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# Lessons from the crisis : Monetary policy and financial stability

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## Introduction

This article examines the link between monetary policy and financial stability in the context of the recent financial and economic crisis. It aims to draw lessons from those recent events and to examine the implications for monetary policy. More specifically, it asks whether, apart from its price stability mandate, monetary policy should play a more significant and pro-active role in safeguarding financial stability. The underlying motive behind that discussion, focused on the respective aims of price stability and financial stability, is of course to investigate how monetary policy could best contribute towards the performance of the macroeconomy in the broad sense.

This question has recently formed the focus of numerous publications and speeches by well-known researchers and/or policy-makers<sup>(1)</sup>. This reveals that it is clearly too soon to draw definite lessons, and that there is as yet no post-crisis consensus on monetary policy, whereas before the crisis a consensus had emerged among central banks and academics in recent decades. The link between monetary policy and financial stability is currently the top priority of both theoretical research and more practical research conducted by central banks and the academic world, and that is likely to remain so in the coming years. It is therefore obvious that only provisional lessons can be drawn at the moment.

The layout of this article is as follows. The first section discusses the so-called pre-crisis consensus on monetary

policy. The second section looks at the lessons which can be drawn from the crisis and examines to what extent they have cast doubt on the pre-crisis consensus. The final section sets out the conclusions.

## 1. The pre-crisis consensus on monetary policy

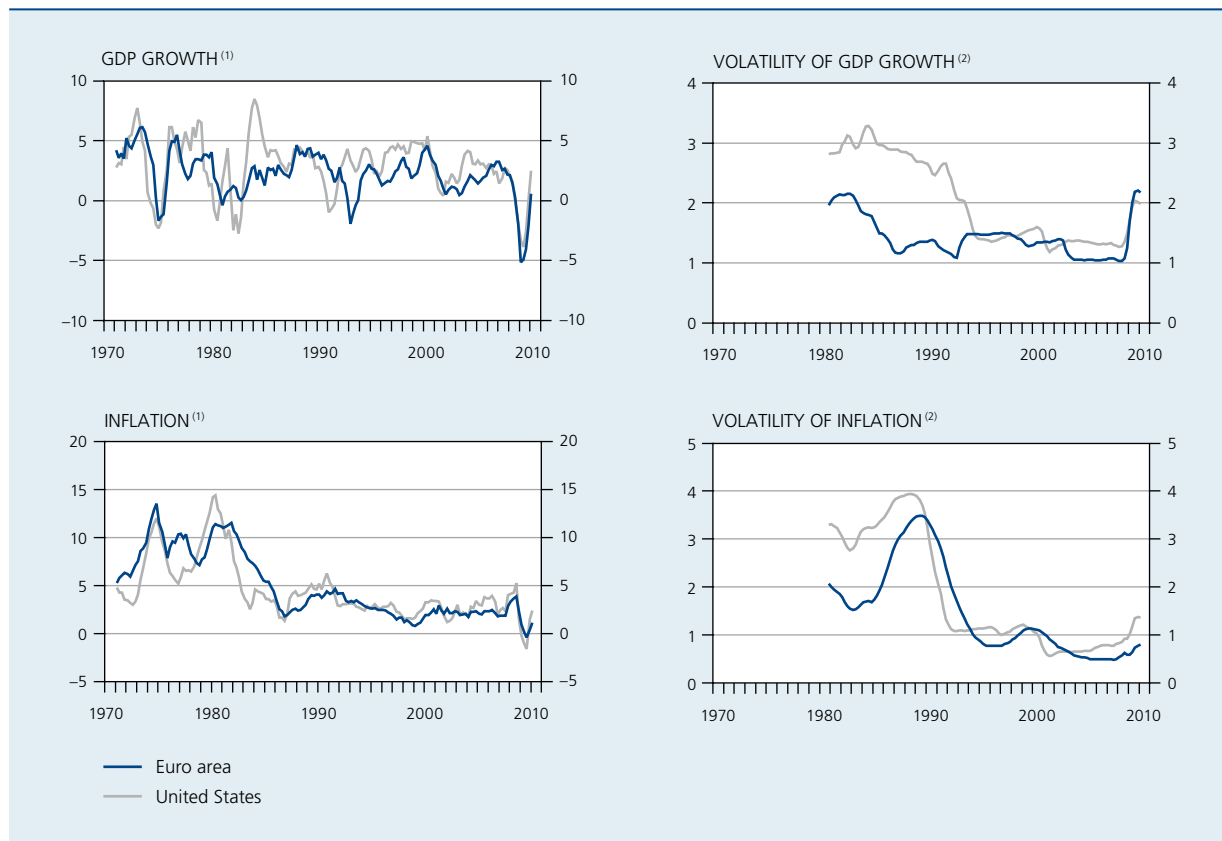
This section starts by considering the main economic developments of recent decades, since they form the background against which the pre-crisis consensus on monetary policy has emerged. It then reviews the main elements of that pre-crisis consensus and examines in more detail the specific link between monetary policy and financial stability. Finally, it comments briefly on the Eurosystem's monetary policy strategy in that context.

### 1.1 From "Great Inflation" to "Great Moderation"

In recent decades, the monetary policy debate has focused mainly on the link between inflation and economic activity, while the issue of financial stability or instability has taken a back seat. The reason probably is that, in the period following the Second World War, the advanced economies did not really encounter any serious financial crises; as demonstrated by the work of Reinhart and Rogoff (2009), that is in stark contrast to the scale of the pre-war financial turbulence and the extent of the recent global financial crisis. Conversely, inflation and growth were more volatile, especially when – in the 1970s, following the oil shocks and monetary policy decisions which later proved inappropriate – inflation accelerated sharply

(1) Notably Bean (2009), Bernanke (2010), Bini Smaghi (2009), Blanchard et al. (2010), BRI (2009a), Cecchetti, Disyatat et Kohler (2009), Kohn (2009), Goodhart (2009), Papademos (2009), Taylor (2007) and Trichet (2009, 2010), ...

**CHART 1**      **MACROECONOMIC FLUCTUATIONS SINCE 1970**  
(quarterly data)



Sources: Fagan et al.(2005), Thomson Reuters Datastream, OECD.  
(1) Percentage changes compared to the corresponding quarter of the previous year.  
(2) Standard deviation over moving periods of 40 quarters.

both in the United States and in most of the countries which would later make up the euro area. By the early 1980s, a policy of disinflation had been introduced. Experience had indicated that tolerating inflation had not promoted more sustained economic growth or falling unemployment, but instead had derailed inflation expectations and caused monetary instability, which in turn had had negative repercussions on growth and employment.

Moreover, that disinflation was accompanied by a marked decline in macroeconomic volatility. Since the mid 1980s, both inflation and economic growth have been less volatile than previously. That is why economists often talk of the “Great Moderation” (after the “Great Inflation” of the 1970s), a period of great macroeconomic stability which was suddenly interrupted by the recent financial crisis and the particularly severe recession which followed during 2008-2009.

There are several factors which could account for this “Great Moderation”. First, it could be simply attributable

to the fact that, during that period, the economy happened to experience essentially favourable macroeconomic shocks. It could also be due to structural changes in the economy, such as more flexible product and labour markets or better management techniques, e.g. in regard to stock management. Finally, a more efficient macroeconomic policy – and in particular a more efficient monetary policy – may also have helped to stabilise the macroeconomic environment. Opinions are divided on the relative importance of these explanations, but it was widely believed that a more efficient monetary policy had made a significant contribution. Over the years, in the macroeconomic context described above, a clear consensus on (good) monetary policy did in fact emerge. That consensus was based on the following elements.

### 1.2 Elements of the pre-crisis consensus

First, monetary policy-makers came to the understanding that the long-term pattern of inflation was determined by

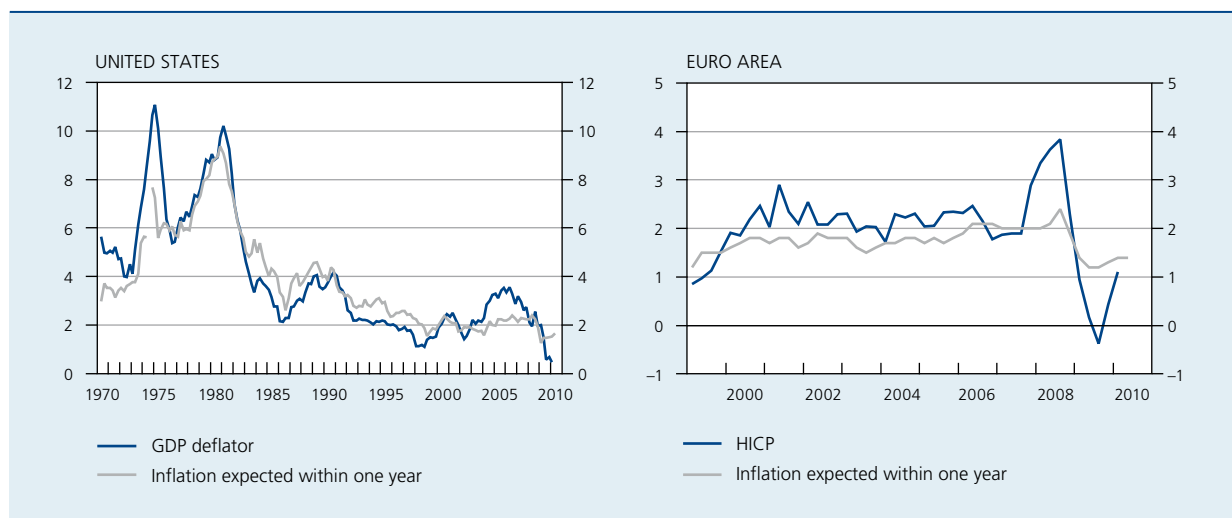
the prevailing monetary policy system. However, acknowledging that inflation is essentially a monetary phenomenon does not imply that real shocks cannot affect it. Shocks on both the demand and supply side of the economy have an impact on inflation, but the impact can be moderated if the central bank pursues a policy designed to stabilise inflation. However, if the central bank does not combat the inflationary pressure resulting from such shocks, but instead accommodates it, the impact will be considerably greater because of soaring inflation expectations. Thus, in all the advanced economies the first oil shock of the 1970s triggered a clear surge in inflation, although it was less marked in Germany precisely because monetary policy – even during that period – was aimed more at maintaining price stability. Today it is commonly assumed that monetary policy steers the long-term pattern of inflation, so that it should preferably aim at price stability.

A second element of this consensus on monetary policy is the idea that price stability does not have a cost in terms of economic activity, at least in the long term. It is in fact real – and not nominal – factors that determine economic growth and employment in the longer term. That is why the attempts of the monetary policy-makers in the late 1960s and in the 1970s to stimulate growth by paying the price of higher inflation were unsuccessful. What is more, such a period of monetary instability and high, volatile inflation has adverse consequences in terms of growth and employment owing to the rise in risk premiums, the distorted price signals and the resulting arbitrary distribution of incomes. The advantage of aiming at low and

stable inflation lies precisely in the prevention of those distortions. Thus, the understanding became widespread that the best way for monetary policy to contribute to sustainable economic growth was by guaranteeing price stability. Nevertheless, this emphasis on price stability does not mean that central banks are totally impervious to other economic considerations. Most central banks pursue some form of “flexible inflation targeting” (terminology taken from Svensson, 1999). Apart from the emphasis on the main aim of price stability, in the short term they take account of other considerations, such as developments in economic activity. The aim is to avoid the excessive volatility in economic activity and nominal interest rates which could accompany “strict inflation targeting”. While the dual aims of price stability and sustainable economic growth in the long term are not contradictory, and are even complementary, monetary policy may in fact face dilemmas in the short term, e.g. in the case of supply shocks, and a gradual response is often advisable.

A third element of the pre-crisis consensus on monetary policy is the major role played by inflation expectations in the inflation process. Economic agents are forward looking when setting prices and wages, thus taking account today of expectations regarding inflation in the future. The central bank’s credibility in regard to the maintenance of price stability is therefore crucial. For instance, the excess inflation of the 1970s led to higher inflation expectations, whereas the disinflation seen in the 1980s initially brought only a very gradual decline in those expectations. At first, there was little faith in the central

**CHART 2 INFLATION EXPECTATIONS**  
(percentage change compared to the corresponding quarter of the previous year)



Sources: Thomson Reuters Datastream, Federal Reserve Bank of Philadelphia Survey of Professional Forecasters, ECB Survey of Professional Forecasters.

bank's promise to reduce inflation, so that inflation expectations exceeded observed inflation for quite some time. That complicated the task of monetary policy in regard to price stability: a more restrictive policy was needed, and that had a short-term cost in terms of economic activity. In sharp contrast, during the past decade inflation expectations have remained firmly anchored because the monetary authorities have pursued a credible policy aimed at price stability. As a result, inflation expectations in the United States hardly increased at all in the wake of the rising inflation experienced in 2005-2007. In the euro area, for which long time series on inflation expectations are not available, inflation expectations also remained firmly anchored during 2007-2008, whereas the increasing commodity prices triggered a sharp surge in inflation. In both the United States and the euro area, the marked fall in inflation during the crisis also had only a limited impact on inflation expectations.

It is precisely because credibility and inflation expectations are so crucial that much importance is nowadays accorded to the institutional aspects of monetary policy. A fourth element of the pre-crisis consensus therefore concerns the creation of a framework forcing the monetary policy authority to concentrate on the aim of price stability. That fosters credibility, leads to better anchoring of inflation expectations, and ultimately facilitates the stabilisation of inflation. The establishment of such a binding framework is the practical reflection of the lessons drawn from the "discretion" versus "commitment" debate in the literature<sup>(1)</sup>. There are several important factors here. The existence of an explicit mandate – maintaining price stability – is one. In addition, many central banks have translated that mandate into a quantitative inflation target, offering a nominal anchor for inflation expectations and encouraging accountability. The adoption of a clear strategy with regular central bank communication on the subject means that the policy also becomes more predictable and therefore more effective, since it thus becomes easier to steer expectations. However, that transparency and predictability do not mean that monetary policy is implemented mechanically according to some rule: although the decisions conform to a clearly stated strategy, the policy-maker still has some discretion and can therefore be flexible in implementing the strategy. In reality, the economy is far more complicated than the highly simplified economic models demonstrating the superiority of the "commitment" approach, so that the policy-maker needs to have a degree of flexibility. Practical experience has also shown that the central bank should

preferably be independent in the exercise of its mandate. That also enhances credibility, though the central bank must still be accountable for its actions and motivations. That is the only justification for a high degree of independence. Moreover, the obligation to render account permits clarification of the strategy pursued.

### 1.3 Monetary policy and financial stability in the pre-crisis consensus

Before the outbreak of the crisis, a fairly broad consensus had also emerged in regard to the link between monetary policy and financial stability. Thus, it was generally accepted that by guaranteeing price stability, monetary policy was making a considerable contribution towards the maintenance of financial stability, for example by reducing the risks associated with financial contracts, which are generally concluded in nominal terms. Preventing deflation also promotes the maintenance of financial stability, since it avoids a significant increase in the real burden of existing debts. The greater predictability of monetary policy may equally help to maintain financial stability since it makes it easier to estimate the likely impact of certain financial decisions, such as the conclusion of a variable rate mortgage loan. Conversely, financial stability was regarded as a key – if rarely binding – constraint for monetary policy, since financial instability can seriously disrupt the monetary transmission mechanism. Since that transmission mechanism had hardly ever been disrupted by a serious financial crisis in recent decades, that aspect had become a minor consideration in current thinking.

Despite the recognition of that long-term complementarity between the aims of price stability and financial stability, it was obvious from the start that while the pursuit of price stability was an essential aim, it could not be sufficient in itself to ensure financial stability. However, the dominant view did not attribute a more active role to monetary policy, but considered that financial stability must be achieved primarily by an appropriate prudential policy in terms of regulation and supervision. Yet it must be said that the consensus on that aspect was not as broad as the consensus on the role of monetary policy mentioned above, in regard to inflation and growth respectively. That debate centred largely on whether or not monetary policy should take account of asset prices, and if so, how and to what degree.

In that connection, the dominant view was that monetary policy-makers should take account of asset prices and other financial variables only in so far as they have implications for the future trend in activity and inflation over a period normally taken as relevant for monetary

(1) At first, the focus was on the inflation bias (Kydland and Prescott, 1977): "discretion" leads to higher inflation, but does not improve economic activity. Later, there was more emphasis on the stabilisation bias: "commitment" leads to a better trade-off in the short term between inflation stabilisation and stabilisation of the output gap (cf. for example Clarida, Gali and Gertler (1999)).

policy (usually little more than two years). It was only considered appropriate to respond if rising asset prices were accompanied by wealth effects which propelled growth and thus generated inflationary pressure. Asset prices and financial variables were therefore not aims in themselves, but merely ordinary variables in the broad range of indicators forming the basis of the central bank's growth and inflation forecasts. A more explicit response to a rise in asset prices beyond what was necessary to stabilise inflation – for example, to prevent the development of a bubble – was generally regarded as inappropriate. However, there were also divergent opinions on the subject. Various observers – such as Cecchetti et al. (2000), numerous publications by the Bank for International Settlements (BIS), White (2006), etc. – have shown that a central bank should really take account of asset prices and financial imbalances beyond their implications for inflation forecasts over a two-year horizon. They constantly warned against the serious macroeconomic consequences of the bursting of a bubble, including the impact on price stability, since deflationary pressure may develop in such circumstances. They therefore advocated looking beyond the usual horizon and curbing any strong surge in asset prices, a policy known as “leaning against the wind”. However, the dominant view was still that asset prices should not become a supplementary aim of monetary policy. In simple terms, that view was based on five main arguments<sup>(1)</sup>.

First, it is difficult to identify bubbles in real time. In principle, there appears to be no reason to assume that monetary policy-makers are in a better position to distinguish between rising asset prices caused by improved fundamentals and the formation of a bubble. While central banks have an accurate idea of the optimum level of inflation, that is not the case for asset prices.

Second, in the past, the bursting of a bubble has not always led to serious financial instability and major macroeconomic fluctuations. Part of the reason may lie in the aforesaid fact that financial instability was rarely a serious issue after the Second World War, at least not until recently, or that any bubbles which did occur appeared on less crucial markets. Moreover, there was the impression that a very accommodating monetary policy could largely limit the impact of a burst bubble on the real economy.

The third argument was that, once a bubble had burst, it was always possible to make drastic cuts in interest rates in order to limit the macroeconomic damage caused by the crash. This strategy of “cleaning instead of leaning” was therefore often applied in the recent past, and at first sight was reasonably successful, e.g. after the 1987 stock market crash and the bursting of the dotcom bubble, and

that strengthened the feeling that it was not really important for monetary policy to prevent bubbles.

The fourth argument was that the interest rate instrument is not very suitable for preventing financial imbalances. It was originally assumed that large interest rate adjustments are needed to prevent bubbles. Ordinary sized interest rate hikes are probably not very significant in comparison with the capital gains which investors expect in the bubble development phase. Moreover, interest rates are not an accurately targeted instrument, whereas the emergence of bubbles on particular markets might require a more specific approach. Finally, it is preferable to intervene at an early stage in the bubble, although that is precisely when it is most difficult to identify the bubble. Later, when the bubble is easier to detect, it is more difficult to tighten monetary policy because that could actually accelerate the bursting of the bubble and even intensify its adverse impact on the real economy. This implies that, according to the dominant view, “leaning against the wind” may have a high price in terms of macroeconomic volatility, at least across the usual horizon relevant for monetary policy, and is also difficult to implement in practice.

Finally, attention was systematically drawn to the fact that additional policy dilemmas would be created. For example, that is so if the central bank faces a favourable and persistent supply shock which causes inflation to fall, whereas that same shock may engender excessive optimism about the future on the financial markets, and could lead to a bubble. In that case, it is necessary to tighten policy in order to prevent the bubble, but in such circumstances inflation control actually requires an easing of policy. Moreover, such policy dilemmas hamper communication and may make the eventual decision less transparent. Furthermore, the independence of monetary policy may also be at risk because other policy areas such as regulation and supervision have a significant influence on financial stability. The maintenance of price stability thus becomes more complicated because the advantages outlined above of a simple but clear framework are lost, with possible adverse effects on the anchoring of inflation expectations.

#### 1.4 The monetary policy strategy of the Eurosystem in the light of the pre-crisis consensus

The monetary policy strategy of the Eurosystem is largely in line with the pre-crisis consensus outlined above. For instance, price stability is indubitably the primary objective of monetary policy. That is even expressly spelt out

(1) Cf. in particular Giavazzi and Mishkin (2006) for a fuller account.



in the Treaty on the functioning of the European Union. Furthermore, the Treaty also stipulates the independence of the central bank, and it states that monetary policy should support general economic policy in the Union, without prejudice to the goal of price stability. The aims of that policy include sustainable, non-inflationary growth and high employment. In regard to financial stability, the Treaty stipulates that monetary policy should contribute to the effective implementation by the competent authorities of the policy on prudential supervision of credit institutions and the stability of the financial system. Not only does that again indicate the priority of the price stability objective, but it also explicitly acknowledges that other institutions (supervisory and budgetary authorities) have a key responsibility in regard to financial stability.

The ECB Governing Council then defined a clear strategy for putting the price stability mandate into practice. That strategy first gives a quantitative definition of price stability, defining it as an increase in the HICP of less than but close to 2 p.c. in the medium term in the euro area. Both the aim of low inflation and the quantification of that aim are entirely in line with the pre-crisis consensus. The stipulation that stability is to be maintained in the medium term is also important, because it allows a degree of latitude in the short term to take account of other considerations – such as the prevention of excess volatility in interest rates or economic activity – and therefore permits a gradual policy response. The monetary policy strategy of the Eurosystem is also based on an analytical framework comprising two pillars: economic analysis and monetary analysis respectively, each being intended to detect risks to price stability at different horizons. This unique two-pillar strategy means that the Eurosystem pays explicit attention to financial developments, more so than other central banks. However, it should be noted that the monetary analysis was initially aimed at identifying risks to price stability rather than financial imbalances, since it originated from the long-term link between the trend in the money supply and inflation. Nonetheless, monetary analysis has gradually focused more on aspects of financial stability. Thus, on the basis of its monetary analysis, the ECB Governing Council repeatedly expressed its concern, during the years preceding the recent financial crisis, over the movement in property prices in certain euro area countries.

Like other modern central banks, the Eurosystem is open about its strategy and the way in which it is implemented: monetary policy decisions are explained in detail in the light of that strategy, setting out the justification for the policy pursued. As a result, monetary policy has become ever more predictable. In the first twelve years of monetary union, this has effectively stabilised inflation

at a level corresponding to the quantitative definition of price stability and ensured that inflation expectations are firmly anchored. The stabilisation of inflation was also accompanied by a high level of macroeconomic stability in the euro area, at least prior to the eruption of the recent financial crisis.

## 2. Lessons from the crisis

This section draws a number of provisional lessons from the crisis and examines the extent to which they cast doubt on the pre-crisis consensus on monetary policy. Of course, it is still too soon to draw definite lessons. Not only is the crisis not entirely over – in recent months it actually entered a new phase – but it will take time to analyse these experiences in depth. Yet some lessons are already fairly clear.

