013 period and a negative gap averaging around 1% since 2014. However, the estimated gap in residential property prices of the econometric model and that of Warisse's model (2017) diverge for the period since 2000, which may be explained by the fact that Warisse's equilibrium house price factors in property taxation and demographics. As the econometric model does not take into account these house price determinants, we would not recommend using it to assess the (over)valuation in residential property prices.

The most important conclusion is that the difference between the output gap estimate of this new method and that of the traditional approaches cannot be attributed to the factoring in of financial variables. In the new method, a larger output gap in the run-up to the great recession comes with negative financial gaps; gaps that may be narrowing, but that remain negative nonetheless. In other words, the output gap as estimated by this method is not found to be larger in these years due to unsustainable imbalances in credit growth or in residential property prices. This result suggests that, unlike the previously mentioned other countries, Belgium did not see its growth pushed up excessively

CHART 14 FINANCE-NEUTRAL ESTIMATES OF BELGIUM'S OUTPUT GAP OVER TIME
(in % of potential GDP)



Source: NBB.

by financial bubbles in the run-up to the great recession. The differences between the output gap estimates of the new model and the estimates of the traditional approaches rather seem to point to the general model uncertainty.

What's more, the econometric model does not solve the issue of the real time inaccurate estimates, as its estimates are also still subject to major ex-post revisions. Chart 14 shows the estimates of the finance-neutral output gap at two point in time, using the data up to 2007 and those up to 2016. Output gap revisions for the 2004-2007 period still amount to three percentage point, which is comparable to revisions of the traditional output gap methods, as shown earlier in chart 11.

Conclusion

Despite the relevance of the potential output and the output gap to many policy-makers, no uniform estimation method currently exists. The range of various models therefore results in different estimates. International institutions typically use a production function method, enabling them to break down potential growth by the various production factors.

Like in many other advanced economies, potential growth in Belgium fell substantially during the crisis period and it is not yet back to its previous pace.

The contribution of total factor productivity has declined the most, due to the impact of the financial crisis, but also due to global trends that had already been reducing productivity growth in advanced economies for even longer. Moreover, in Belgium specifically, recent wage restraint policies have also adversely affected (labour) productivity as they have led to strong employment growth and only rather moderate growth in economic activity. Both the labour and capital contributions of growth also declined in Belgium during the crisis period, but these decreases were fairly limited compared with those in other euro area countries. This was mainly thanks to a more robust investment growth and Belgium's high level of protection in the labour market.

In the near future, population ageing is expected to have a further negative impact on (potential) growth. To offset this negative effect of an ageing population and to safeguard future prosperity, a joint improvement of the potential growth determinants should be pursued. First of all, there is still a lot of scope to further increase the employment rate, especially for targeted groups (at risk) such as older workers, women, young workers, the low-skilled and non-EU citizens. Additionally, attracting, training and efficiently employing additional foreign employees could reduce the population ageing problem (Bundesbank, 2012). Another important agenda item is to boost productivity growth and investment through structural reforms. In order to create an environment conducive to investment and innovation, it is crucial to encourage the

entrepreneurship culture in Belgium and to simplify the administrative burden for businesses, excessive regulation and the complex tax system. In addition, the mobility problem should be addressed through targeted investment in infrastructure, more attractive public transport and the deployment of new technologies.

Since the recent financial crisis, the traditional output gap methods have been criticised because of the difficulty of correctly assessing the structural and cyclical components of GDP in real time. And it is precisely such real-time accuracy that is essential for policy-makers. Recent research has therefore proposed an alternative concept of sustainable output, taking into account financial imbalances. The estimates based on such an alternative method for Belgium are not clear-cut and the traditional production function method may therefore still be preferable. Today's econometric methods of estimating the sustainable output do not have economic foundations in the same way that production function methods do, and therefore cannot be broken down into the various production factors. More importantly, for Belgium, the sustainable output method does not solve the issue of substantial ex-post revisions. Lastly, the choice and specification of the relevant financial imbalances remains highly uncertain and the "best choice" tends not to become clear until after a financial crisis. More generally, estimates of potential output and potential growth remain uncertain to some degree and they should therefore be interpreted with caution.

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