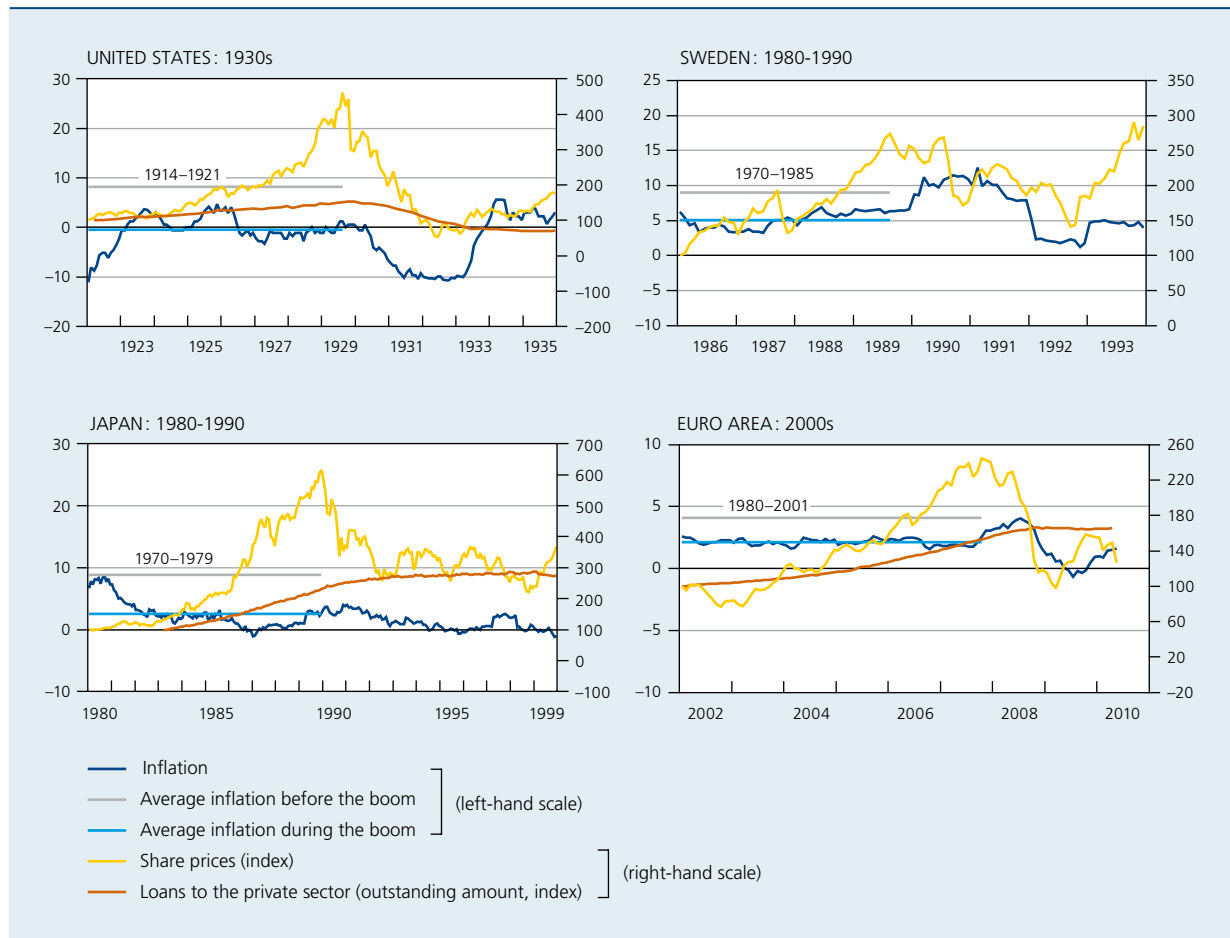
### 2.1 Price stability is not sufficient to maintain financial stability and macroeconomic stability in general

The recent financial crisis demonstrated that efforts to achieve price stability were necessary but certainly not sufficient in themselves to ensure financial stability. Although the pre-crisis consensus did not claim that the pursuit of low and stable inflation would always ensure financial stability, the importance of a policy specifically aimed at financial stability had faded somewhat into the background. In that regard, the experience of the recent crisis differs little from earlier periods of financial instability. During the run-up to a financial crisis, high inflation seldom appeared to be a problem; quite the contrary. That is evident from four periods in which substantial financial imbalances built up: the 1930s in the United States, the years 1980-1990 in Sweden, 1980-1990 in Japan and the current crisis for which data for the euro area are shown here. On each occasion it is evident that, during the bubble formation phase, inflation was relatively low, on average<sup>(1)</sup>. It is also notable that after the bubble had burst, inflation generally fell sharply, in some cases actually becoming negative. In other words, while price stability is not sufficient to prevent the formation of bubbles, the bursting of a bubble clearly generates deflationary pressure, and hence downside risks to price stability.

Moreover, in contrast to some of the assumptions in the pre-crisis consensus, the recent financial crisis clearly

(1) In regard to inflation during the period 1914-1921 in the United States, it must be said that it was probably influenced significantly by the First World War.

**CHART 3** PRICE STABILITY AND FINANCIAL STABILITY<sup>(1)</sup>  
(percentage change compared to the corresponding period of the previous year, unless otherwise stated)



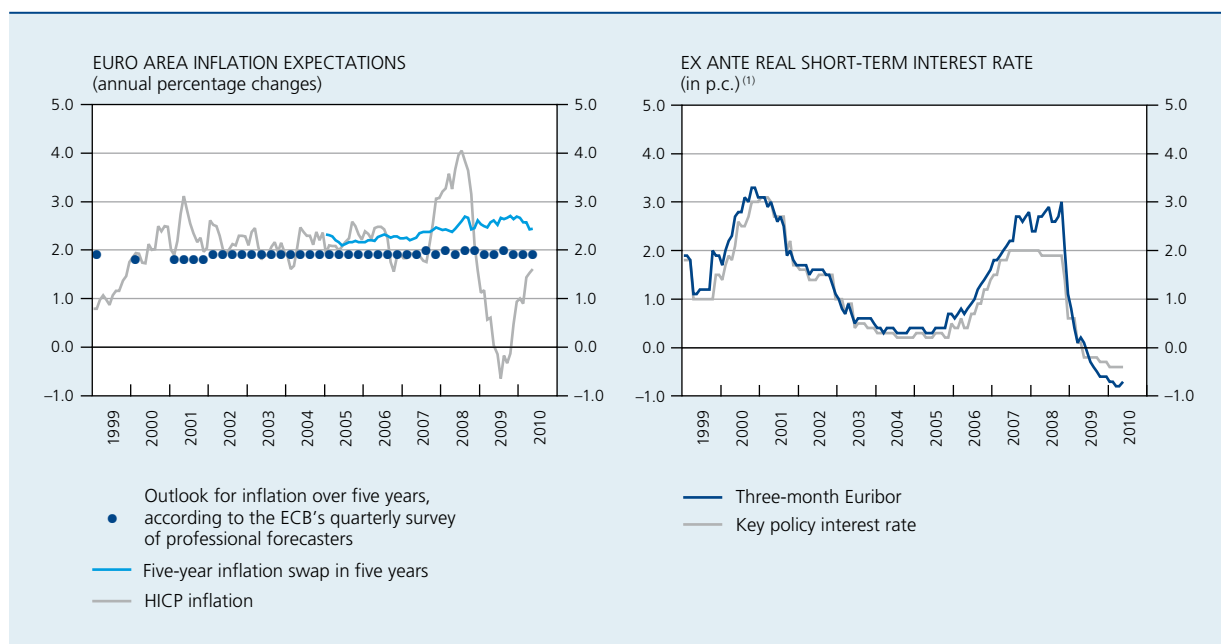
Sources: Bureau of Labor Statistics, Ohio State University, Thomson Reuters Datastream, Federal Reserve Board.  
(1) Inflation measured by the CPI. Share prices in the United States: Dow Jones, for Sweden: Affarsvarlden Index, for Japan: TOPIX, and for the euro area: Datastream Euro Share Price Index. Loans to the private sector are outstanding amounts recorded by the banks. For Sweden, no data are available on loans to the private sector for the period in question.

shows that under certain circumstances the bursting of a bubble can certainly create considerable financial and macroeconomic instability. That is also evident from historical research conducted by the IMF (2009): economic recessions accompanied by a financial crisis are on average more protracted and deeper than others.

The current crisis also shows that a fragile financial system can seriously disrupt the transmission of monetary policy. Moreover, managing the macroeconomic consequences of the bursting of a bubble can put a heavy strain on the monetary authorities: the two aspects go hand in hand because, in principle, any serious disruption of the transmission mechanism implies a need for stronger monetary policy impulses. During the post-war period, it was often possible to offset the macroeconomic consequences of financial crises by

drastic easing of the monetary policy interest rate, but the latest crisis has shown that, in certain circumstances, the traditional interest rate instrument may be rapidly exhausted and that central banks had to make extensive use of unconventional monetary policy measures in order to generate additional monetary impulses once short-term interest rates had reached their lower limit, on the one hand, and also to correct specific malfunctioning in the monetary transmission, on the other hand. Owing to its severity, this crisis also caused a substantial deterioration in public finances, a recurrent feature of serious financial crises, as is evident from historical research by Reinhart and Rogoff (2009). To sum up, in the immediate future there is little room for manoeuvre if the economic crisis were to take a turn for the worse. In regard to fiscal policy, the time has come to consolidate public finances,

**CHART 4** INFLATION EXPECTATIONS AND REAL SHORT-TERM INTEREST RATE IN THE EURO AREA



Sources : Thomson Reuters Datastream, Bloomberg and ECB.  
 (1) Interest rate deflated by inflation expected in one year's time on the basis of the ECB's quarterly survey of professional forecasters.

as is clear from recent developments on the market in government securities.

The idea that aiming at price stability would be sufficient to ensure macroeconomic stability proved to be an illusion. More specifically, it is evidently inadvisable to adopt a *laissez-faire* policy in regard to cumulative financial imbalances, and it is obvious that policy-makers should do more than simply limit the macroeconomic impact during a downturn. That is perhaps the most important lesson to be learnt from the crisis, but it does not necessarily mean that monetary policy itself should tackle the formation of financial imbalances, let alone take sole responsibility for that. It is in fact necessary to assess to what degree monetary and prudential policy respectively should be deployed for that purpose (cf. below).

## 2.2 Inflation expectations firmly anchored, even during the crisis

However, the above remarks do not imply that monetary policy geared to price stability made it more difficult to combat the macroeconomic consequences of the crisis. On the contrary, the firm anchoring of inflation expectations enabled the monetary policy-makers to respond appropriately. When the financial crisis spread to the real economy, and inflation fell sharply and even

became negative as a result of the decline in commodity prices, that steep fall in inflation had very little impact on inflation expectations. The reduction in the nominal key interest rates thus led to a marked fall in the *ex ante* real interest rate, which actually became negative. Since it is precisely the latter rate that is important for economic activity, a very expansionary monetary policy was therefore feasible. That would have been impossible if inflation expectations had been insufficiently anchored and had mirrored the decline in inflation. Such a downward uncoupling of inflation expectations is specifically one of the principal mechanisms triggering a deflationary spiral. Deflation would in turn have seriously hampered the ongoing process of debt deleveraging, and would therefore have placed additional stress on financial and macroeconomic stability.

For the future, it is therefore crucial to take full account of the need for effective anchoring of inflation expectations – one of the key elements of the pre-crisis consensus.

## 2.3 Recurrent patterns can help to identify financial vulnerabilities

The difficulty of identifying financial imbalances in real time has already been mentioned. That difficulty was one of the main arguments against the use of asset prices as

an additional monetary policy objective. Of course, that is equally true in the case of prudential policy. Nonetheless, recent research has revealed patterns which recur systematically in the run-up to a serious financial crisis. Moreover, the current crisis largely confirms those patterns.

It is not so much the actual rise in asset prices that causes a problem, but the combination with rapidly rising debt leverage. Historical analysis has also shown that the most damaging bubbles have been those concerning house prices<sup>(1)</sup>. The two aspects are closely linked. Although a sharp fall in both share prices and house prices leads to a substantial wealth loss, the impact on the financial system varies. Rising share prices are not generally accompanied by an increase in the debt leverage of households or institutional investors, so that the bursting of such a bubble does not directly threaten the financial system, and the macroeconomic implications are therefore confined to negative wealth effects for private consumption and a negative impact on investment resulting from the rise in corporate financing costs. In contrast, rising house prices are generally accompanied by a sharp increase in the debt leverage of both households and financial intermediaries. If those prices fall, that puts severe pressure on the balance sheets of the economic sectors concerned, triggering additional transmission mechanisms: there are mutual feedback effects both between the real economy and the financial economy, and between financial institutions and financial market segments. In that context, it is not surprising that recent research<sup>(2)</sup> has also revealed the existence of recurrent patterns – mainly in credit, monetary aggregates and asset prices – which help to identify the development of financial imbalances. It is also clear that the accumulation of current account deficits leads to increased vulnerability in many cases. Further research on this subject is obviously desirable. It could offer angles for more detailed monetary analysis under the Eurosystem's two-pillar strategy. Over the years, that analysis has progressed from a virtually one-sided approach – suggesting a direct, positive link between monetary developments and the longer-term risks to price stability – towards a more eclectic approach which also establishes a link with both the economic cycle and the risks to financial stability.

Despite the progress on the analysis front, it would not be true to say that the identification of financial imbalances in real time is no longer a challenge, as many of the findings on that subject are based on *ex post* analysis. They also present an average pattern for the various crises, so that those findings cannot be regarded as reliable predictors of individual crises. There is therefore still a relatively high risk of failing to spot an impending crisis, and thus adopting a policy which is too passive, alongside the risk of a false alarm and hence an overly pro-active policy. Both

situations generate costs in the form of excessive macroeconomic variability, but the current crisis – owing to its unusual severity – has shown that the costs resulting from the first type of policy errors may be greater than the costs of the second type of errors. Moreover, this type of real time uncertainty over the accuracy of the policy pursued does not only occur in this context but is inherent in the actual conduct of the policy. For example, it is equally difficult to obtain an accurate assessment of the inflationary or deflationary pressure present in the economy, owing to the uncertainty surrounding the measurement of the output gap in real time. But in that case, such uncertainty does not prompt the policy-maker to adopt a passive approach. It only encourages caution in the use of both the uncertain indicator and the available policy instruments.

#### 2.4 Implications for monetary policy and (macro) prudential policy

It is clear from the foregoing that, in view of the scale of the current financial and economic crisis, on the one hand, plus the fact that understanding of the patterns associated with the formation of financial imbalances has gradually improved, economic policy can and should pay more attention to the management of financial vulnerabilities. This article has so far left unanswered the question whether that is a task for monetary policy, prudential policy, or both. Of course, there is also the question of possible interactions between these two aspects of policy.

In that regard, it is worth looking further into the causes of the current financial and economic crisis. It is evident that both macro- and microeconomic factors have played a role. At macroeconomic level, the “Great Moderation” mentioned earlier reached its zenith on the eve of the crisis and created what with hindsight proved to be an exaggerated sense of security. Moreover, following the bursting of the dotcom bubble, monetary policy had been eased significantly, primarily in the United States. Fears of deflation – fuelled partly by cheap imports from the emerging economies – prompted the monetary authority to keep interest rates exceptionally low for a lengthy period. Finally, the capital flows associated with the global imbalances caused distortions in the prices of many assets, and subsequently helped the contagion to spread to various countries and economic regions, so that the crisis became global. More particularly, the risk-free long-term interest rate was further depressed by the massive accumulation of foreign exchange reserves by

(1) Cf. in particular Reinhart and Rogoff (2009).

(2) Cf. in particular Borio and Lowe (2002), Detken and Smets (2004), Bruggeman (2007), Adelid and Detken (2007), Borio and Drehmann (2009), Gerdemesier et al. (2009).

Asian central banks. Those reserves were invested mainly in American government paper. The low real interest rate encouraged the expansion of credit, and in many economies led to unsustainable property price rises. It also prompted a search for yield which led to riskier behaviour.

At microeconomic level, things first went wrong because consumers, investors, financial institutions and even rating agencies received and/or gave false signals, so that ultimately risk-taking steadily increased. That risk was in turn measured or estimated incorrectly, since the most recent period, though relatively long, was a time of unusually great stability. That in turn led to less stringent risk management. Finally, regulation and supervision proved to be too weak, because too much reliance was placed on the self-regulating effect of market discipline.

In the end, analysis of the causes of the crisis indicates that it was a complex interplay of various factors, rather than one particular factor, that was decisive. In that context, it is rather unrealistic to assume that either monetary policy or prudential policy could avert the formation of financial imbalances in the future. Moreover, if monetary policy had to carry all the responsibility, it could face serious dilemmas in certain circumstances, and would therefore have to strike a balance between the aims of price stability and financial stability. That would pose a threat to the hard-won credibility of inflation control, whereas that is of vital importance, as demonstrated by the crisis.

It is therefore beyond dispute that prudential policy needs to be strengthened and that macro-prudential policy has a key role to play, alongside the more traditional micro-prudential policy. While micro-prudential policy on regulation and supervision focuses on individual institutions, macro-prudential policy aims to limit systemic risk. The horizontal and vertical dimensions are both important here. The horizontal dimension refers to the fact that the entire financial system may get into difficulties as a result of the interconnections between individual institutions. The vertical dimension concerns procyclicality, i.e. the phenomenon of self-amplifying feedback mechanisms between the financial system on the one hand and the broader macroeconomy on the other. Procyclicality may contribute to the development of unsustainable upward movements, but in a downturn it may equally inflict serious damage on the financial system, causing a severe recession. The main instruments considered here are those which are used for the regulation and supervision of individual institutions – capital buffers, liquidity buffers,

maximum loan-to-value ratios, etc. – but their use is adjusted to a broader perspective.

By augmenting the financial system's resilience and containing procyclicality via the use of additional instruments, a successful macro-prudential policy together with an appropriate micro-prudential policy can facilitate the conduct of monetary policy. Limiting the procyclicality of the financial system makes it easier, in principle, for monetary policy to achieve macroeconomic stability and more particularly, to aim at price stability, but of course it is no substitute for that policy. Macro-prudential and monetary policy are therefore likely to be synchronised and mutually reinforcing in a phase in which policy is tightened or eased. Furthermore, specific macro-prudential instruments reduce the risk of serious policy dilemmas precisely because the two aspects of policy can move in opposite directions, depending on the circumstances, and therefore address specific challenges in an appropriate way. That could happen, for example, in situations where the financial system is vulnerable, but at macroeconomic level there are nevertheless upside risks to price stability. At that point, macro-prudential policy could be eased while monetary policy is tightened, therefore securing the necessary room for manoeuvre since there is less need to be concerned about the health of the financial system. Conversely, in certain circumstances, it may be desirable to ease monetary policy while tightening macro-prudential policy, e.g. in situations where there is no inflationary pressure whereas unsustainable developments are threatening the financial system. As stated earlier, that type of situation is not infrequent.

Viewed in that way, the question is whether it is sufficient to reinforce prudential policy and whether it is still necessary for monetary policy to aim to contribute more to financial stability. Nonetheless, it is rather unlikely that prudential policy will be sufficient on its own to safeguard financial stability in all circumstances. That is why it seems right that monetary policy itself should make a bigger contribution here than in the past. For one thing, the design of macro-prudential policy is still in its infancy, so that it is preferable, at least in the first instance, to adopt realistic aims and objectives. Also, monetary policy itself undeniably has an influence on the risk-taking behaviour of the various economic agents. It is therefore appropriate to take full account of that influence on risk-taking, which is also regarded as an additional monetary policy transmission mechanism, known as the risk-taking channel<sup>(1)</sup>. It operates in various ways<sup>(2)</sup>. Thus, a lower (risk free) interest rate exerts a positive effect on the valuation of assets and collateral, so that financial institutions are able to enlarge their balance sheet, and that is accompanied by greater risk-taking. Higher valuations are often

(1) Cf., for example, Bini Smaghi (2009), Borio and Zhu (2008).

(2) For empirical results, see in particular Gambacorta (2009), Adrian and Shin (2009) and Altunbas et al. (2009).

also accompanied by lower volatility, so that the usual yardsticks indicate a lower risk. Moreover, in a period of low nominal interest rates, a search for yield may develop because of a degree of inertia in the nominal returns which investors aim to achieve. That is attributable to a form of monetary illusion; certain nominal yields may also have been guaranteed, whether or not on a contractual basis, by pension funds or life insurers for example. Finally, monetary policy may have encouraged greater risks by tending in the past to react asymmetrically to the movement in asset prices – a widely accepted rule of the pre-crisis consensus – and the financial markets may have seen that as an insurance against risk-taking.

The fact that monetary policy is to contribute more towards safeguarding financial stability need not be at odds with the aim of price stability. The crisis specifically showed that too narrow a focus on price stability at a horizon of no more than two years may imply risks for financial stability and thus also for price stability in the longer term. By helping to safeguard financial stability, monetary policy therefore promotes the attainment of its own goal, and in effect assumes an extension of the monetary policy horizon. In the case of the Eurosystem's monetary policy, the medium-term stance offers the necessary scope for that. Moreover, a key role can be assigned to monetary analysis, though it should be noted that, in that case, its content would change. Traditionally, strong growth of the money supply and credit has been linked to upside risks to price stability, while the prevention of the formation of financial imbalances aims to limit the downside risks to price stability which accompany the bursting of a bubble. Although a strong monetary dynamic justifies the tightening of monetary policy in both cases, the reasons for the tightening are different.

### 2.5 An integrated analysis framework, but clearly defined mandates for monetary and macro-prudential policy

The strong interactions between the real economy and the financial economy on the one hand, and between a macro-prudential policy that reduces procyclicality and monetary policy on the other, require an integrated analysis framework in which those interactions are clearly defined. That makes it possible to assess the impact of the macro-prudential policy on the behaviour of the financial system, and to examine which are the most appropriate instruments. Moreover, that also means that the influence of the macro-prudential policy on the monetary policy transmission mechanisms can be analysed and taken into account in the conduct of monetary policy.

Development of such an integrated analysis framework is therefore a top priority for the research agenda in the immediate future. Central banks have a clear comparative advantage here, since they can combine their knowledge of the financial markets and the financial system with the macroeconomic analysis which they conduct in order to support monetary policy. This natural “macroeconomic reflex” makes central banks particularly suitable candidates for a key role in macro-prudential policy. That also facilitates the rapid exchange of expertise and information between monetary and macro-prudential policy, enhancing the effectiveness of both policy aspects.

Nevertheless, monetary and macro-prudential policy require clearly defined mandates and corresponding strategies, because that makes them more accountable and should permit full consolidation of monetary policy's hard-won credibility in regard to the price stability objective.

## Conclusion

The current financial and economic crisis has again highlighted the importance of financial stability and has clearly demonstrated that macroeconomic stability requires more than just price stability. The question is therefore whether, in the future, monetary policy should make a greater contribution to the maintenance of financial stability, and perhaps be given a broader mandate. That debate is still ongoing, but some key points are already becoming clear.

Thus, everyone agrees that financial stability benefits in the first place from a strengthening of prudential policy, and particularly from the conduct of a macro-prudential policy alongside the more traditional micro-prudential policy. While the latter focuses on individual institutions, macro-prudential policy aims to limit the systemic risk associated with two types of interaction, namely the interactions between financial institutions themselves, and those between the financial system and the macro-economy. A successful macro-prudential policy makes it easier to conduct monetary policy; it prevents monetary policy from being over-burdened or confronted by serious policy dilemmas, so that it can continue to focus on the primary goal of price stability. Indeed, the importance of firmly anchored inflation expectations and the credibility of the price stability mandate was also clear during the crisis.

Although this does not, in principle, imply any modification of the existing monetary policy frameworks, it nevertheless seems advisable for monetary policy itself to do more to safeguard financial stability. Above all, it is necessary to take account of the impact of that policy on the

risk-taking behaviour of the various economic agents. In addition, greater importance should be attributed to analysis of the formation of financial imbalances. That is not at odds with the priority of the price stability mandate, because the crisis clearly showed that risks to financial stability in the longer term also imply risks to price stability. However, it does assume an extension of the monetary policy horizon. If that horizon is actually extended, that should preferably be made explicit, as it would clarify the monetary policy strategy and increase accountability.

## Bibliography

- Adelid R. and C. Detken (2007), *Liquidity shocks and asset price boom/bust cycles*, ECB Working Paper 732.
- Adrian T. and H. Shin (2009), *Financial intermediaries and monetary economics*, Federal Reserve Bank of New York Staff Reports 398.
- Altunbas Y., L. Gambacorta and D. Marques-Ibanez (2009), *An empirical assessment of the risk-taking channel*, paper presented at the BIS/ECB conference "Monetary policy and financial stability", September.
- Bank for International Settlements (2009), Annual Report.
- Bean C. (2009), *The Great Moderation, the Great Panic and the Great Contraction*, Schumpeter Lecture at the Annual Congress of the EEA, Barcelona, 25 August.
- Bernanke B. S. (2010), *Monetary policy and the housing bubble*, Remarks at the Annual Meeting of the AEA, Atlanta, 3 January.
- Blanchard O., G. Dell'Ariccia and P. Mauro (2010), *Rethinking macroeconomic policy*, IMF Staff Position Note, February.
- Bini Smaghi L. (2009), *Monetary policy and asset prices*, Opening address at the University of Freiburg, Freiburg, 14 October.
- Borio C. and P. Lowe (2002), *Asset prices, financial and monetary stability: Exploring the nexus*, BIS Working Paper 114.
- Borio C. M. and M. Drehmann (2009), "Assessing the risk of banking crisis - revisited", *BIS Quarterly Review*, March.
- Borio C. and H. Zhu (2008), *Capital regulation, risk-taking and monetary policy: A missing link in the transmission mechanism?*, BIS Working Paper 268.
- Bruggeman A. (2007), *Can excess liquidity signal an asset price boom?*, NBB Working Paper 117.
- Cecchetti S., H. Genberg, J. Lipsky, and S. Wadhvani (2000), *Asset prices and central bank policy*, Geneva Report on the World Economy 2, CEPR and ICMB.
- Cecchetti S. G., P. Disyatat and M. Kohler (2009), *Integrating financial stability: new models for a new challenge*, Essay prepared for the joint BIS-ECB Workshop on "Monetary policy and financial stability", Basel, 10-11 September.
- Clarida R., J. Gali and M. Gertler (1999), "The Science of Monetary Policy: A New Keynesian Perspective", *Journal of Economic Literature*, vol. 37(4), pp. 1661-1707, December.
- Detken C. and F. Smets (2004), *Asset price booms and monetary policy*, ECB Working Paper 364.
- Fagan G., J. Henry and R. Mestre (2005), "An area-wide model for the euro area", *Economic Modelling*, 22, 39-59.
- Gambacorta L. (2009), "Monetary policy and the risk-taking channel", *BIS Quarterly Review*, December.
- Gerdesmeier D., B. Roffia and H.-E. Reimers (2009), *Asset price misalignments and the role of money credit*, ECB Working Paper 1068.
- Giavazzi F. and F. S. Mishkin (2006), An evaluation of Swedish monetary policy between 1995 and 2005.



Goodhart C. (2009), *Inflation targeting twenty years on*, dinner speech delivered at the Sixth Norges Bank Monetary Policy Conference, Oslo, 11-12 June.

IMF (2009), *Lessons for monetary policy from asset price fluctuations*, World Economic Outlook Chapter 3, October

Kohn D.(2009), *Policy challenges for the federal reserve*, Speech at the Kellogg School of Management, November.

Kydland F. E. and E. C. Prescott (1977), "Rules rather than discretion: The inconsistency of optimal plans", *Journal of Political Economy*, University of Chicago Press, vol. 85(3), 473-91, June.

Papademos, L. (2009), *Monetary policy and the 'great crisis': Lessons and challenges*, speech at the 37th Economics Conference "Beyond the crisis: Economic policy in a new macroeconomic environment" organised by the Österreichische Nationalbank, Vienna, 14 May.

Reinhart C. M. and K. S. Rogoff (2009), *This time is different: eight centuries of financial folly*, Princeton University Press.

Svensson L. E. O. (1999), "Inflation targeting: Some extensions", *Scandinavian Journal of Economics*, vol. 101(3), 337-361, September.

Taylor J. B. (2007), *Housing and monetary policy*, Proceedings, Federal Reserve Bank of Kansas City, 463-476.

Trichet J. C. (2009), *The crisis and its lessons*, Lecture at the University of Venice, Venice, 9 October.

Trichet J. C. (2010), *Commentary on "Fifty years of monetary policy: What have we learned?"* by Adam Cagliarini, Christopher Kent and Glenn Stevens, at the Symposium for the 50th anniversary of the Reserve Bank of Australia, Sydney, 9 February.

White W. R. (2006), *Is price stability enough?*, BIS Working Papers 205.

# Rebalancing global demand

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## Introduction

At the end of 2008, the escalating financial crisis drove most of the advanced countries into a severe recession. The emerging economies also suffered as capital flows dried up and international trade collapsed. These developments caused global GDP to contract for the first time in decades, in contrast to the often very strong economic expansion seen in previous years.

With the support of massive fiscal recovery plans and extremely accommodating monetary policies, the global economy has gradually recovered. However, there is great uncertainty over how long it will take to regain a growth rate comparable to that seen before the crisis, or even whether that is possible, especially as that dynamic growth was based largely on macroeconomic distortions in a good many countries. Some western economies saw rapidly expanding credit, asset price bubbles and exceptionally low savings ratios, while a number of emerging countries featured relative price distortions, underdeveloped financial markets and excessive levels of savings. The most obvious manifestation of these imbalances was found in the growing current account surpluses and deficits on the balance of payments. Many observers had for years been stressing that this situation was unsustainable. Moreover, there is a general consensus that these imbalances contributed to the outbreak of the financial crisis.

Recently there have been signs of shifts in global demand: some countries were harder hit than others by the financial crisis, while some governments had greater fiscal scope for adopting a recovery strategy. These shifts have led to a partial correction of the external imbalance.

However, a vigorous and sustainable global economic recovery requires fundamentally more balanced growth of global demand, implying the permanent elimination of the inherent distortions in national growth profiles. That is no easy task and will require a globally coordinated approach involving all regions of the world. The resolute commitment of the G20 leaders at the Pittsburgh summit at the end of September 2009 is grounds for optimism. In the Framework for Strong, Sustainable and Balanced Growth, they agreed that countries with a current account deficit would endeavour to promote savings and embark on a path towards fiscal consolidation. Consequently, those countries – and especially the United States – will cease to be world spenders of last resort for many years to come. It is therefore up to the countries with a surplus, primarily the Asian countries, to propel global demand. To that end, they need to strengthen “domestic sources of growth”, e.g. by a policy which curbs private savings and encourages a shift from the export industry in favour of the service sectors. Although a number of countries have already taken a series of measures representing a move in the right direction, the rebalancing of global demand will still require fundamental structural reforms in many areas and regions. Finding a new global balance is likely to be a lengthy process which could temporarily weaken economic growth. It will remain a central theme of international debate in the coming years.

This article is structured as follows. The first section discusses the development of distortions in some key regions and countries since the mid 1990s. The external imbalances were in fact symptoms of underlying internal distortions. The current account balances are therefore analysed taking account of the savings and investment decisions of individuals, businesses and governments. The

commitments given at the G20 summit in Pittsburgh are set out in the second section. Section 3 deals with the practical policy implications for countries with a deficit or surplus. Finally, section 4 examines to what extent the global economic recovery is already “strong, sustainable and balanced”, in accordance with the G20’s aims.

## 1. Development of global imbalances

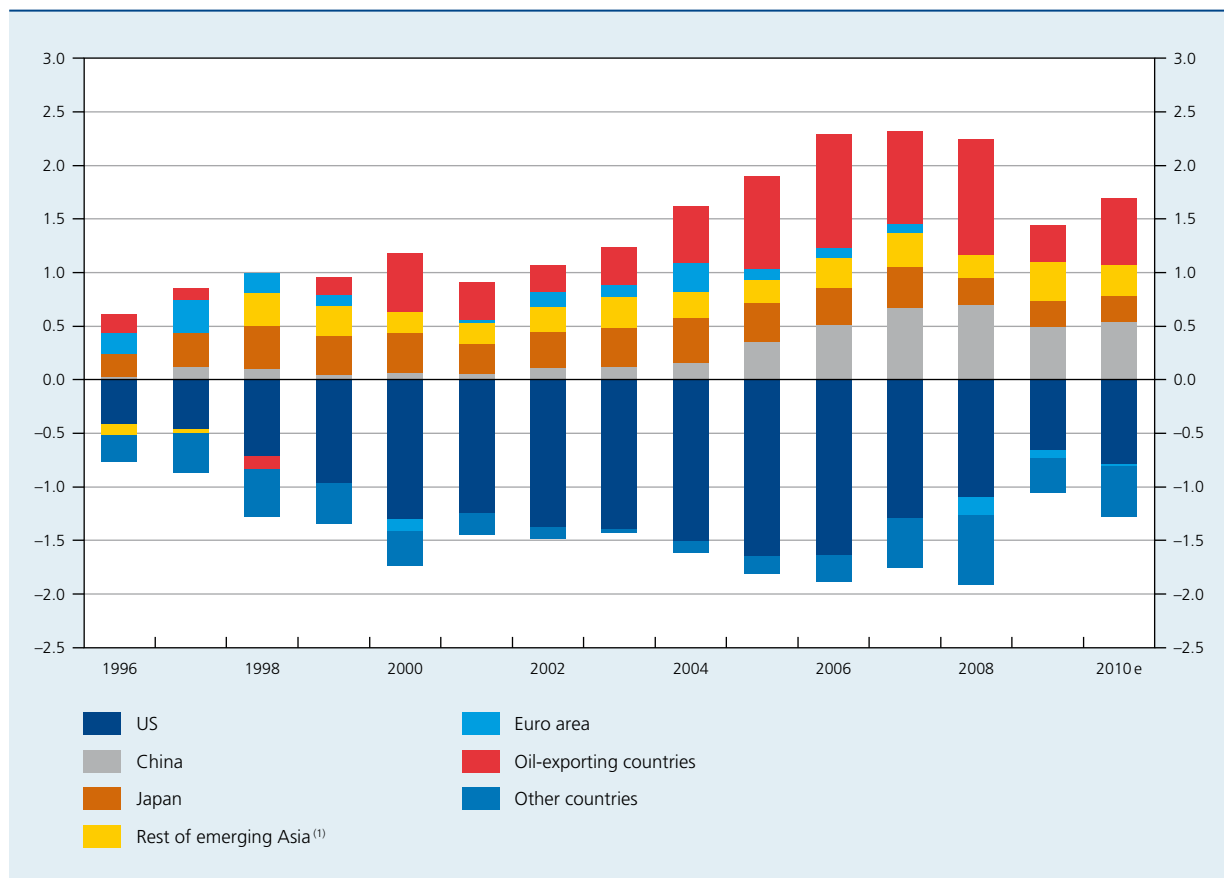
The global imbalances on the balance of payments current account grew almost continuously from the second half of the 1990s until 2008. Among the deficit countries, the United States was the principal contributor to this phenomenon, acting as consumer of last resort. The countries in surplus include the fast-growing emerging Asian countries, especially China, but also Japan and the oil-exporting countries. The pattern of current account balances during this period is attributable to a multitude of factors, such as the low and declining savings ratio

in the United States, the high and rising savings ratio in China, and the increase in oil prices.

Current account imbalances are not a source of concern in themselves. For instance, a country with lucrative investment opportunities can make good use of foreign savings as a source of funding. However, imbalances may prove to be a problem if they reflect underlying internal distortions, such as the asset price bubbles in the United States – causing American households to overestimate their wealth and inappropriately increase their consumption – or inadequate social security in China, encouraging Chinese households to step up their precautionary savings.

It is generally acknowledged that the internal and external imbalances also helped to trigger the financial crisis. The dollar’s status as an international reserve currency certainly made it easy for the United States to attract foreign investors to finance its current account deficit.

**CHART 1** CURRENT ACCOUNT BALANCES OF SOME KEY COUNTRIES AND ECONOMIC REGIONS  
(percentages of global GDP)



Source : IMF.

(1) Hong Kong, Indonesia, South Korea, Malaysia, Philippines, Singapore, Thailand, Taiwan.

It was principally the Asian countries that showed a marked preference for investing their surpluses in risk-free assets in the form of US government bonds. In the United States, these massive capital flows combined with an extremely accommodating monetary policy stance were reflected in abundant liquidity and very low interest rates which led to a further decline in the already relatively low savings ratio of American households. Together with inadequate prudential supervision of the financial sector, these developments fostered the formation of speculative bubbles on asset markets, the emergence of new, risky financial products designed to achieve higher returns, and ultimately the financial crisis.

The situation in the United States, China and the euro area is described below. The oil-exporting countries are disregarded since the current account surplus of those countries is due almost exclusively to oil price fluctuations on international markets, rather than domestic factors. The movement in the current account balance is studied from the savings and investment angle, that being the best approach for exploring the link between external and internal imbalances<sup>(1)</sup>.

### 1.1 United States

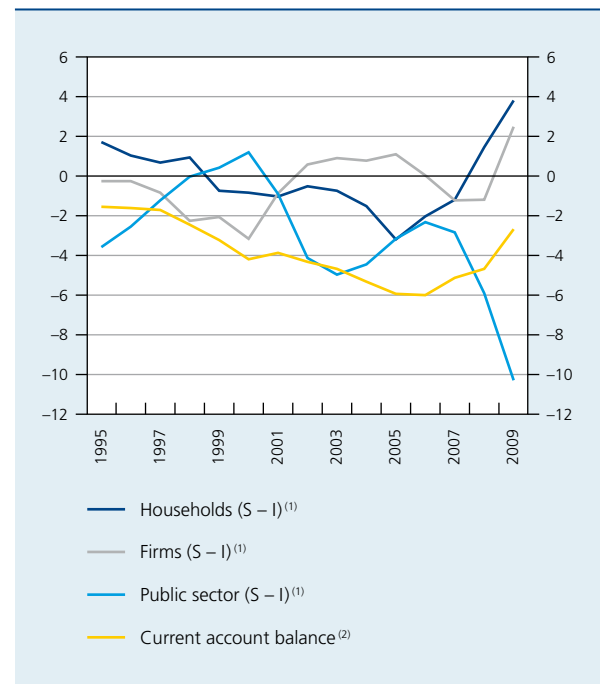
#### CURRENT ACCOUNT BALANCE AND BALANCE OF SAVINGS AND INVESTMENT

In the past fifteen years, the US balance of payments current account presented a constant deficit which increased from under 2 p.c. of GDP in the mid 1990s to 6 p.c. of GDP in 2006. In the ensuing three years, the deficit more than halved. However, it is clear from the quarterly figures that it has grown again slightly since the second half of 2009.

A sharp deterioration in the net savings of the private sector occurred in the second half of the 1990s; this was attributable both to households, which cut their savings and invested more in housing, and to firms which expanded their investment on the basis of their belief in the New Economy<sup>(2)</sup>. Though it helped to avoid the "twin deficit", whereby an external deficit is accompanied by a budget deficit, from 1998 onwards, the consolidation of public finances during that same period did not prevent an increase in the borrowing requirement of the American economy as a whole.

In the initial years of the new millennium, there was a temporary change in the macroeconomic context underlying the increase in the external financing requirement of the United States. The private sector borrowing requirement

**CHART 2** CURRENT ACCOUNT AND NET SAVINGS IN THE UNITED STATES  
(percentages of GDP)



Source : Bureau of Economic Analysis (BEA).

(1) S-I expresses the difference between the savings and investment of a sector, i.e. net savings.

(2) For statistical reasons, there is some disparity between the current account balance and the overall financing balance.

diminished, mainly as a result of the sharp dip in business investment after the bursting of the dotcom bubble. On the other hand, the general government financing capacity was converted to a borrowing requirement on account of tax cuts and the increase in public spending. The twin deficit therefore reappeared.

During the period 2004-2006, there was again a modest decline in private net savings as a result of a revival in investment in housing and business investment, and the renewed fall in the household savings ratio. Conversely, the public sector borrowing requirement diminished, partly as a result of the increased revenues generated by the favourable economic climate.

From 2007 onwards, the current account deficit on the balance of payments began to decline, dropping to 2.4 p.c. of GDP by mid 2009. That decline reflected a

(1) From an accounting angle, the current account balance in fact corresponds to the balance of savings and investment. Cf. box in Eugène, B. and W. Melyn (2003). Other approaches concentrate on trade and capital flows.

(2) At the end of the 1990s, many economists and other observers considered that the use of new information and communication technologies (ICT) had accelerated American economic growth. This led to a rush to buy shares in dotcom companies, an increase in business investment and higher income expectations among households.

marked improvement in private net savings. Owing to the crisis, households and firms cut down on their investment, and households stepped up their savings in order to rebuild their wealth. The improvement in the private sector balance offset the marked expansion of the general government borrowing requirement resulting from the economic and financial crisis.

From the second half of 2009, the current account deficit increased again: the improvement in public finances was not enough to compensate for the deterioration in the balance of private savings and investment caused mainly by the fall in household savings.

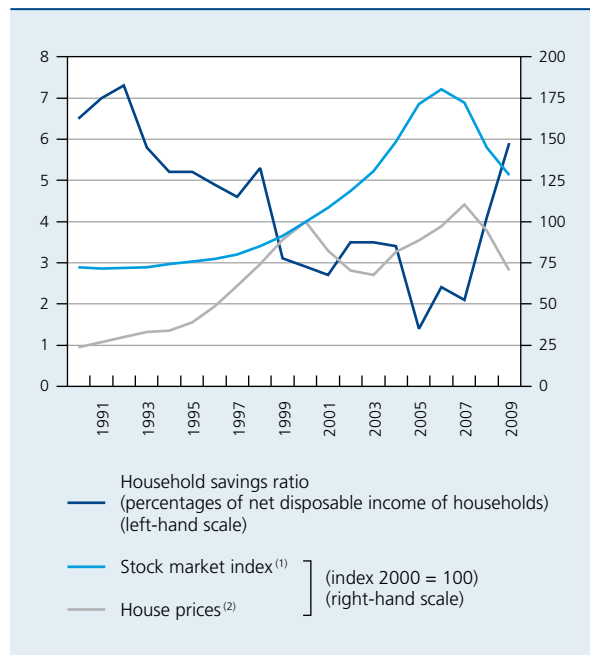
### HOUSEHOLD SAVINGS

The deterioration in net savings and especially the decline in the household savings ratio was a major factor in the worsening US external balance examined above. The household savings ratio dropped from just over 7 p.c. of net disposable income in the early 1990s to 1.4 p.c. in 2005. The literature proposes a number of explanatory factors, such as the increase in net wealth of households, easier access to credit, the low real interest rates and higher income expectations.

The net wealth of households grew strongly, from around 490 p.c. of their net disposable income in the mid 1990s to 631 p.c. in 2006. That growth was due to the steep rise in the value of their assets, which subsequently proved to be overblown. Share prices rose strongly at first, and property prices then strengthened substantially. In view of the strong growth of their wealth, American households felt less need to save. During the financial crisis, between late 2007 and early 2009, those net assets contracted by 25 p.c. following the sharp downward correction of property prices and share prices. From the second quarter of 2009, wealth began rising again, mainly as a result of a partial stock market recovery. However, at the beginning of 2010, it was still worth about 17 p.c. less than before the crisis.

The various financial market innovations giving households easier access to credit are a second factor which depressed the savings ratio. Those innovations include the liberalisation of the mortgage loan market and the growing use of credit cards, which led to excessive easing of lending conditions (e.g. subprime mortgages). The ratio between households' debts and their net disposable income increased from around 90 p.c. in the mid 1990s to 135 p.c. in 2007, essentially as a result of the growing volume of mortgage loans. The crisis led to a slight fall in that ratio, though it remains high: at the beginning of 2010 it stood at around 126 p.c., so that most observers

**CHART 3** ASSET PRICES AND SAVINGS RATIO OF AMERICAN HOUSEHOLDS



Sources : BEA, Standard & Poor's, Thomson Reuters Datastream.

(1) Wilshire 5000 index.

(2) Case-Shiller national price index.

consider it desirable for American households to continue reducing their debt ratio.

Higher income expectations owing to the stronger growth of productivity in the US between the mid 1990s and the mid 2000s (New Economy) may also have influenced household savings. According to the permanent income hypothesis, household consumption is in fact determined not only by current income but also by expected future income.

A final factor often mentioned to explain the downward trend in the savings ratio is the decline in real interest rates to historically low levels. A number of developments played a role here. On the one hand, interest rates were depressed by the substantial surplus savings built up in emerging Asian economies since the 1997-1998 crisis, and in oil-exporting countries since the surge in oil prices. This "savings glut", as it was called by the Federal Reserve Chairman, Ben Bernanke, was invested mainly in US government bonds. Also, following the bursting of the stock market bubble in 2000-2001, the Federal Reserve maintained an accommodating interest rate policy for a long time, since the credibility of that policy and cheap imports from Asia exerted a moderating effect on consumer prices. Discouraged by the low interest rates, households rejected savings in favour of investment and consumption.

## PRIVATE CONSUMER SPENDING AS THE ENGINE OF GROWTH

The decline in the household savings ratio is reflected in the dynamism of household consumption. In the past two decades, private consumer spending has made a greater contribution to GDP growth than in the past; that contribution is estimated at over 80 p.c. on average in the 2000s. The contribution of the other components was much more modest. An international comparison of the share of private consumption expenditure in GDP also reveals the relative importance of this expenditure category in the US, compared to most other advanced economies. Moreover, the gap in relation to other countries widened steadily in the past twenty years as a result of the increase in the relative share of this expenditure category in the United States and its stabilisation, or even decline, in most other countries.

### 1.2 China

#### CURRENT ACCOUNT BALANCE AND NET SAVINGS

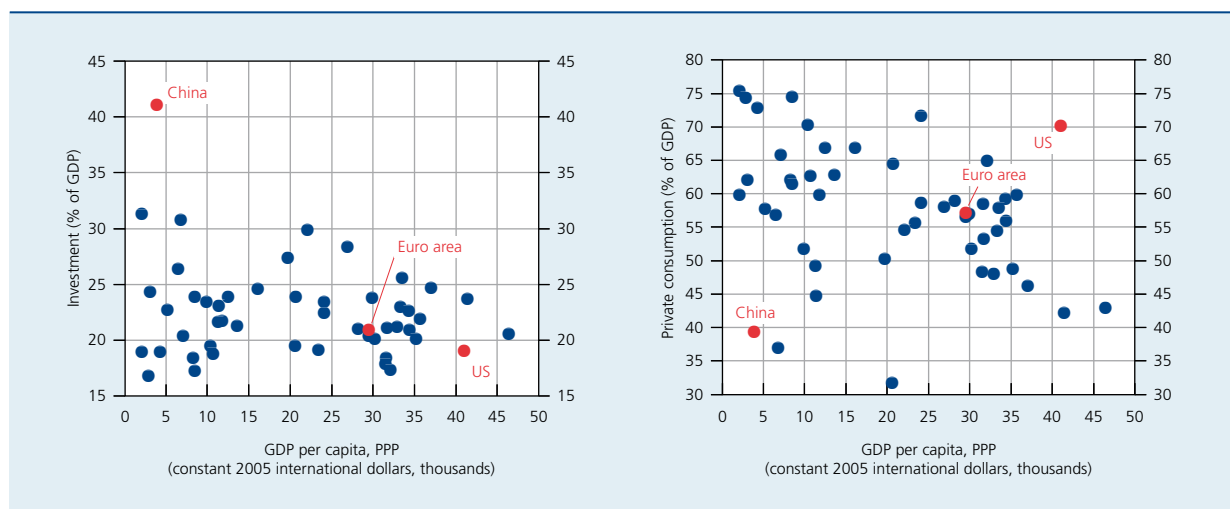
The current account balance of China's balance of payments increased from 1.7 p.c. of GDP in 2000 to a peak of 11 p.c. in 2007, before subsiding somewhat in 2008. The substantial current account surplus since the mid 2000s reflects excess savings in relation to investment, though that certainly does not imply a low level of investment: quite the contrary. In international terms, China is investing exceptionally heavily. The extremely rapid accumulation of

capital began in the late 1990s. Since then, gross fixed capital formation has increased faster, on average, than economic growth, so that its share of GDP rose from 33 p.c. in 1995 to 42 p.c. in 2008, double the average level in other countries. Moreover, domestic savings are amply sufficient to finance investment, unlike in India, for example, a country which also has a relatively high investment ratio but is obliged to rely on foreign capital. As a result, China has a sizeable current account surplus while India records a deficit. Furthermore, the national savings ratio has risen faster than the investment ratio, increasing from 36.7 p.c. of GDP in 1995 to almost 50 p.c. of GDP in 2007. Firms, the public sector and households have all contributed to the rise in the savings ratio.

#### CORPORATE AND HOUSEHOLD SAVINGS

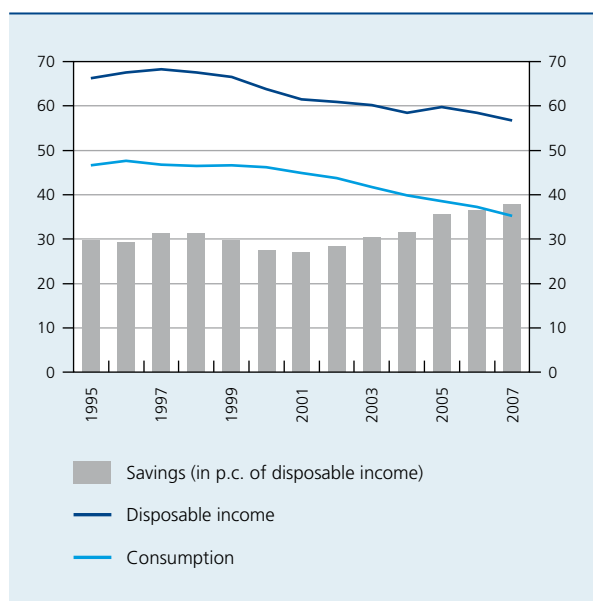
Between 1995 and 2007, corporate savings increased by 2.6 percentage points of GDP. With a combination of particularly low production costs and limited competition, China greatly increased its market share. Chinese businesses, including a large number in the public sector, were consequently able to make huge profits. At the same time, they pursued a policy of paying low dividends, and thus contributed to the increase in the national savings ratio. Owing to the rapid pace of economic growth and the expansion of the export market, particularly after China joined the WTO in 2001, it is hardly surprising that most State enterprises opted to invest their profits in expanding capacity. Corporate investment growth actually outpaced the rise in corporate savings.

**CHART 4** CONSUMPTION AND INVESTMENT IN THE ADVANCED AND EMERGING ECONOMIES (2000-2008)



Source : World Bank (World Development Indicators).

**CHART 5** DISPOSABLE INCOME, SAVINGS AND CONSUMPTION OF HOUSEHOLDS IN CHINA  
(annual data, percentages of GDP, unless otherwise stated)



Sources : CEIC, IMF.

The share of households in the national savings ratio increased by only 0.9 percentage point of GDP over the same period 1995-2007. This increase was the outcome of two opposing movements, namely a rise in the household savings ratio in relation to disposable income, and a decline in household income as a percentage of national income: having remained stable between 1995 and 2001, the Chinese household savings ratio in terms of disposable income increased steadily to reach 38 p.c. in 2007, while the share of household disposable income in GDP declined from 66.6 p.c. in 2001 to 57 p.c. in 2007.

The relatively recent rise in the propensity of Chinese households to save – in proportion to their disposable income – is probably due to demographic factors, according to the life cycle hypothesis: while consumption is spread throughout a person's entire life, income is concentrated during working life. This means that individuals tend to dissave when young, then accumulate capital by saving more during their working life, and can draw on that capital once they retire. The increase in the population at working age in relation to the total population in China during recent decades could therefore explain the high household savings ratio. Moreover, according to this same theory, the savings ratio rises more steeply when income increases particularly fast. That applies to countries with a modest standard of living which, like China, are in the initial stages of a catching-up process, because

that income growth could principally benefit people in the age group of working people who are building up savings. The pattern of Chinese household savings may also be due to the erosion of the social security safety net, especially the disappearance of the "iron rice bowl", namely the cradle-to-grave provision by the State. That triggered a rise in precautionary savings intended to cover the risks and costs relating to health, retirement and education. Finally, financial under-development is also a factor, given that it is difficult for households to obtain loans.

#### INVESTMENT AND EXPORTS AS THE ENGINE OF GROWTH

Apart from households' increased propensity to save, the decline in disposable income of households as a percentage of national income also depressed the share of private consumption in GDP. This change in the national distribution of income is the direct consequence of the promotion of a growth model centred on investment and exports favourable to large, State-privileged, capital-intensive enterprises in manufacturing industry, but unfavourable to firms active in sectors using abundant labour, such as SMEs in services. In contrast to the latter firms, which had only limited access to external finance and were thus forced to build up substantial reserves in order to carry out their investment projects, large public enterprises in the industrial sector geared to exports had easy access to cheap loans from State banks. Moreover, with a subsidised energy supply, those enterprises were able to cut their production costs even further. The loss of millions of jobs in the labour-intensive agricultural sector also created a surplus supply of labour. It weakened the workers' collective bargaining position which had already been impaired by State control of the unions. This probably prevented wages from keeping pace with productivity gains, especially at the lower end of the income scale. However, the fall in household income as a percentage of national income is not due solely to the movement in labour incomes but also to the low level of savings incomes, a reason being the low deposit interest rate.

Although China's growth was export led, the direct contribution of net exports to economic growth averaged only 1.1 percentage points per annum between 2000 and 2008. However, the contribution of exports to growth is much larger than suggested by the net export figures in the national accounts. Here, net exports are a misleading indicator in that they are equal to exports minus total imports, whereas the balance of exports minus export-related imports would give a more accurate picture of export dependence. Furthermore, China's real dependence on exports is actually even greater, given that a large proportion of investment occurred in export-oriented

sectors. If this last factor is taken into account, China's dependence on exports increases from 27 to 42 p.c. of GDP in 2008. That phenomenon is evident throughout Asia: export dependence increases by an average of 10 percentage points if export-related investment is taken into account.

To sum up, it can be said that the capital-intensive enterprise sector centred on exports dominated national income, savings and investment, and that helped to create a vicious circle of capacity expansion followed by government export promotion measures aiming to absorb the increase in capacity. The decision to go for capital-intensive rather than labour-intensive growth means that enterprises account for an ever-increasing share of national income. Chinese households were also forced to "subsidise" investment in infrastructure and in industry via a low deposit interest rate. However, that does not mean that Chinese households have become poorer. On the contrary, they have become richer, but at a much slower rate than the country as a whole, so that their share in national income has declined.

In other words, there has been a massive transfer of wealth from consumers to producers, preventing Chinese private consumption from growing in proportion to GDP. Thus, the share of private consumption in GDP declined sharply, from 46 p.c. in 2000 to just 36 p.c. in 2007, compared to 70 to 80 p.c. in many advanced economies and 50 to 60 p.c. in most Asian countries; in 1985 it still stood at 52 p.c. A rebalancing of the Chinese economy entails increasing the share of private consumption in GDP, rather than aiming at consumption growth. Private consumption therefore needs to grow considerably faster than GDP in order to initiate that rebalancing: if private consumption is to equal 40 p.c. of GDP over the next five years (and even that is an exceptionally low percentage), consumption would have to increase by 11 p.c. per annum given annual economic growth averaging 8 p.c. Such an outcome entails a major adjustment to the Chinese growth model, and that will take time.

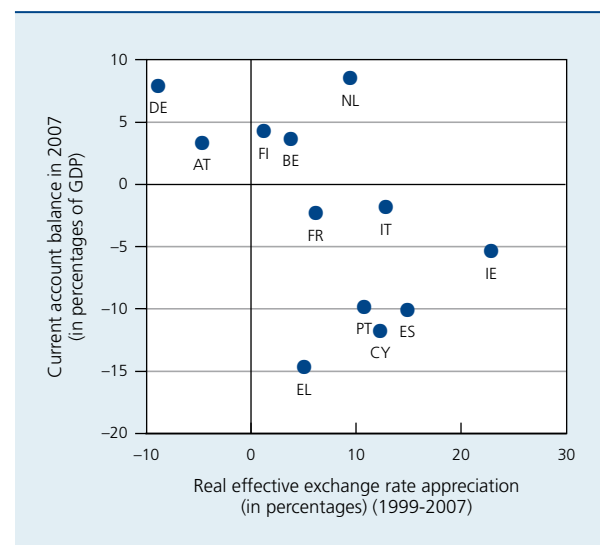
### 1.3 Euro area

The euro area's current account is more or less in balance, yet that masks significant disparities between Member States. In the past decade, Germany, Luxembourg, the Netherlands, Austria and Finland have built up surpluses while Greece, Spain, Portugal and Cyprus have accumulated heavy deficits. The differences are due mainly to varying trends in these countries' competitiveness and in domestic demand.

First, opposing movements in the form of gains or losses of competitiveness were reflected in a corresponding improvement or deterioration in the trade balance and hence in the current account. Thanks to wage moderation and productivity gains, countries such as Germany and Austria became more competitive while other countries became less so. In Spain and Italy, for example, a failure to adjust wages in line with lower productivity gains impaired their ability to compete on price; in Greece, other factors also played a role, such as a less favourable export mix or geographical focus of exports.

Next, opposing domestic growth forces contributed to contrasting movements in the current account balances. While domestic demand was relatively sluggish in the surplus countries, strong domestic demand in the deficit countries, particularly Ireland, Greece and Spain, fostered vigorous growth, outpacing the euro area average. In fact, some deficit countries benefited greatly from the convergence of interest rates in the run-up to monetary unification. However, the relatively low level of interest rates (compared to the past) led to excessive expansion of credit, especially mortgage loans, which in turn fuelled a property market boom, principally in Ireland and Spain. Despite the resulting high level of private debt (in Spain, Greece and Ireland, lending to households increased by annual average of 19, 26 and 24 p.c. respectively between 2003 and 2007), wealth effects combined with substantial wage increases triggered strong domestic demand, and hence substantial demand for imported goods, which in a number of Member States led to sizeable current account deficits.

CHART 6 COMPETITIVENESS AND THE CURRENT ACCOUNT BALANCE



Source : EC.



Finally, lax fiscal policy accelerated the formation of deficits in some euro area countries. In Portugal and Greece, in particular, an extremely expansionary fiscal policy led to the emergence of a twin deficit problem. Since 1999, public finances of Spain and Ireland have been sound overall but that situation was suddenly reversed in the aftermath of the crisis.

Germany holds a special position among the surplus countries: not only is it the biggest economy in the euro area, it has actually accumulated substantial surpluses by global standards. The positive current account balance recorded in the past decade is due to strong competitiveness and structurally low private consumption over many years.

In the early 1990s, German unification gave a strong boost to economic activity, but it culminated in overheating of the economy and a loss of competitiveness. Unification also placed a heavy burden on Germany's public finances, and that was reflected in heavier taxation and a rise in social security contributions. Similarly, the construction sector – which had built up excess capacity in the 1990s – experienced a recession which persisted for over ten years. The impact of these shocks was long-lasting, the labour market was hard hit and employment stagnated for many years, which accounts to a large extent for the low level of consumption. Unlike other euro area countries, Germany also recorded a rise in the household savings ratio from the year 2000; this was partly precautionary, in response to a pension system reform.

Since the turn of the millennium, however, wage moderation has restored competitiveness so that Germany has increased its market share, particularly in the emerging economies, the oil-exporting countries and Eastern Europe, where demand for German investment goods has soared.

## 2. Need for international coordination to deal with global imbalances

Against the backdrop of a virtually continuous increase in global imbalances since the second half of the 1990s, a consensus emerged around 2005 on the need for coordinated policy adjustments in the leading economies in order to achieve an orderly reduction in these imbalances. One of the main concerns was that the external debt position of the United States would lead to a loss of confidence in the dollar, causing the collapse of the currency. In 2006 the IMF therefore initiated multilateral consultations (Multilateral Consultation on Global Imbalances) between Saudi Arabia, China, the United States, Japan

and the euro area. In April 2007, an agreement was concluded on a number of essential policy adjustments<sup>(1)</sup>. These included an increase in savings in the United States, measures to promote growth in Europe, reforms designed to stimulate domestic demand in the emerging Asian countries and greater exchange rate flexibility in a number of countries with a current account surplus on the balance of payments. However, the major part of the agreement was never implemented.

The financial crisis once again demonstrated the importance of international policy coordination. More particularly, the G20<sup>(2)</sup> (which succeeded the G7) played a role in coordinating the measures to combat the crisis. In view of the success of that approach, the G20 also presided over the preparations for the international policy response to the challenges of the 21st century in a number of specific areas, such as energy, climate change, financial regulation and economic growth. In this last area, collaboration was put on a formal footing at the Pittsburgh summit in September 2009 in the Framework for Strong, Sustainable and Balanced Growth<sup>(3)</sup>. Its aim is to define the general outline of a coherent medium-term strategy for achieving such growth and avoiding future crises. "Sustainable" means that growth must be compatible with sound public finances, financial stability and price stability, and a range of social and environmental objectives. "Balanced" means that global economic growth is supported by all G20 countries and all the regions of the world.

The Framework's initial recommendations were largely in line with those of the Multilateral Consultation on Global Imbalances. It was first agreed that the G20 members with structural current account deficits would take steps to increase savings in the private sector, strengthen their export sectors and make a start on fiscal consolidation. Also, the G20 members with a structural surplus would adopt measures to stimulate internal sources of growth. Depending on the national context, that could mean an increase in investment, a gradual reduction in the distortions apparent on financial markets, productivity growth in the service sector, an improvement in the social security system and, more generally, elimination of the factors depressing expenditure.

It was also agreed that the G20 members would share their policy plans and projections and their growth forecasts in a Mutual Assessment Process and would

(1) IMF (2007).

(2) The G20 was formed in Berlin in December 1999 following the Asia crisis, in order to bring together systemically important advanced and emerging countries to discuss global economic issues. The group comprises the EU and 19 countries: Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, the United Kingdom and the United States.

(3) G20 (2009a).

examine whether these conform to the overall objective of strong, sustainable and balanced growth. At the end of January 2010, each G20 member presented a national policy plan and medium-term growth forecasts (3 to 5 years) on which basis the IMF calculated a growth scenario for the global economy. That scenario was considered over-optimistic, and it was also thought that too little had been done to address various structural problems. At the G20 summit held in Toronto in June, with respect to fiscal consolidation the advanced G20 economies then undertook to at least halve their deficits by 2013. By 2016, they will also begin to stabilise or reduce their debt ratio. Several emerging countries were once again requested to conduct reforms to strengthen social security, develop their financial markets and augment their exchange rate flexibility.

The move to establish a Framework together with a Mutual Assessment is already more ambitious than the Multilateral Consultation. Nevertheless, the countries concerned have yet to implement the suggested policy adjustments. In view of the inevitable national political pressure associated with domestic rebalancing, there is a risk that some countries may want to shift the burden of those adjustments onto others. Thus, countries with a deficit could be tempted to impose measures to restrict imports, such as import levies, or to carry out competitive devaluations. Countries with a substantial public debt may be inclined to use inflation to facilitate the debt reduction process. Others will continue to promote their exports at all costs. The international debate on the exchange rate policy of some countries seems far from over.

### 3. Global economic rebalancing and policy implications

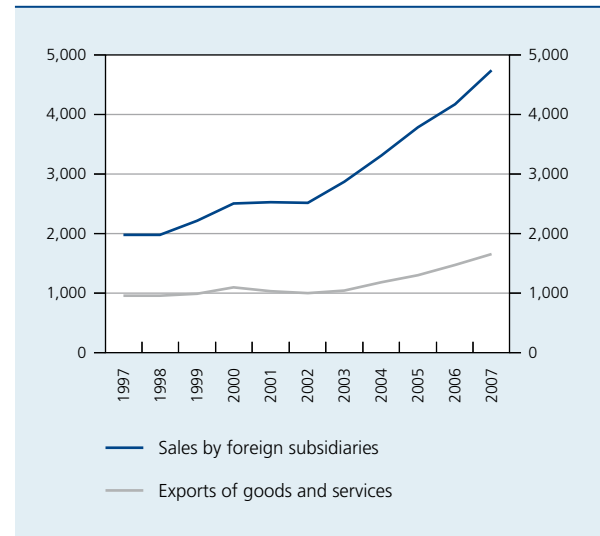
#### 3.1 United States

In accordance with the recommendations made at the G20 summit in Pittsburgh, the US authorities had already outlined last year their strategy for rebalancing the American economy. The Economic Report of the President published early this year confirmed that outline and filled in the details<sup>(1)</sup>. In practice, policy-makers want future growth to be based more on exports and investment in equipment and software rather than on private consumption and investment in housing. The report contains a set of proposals for achieving that aim.

(1) Council of Economic Advisors (2010).

**CHART 7** SALES BY FOREIGN SUBSIDIARIES OF AMERICAN COMPANIES AND US EXPORTS OF GOODS AND SERVICES

(billions of US dollars)



Source : BEA.

Thus, in February 2010, President Obama announced measures designed to double exports of goods and services in nominal terms over the next five years. In that regard, the launch of a National Export Initiative (NEI) is crucial. First, more financial resources will be made available for promoting exports. Second, an Export Promotion Cabinet will be set up, comprising representatives of various public bodies, with the task of devising a detailed plan to stimulate exports. Finally, greater attention will focus on eliminating trade barriers in order to open up foreign markets to American businesses. The reinstatement of the President's Export Council is another initiative designed to support exports. It brings together business leaders and union representatives, and its job is to advise the government on export promotion.

Most observers think that these measures will be insufficient. It is evident from historical data covering the period 1970-1995 that doubling the value of exports in the space of five years was only occasionally achieved during periods of strong inflation in the 1970s. Studies have shown that sustained growth of the main trading partners is essential, and that a sharp dollar depreciation may also help to attain the objective.

Moreover, it must be remembered that American firms were the first to offshore their production. One reason could be the relatively high rate of corporation tax in the United States, which stood at 39 p.c. in 2009, compared

to an average of 25.9 p.c. in the euro area, for example. Many products are designed in the United States and manufactured abroad. Offshoring therefore led to erosion of industrial production facilities and impaired export capability. Although the same phenomenon is seen in other advanced countries, it seems to have a greater impact in the United States. Figures compiled by the BEA show that sales by foreign subsidiaries of American companies have soared since the early 1990s, so that, by 2007, they were three times the value of US exports of goods and services. That ratio is higher than in most other advanced countries.

The Economic Report of the President also stresses the importance of innovation in sustaining economic activity and employment. Among other measures taken for that purpose, the resources of a number of public institutions promoting research and development will be increased, and a tax credit designed to encourage innovation will be made permanent.

The report likewise considers that the establishment of new, stricter regulations for the financial sector is a crucial factor in the domestic rebalancing of economic growth. The aim is to avoid the excesses of the past – such as the very easy credit terms – and to prevent a new financial crisis. In July, President Obama signed a financial reform plan (Wall Street Reform and Consumer Protection Act) comprising a whole range of measures which now need to be specified in detail by the regulatory authorities. The main provisions concern creating an agency in charge of consumer protection in the financial sector, giving the regulatory authorities the power to dismantle financial institutions which fail to fulfil their obligations and to pass on a larger percentage of the costs to the surviving competitors, introducing stricter regulations on the market in derivatives, strengthening the capital requirements and restricting the own account activity permissible for financial institutions (the “Volcker Rule”).

Regarding another G20 recommendation – the consolidation of public finances – there is an article on exit strategies in this Economic Review. So far, Congress has only approved a few specific measures, but the President has already made a number of proposals which indicate the intended route. At the beginning of February 2010, the Obama administration unveiled its strategy on public finances up to the year 2020, together with the federal budget for the year 2011. Those forecasts were updated at the end of July on the occasion of the mid-session budget review. The federal public deficit is set to fall from 10 p.c. of GDP in 2010 to 9.2 p.c. of GDP in 2011. The budget path for the next ten years reflects the government’s aim of cutting the deficit to 3.4 p.c. of GDP in

2018. The deficit is then expected to begin rising again to 3.8 p.c. in 2020 owing to the increased costs associated with population ageing. According to the budget proposals, the federal public debt will increase from 53 p.c. of GDP during 2009 to 77.4 p.c. in 2020. According to the OECD’s spring 2010 forecasts, total public debt is likely to grow from 83 p.c. of GDP in 2009 to 94.8 p.c. in 2011.

In addition, for the purpose of shaping fiscal policy a bipartite commission has been created (National Commission on Fiscal Responsibility and Reform), with the task of formulating concrete proposals by the beginning of December with a view to more radical consolidation. The Commission’s principal tasks are to restore the primary balance to equilibrium by 2015 and to propose additional measures to ensure the long-term sustainability of public finances.

Furthermore, the PAYGO rule was reintroduced. This rule stipulates that new spending programmes or new tax cuts must be offset by savings or tax increases on other items. The rule will help to support the necessary budgetary effort.

### 3.2 China

In the mid 2000s, the Chinese authorities also began to recognise the risks inherent in maintaining their existing growth model. In 2006, the eleventh five-year programme already explicitly called for a change of direction. That awareness was also apparent in the speech by the Chinese Prime Minister Wen Jiabao in March 2007: he expressed the fear that the Chinese economy could suffer structural problems making its development “unstable, unbalanced, uncoordinated and unsustainable”. The global consequences of the financial crisis and its impact on Chinese export markets reinforced the arguments in favour of directing growth towards domestic demand rather than exports. In addition, the Chinese leaders realise that social and political stability can no longer be ensured by the strategy which has prevailed hitherto. It is time to find a solution to the increasing income inequality between urban and rural regions, the coastal areas and the hinterland, and the low skilled and highly skilled. Apart from an increase in the relative weight of domestic demand in growth, more balanced growth therefore also implies greater geographical dispersion of economic activity and a fairer distribution of incomes. The new economic objective – production for the Chinese people themselves – implies above all that the Chinese must have sufficient purchasing power in order to be able to consume. Structural reforms designed to increase the share of households in national income, to bolster

domestic (service) sectors and develop social security in order to rein in the precautionary savings of households are therefore essential. Finally, exchange rate policy may also provide support. Although significant reforms are being introduced – and some are already in progress – it could be that the desired effect on the share of consumption in the economy will be modest. In the meantime, the government has the option of speedier solutions, such as an immediate increase in pensions: on 1 January 2010, China increased the basic pensions of all workers by around 10 p.c., for the fifth consecutive year. Also the series of pay increases that the government granted in the spring of 2010 confirms that China is adopting a change of course. The pay increases are entirely in line with a transition to growth centred on consumption, driven by an expanding middle class.

#### A POLICY AIMED AT SUPPORT FOR HOUSEHOLD INCOMES AND DEVELOPMENT OF THE SERVICE SECTOR

It is vital to develop China's financial sector, which still suffers from a number of defects. First, the cap on bank deposit interest rates means that savings incomes are very low, or even negative in real terms. Also, most of the capital channelled through the financial sector goes to State-owned industrial enterprises. Easier access to credit for SMEs and households, accompanied by prudential regulation and supervision, could encourage the necessary investment in the service sector and reduce the need for precautionary savings.

It may also be desirable to reorientate fiscal policy. The government's recent efforts<sup>(1)</sup> in that regard aimed at boosting household income and reducing income inequality, thereby stimulating consumption, have already proved effective. The government could maintain that momentum by further reducing the tax burden on labour and consumption and by increasing transfers to low incomes.

Finally, the transition to more balanced growth, less dependent on industry – which is highly capital intensive – and centred more on highly labour-intensive sectors is vital in order to increase the share of wages in national income and to stimulate private consumption. In its eleventh five-year plan, the government adopted the aim of increasing the share of the service sector in the economy. Although the economic crisis diverted the government's attention towards supporting the export-centred sectors, it stands by its intention of moving towards an economy based on services, as is evident from the initiatives in support of SMEs.

(1) In response to the crisis, the Chinese government decided to increase social security expenditure and grant tax cuts in order to support private consumption, devoting 2 to 3 p.c. of GDP to those measures.

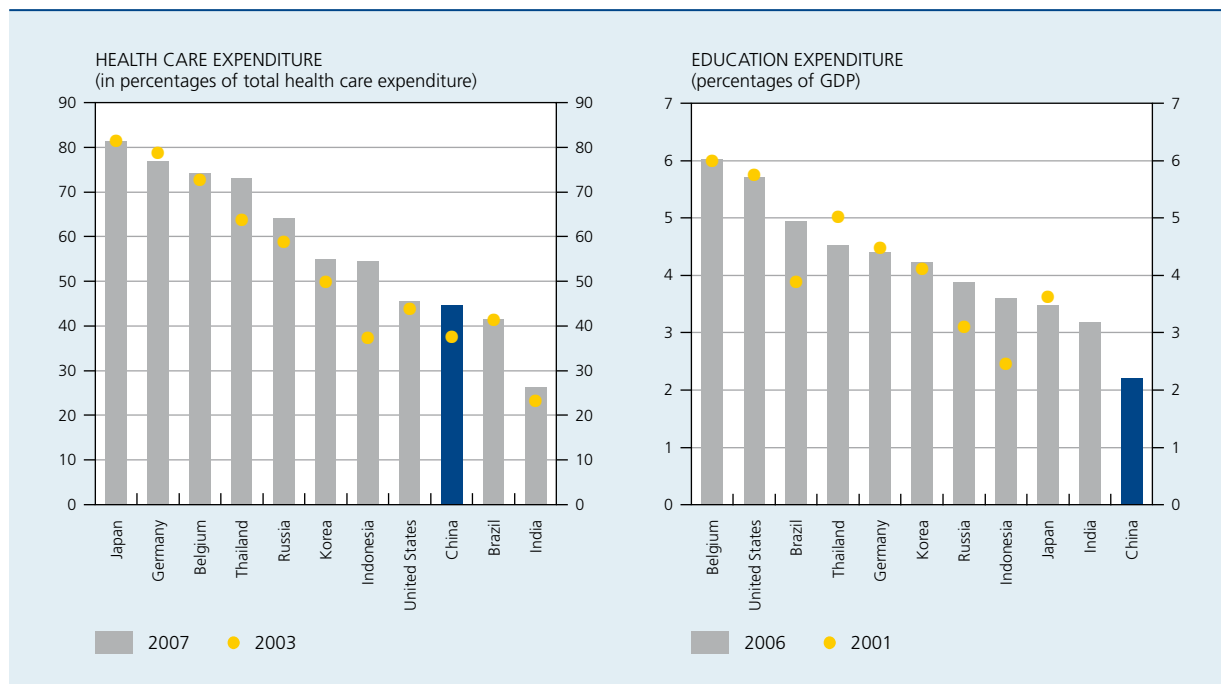
#### A BETTER SOCIAL SECURITY SAFETY NET WHICH CURBS PRECAUTIONARY SAVINGS

In recent years, owing to an inadequate social security system covering pensions, unemployment benefits and health care combined with the absence of appropriate forms of private insurance, households have tried to make provision for themselves by setting aside a large part of their disposable income. The liberalisation of the economy in fact heralded the end of the "iron rice bowl" policy. In the past, State enterprises were responsible for paying out lifelong social benefits to their workers, but when the reforms were introduced in the mid 1990s, the State relieved those enterprises of that obligation in order to make them more competitive, and transferred the responsibility to the local authorities, who frequently ignored it as the corresponding funding was not transferred to them. In other words, the provinces were given a new responsibility but no additional resources. The provision of services therefore varies greatly from one region to another. Also, this system causes problems in a country where migration is constantly increasing: under the hukou system, migrants cannot transfer their social entitlements because they are tied to official registration in their province of origin; the host provinces or towns do not want to take responsibility for their social security. Workers who move a long way away from their place of origin are therefore abandoned to their fate. The government would like to reform the hukou system, but that is a hotly debated issue between the various levels of power in China. New regulations came into force on 1 January 2010, but only concern the maintenance of pension entitlements for people moving to a different province. In June 2010, the Chinese government also brought in new regulations on the transfer of dividends on State shares to the National Social Security Fund. That decision will foster the continued development of the social security system, and therefore reduce the propensity of households to accumulate precautionary savings.

Total expenditure on health care in China has risen steeply in recent years, though in international terms it is still relatively low (4.8 p.c. of GDP in 2008, whereas the OECD average stood at 8.6 p.c.). During the 1990s, this rise was accompanied by an increase in the proportion paid for by the consumer, which rose from 35 p.c. in 1990 to over 60 p.c. in 2001. In order to alleviate to some extent this financial burden on citizens, the Chinese government had already launched a series of reforms in 2003, which brought down the share of private expenditure in total health care spending even further to 54 p.c. in 2007. That figure is not particularly high in comparison with other Asian countries, but it is high in relation to western Europe where the average is no more than 25 p.c.

**CHART 8 PUBLIC EXPENDITURE ON HEALTH CARE AND EDUCATION**

(in p.c. bbp)



Source : World Bank.

Conversely, the proportion of the population covered by social security increased from barely 10 p.c. in 2003 to over 80 p.c. in 2008. The aim of the health care reform plan announced in June 2009, for which the government is ready to release 820 billion renminbi, is to achieve a proportion of 90 p.c. in 2011; that plan is also linked to other reforms intended to improve the medical infrastructure and services by 2020, as a shift in the financial burden from households to the government needs to be accompanied by an improvement in health care quality, failing which households will continue to save in order to be able to afford better services elsewhere.

Households spend five times as much on education as they do on health care. The government only provides free education at primary and secondary level; on average, the cost of one year at university represents half the annual disposable income of an average Chinese household. The fact that the government does not fund that education is therefore a key reason for saving, especially as the Chinese are reluctant to incur debts in order to finance their studies. China has developed two types of student loan, but the take-up is low. Overall, the current system of funding education is hampering the development of a workforce with higher education qualifications.

#### EXCHANGE RATE POLICY

Finally, an appreciation of the renminbi could increase the purchasing power of Chinese households, both directly and via a shift away from the export industry towards the service sector, which is labour intensive. The reallocation of production resources will take a while anyway, and there could be some repercussions on growth and employment in the meantime.

However, it is mainly other countries that criticise China's exchange rate policy. The dramatic export growth, the persistent surplus on the trade balance and the exponential growth of the foreign exchange reserves are commonly regarded as signs that the renminbi is undervalued. Some people, especially in America, view a stronger renminbi as the solution to the US trade deficit. However, it is uncertain whether a revaluation would have the desired effect on the American economy. The fact that the United States also has deficits with many countries other than China tends to suggest that American industry is in a weak competitive position. Moreover, the United States and China are relatively different producers. Thanks to low wages, China plays a significant role as an assembler in the regional production chain in Asia. In contrast, the

United States is more in competition with Japan and the EU. All the same, on 19 June 2010, the Chinese central bank announced that it would “increase the flexibility of the renminbi exchange rate”. Following that relaxation of monetary policy, the exchange rate can now fluctuate daily within a range of 0.5 p.c. on either side of the central rate, which will be adjusted periodically. However, in the first two months, the renminbi appreciated by only 0.6 p.c. against the dollar.

### 3.3 Euro area

Although the crisis reduced the current account deficits and surpluses of the various euro area countries, that correction was due partly to cyclical factors, such as the collapse of world trade. The correction could therefore be merely temporary, and could be wiped out altogether when the economic recovery gathers strength. As demonstrated by the events of recent months, persistent distortions threaten the economic and financial stability of individual Member States, undermine confidence in the euro and impair the euro area’s cohesion, because commercial and financial channels transmit shocks between Member States.

Deficit countries need to become more competitive, e.g. via wage moderation and by shifting the means of production towards the export sectors. Conversely, countries in surplus need to boost the growth potential of the sectors of their economy which are not geared to exports. That is the way to achieve a more balanced growth dynamic and become less dependent on exports while also supporting the rebalancing of deficit countries both in the euro area and elsewhere.

Responsibility for these vital measures rests mainly with the Member States, in view of their national powers, e.g. in regard to employment policy. Moreover, these measures must be adapted to each country in view of the varying situations which they face. Nevertheless, policy coordination could alleviate the economic cost of those adjustments. The present situation is an unprecedented opportunity for improving the EU’s *economic governance*. The first move should be to improve fiscal policy supervision under the existing Stability Pact. Next, there should be better monitoring of macroeconomic imbalances, in order to avoid them or at least take appropriate action to address them if they do occur. That monitoring should accompany fiscal supervision. Finally, it is necessary to develop crisis management procedures. The Van Rompuy working group will submit proposals on that subject in the autumn of 2010 (see the box in Article 3 in this Review).

Gradual macroeconomic rebalancing is crucial to economic recovery. Many governments have already started a fiscal consolidation strategy (cf. Article 3 in this Economic Review) and are aware of the need for structural reforms boosting growth potential in order to support fiscal discipline.

## 4. Towards a smooth rebalancing ?

### PARTIAL CORRECTION OF EXTERNAL IMBALANCES BETWEEN COUNTRIES

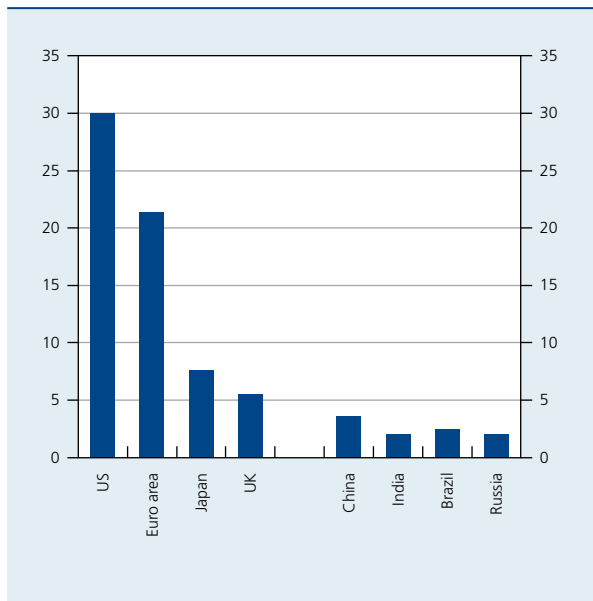
The financial crisis led to a partial correction of external imbalances between countries. Surplus countries focusing on exports, such as Germany, China and Japan, were hard hit by the collapse of international trade: in 2009, their current account surplus contracted by 4, 2.5 and 0.7 percentage points of GDP respectively. Germany and Japan suffered in particular from the considerable impact which the crisis had on demand for investment goods and consumer durables. In view of the decline in demand for oil and the price of Brent, the surplus of the oil-exporting countries expressed in dollars also slumped by around 80 p.c. in 2009. Conversely, the oil bill of the oil-importing countries was down. In the United States, the weakness of domestic demand and its impact on imports – outweighing the impact on exports of the decline in foreign demand – led to a marked fall in the current account deficit, reducing it from a peak of 6 p.c. of GDP in 2006 to 2.7 p.c. of GDP in 2009.

The contraction of global demand therefore led to a correction of external imbalances. Part of that correction was only temporary. The cyclical upswing in mid 2009 triggered a revival in commodity prices and international trade. American households benefited from the asset market rebound. In China and India, growth soon returned to its high pre-crisis rate. In contrast, in mid 2010, the recovery remained modest and uncertain in the United States, the euro area and Japan. Will this hitherto patchy recovery ultimately lead to strong, balanced and sustainable growth of the global economy in line with the aim of the G20 Framework ?

### SUSTAINABLE GROWTH ?

In many countries, growth has hitherto been supported by monetary policy and massive fiscal recovery measures. Eventually, the latter measures will be phased out in view of the risk to the sustainability of public finances. Consequently, the centre of gravity will have to shift from public to private demand. Countries will have to start by spelling out their medium-term consolidation

**CHART 9 PRIVATE CONSUMPTION IN 2007**  
(percentages of the world total at market exchange rates)



Source : World Bank (World Development Indicators).

programmes. A credible consolidation plan is the only thing that will restore the confidence of businesses, consumers and investors. Events in Greece and some other euro area countries have shown the potential repercussions of diminished confidence in the financial markets on the sustainability of public finances. Moreover, that financial sustainability will come under even greater pressure in the future in the context of population ageing in most of the western economies. It is also vital that consolidation should not impair growth. Cuts in public consumption generally have a less adverse effect on growth than tax increases or cuts in public investment. Although the consolidation measures which the governments of many advanced economies will have to adopt in the coming years could put the brakes on growth for a time, there is no alternative (cf. Article 3 in this Economic Review).

#### BALANCED GROWTH?

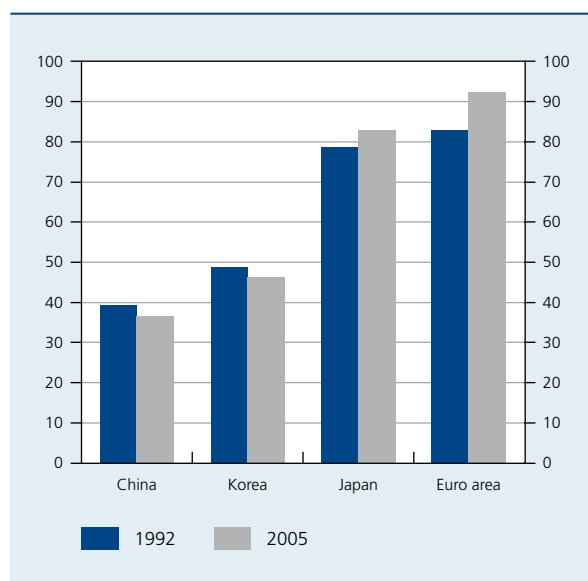
Balanced global growth also requires a more general rebalancing of demand. The centre of gravity of that demand will therefore have to be transferred from the deficit countries to the surplus countries. In order to rebuild their wealth, which were seriously impaired by the crisis, and to reduce their debts, American households increased their savings ratio to 7.2 p.c. of net disposable income in mid 2009, after an absolute low of 1.2 p.c. in 2005 Q3. The ratio has since subsided again, falling to around 6.2 p.c. by the beginning of 2010. Be that as it may, recent forecasts

by American and international bodies predict that, in the years ahead, the savings ratio will be structurally higher than it was before the financial crisis, as American households realise that sharp asset price corrections could occur, even if they are infrequent. Expectations of high returns on the stock market and the idea that property prices rarely if ever fall have proved to be too optimistic. Moreover, a return to the extremely easy credit terms prevailing before the crisis is highly unlikely, and even undesirable. In the coming years, these factors mean that American households are likely to consume at a more modest pace than in the period 1992-2007 and will therefore cease to perform the role of world consumer of last resort.

That is why many people put their hopes in the Asian economies as drivers of global demand. In any case, they were the first to recover from the international economic and financial crisis. The rapid GDP growth in the region already seems to be firmly anchored. The World Bank predicts growth of 8.7 p.c. this year in the emerging Far East economies. The shift in the centre of gravity of global demand towards those regions therefore seems to have accelerated. China, the largest emerging economy, was at the centre of the region's economic recovery, making the biggest contribution to global economic growth in 2009.

However, one question remains: to what extent will a reorientation of the Chinese growth model be sufficient to ensure a sustainable global economic recovery?

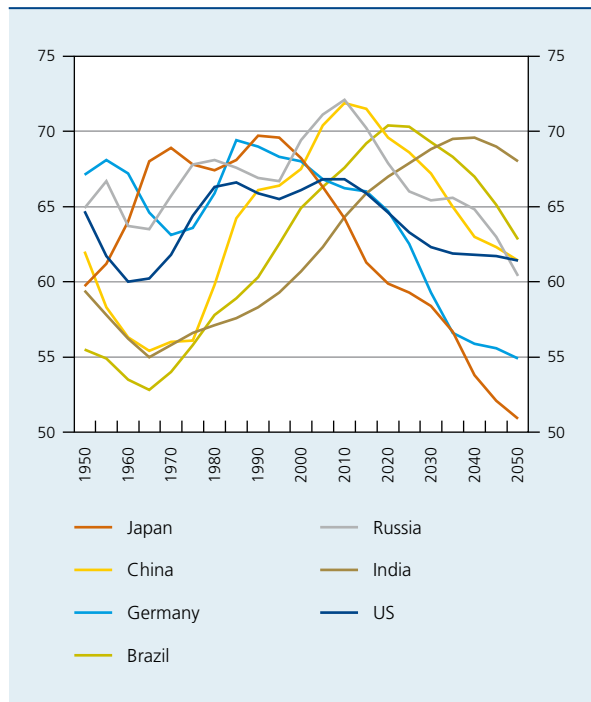
**CHART 10 PERCENTAGE OF IMPORTS WHICH OVERLAP WITH THE US-CONSUMPTION GOODS**  
(100 indicates that imports overlap perfectly)



Source : IMF (Regional Economic Outlook, October 2009).

**CHART 11** THE CHINESE POPULATION OF WORKING AGE PEAKS IN ABOUT 2010

(share of the population aged from 15 to 64 years in the total population, percentages)



Source : UN (World Population Prospects, 2008 Revision).

Although China's share in global GDP has increased considerably, that growth has been accompanied by a steep increase in the household savings ratio, while Chinese growth has remained largely dependent on sales to the advanced economies, whose growth prospects for the coming years are less favourable. The scale of private consumption in China currently appears insufficient to compensate for the slackening pace of growth of American consumption. In view of their relative size, China would have to speed up consumption growth by seven times as much as the slowdown in US consumption.

Moreover, despite strong growth of its imports of consumption goods (up 15 p.c. on average over the past fifteen years, against a world average of 10 p.c.), China remains a marginal player in that respect owing to the small share of Chinese private consumption in the world total and a much smaller imported component in private consumption. Consequently, China's contribution to the growth of world imports of consumption goods has been relatively small (around 4 p.c. in recent years).

Furthermore, there are significant differences between the consumption goods imported into China and imports into the US; only 35 p.c. of China's basket of consumption

goods is comparable to that of the United States. The composition of global demand will ultimately change as demand shifts towards the emerging economies. The changing consumption patterns at world level will therefore require modifications to production structures; if that sectoral reorganisation is to go smoothly, capital and labour markets need to be flexible.

Since structural measures take effect in the medium term at best, the restoration of the global balance will probably encounter a transitional phase in which the declining role of American consumption cannot be entirely offset by demand from other countries. Progress towards a new, sustainable balance is therefore liable to take a long time and entail a slowdown in global growth.

Leaving aside the medium-term outcome of structural reforms, there are several promising developments emerging in the longer term. Thus, according to the life cycle theory, the expected increase in the dependency ratio in the emerging economies (except India, Brazil and Indonesia) could depress savings ratios in the coming decades. Also, a higher level of prosperity could create a new middle class with considerable consumption potential. That effect is likely to be felt mainly in the most heavily populated countries, such as India and China, and will ultimately have a significant effect on consumption patterns at the global level. At the same time, there could be significant shifts in consumption patterns away from food and clothing and towards energy and consumer durables. That is why this development could well be accompanied by increasing competition for scarce energy resources and a larger impact on the environment.

## Conclusion

Sustainable, balanced growth of the global economy requires a radical change of policy on the part of countries with substantial external and internal imbalances.

Deficit countries will have to cut the sizeable current account deficits which they have accumulated as a result of producing less than they spend and saving less than they invest. They will need to adjust their spending and concentrate on the export sector. The sectoral shifts and redistributive effects which will accompany internal rebalancing will create tensions between winners and losers. It will not be easy to restore the macroeconomic balance while achieving a social and political consensus and creating the conditions for future growth, especially in the case of countries where the crisis has caused a substantial increase in the public debt. Even the gradual reduction of heavy public deficits could usher in a period



of low growth. Countries with significant competitiveness problems will also face a major challenge. In view of the rigidity of the product and labour markets, regaining competitiveness will inevitably be a lengthy and painful process for those countries.

To compensate for the decline in demand from deficit countries, surplus countries are called upon to act: if domestic demand does not increase in those countries, the world economy could face a shortage of aggregate demand and an excess of production capacity. The surplus countries will have to reduce their dependence on exports, which implies refocusing their growth model on the domestic market. Here, too, the process will generate political tensions. In China, the industrial sector has been central to the economic, social and political order for many years. Eliminating the privileges granted to that sector will entail shifts of power in all those spheres.

However, there are some encouraging signs. Thus, China is becoming increasingly aware of the need to promote domestic consumption rather than exports and export-related investment. Vigorous growth and relatively sound public finances give China precisely the preconditions required for that shift of focus. The political will exists.

Moreover, China is a centrally managed economy which, in the past, has already demonstrated that it can implement drastic reforms in a relatively short space of time. Conversely, the United States recognises the need to consolidate public finances and stimulate exports; it could return to consumption-led growth, but the benefits would probably be transient and the latent distortions which caused the crisis, would persist, probably until the eruption of a new crisis. If these promising policy intentions become reality, the global economy could benefit. The efforts needed to consolidate the fragile recovery which followed the crisis will be considerable, and must begin right away.

Nonetheless, the rebalancing of the global economy remains a major challenge with potential for tensions between countries over the allocation of the negative wealth effects. Hence the importance of an international platform capable of offering a global and powerful policy response, with a role for all deficit and surplus economies. In that regard, the commitment by the leaders of the G20 countries to implement the Framework is grounds for optimism. Yet, it is vital to set up an effective system of monitoring progress in surplus and deficit countries, to impose discipline and to exert peer pressure. The G20 will play a crucial role here too.

## Bibliography

- Abbas S.M.A., J. Bouhga-Hagbe, A.J. Fatás, P. Mauro and R.C. Velloso (2010), *Fiscal Policy and the Current Account*, IMF Working Paper, May.
- Asian Development Bank (2009), "Rebalancing Asia's growth. A question of balance", in *Asian Development Outlook*.
- Aziz J. and L. Cui (2007), *Explaining China's low consumption: the neglected role of household income*, IMF Working Paper, July.
- Bank of England (2009), "Global imbalances and the financial crisis", *Quarterly Bulletin of the Bank of England*, Q3.
- BIS (2010), 80th Annual Report.
- Blanchard O. (2009), "Sustaining a Global Recovery", *Finance & Development*, 46 (3), September.
- Blanchard O. (2010), *Saving scenarios for Emerging Asia and the United States*.
- Blanchard O. and F. Giavazzi (2005), *Rebalancing Growth in China: A Three-Handed Approach*, CEPR Discussion Paper 5403.
- Blanchard O. and G. M. Milesi-Ferretti (2009), *Global Imbalances: In Midstream?*, IMF Staff Position Note 09/29, December.
- Bosworth B. and S. Collins (2009), *The US external deficit: a soft landing, doomed or delayed?*
- Bosworth B. and S. Collins (2010), *Rebalancing the US economy in a post-crisis world*, The Brookings Institution, April.
- Bracke T., M. Bussière, M. Fidora and R. Straub (2008), *A Framework for Assessing Global Imbalances*, ECB Occasional Paper 78, January.
- Butzen P., E. De Prest, S. Ide and H. Zimmer (2005), "The US current account deficit: how did it come about and what are the policy implication?", *Economic Review of the National Bank of Belgium*, II, 51-67.
- Council of Economic Advisors (CEA) (2010), *Economic Report of the President*.
- EC (2010a), "Global imbalances still casting a shadow", *European Economic Forecast*, spring.
- EC (2010b), "Surveillance of Intra-Euro-Area Competitiveness and Imbalances", *European Economy* 1.
- ECB (2007), "Putting China's economic expansion in perspective", *ECB Monthly Bulletin*, January.
- ECB (2010), "Prospects for real and financial imbalances and a global rebalancing", *ECB Monthly Bulletin*, April.
- Eugène, B. and W. Melyn (2003), "A persistently positive financing balance: a structural feature of the Belgian economy", *Economic Review of the National Bank of Belgium*, IV 2003.
- Feldstein M. (2008), *Resolving the global imbalance*.
- Guo K. and P. N'Diaye (2010), *Determinants of China's Private Consumption: An International Perspective*, IMF Working Paper, April.
- G20 (2009a), *Leaders' statement*, The Pittsburgh Summit, 24-25 September.

- G20 (2009b), *Communiqué*, Meeting of Finance Ministers and Central Bank Governors, 7 November.
- Hüfner F. and I. Koske (2010), *Explaining Household Saving Rates in G7 Countries: Implications for Germany*, OECD Economics Department Working Papers 754.
- IMF (2007), *The multilateral consultation on global imbalances*, IMF Issues Brief, April.
- IMF (2009a), "Beyond 2010: How will the Global Economy Rebalance?", *IMF World Economic Outlook*, October.
- IMF (2009b), *The G-20 Mutual Assessment Process and the role of the Fund*, 2 December.
- IMF (2010a), *Global Economic Prospects and Policy Challenges*, Meetings of G-20 Deputies, 27 February, Seoul, Korea.
- IMF (2010b), "Leading the Global Recovery. Rebalancing for the Medium Term", *IMF Regional Economic Outlook – Asia and Pacific*, April.
- IMF (2010c), "Rebalancing Growth", *IMF World Economic Outlook*, April.
- IMF (2010d), "Rebalancing global demand: what will take up the baton from the US consumer?", in *IMF Regional Economic Outlook – Western Hemisphere*, May.
- IMF (2010e), *G-20 Mutual assessment process – Alternative policy scenarios*, G-20 Toronto Summit, 26-27 June.
- Kohn D.L. (2010), *Global imbalances*, Speech by the Vice Chairman of the Board of Governors of the Federal Reserve System, 11 May.
- Mody A. and F. Ohnsorge (2010), *After the crisis: lower consumption growth but narrower global imbalances?*, IMF Working Paper, January.
- NBB (2006), "Onevenwichtigheden in de lopende rekeningen van de betalingsbalansen", Kader 1 in Verslag 2005.
- NBB (2010), "Naar een nieuw evenwicht in de mondiale vraag", Kader 1 in Verslag 2009.
- OECD (2010a), *2009 Economic Review – China*, OECD Economic and Development Committee, January.
- OECD (2010b), *China in the 2010s: Rebalancing Growth and Strengthening Social Safety Nets*, OECD Contribution to the China Development Forum, 20-22 March, Beijing.
- Prasad E. (2009), *Rebalancing growth in Asia*, NBER Working Paper 15169, July.
- Reserve Bank of Australia (2009), "Patterns and trends in global saving and investment ratios", *Bulletin of the Reserve Bank of Australia*, September.
- Visco I. (2009), *Global imbalances in the financial crisis and the international monetary system*, distinguished lecture at the XVIII International Conference on "Money, Banking and Finance", Rome, 4 December

# Strategies and measures aimed at consolidating public finances

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## Introduction

The financial crisis and the resultant economic recession have seriously undermined the health of public finances in almost all the developed economies. Budget deficits and public debt have risen sharply and it is clear that these budgetary problems will not disappear automatically once the economy has fully recovered from the recession. If policy remains unchanged, public debt will continue to increase in many countries. On top of this, the budgetary impact of the ageing of the population could drive up budget deficits and cause public debt to rise even more quickly.

Financial markets have reacted to the situation by casting doubt on the sustainability of some countries' budgetary positions, which was expressed by a rise in the interest rates applying to those countries and even, as far as Greece is concerned, by problems in finding sources of financing. Given these circumstances, the latter country was forced to appeal to its partners in the euro area and the IMF.

A clear and credible strategy for returning to a healthy and sustainable budgetary situation therefore seems to be absolutely essential for many economies. The Greek debt crisis and the threat that it might spread to other countries not only demonstrated the risks associated with budgets

becoming derailed but also acted as a tipping point in the sense that, in its immediate aftermath, many countries drew up concrete consolidation plans.

The first chapter in this article outlines the current budgetary situation. This is followed by an explanation of why consolidation plans are urgently needed and an attempt is made to provide an answer to the question of what form those plans should preferably take. The last chapter contains an insight into the strategies that have been drawn up to consolidate public finances. This last chapter also looks back at the response of the European authorities to the Greek debt crisis and outlines the sometimes very concrete budgetary consolidation measures that a number of European countries have already taken. Lastly, a number of conclusions are drawn.

## 1. Outline of budgetary positions

### 1.1 Current budgetary situation

The economic and financial crisis that began in the course of 2007 and worsened in 2008 had very significant consequences for the public finances of most of the advanced economies. On the one hand, many governments took action to rescue the financial system, and more specifically the banks. On the other hand, they undertook extensive budgetary measures in order to limit the severity of the recession as far as possible, by way of their stimulus plans<sup>(1)</sup>. These complemented the automatic stabilisers so as to prevent the collapse of economic activity, but they

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(1) An article about these economic stimulus plans was published in the September 2009 edition of the Bank's Economic Review.

also adversely affected the budget situation in a great many countries.

Thus, the budget balance of most of the industrial countries has deteriorated sharply since 2007, from an average deficit of 1.7 p.c. of GDP to 8.9 p.c. in 2010, in the advanced countries of the G20. The deterioration was less severe in the emerging countries: there, the budget surplus of 0.3 p.c. of GDP turned into a deficit of 3.7 p.c. of GDP.

The decline is pronounced in the United States and Japan, where the deficit is expected to amount to more than 10 p.c. and about 8 p.c. of GDP respectively in 2010, and even more so in the United Kingdom, where it is likely to come out at 12 p.c. of GDP. In the euro area, very different situations in the respective countries are sometimes concealed behind the expected deficit of 6.6 p.c. of GDP. Specifically, the budget deficit ranges from around 12 p.c. and 10 p.c. of GDP in Ireland and Spain respectively to some 5 to 6 p.c. in Germany, Belgium, Italy and the Netherlands and about 4 p.c. in Luxembourg, Finland and Malta. In China, as in many emerging countries, the budget balance has only deteriorated to a moderate degree.

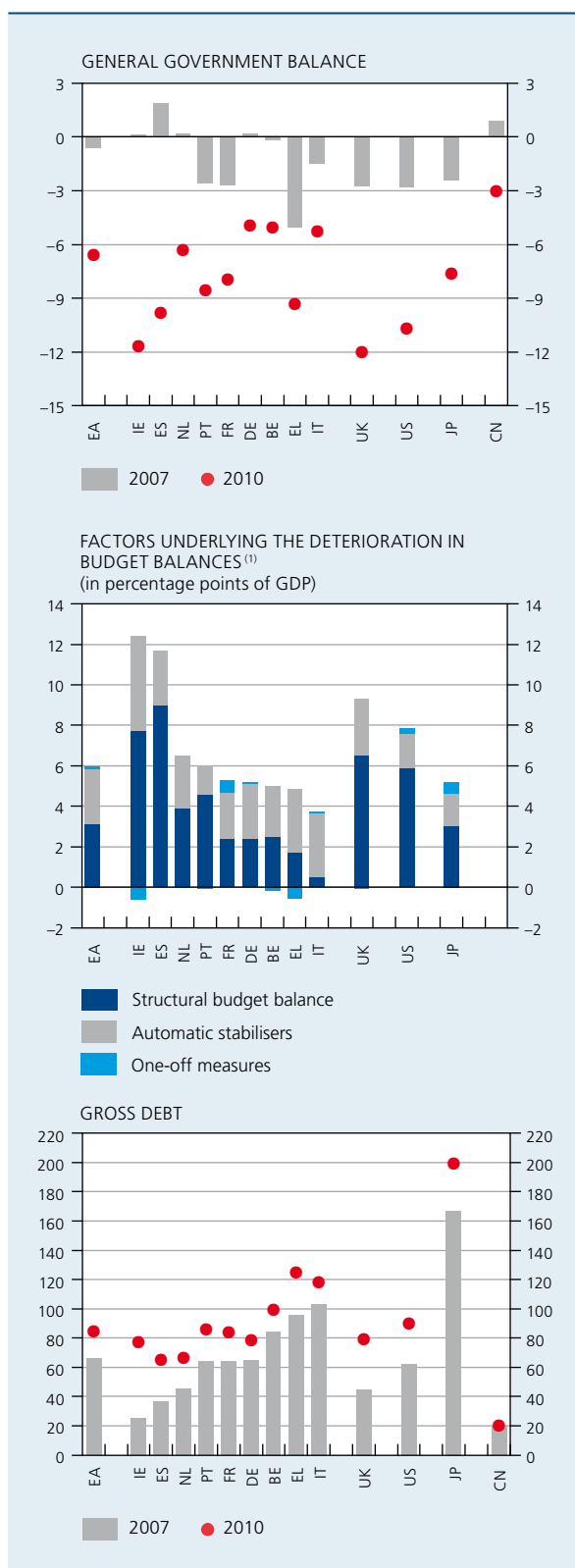
However, the general deterioration cannot be attributed solely to the economic and financial crisis. In some countries, considerable deficits were already being recorded prior to the beginning of the crisis, whilst the favourable business cycle in 2007 put a gloss on the budget situation to some extent. In these countries, the crisis exerted a further adverse effect on what were already structurally weak budget positions in the first place.

Moreover, the weakening of budget positions since the beginning of the crisis is largely structural in nature. This deterioration is even chiefly structural in the United States, the United Kingdom and Japan, whilst in the euro area as a whole, the automatic stabilisers played virtually as significant a role as the structural factors. However, the latter were of critical importance in some countries in the euro area, such as Spain and Ireland, whilst in Italy, for example, these factors only exerted a very limited influence.

The deterioration in the structural budget balance is partly explained by the stimulus packages which the various countries have put together for the years 2009-2010. According to the IMF, the discretionary measures are expected to amount to 3.9 p.c. of GDP on average in 2009-2010 in the countries of the G20. They are likely to be more extensive in China, Japan and, to a lesser extent, the United States than in Europe. The stimulus plan coordinated within the European Union has, according to the

**CHART 1 BUDGETARY DEVELOPMENTS BETWEEN 2007 AND 2010**

(in p.c. of GDP unless otherwise stated)



Sources: EC, IMF, OECD.

(1) A positive (negative) sign indicates a deterioration (improvement) in the balance.

most recent EC data, a scope of 2.9 p.c. of GDP, whilst comparable measures achieve 4.7 p.c. of GDP in the United States and 5.8 p.c. of GDP in China.

The level of debt has grown drastically in many countries, primarily as a consequence of the deterioration in public finances in general. Thus, the government debt in the United States increased by about 28 percentage points of GDP between 2007 and 2010, to almost 90 p.c. of GDP. In Japan, where the level of debt was already particularly high in 2007, it is forecast to grow by a further 32 percentage points of GDP, to almost 200 p.c. of GDP. The growth in the United Kingdom's debt amounted to as much as 34 percentage points of GDP but due to the still relatively low level in 2007, the debt ratio is expected to remain more limited there, more specifically around 80 p.c. of GDP in 2010. The rise was smaller in the euro area, albeit starting from a higher debt level in 2007, and so the public debt there is expected to come out at about 85 p.c. of GDP at the end of 2010. The situation diverges relatively markedly in the countries making up the euro area. The strongest increase was posted in Ireland, at more than 50 percentage points of GDP, whilst the increases in Italy, Belgium and Germany remained limited to less than 15 percentage points of GDP. In China, the debt remained small and did not increase, expressed as a percentage of GDP – a finding which can be attributed to continuing strong growth figures.

The rescue operations in the financial sector only explain a small part of the overall rise in public debt since the beginning of the crisis; the most significant determinant of this rise is in any case the increase in budget deficits.

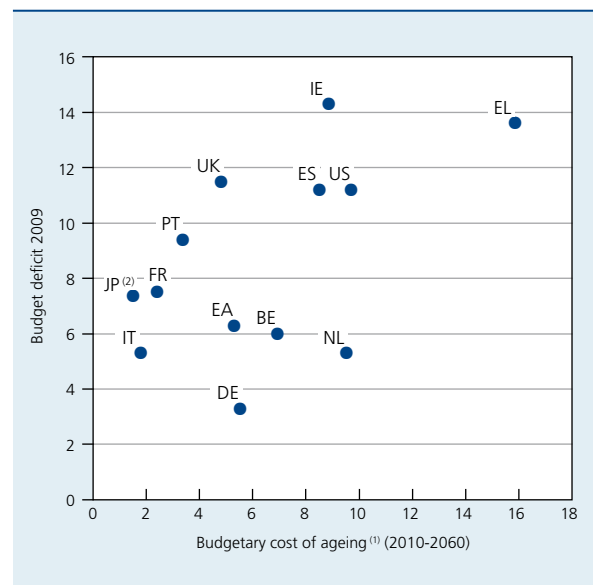
Given that the level of debt rose relatively markedly in those countries that had a relatively small debt in 2007, the degrees of indebtedness tended to converge. However, Japan and China formed an exception to this trend, as did – to a lesser extent – Greece.

## 1.2 Prospects for public finances

The combination of extensive budget deficits and a high level of debt on the one hand, and the anticipated rise in government expenditure as a result of the ageing of the population on the other, casts doubt on the sustainability of public finances over the long term.

The ageing of the population will in any case weigh on public finances – and thus on debt – since it puts a brake on economic growth as a result of the fall in the population of working age on the one hand, and since government expenditure on pensions, health care and care of

**CHART 2** BUDGET DEFICIT AND BUDGETARY COSTS OF AGEING  
(in percentage points of GDP)



Sources: BIS, CBO, EC, IMF.

(1) Costs that are limited to pensions, health care and long-term care.

(2) With regard to Japan, the budgetary costs associated with ageing relate to the period 2010-2050.

the elderly is increasing over the long term on the other. In the euro area, government expenditure associated with ageing is forecast to rise by 5.1 percentage points of GDP on an annual basis between 2010 and 2060.

On average across the euro area, the effort needed to meet the intertemporal budget constraint<sup>(1)</sup> – the sustainability gap – amounts to not less than 5.8 p.c. of GDP. The main determinants of the sustainability gap comprise the current structural budget position and the anticipated change in costs associated with ageing. However, the scope of the corrections required so as to achieve a sustainable situation differs from one country to the next. Some countries, such as Greece, are having to contend with a large initial imbalance and considerable anticipated growth in age-related expenditure simultaneously. The sustainability of budget positions constitutes a severe problem outside the euro area too.

An alternative method of showing that current budgetary policy is unsustainable consists in simulating the increase in the debt if policy remains unchanged<sup>(2)</sup>.

(1) This constraint means that total expenditure over a long period is covered by total revenue over that same length of time.

(2) The EC's simulations are carried out in the context of a partial equilibrium, where the reactions of the agents to such a level of debt are not taken into account. They do not involve realistic scenarios, therefore. The scenarios drawn up by the BIS do not seem to differ in this respect.

Whilst the average level of debt in the euro area still amounted to 78.7 p.c. of GDP in 2009, this level would balloon to more than 400 p.c. of GDP by 2060. The other advanced economies would not escape any more lightly: in the United Kingdom, the debt would climb to more than 750 p.c. in 2060, in Japan to about 350 p.c. by 2030 and in the United States to more than 200 p.c. by 2030.

## 2. Budgetary consolidation is urgently needed

In most of the advanced economies, the present state of public finances is a cause for concern. A situation of this type implies very serious policy risks. It could bring about a sharp rise in interest and could have dire consequences for economic growth over the long term. This chapter looks at both these risks in detail.

### 2.1 Is there a danger of a sharp rise in interest?

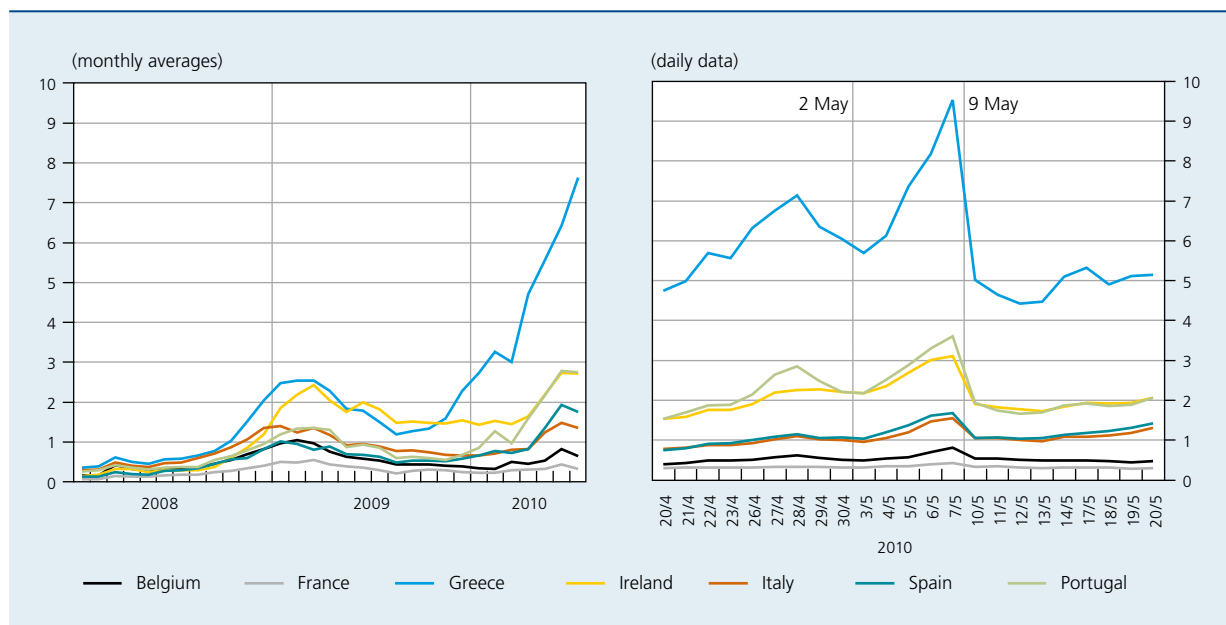
Growing government deficits and public debt have the effect of making interest rates move upwards. The IMF has carried out empirical research investigating what influence budgetary variables have on long-term interest rates (IMF, 2009). This shows that a rise of 1 percentage point in the budget deficit leads to long-term interest rates on public

securities being raised by 10 to 60 basis points. There is a relatively severe impact in countries with an unfavourable starting position with regard to public finances, weak institutions, a low savings rate and limited access to the international capital markets. The expectation that public finances will be more vulnerable as a result of the impact of population ageing also appears to reinforce the effect of government deficits on interest.

Up to now, however, long-term interest rates have remained relatively low in most countries. The upward pressure that emanated from growing government deficits and public debt was counteracted by a number of factors which are also connected to the financial and economic crisis. Indeed, the crisis has caused an increase in the savings ratio of individuals, whilst private investment is running at a very low level. Moreover, the crisis has led to a sharp fall in inflation and expectations regarding inflation which, together with real interest rates, are a component of nominal interest rates. Lastly, the very expansive monetary policy has also made a large contribution to the low interest rates. These factors are nevertheless temporary in nature and therefore do not constitute a lasting counterweight to the upward pressure on interest rates resulting from increasing government deficits and public debt.

Interest rates may rise if investors demand higher risk premiums for their investments in public securities,

**CHART 3** DIFFERENCES IN YIELD ON TEN-YEAR GOVERNMENT BONDS COMPARED TO THE GERMAN BUND



Source : Thomson Reuters Datastream.

namely if the financial markets begin to make more allowance for a higher risk of default by some countries. Thus, in the first few months of 2010, the financial markets moved to a strong upward revision of the likelihood of Greece defaulting. The problems that Greece had to contend with also clearly show that financial markets can react suddenly and very strongly.

Furthermore, higher interest rates may be demanded when investors expect higher inflation. The inflation expectation may be fuelled in two ways. In the first place, the monetary and budgetary policy mix, which has become very expansive in virtually all countries in response to the financial and economic crisis, might be adjusted too late. Should this policy mix remain very expansive whilst economic activity picks up, this could then drive inflationary expectations upwards. Furthermore, investors could allow for a greater likelihood of monetisation of the public debt.

A situation in which investors and other economic actors proceed on the basis of higher inflationary expectations would not only lead to long-term interest rates being raised but would also have consequences for the conduct of monetary policy. In a situation of this type, a tightening of monetary policy in the form of higher short-term interest rates could appear unavoidable in any case. A timely budgetary exit, on the other hand, could dampen the increase in inflationary expectations, which would enable a more gradual tightening of monetary policy.

## 2.2 What is the impact of budget consolidation on economic growth?

A lively debate is being conducted amongst economists about the impact of budgetary policy on growth. There is therefore a very extensive theoretical and empirical literature on this topic. Although this does not provide an unequivocal answer, a number of cautious conclusions can nevertheless be drawn. In this respect, a distinction must be made between the impact over the short term and that over the long term.

### SHORT-TERM IMPACT

It may be anticipated, *a priori*, that the measures that are being taken to consolidate the budget will have a negative effect on the economic cycle over the short term. After all, most empirical studies show that the budgetary multipliers – which indicate the extent to which a certain budgetary stimulus influences the growth in activity – are positive over the short term. However, the impact that

budgetary adjustment has on economic growth varies according to the type of consolidation measure. Thus, it appears that public consumption and investment measures have a relatively marked impact on economic activity, whilst measures involving transfers, such as taxation and social benefit payments, have a smaller impact. The reason is that the latter only alter consumption and investment indirectly, by way of a change in the incomes of individuals and companies. The extent to which households and enterprises have to cope with restrictions on liquidity and credit is also an important aspect of the impact that raising taxation or lowering social benefit payments would have on economic growth.

Furthermore, it appears that the negative impact of consolidation measures on economic growth over the short term is smaller or even almost zero as the state of public finances becomes worse and is perceived as being a cause for concern. This has to do with the fact that consolidating measures may prevent the interest rate rising, which would depress private investment. Moreover, these measures may lead to a fall in the savings ratio, for instance because households start to do less in the way of precautionary savings as their confidence is restored following a period of budgetary problems. In this case, the influence on economic activity over the short term could remain very limited.

The latter elements are very relevant in the present situation; so budget consolidation does not necessarily exert a strongly negative effect on the business cycle.

### IMPACT OVER THE LONG TERM

The long-term effects of a budget consolidation that guarantees the sustainability of public finances are unambiguously positive. These effects comprise amongst other things a fall in long-term interest rates due to a reduction in the quantity of public securities put into circulation. Furthermore, the fall in interest expenditure as a result of budgetary adjustment may release more funds for productive government expenditure or may limit the fiscal and parafiscal burden.

It appears from the economic literature that budget consolidation based on reducing expenditure is more successful and has more favourable effects on economic growth over the long term than consolidation supported by raising government revenues. This applies in particular when the budget consolidation refers to expenditure other than what is often described as productive expenditure, such as expenditure on investment, education and research and innovation.



### 3. How should budget consolidation proceed?

This chapter looks at the question of how the restructuring of public finances – a necessity in most of the advanced economies – needs to proceed. Firstly, an indication is given of the scope of the consolidation effort. Then, consideration is given to what the best timing is for starting to consolidate the budget. Lastly, a number of observations follow about the composition of the budgetary adjustment packages.

#### 3.1 Scope of the necessary consolidation effort

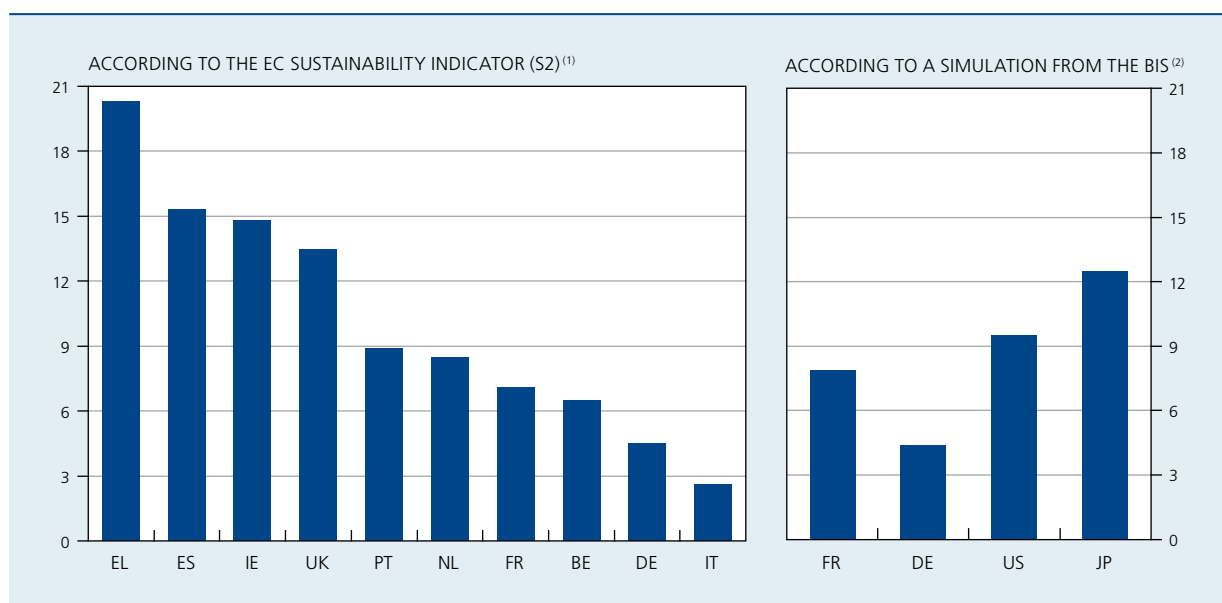
The scope of the required budgetary consolidation can be measured on the basis of the difference between the present budgetary situation and a sustainable situation. One of the indicators of that difference – referred to as “S2” by the EC – specifies the effort that needs to be delivered with regard to the primary balance so as to comply with the budget constraint indefinitely, whilst taking into account the extra expenditure associated with the ageing of the population. The EC (2009a) regularly performs this exercise for all the European countries. The BIS<sup>(1)</sup> has also carried out a simulation which can be used as a basis for measuring the required budgetary effort.

The effort to be made needs to refer to two elements: a lowering of the initial structural budget deficit and the cost of ageing. It appears from these indicators that all the countries under consideration need to deliver a substantial effort with regard to sustainability. According to the EC, the effort in the euro area amounts to 5.8 p.c. of GDP on average; here, the burden of ageing constitutes a greater problem with regard to sustainability than the initial budgetary position, amounting to 3.5 p.c. and 2.3 p.c. of GDP respectively. According to the exercise undertaken by the BIS, which differs to some extent and does not include all the European countries, Japan and the United States would generally have to deliver greater efforts than the countries in the euro area.

According to the S2 indicator, the effort needed to return to a sustainable budgetary position is particularly marked in Greece, where a consolidation of more than 20 percentage points of GDP is required. Spain, Ireland and the United Kingdom also need to make a considerable effort – that is, more than 13 percentage points of GDP. Although Italy, for instance, seems to be less far removed from a sustainable budgetary situation, that country needs to reduce its public debt – the second highest in

(1) Cecchetti et al. (2010). In this simulation, the authors studied the primary balance anticipated for 2011 and the primary balance that needs to be attained within 5, 10 and 20 years so as to stabilise the debt ratio at the level of 2007. The difference between the two balances indicates the effort to be made.

**CHART 4** SCOPE OF THE REQUIRED BUDGET CONSOLIDATION  
(in p.c. of GDP)



Sources: BIS, EC.

(1) S2 indicates the permanent adjustment of the primary balance needed so as to comply with the intertemporal budget constraint indefinitely.

(2) Difference between the primary balance anticipated for 2011 and the primary balance required within 20 years so as to stabilise the debt ratio at the level of 2007.

the European Union – just as much in order to ward off other risks, such as the impact of a renewed interest rate rise on the budget situation.

### 3.2 Timing of budget consolidation

Given that the economic recovery is still fragile at the moment, substantial and rapid consolidation efforts delivered by most countries simultaneously – on top of the ending of the stimulus measures – could entail risks for the economic revival. A postponement of consolidation efforts, on the other hand, could lead to financing risks and rising long-term interest rates.

In view of these risks, there is an urgent need for credible consolidation programmes. These must be aimed at a substantial narrowing of what is in many countries the very wide sustainability gap, which reflects the difference between the current primary balance and the balance needed to guarantee the sustainability of public finances. A distinction can be drawn in this regard between the announcement of consolidation plans and their implementation. To prevent doubt arising about the sustainability of public finances, it is advisable not to delay the announcement of concrete and credible plans, even if they are to be largely put into effect during the years to come. In view of the scope of the consolidation effort required in most countries, spreading it out over a period of time seems in fact to be unavoidable.

The timing of budget consolidation may be different depending on the economic circumstances in the specific countries. Amongst other things, allowance needs to be made in this regard for the economic cycle and the budgetary situation. In countries where public finances have been seriously derailed and are regarded as problematical, and where the confidence of the financial markets in sustainability is damaged or threatens to be damaged, public finances have to be consolidated urgently anyway.

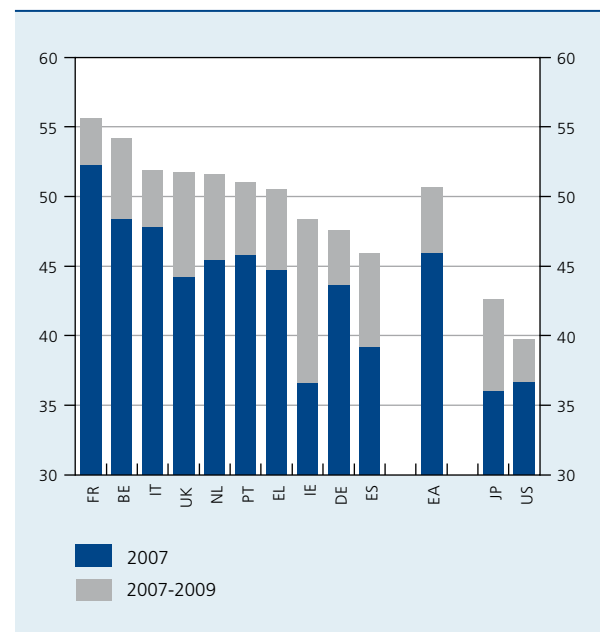
### 3.3 What should the budgetary adjustment plans look like?

Fundamental consolidation measures are therefore required in most of the advanced countries. These consolidation measures have to be aimed to a large extent at the expenditure side. As already mentioned, measures that focus on limiting non-productive government expenditure do in any case have a much more positive effect on economic growth over the long term than raising revenues. Moreover, the financial and economic crisis has caused the expenditure ratio to rise sharply in virtually all countries

concerned. In the euro area and the United Kingdom, the ratio has risen from about 45 p.c. of GDP in 2007 to more than 50 p.c. of GDP in 2009. In Japan too, the expenditure ratio has grown by almost 7 percentage points over the period, to 42 p.c. in 2009. In the United States, the rise remained limited to 3.1 percentage points, with the result that the expenditure ratio increased to about 40 p.c. Together with France and Finland, Belgium belongs to a group of countries where the expenditure ratio has grown to as much as approximately 55 p.c. of GDP.

Combined with the budgetary costs of ageing, which are very considerable in some countries, and the expectation that interest charges will also rise, such high expenditure ratios can barely be financed by way of government revenues, if at all. This would in any case demand very severe fiscal and parafiscal pressure, which would have a negative impact on economic growth. More selective government action is therefore evidently required in most countries. In the face of the unavoidable savings in government expenditure, gains in efficiency have to be pursued anyway. The consolidation also needs to be aimed especially at expenditure that is regarded as non-productive. Productive government expenditure, on the other hand, including that for education, for certain investments and for R&D, preferably needs to be spared as far as possible since it is a significant stimulus for economic growth over the long term.

**CHART 5** TOTAL GOVERNMENT EXPENDITURE BEFORE AND AFTER THE ECONOMIC CRISIS  
(in p.c. of GDP)



Source: EC.

However, due to the scope of the consolidation effort to be made, raising government revenues also seems to be unavoidable. In some countries with a relatively low burden of taxation, there is a useful margin for this. However, the weight of taxation – particularly on earned income – is already very heavy in a great many countries, for example in Belgium. In these countries, the margins for raising revenues and thereby consolidating the budget tend to be limited. Nevertheless, these countries also have a number of options at their disposal. Thus, it is possible to point to the discussions that are currently being held at international meetings about the introduction of a specific tax on financial institutions, which is regarded by some as compensation for the systemic risk that these institutions embody. In addition to this, there are also ample margins with regard to environmental levies or, as a technical variant of these, the sale of emission rights. Using the tool of environmental levies on a greater scale means that both environmental and budgetary objectives could be pursued. Lastly, more efficient collection of taxes must be an aim and a broadening of the tax base can be considered.

The budgetary adjustment plans preferably also need to include measures that are aimed at limiting the budgetary costs associated with ageing, and certainly in countries which have not yet put enough reforms into effect in this regard. If policy remains unchanged, substantial rises are in prospect in many countries for expenditure on health care and pensions especially. Measures that hold down the budgetary costs of ageing may in fact be of crucial importance in some countries, so as to remove doubts about the sustainability of public finances. Moreover, measures that result in pushing up the effective pension age, or other measures with an effect over the long term, do not have a direct negative impact on economic recovery, which is very important in the current circumstances.

#### 4. Budgetary consolidation plans in the United States, Japan and the European Union

In the last few years, the G20 has played a significant coordinating role in combating the financial and economic crisis. As far as budgetary policy is concerned, it was agreed that measures should be taken in support of domestic demand but without losing sight of the sustainability of public finances. At the summit meeting in Pittsburgh in September 2009, emphasis was placed on the need for cooperation and coordination when, at the appropriate time, the extraordinary policy support would be withdrawn. The call therefore went out at that summit of the G20 leaders, and also during subsequent meetings, to develop credible budgetary exit strategies now,

whilst making allowance for the differences between countries and any possible spillover effects. The Toronto summit in June 2010 again underlined the need to draw up credible, well-phased and growth-friendly plans, albeit differentiated and tailored to national circumstances, for the purpose of guaranteeing the sustainability of public finances. In this respect, countries with serious budgetary problems need to consolidate their budgets more rapidly. The world leaders emphasised the fact that healthy public finances are essential for the economic revival, provide flexibility so as to respond to new shocks, safeguard the capacity to face up to the challenges of population ageing and prevent government deficits and public debt being passed on to future generations. However, the consolidation process has to be carefully calibrated so as to support the revival in private demand. The risks that synchronised budget austerity across various major economies may have an unfavourable impact on the economic revival, on the one hand, and that the failure to carry out consolidation plans where they are needed would undermine confidence and would hinder growth, on the other hand, have to be carefully weighed up. As a reflection of this balance, the advanced countries have committed themselves to at least the halving of government deficits by 2013 and the stabilisation of public debt as a percentage of GDP by 2016.

##### 4.1 United States

After considerable amounts had already been allocated to stimulate the economy during the years 2008 and 2009, budgetary stimulus was raised further in 2010. However, measures of this type have met with more and more resistance given that the pressure to prepare a budgetary exit has increased. In mid 2010, the Congress had only approved very few concrete measures in this regard, but the President has already formulated a number of proposals which give an indication of the path intended to be followed.

At the beginning of February 2010, the Obama administration announced a path for public finances over the medium term (up to 2020), together with the federal budget for the fiscal year 2011. At the end of June, this path was updated in the mid-session review of the budget. The federal government deficit is projected to fall to 9.2 p.c. of GDP in the fiscal year 2011, as against 10 p.c. of GDP in 2010. It appears from the budget path for the next ten years that the government subsequently wishes to drive down the deficit to 3.4 p.c. of GDP in 2018. Thereafter, the deficit is projected to rise again to 3.8 p.c. in 2020 due to the influence of increasing costs associated with population ageing. The prospective fall in the deficit would primarily be the result of the expiry of

the support measures that the government took in the context of the crisis and the anticipated economic revival. The deficit will also diminish due to a number of new measures, the most significant of these being the freezing of discretionary expenditure not relating to national security for a period of three years; streamlining existing expenditure programmes; scrapping the tax reduction for the highest income brackets; stopping subsidies to major energy companies and the introduction of a levy on large financial institutions. According to the budget proposals, the federal public debt is forecast to increase from 53 p.c. of GDP in the fiscal year 2009 to 77.4 p.c. in 2020. The OECD predicts that total public debt will grow from 83 p.c. of GDP in 2009 to 94.8 p.c. in 2011.

Moreover, so as to give form to the budgetary policy, a two-party committee was set up (National Commission on Fiscal Responsibility and Reform) which must draw up concrete proposals for even more fundamental consolidation by the beginning of December. The most important objectives of this committee, to be achieved over the medium term, by 2015, are to bring the primary balance into equilibrium and to propose extra measures to guarantee the sustainability of public finances over the long term.

In addition, the so-called PAYGO rule is being re-introduced. This rule requires that new expenditure programmes or tax cuts must be paid for by means of savings or tax rises on other items. This rule will provide additional support for the required budgetary effort.

## 4.2 Japan

The new Prime Minister is setting the restoration of public finances high on the agenda. On 22 June 2010, he announced the broad outlines of his budgetary restructuring plan. The plan contains ambitious objectives, amongst other things to post a primary surplus by the fiscal year 2020 (following a halving of the primary deficit by 2015). The reforms necessary to achieve these objectives are currently being worked out in detail. The tax system would be thoroughly revised; and government expenditure and the issuing of government bonds would be limited for the fiscal years 2011 to 2013.

## 4.3 European Union

### 4.3.1 European authorities' decisions and the stability programmes

In spite of the risks to the sustainability of public finances, the EC came out in favour of a recovery plan for the

European economy at the end of 2008. A European Economic Recovery Plan was approved at the European Council meeting on 11 and 12 December 2008. This urged an immediate and coordinated budget stimulus, and preference was given to action which would help meet the Lisbon targets.

Subsequently, various European authorities fairly quickly advocated budget strategies involving scaling back the support measures for the economy. Thus, the Ecofin Council established formally in October 2009 that the time was right to prepare and map out an exit strategy from the support policy, even though the recovery was still fragile and the assistance measures still had to remain in place. On top of the scrapping of stimulus measures, the Council recommended extensive budgetary consolidation. Within the context of the Stability and Growth Pact, the coordinated strategy needed to make allowance for the specific situation of each country, and to be implemented with effect from 2011 at the latest, and in some countries even sooner. The consolidation plans had to be ambitious and come out substantially above the consolidation benchmark of an annual 0.5 percentage points of GDP in structural terms that is included in the pact. Lastly, the exit strategy should be accompanied by other measures, for example a stronger budgetary framework – which contributes to the credibility of the consolidation –, as well as by measures to promote sustainability over the long term and by structural reforms to improve productivity and to stimulate investment over the long term.

In November 2009, the Ecofin Council also emphasised the fact that the deterioration in the budgetary position made the problems resulting from ageing more complicated. At the time, the Council requested the Member States to concentrate their attention on strategies that were aimed at safeguarding the sustainability of their public finances, amongst other things in their stability and convergence programmes.

At the same time as this gradual change of course by the Ecofin Council and the EC, the Governing Council of the ECB also repeatedly emphasised that it is important to pursue the sustainability of public finances in order to maintain confidence and promote economic recovery. The announcement and, subsequently, the implementation of ambitious exit strategies had to contribute to the realisation of these objectives.

Each time a country's budget deficit exceeds the threshold of 3 p.c. of GDP, the EC investigates whether this overshoot is merely exceptional and temporary, and whether the deficit remains in the vicinity of the threshold. "Exceptional" means that the overshoot is either

**TABLE 1** DECISIONS TAKEN BY THE ECOFIN COUNCIL TO IDENTIFY A SITUATION OF EXCESSIVE DEFICIT FOR SOME COUNTRIES

	Deficit in 2009 <sup>(1)</sup> (in p.c. of GDP)	Time-limit currently identified for correction of the excessive deficit
Germany .....	-3.3	2013
France .....	-7.5	2013
Italy .....	-5.3	2012
Spain .....	-11.2	2013
Netherlands .....	-5.3	2013
Belgium .....	-6.0	2012
Austria .....	-3.4	2013
Greece .....	-13.6	2014 <sup>(2)</sup>
Finland .....	-2.2	2011
Ireland .....	-14.3	2014
Portugal .....	-9.4	2013
Slovakia .....	-6.8	2013
Slovenia .....	-5.5	2013
Cyprus .....	-6.1	2012
Malta .....	-3.8	2011

Source: EC.

(1) Notification dated March 2010.

(2) Insufficient action and subsequent step in the procedure (public notification).

the result of an event that the Member State has no control over or a serious recession. Following this analysis, the Ecofin Council decides whether or not a deficit is excessive.

At the present time, fifteen of the sixteen Member States of the euro area are regarded as countries with an excessive deficit, since their deficits are neither limited nor temporary. Within the euro area, only Luxembourg has a deficit that has not yet been declared to be excessive.

Moreover, whenever an excessive deficit is recorded, the Council imposes a deadline for eliminating that deficit. As a rule, this coincides with the year following the identification of an excessive deficit, but sometimes exceptional circumstances may cause that deadline to be extended. Thus, the deadline has been extended one or more times for all the affected countries except Finland since, on the one hand, the Commission made allowance for the repercussions of the economic and financial crisis and judged that it was necessary to prevent a budgetary consolidation prolonging the recession and, on the other hand, corrective measures were taken in a number of countries which

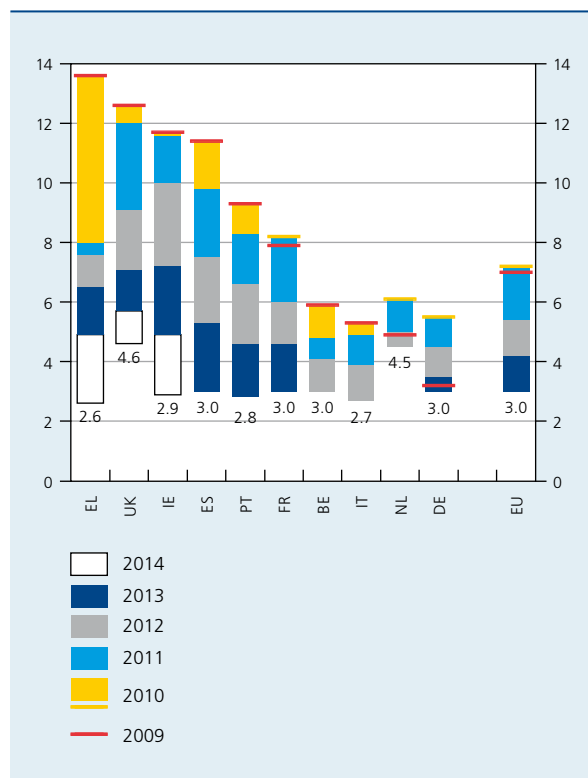
were followed by a significant and unexpected adverse economic event.

The deadline currently imposed for correcting excessive deficits is 2011 for Malta and Finland, 2012 for Cyprus, Belgium and Italy and 2013 for the other countries, with the exception of Ireland and Greece which are being given until 2014. In February of this year, Greece had been given a first deferral until 2012; that deferment was then extended on 7 May to the year 2014. This relaxation has to do with the fact that economic activity is expected to continue to contract into 2011, that the deficit for 2009 turned out larger than initially estimated and that the risk premiums which Greece now has to pay have risen sharply.

As a result of these decisions, the European countries submitted updates to their stability programmes (or to their convergence programmes for those countries that do not participate in monetary union) at the beginning of 2010. According to these updates, the Member States are expected to drive their deficits down to the threshold

**CHART 6** EVOLUTION OF GOVERNMENT DEFICITS ACCORDING TO THE STABILITY PROGRAMMES (OR CONVERGENCE PROGRAMMES)<sup>(1)</sup>

(in p.c. of GDP)



Sources: EC, national stability or convergence programmes.

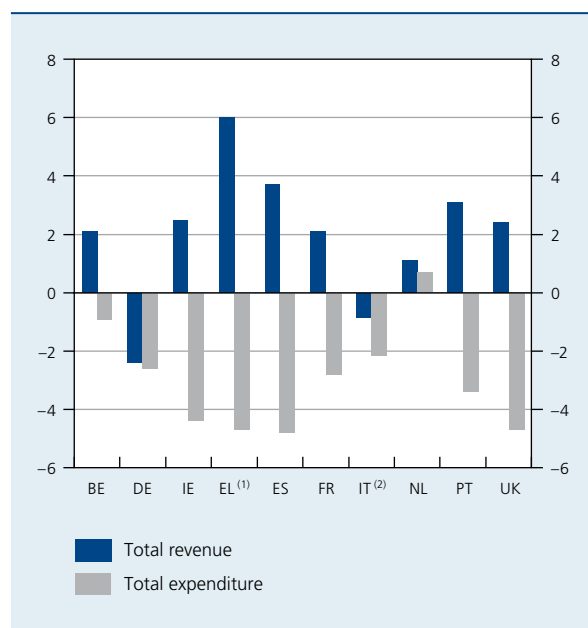
(1) Since the introduction of these programmes, some countries have updated their objectives.

of 3 p.c. of GDP or slightly below by 2013 at the latest. The only exceptions are Greece, the United Kingdom and Ireland, for which the deadline for eliminating an excessive government deficit falls after 2013, whilst the Netherlands would have to accomplish this by 2013 but has submitted a programme limited to 2012.

Most of the countries with an extensive budget deficit want to reduce it with effect from 2010. France is the only one among those where the deficit is projected to continue to rise. The Netherlands, Germany, Finland and Luxembourg – which had to contend with smaller budget deficits in 2009 – are expected to allow their deficits to grow somewhat further in 2010. As for the European Union as a whole, the deficit is projected to continue to increase initially, to 7.2 p.c. of GDP in 2010. At the aggregate level, the consolidation is therefore only likely to become visible in 2011, when only Luxembourg is expected to still post a deterioration in its balance, according to its stability programme. According to the stability or convergence programmes, the average general government balance of the countries in the European Union would fall back to the threshold of 3 p.c. of GDP in 2013. However, there is sometimes a great disparity between the intentions of the Member States to drive down their deficit and the measures required to achieve these objectives actually being put into effect. Thus, for most countries, the budgetary targets identified in the stability programmes cannot be met without new measures, according to the spring forecasts of the EC published on 5 May 2010. With regard to the European Union, the budgetary consolidation effort which still had to be delivered for 2011 amounted to an average of 0.9 percentage points of GDP. Given that some countries have since decided to take new consolidation measures, the total effort still to be made has, logically, diminished.

In many countries, the scope of the required consolidation implies that measures should be put into effect on the revenue and the expenditure sides simultaneously. In countries that already have a high ratio of government revenues, a consolidation effected by raising those revenues would normally be smaller than in countries with a lower ratio. Of those countries where the revenue ratio was already higher than 45 p.c. of GDP in 2009, only Belgium and France are therefore planning to boost that ratio further by 2012-2013. On the other hand, raising revenues is likely to contribute to the consolidation in a large number of countries of the European Union with a government expenditure ratio of less than 45 p.c. of GDP except, specifically, in Germany. With regard to the European Union as a whole, therefore, this ratio is expected to rise slightly, that is to say from 43 p.c. of GDP in 2009 to 43.3 p.c. in 2012.

**CHART 7** PLANNED CHANGES WITH REGARD TO GOVERNMENT EXPENDITURE AND INCOME  
(in percentage points of GDP, between 2009 and 2012-2013)



Sources: EC, national stability and convergence programmes.  
(1) With regard to Greece, this relates to the obligations arising from the agreements of 2 May 2010.  
(2) With regard to Italy, part of the effort to reach the targeted balance has not yet been distributed between revenue and expenditure in its stability programme. The effort still to be distributed amounts to 0.4 p.c. of GDP in 2011 and 1.2 p.c. of GDP in 2012.

Lowering the expenditure ratio, on the other hand, is a virtually universal intention which differs, however, in terms of scope. Only the Netherlands, Luxembourg, Cyprus and Malta wish to raise this ratio between 2009 and 2012-2013. At the other end of the spectrum, this lowering is projected to amount to not less than 4.8 percentage points of GDP in Spain. Viewed as an average across the European Union, the expenditure ratio is forecast to fall back by 2.1 percentage points of GDP between 2009 and 2012.

#### 4.3.2 Greek debt crisis and policy responses

Greece has already been in a delicate budgetary position for some time. The Greek public debt is the largest – in proportional terms – of the countries in the euro area. The financial and economic crisis has caused its government deficit and public debt to grow significantly. Moreover, if policy remains unchanged, Greece would have to cope with a steep increase in the expenditure associated with population ageing over the long term, with the result that the sustainability of public finances may be regarded as a cause for concern.

In October 2009, the sharp upward revision of the government deficit in Greece produced tension on the securities market for the Greek public debt. In April 2010, anxiety about the sustainability of Greek public finances increased, with the result that the interest rates at which the Greek State could obtain financing rose sharply, thereby causing a liquidity crisis. Moreover, contagion effects emerged. Operators on the financial markets focussed their attention on the situation of countries with similar, albeit far less acute, problems in the area of public finances and competitiveness, for example Portugal and Spain. In addition, the fear that Greece's insolvency, and possibly that of other countries, would bring about losses that would destabilise the financial sector drove up the banks' financing charges. Lastly, the potential influence of this anxiety on the financing of the economy prompted falls on share markets, a rise in the risk premiums associated with corporate bonds and a depreciation of the euro.

The international authorities have taken various measures to prevent the crisis spreading and to guarantee financial stability in the euro area. They would thereby provide financial assistance to countries which have to contend with a self-fulfilling lack of trust on the financial markets, in order to give them time to win back their credibility, and they would also restore the operation of distorted markets and guarantee that the public finances of countries in difficulties would be thoroughly consolidated.

In the first place, the European budgetary authorities and the IMF have set up a system of conditional financial assistance. On 11 April 2010, following a previous agreement in principle by the heads of state and government leaders of the euro area countries on 25 March 2010, the Eurogroup reached an accord on the concrete methods for providing emergency financing to Greece. This emergency financing was to take the form of bilateral loans by the various other countries in the euro area and the IMF. In the first phase, an overall amount of €30 billion in bilateral loans was under consideration. However, following the official request from the Greek government to activate the support package, the accord was specified in greater detail and substantially expanded on 2 May 2010: in the context of a three-year programme, Greece will be able to borrow €110 billion, consisting of €30 billion from the IMF and €80 billion from the other Member States in the euro area. The loans are subject to the condition that Greece takes vigorous measures to consolidate its budget (see below). The accord also provides for the implementation of structural reforms to strengthen the Greek economy, amongst other things by way of smoother operation of the labour market.

Since this decision only brought a very temporary calm to the financial markets, a decision was taken at the Ecofin Council meeting on 9-10 May 2010 to set up a European Stabilisation Mechanism for a period of three years, in order to provide conditional financial assistance to countries which find themselves in financing difficulties as a result of exceptional events that are beyond their control, and to do so for a total of €500 billion. A sum of €60 billion, which is intended for all EU Member States, could be financed by loans from the EC. Moreover, a Special Purpose Vehicle guaranteed by the Member States of the euro area could contribute up to €440 billion to the financing of assistance for countries in the euro area. The IMF would take part in the support operations and would help to work out the granting conditions. At the same meeting, the Council stated expressly that plans for budgetary consolidation and structural reforms will be accelerated, where warranted. In this connection, the governments of Spain and Portugal announced new budgetary measures.

Once the ECB's Governing Council had adapted the rules regarding guarantees for loans by the Eurosystem, it approved a series of measures on 10 May 2010 to calm the severe tensions on certain markets. Specifically, the ECB decided to undertake interventions on the markets for government and corporate bonds in the euro area, in order to remove the dysfunctional aspects of those markets. It also began once again to provide three-month and six-month funds at a fixed interest rate and for an unlimited amount, as well as funds in US dollars. In the euro area, the aim of monetary policy is still price stability: decisions about the course of monetary policy will be taken on the basis of an evaluation of both the risk of inflation (amongst other things, it is necessary to prevent an incorrect perception of the monetary financing of the public sector giving birth to inflationary expectations) and also the risk of deflation (with regard to which proper allowance is being made for the effect of budgetary consolidation on demand and therefore on prices).

Lastly, the intention is to learn the necessary lessons from the crisis in order to improve management of the euro area, especially with reference to budgetary policy and monitoring. The EC announced a series of proposals on 12 May 2010. In the meantime, a Working Group on Economic Governance, set up by the European Council, has also begun its work. This group has to submit its conclusions to the European Council in October 2010.

## Box – Proposals of the Working Group on Economic Governance set up by the European Council

Based on the finding that the current crisis is partly the result of a lack of respect for the rules applicable within the European Union and of the loopholes in economic policy coordination, the EC has addressed a series of proposals to the European institutions so as to strengthen the coordination between those institutions. Thus, the EC considers it necessary, in a statement dated 12 May 2010, to introduce measures to strengthen the operation of the Stability and Growth Pact, to expand the monitoring to macroeconomic imbalances, to set up a “European Semester” that offers an opportunity to coordinate economic policy at the European level at an early stage, and to put into effect the European Stabilisation Mechanism approved by the Council on 9 May.

On the basis of these same considerations, the European Council meeting in March 2010 set up a working group to look at economic governance. This group, under the leadership of the President of the European Council, consists of representatives of all the Member States of the EU – mainly the Ministers of Finance –, a member of the EC, the President of the ECB and the President of the Eurogroup. This working group, which has partly taken its lead from the EC’s proposals, is seeking to achieve four major objectives: it wishes to strengthen budgetary discipline by making the Stability and Growth Pact more efficient, find methods to reduce the differences in competitiveness between the countries, work out a mechanism to resolve financial crises and improve economic management. An interim report was submitted to the European Council on 17 June, which approved part of the proposed initial guidelines.

Thus – with regard to public finances – coordination would have to take place *ex ante* and the national budgeting procedures would have to include the stability or convergence programmes. In this connection, a “European Semester” will be introduced as from 2011, running from the spring to the presentation of the budgets in the national parliaments. The draft national budgets would be submitted to the EC and the other Member States of the EU, which would then provide their comments on the most significant assumptions adopted for compiling these budgets and on the main budgetary aggregates. This timescale would offer an opportunity to make changes at the national level prior to presentation to the respective national parliaments.

In addition, the Stability and Growth Pact would have to be toughened up, which implies a change of course compared to its relaxation in 2005. The tightening of the rules would have to relate both to the preventive and the corrective components of the pact. Sanctions would have to be coherent and would have to follow a progressive system. Amongst other things, the working group has put forward the possibility of implementing sanctions even if the government deficit does not exceed the threshold of 3 p.c. of GDP, for example if there is no response following warnings or if the level of debt rises alarmingly. However, the Council has not yet approved these elements. The EC too, which had already proposed a more automatic application of the rules and more rapid sanctions, still has to submit proposals. It has also already raised the possibility of new sanctions, for instance suspending the payment of some support amounts or grants, or withdrawing certain voting rights.

Moreover, the debt and – more generally – the sustainability of public finances would gain greater importance in the budgetary monitoring practised. This should prompt the Member States to take up a budgetary position that makes better allowance for the ageing of the population and, even in a favourable economic climate, to seek to meet consolidation targets over the medium term. Specifically, the working group is thinking about the possibility of initiating the procedure for excessive deficits more rapidly for countries where the debt does not come down sufficiently rapidly.

Following this same line of reasoning, the European Council believes it necessary to ensure that the Member States draw up appropriate budgeting rules at the national level and define a budgetary framework over the medium term which is in accord with the Stability and Growth Pact. These rules and this budgetary framework would be submitted to the EC and the Council for approval.





Furthermore, the European Council states that it is essential to have reliable and independently collated statistics available, which implies that the national statistical institutions must not be subject to any political influence whatsoever. In this connection, the EC is proposing to expand the checks that Eurostat can carry out.

Apart from these aspects, which in strict terms are associated with budgetary discipline, the Council has also already approved certain lines of thinking which the working group has launched with regard to macroeconomic monitoring. This is primarily a matter of creating a scoreboard with which distortions of balance can be detected, as well as any possible loss of competitiveness or sharp rises in the prices of assets. The working group is proposing that, if there is an alert, recommendations could be formulated in the areas of budgetary income and expenditure, the operation of the markets and macroprudential measures.

Lastly, the working group is also examining the setting up of a permanent crisis management system, which is thought to be very much needed in the euro area. This system would offer an opportunity to provide financial assistance to those Member States in need of help, but then under strict conditions so as to avoid problems of moral hazard which would prompt the states to behave irresponsibly.

The final report of the Working Group on Economic Governance should be presented at the European Council meeting in October 2010.

#### 4.3.3 Consolidation plans and measures in Europe

It was explained above how a coordinated budgetary exit strategy was worked out for the countries in the European Union, in the context of the Stability and Growth Pact. Some countries have already taken steps fairly rapidly for the purpose of guaranteeing sustainable public finances. Thus, Germany incorporated a so-called "debt brake" in its constitution in mid 2009. This "brake" is regarded as an institutional guarantee of budgetary consolidation. Initially, the adoption of specific measures to flesh out the budgetary exit strategy was still mainly limited to the year 2010 in most countries, whilst only a little in the way of concrete action was planned for the subsequent years. However, this all moved into a higher gear as a result of the Greek debt crisis.

Greece needed to take very far-reaching consolidation measures and put profound structural reforms into effect if it wished to be able to lay claim to international emergency financing. Spain and Portugal for their part, as a reaction to the Ecofin Council agreement on 9 May 2010 to accelerate the plans for budgetary consolidation and structural reforms where warranted, tightened up their budgetary objectives for 2010 and 2011 and announced significant supplementary measures. Shortly thereafter, many other countries accelerated their decision-making and published extensive austerity plans.

The following provides an overview of the most significant recent measures in a number of countries.

##### Greece

Greece's adjustment plan implies an effort that has to result in an improvement of at least 10 p.c. of GDP in the structural balance and which is aimed at reducing the budget deficit to 2.6 p.c. of GDP by 2014. The scope of the actual consolidation effort is preferably estimated on the basis of the progress of the structural primary balance. Given that it may reasonably be assumed that interest charges will rise, these objectives embody a budgetary effort which is estimated at 13 p.c. of GDP, and is on top of the significant measures already taken by the Greek government in 2010.

The specific consolidation measures that the Greek government has to take in order to drive down the budget deficit are already described to a large extent in the conditions for the emergency financing. On the revenue side, they involve, amongst other things, the introduction of a uniform, progressive system of taxation for all incomes, including the abrogation of all tax exemptions and separate taxation arrangements. Another item being introduced is stricter taxation of certain professional categories where tax fraud is thought to be rife. A raising of value added tax is also provided for: after the standard rate of VAT had already been pushed up from 19 p.c. to 21 p.c. on 15 March 2010, it is to be raised again to

**CHART 8** GREECE'S GENERAL GOVERNMENT BALANCE TARGETS  
(in p.c. of GDP)



Source: EC.

23 p.c., and in addition the tax base is to be expanded by, amongst other things, taxing certain services that are exempt at present and moving other goods and services from a reduced rate to the standard rate. Furthermore, it has been decided to raise the excise duties on fuel, tobacco and alcohol and to levy a temporary "crisis tax" on particularly profitable enterprises during the period from 2011 to 2013; the gradual introduction of a new tax on CO<sub>2</sub> emissions is also planned.

On the expenditure side, drastic cuts have to be made in pensions and civil servants' pay. Thus, the monthly amounts of the highest pensions are being lowered. In addition, various bonuses and allowances paid to pensioners and civil servants are being scrapped or reduced. Finally, substantial cost savings are also planned for intermediate consumption and investment. All in all, these involve draconian measures. However, social aspects are being incorporated to a limited extent; thus, minimum pensions are being guaranteed.

The structural reforms affect various areas of activity. Thus, Greece needs to take effective measures so as to strengthen budgetary follow-up and the reliability of macroeconomic statistics, and especially the statistical data with regard to public finances. Furthermore, certain labour market reforms are being imposed, both in the public and the private sector. Lastly, the sustainability of the pension system over the medium and long term must be improved, by way of various clearly delineated actions, by September

2010 at the latest. Amongst other things, these involve the introduction of a uniform statutory pension age of 65, a gradual increase in the number of working years required for a full pension, the introduction of a minimum age for taking retirement (60 years of age), the lowering of the present upper limit on pensions, a reduction in pension amounts for pensions taken before the age of 65, the introduction of the automatic linking of the statutory pension age to life expectancy (with effect from 2020) and the introduction of formulas to strengthen the connection between pension amounts and the contributions paid.

### Spain

In Spain, the consolidation of public finances had already been started with the budget for 2010. This contained a number of discretionary measures, amongst other things a raising of VAT rates with effect from July 2010, higher excise duties and the winding down of a large number of temporary stimulus measures, such as a personal income tax credit. Furthermore, an extensive austerity plan for 2011-2013 was announced in January 2010, but the measures had not yet been worked out in detail. At the time, the government also proposed a reform of pensions, which *inter alia* provides for raising the pension age from 65 to 67. The cutbacks announced were speeded up and extended with a package of supplementary measures in May 2010: the target for the budget deficit in 2010, fixed at 9.8 p.c. of GDP in the stability programme, was tightened to 9.3 p.c. of GDP, and in 2011, the deficit needs to come down further to 6 p.c. of GDP, whereas the target in the stability programme was set at 7.5 p.c. of GDP. The measures in the supplementary package related solely to a reduction in government expenditure this time, of slightly over €5 billion this year and €10 billion in 2011. The most striking cutbacks comprise a lowering of the nominal pay of government officials of 5 p.c. on average with effect from mid 2010 and a freeze in 2011, a fall in public investment, a suspension of the index-linking of pensions in 2011 (with the exception of the lowest pensions), the phasing-out of the reduction in personal taxation in the case of childbirth or adoption and other savings within social security as well as cuts in the transfers to regional and local authorities. In the light of these decisions, the government deficit must come to 4.4 p.c. of GDP in 2012 and 3 p.c. of GDP in 2013.

### Portugal

The Portuguese government also announced a new package of measures in May, with the intention of speeding up the consolidation of the budget. The budget for 2010 already envisaged reducing the government deficit, amongst other things by way of a freeze on the pay of

civil servants. With the new plan, the budget deficit target is being tightened to 7.3 p.c. of GDP in 2010, compared with 8.3 p.c. in the stability programme, whilst 4.6 p.c. of GDP needs to be achieved in 2011, as against a target standing at 6.6 p.c. of GDP according to the stability programme. In contrast to the Spanish package of supplementary savings, the new measures in Portugal relate mostly to the revenue side of the budget. The measures include raising VAT rates by 1 percentage point and raising personal and corporate taxation rates. Government expenditure is also being addressed, *inter alia* by way of a reduction in transfers to public enterprises and regional and local authorities, a reduction in government investment and a lowering of operating costs for central government, amongst other things by way of a freeze in hiring.

### Italy

In Italy, in accordance with the stability programme, the government deficit needs to be reduced to 3.9 p.c. of GDP in 2011 and 2.7 p.c. of GDP in 2012, the year in which the excessive government deficit has to be brought to an end. To do this, supplementary measures were needed, on top of the cutbacks already planned in the three-year package for public finances extending from 2009 to 2011. At the end of May 2010, the Italian government announced a budgetary adjustment plan of around € 25 billion – that is 1.5 p.c. of GDP – which has to be implemented in 2011 and 2012. In principle, taxation is not being raised, but the fight against tax fraud is being stepped up. On the expenditure side, the most significant measures include a freeze on government officials' pay, an extension of the freeze in recruitment and cuts in transfers to regional and local authorities.

### Ireland

Ireland, for its part, has already put several budgetary consolidation packages into effect since mid 2008 and has thus succeeded in limiting the deterioration in public finances. The budget for 2010 contained a significant package of measures, amounting to € 4 billion or 2.5 p.c. of GDP. It is primarily government expenditure that is being cut back, among other things by way of a cut in public sector wages, savings on social benefit payments and lower public investment. Furthermore, the stability programme provides for considerable consolidation measures in order to drive down the government deficit from 11.6 p.c. of GDP in 2010 to 2.9 p.c. of GDP in 2014.

### France

France has taken significant steps in the course of 2010 to restore its public finances. In accordance with

the stability programme, the budget deficit has to be reduced considerably, to 6 p.c. of GDP in 2011, 4.6 p.c. of GDP in 2012 and 3 p.c. of GDP in 2013. At the end of January 2010, the French President convened a national conference on the government deficit, at which various working groups were tasked with formulating proposals. At the beginning of May, a start was made on preparing the three-year budget for 2011-2013. This needs to build on the three-year plan for government expenditure for 2009-2011, in which, as a basic rule, growth in central government expenditure is limited to inflation (zero growth by volume). The three-year budget for 2011-2013 must continue to be based on controlling government expenditure. Expenditure by central government, with the exception of interest charges on the public debt and pension expenditure, is to be frozen in nominal terms until 2013. To this end, the policy of not replacing one out of every two government officials taking retirement must be continued. The current operating expenses of the Ministries have to shrink by 10 p.c. over three years, with a fall of 5 p.c. with effect from 2011. A comparable effort will be demanded from the public-sector operators (universities, museums, etc.). All so-called intervention expenditure – which comprises a set of grants and subsidies – will be re-examined. Although taxes are not being raised in principle, the exemptions, allowances and reductions in the area of taxes and social contributions will be reduced. In May, the President convened the national conference on the government deficit for the second time this year. It was decided that, so as to be able to realise the objectives arising from the stability programme, the pace of growth in expenditure must be slowed down with effect from 2011 in the three government sectors, namely central government, local government and social security. As far as expenditure by central government is concerned, reference is made to the proposals in the framework note for the three-year plan for 2011-2013. The expenditure of local government must be brought under control and the financial transfers from central government to these governments will be frozen in nominal terms with effect from the planning period 2011-2013. For expenditure with regard to health care, the nominal growth target is being gradually slowed down further from 3 p.c. in 2010 to 2.9 p.c. in 2011 and 2.8 p.c. in 2012. The President has also called for a reform of pensions and a revision of the constitution, whereby a compulsory path for the structural public balance would be imposed on every government for its term of office as well as a date for reaching a balanced budget. In mid 2010, the government also proposed a reform of pensions as a result of which, amongst other things, the legal pension age would be gradually raised from 60 to 62 in 2018.

## Germany

At the beginning of June 2010, the German government laid the foundations for converting the budget consolidation planned with effect from 2011 into concrete measures. As mentioned above, Germany had already taken a significant step in mid 2009, which was unique in the European Union, so as to safeguard the sustainability of public finances over the long term, specifically by incorporating the 'debt brake' into its constitution. This new budgeting rule will apply from 2011 onwards and means that, with effect from 2016, the federal government's structural deficit may no longer exceed 0.35 p.c. of GDP, whilst the budgets of the *Länder* must be in structural balance with effect from 2020. A stability council on which the federal government and the *Länder* are represented will monitor the public finances in order to identify and correct potential departures from the set course at an early stage.

The budget operation proposed by the government at the beginning of June 2010 embraces a financial plan with an impact increasing from €11 billion in 2011 to €28 billion, some 1 p.c. of GDP, in 2014. It should enable the objectives of the stability programme and the obligation in the constitution to be respected. According to the stability programme, the government deficit has to be reduced to 4.5 p.c. of GDP in 2011, 3.5 p.c. of GDP in 2012 and 3 p.c. of GDP in 2013. In the measures proposed, investment in education and research is being expressly spared and the extra resources that had been set aside for it remain in place. Income tax and VAT are not being raised. What is being introduced is a tax on electricity generators, which are allowed to keep their nuclear power stations in operation longer; and financial transactions are to be subject to a levy with effect from 2012 which, however, is to be implemented in the wider European context. Furthermore, certain energy tax advantages are being limited and an air traffic charge is included for passengers departing from German airports. However, the most significant cutbacks have to be realised on the government expenditure side, such as on social expenditure. Thus, amongst other things, support to the long-term unemployed is being reduced. The Federal Labour Agency will allocate unemployment benefit payments in a more targeted manner so that their automatic nature disappears. The parent's benefit is being reduced for certain income categories and scrapped for the long-term unemployed. Furthermore, additional cutbacks have to be made in public administration; thus, the number of federal officials has to be permanently reduced by more than 10,000 by 2014. An examination must also be carried out as to how the armed forces can be reduced by 40,000 troops.

## The Netherlands

Like Germany, the Netherlands paved the way at any early point to start restoring public finances to health. Thus, the supplementary policy agreement of March 2009, which still included a considerable extra package of measures so as to stimulate the economy and prevent the consequences of the crisis spreading, already incorporated an engagement about restoring sound public finances and their sustainability over the long term. It was agreed that, in the event of a sufficient economic recovery in 2011, a start would be made on consolidating public finances. This agreement also formulated a proposal to raise the age for the basic pension (AOW) from 65 to 67. In September 2009, the so-called "Fundamental Budget Review" (*brede heroverwegingen*) was announced on the occasion of the presentation of the budget for 2010, the intention being, in the light of the considerable deterioration in public finances, to prepare fundamental choices with regard to community services. The reports on the Fundamental Budget Review were submitted to the lower house of the Dutch parliament on 1 April 2010. They itemise policy variants of cutback measures for 20 areas of policy, where at least one variant in each case leads to a cost saving of 20 p.c. Whereas the stability programme for the Netherlands expects a government deficit of 4.5 p.c. of GDP for 2012, the Netherlands Bureau for Economic Policy Analysis establishes in the medium-term outlook dated March 2010 that, in the light of the ageing of the population in the Netherlands, a budgetary surplus of 1.5 p.c. of GDP is required in 2015 so as to make public finances sustainable. To do this, a structural improvement is needed in the budget balance amounting to a total of approximately 5 p.c. of GDP. The Fundamental Budget Review can be used by the new government as a basis for making substantiated choices.

## United Kingdom

In the United Kingdom, the new government announced a five-year plan at the end of June 2010 with the purpose of strongly stepping up the efforts to consolidate public finances. The intention is to bring down the government deficit – which is estimated at 12 p.c. of GDP in 2010 by the EC, and which is projected to fall to 4.6 p.c. of GDP in the fiscal year 2014-2015 in accordance with the convergence programme submitted in January 2010 – at a faster pace to 1.2 p.c. of GDP in 2015-2016<sup>(1)</sup>. To do this, the recovery plan provides for supplementary measures

(1) The objective of 1.2 p.c. of GDP relates to the so-called "Treaty deficit". With regard to the "public sector net borrowing" concept of the budget used by the British authorities, the intention is to limit the deficit to 1.1 p.c. of GDP in 2015-2016.

that gradually increase from £ 8 billion – about 0.6 p.c. of GDP – in the fiscal year 2010-2011 to £ 40 billion in 2014-2015. The emphasis is primarily on cutbacks in expenditure, the importance of which increases to around 80 p.c. of the measures. These involve, amongst other things, steadily growing savings in social welfare benefits, to £ 11 billion in 2014-2015, and the freezing of public sector pay for two years, except for those earning the least. The raising of taxes includes, amongst other things, raising the standard rate of VAT from 17.5 p.c. to 20 p.c. with effect from January 2011, raising the tax on capital gains for tax-payers in the highest brackets and a levy based on banks' balance sheets with effect from January 2011. At the same time, a number of measures are being taken in support of the economy, for instance a gradual reduction in company taxation from 28 p.c. to 24 p.c. over four years with effect from April 2011 and the raising of personal income tax allowances.

### Belgium

Belgium recorded a deficit of 6 p.c. of GDP in 2009, which is less unfavourable than the European average. According to the last update to its stability programme, Belgium is committing itself to the rapid delivery of an effort to return to the threshold of 3 p.c. as early as 2012. On the one hand, this programme provides for raising revenues by 2.1 percentage points of GDP between 2009 and 2012, without higher taxes on employment, with the exception of the abolition of the tax reduction in the Flemish Region (*jobkorting*). On the other hand, expenditure is set to be driven down by 0.9 percentage points of GDP between 2009 and 2012, primarily in the year 2012. With regard to the years after that, Belgium is committing itself in this programme to post a balanced budget again in 2015, by reducing its deficit by one percentage point of GDP per year between 2012 and 2015.

If policy remains unchanged, the Federal Planning Bureau anticipates that the government deficit would stabilise at about 5 p.c. of GDP. To honour its obligations, Belgium must thus still take significant measures in the context of the budgets for the following years.

## Conclusions

In the aftermath of the financial and economic crisis, budget deficits in most of the advanced economies have risen sharply, with the result that their public debt has increased rapidly. The current state of public finances

in these countries can be regarded as a cause for concern.

To restore the sustainability of public finances, extensive restructuring efforts are therefore required in a wide range of countries. Although a rapid and significant consolidation effort implemented simultaneously by a large group of countries could act as a brake on the economic recovery to some extent, a postponement of consolidation efforts, on the other hand, could shake the confidence of economic agents, give rise to financing risks and trigger a sharp rise in interest rates. The problems that Greece had to contend with are a pertinent illustration of this.

To remove doubts about the creditworthiness of countries, it is therefore advisable not to delay the announcement of concrete and credible consolidation plans, even if the measures will only be implemented in the years to come. The timing and scope of consolidation efforts are dependent on country-specific circumstances. Countries that are confronted with high or rapidly rising interest rates and possibly also financing risks naturally need to put the consolidation measures into effect immediately, whilst the adjustment can proceed more gradually in other countries.

The scope of the consolidation efforts needed in most countries means that no limitations can be imposed with regard to the composition of consolidation plans. However, preference needs to be given to structural measures that reduce non-growth-promoting government expenditure or can dampen the increase in ageing-related expenditure. In spite of the already heavy burden of compulsory taxation in many countries, extra government revenues cannot be ruled out.

Most countries have now begun preparing budgetary exit strategies. In this regard, budgetary objectives that will herald a return to healthy public finances have been announced. In some countries, concrete consolidation measures have already been worked out in the meantime. After Greece had to contend with problems financing its public debt, it has agreed to an extensive consolidation package in the context of emergency financing by the other countries in the euro area and the IMF. In the subsequent period, many countries have elaborated concrete consolidation plans. In other countries, on the other hand, plans of this type have yet to be detailed. However, firm government action is urgently required for this latter group of countries too, all the more so since postponing the necessary consolidation efforts would entail major risks.

## Bibliography

- Bundesministerium der Finanzen (2009a), "Schuldenbremse im Gesetzgebungsverfahren", *Wirtschaft und Verwaltung*, 5 Mai (www.bundesfinanzministerium.de).
- Bundesministerium der Finanzen (2009b), "Historische Entscheidung: Schuldenbremse kommt", *Wirtschaft und Verwaltung*, 29 Mai (www.bundesfinanzministerium.de).
- Bundesministerium der Finanzen (2010), "Nachhaltig Sparen – Gerecht Sparen: Das Zukunftspaket der Bundesregierung", *Wirtschaft und Verwaltung*, 9 Juni (www.bundesfinanzministerium.de).
- Cecchetti S.G., M.S. Mohanty en F. Zampolli (2010), *The future of public debt: prospects and implications*, BIS Working Papers 300.
- Council of the European Union (2009), *Council conclusions on fiscal exit strategies, 2967th Economic and Financial Affairs*, Luxembourg, October 20.
- Council of the European Union (2010a), *Council opinion on the updated stability programme of Belgium, 2009-2012*, Official Journal of the European Union, C143/01, June 2 .
- Council of the European Union (2010b), *Council opinion on the updated stability programme of France, 2009-2013*, Official Journal of the European Union, C140/02, May 29.
- Council of the European Union (2010c), *Council opinion on the updated stability programme of Germany, 2009-2013*, Official Journal of the European Union, C140/03, May 29.
- Council of the European Union (2010d), *Council opinion on the updated stability programme of Greece, 2010-2013*, February 16.
- Council of the European Union (2010e), *Council opinion on the updated stability programme of Ireland, 2009-2014*, Official Journal of the European Union, C142/02, June 1.
- Council of the European Union (2010f), *Council opinion on the updated stability programme of Italy, 2009-2012*, Official Journal of the European Union, C142/03, June 1.
- Council of the European Union (2010g), *Council opinion on the updated stability programme of Portugal, 2009-2013*, Official Journal of the European Union, C144/02, June 3.
- Council of the European Union (2010h), *Council opinion on the updated stability programme of Spain, 2009-2013*, Official Journal of the European Union, C146/01, June 4.
- Council of the European Union (2010i), *Council opinion on the updated stability programme of the Netherlands, 2009-2012*, Official Journal of the European Union, C146/03, June 4 .
- Council of the European Union (2010j), *Council opinion on the updated convergence programme of the United Kingdom, 2009/2010-2014/2015*, Official Journal of the European Union, C146/04, June 4.
- De Tijd (2010), *Italië treedt toe tot groeiende Europese besparingsclub*, 26 mei.
- Dury D., G. Langenus, K. Van Cauter en L. Van Meensel (2009), "The economic recovery plans", NBB, *Economic Review*, September, 59-73.
- EC (2006), "The long-term sustainability of public finances in the European Union", *European Economy* 4/2006.

EC (2009a), "Sustainability report 2009", *European Economy*, 9/2009.

EC (2009b), "European economic forecast, Autumn 2009", *European Economy*, 10/2009.

EC (2010a), *Recommendation for a Council opinion on the updated stability programme of Belgium, 2009-2012*.

EC (2010b), *Overview of the stability and convergence programmes*, unpublished note for the attention of the Economic and Financial Committee.

EC (2010c), "European economic forecast, Spring 2010", *European Economy*, 2/2010.

EC (2010d), *Assessment of the action taken by Belgium, the Czech Republic, Germany, Ireland, Spain, France, Italy, the Netherlands, Austria, Portugal, Slovenia and Slovakia in response to the Council recommendations of 2 December 2009 with a view to bringing an end to the situation of excessive government deficit*, Communication from the Commission to the Council, COM (2010) 329, June 15.

EC (2010e), *Public finances in EMU 2010*, *European Economy* 4/2010.

EC (2010f), *Stability and convergence programmes (or updates): 2009-2010* ([ec.europa.eu/economy\\_finance/sgp/convergence/programmes/2009-10\\_en.htm](http://ec.europa.eu/economy_finance/sgp/convergence/programmes/2009-10_en.htm)).

ECB (2010), *Annual Report 2009*.

Elysée, Presidency of the Republic (2010), *Relevé de conclusions de la 2ième conférence sur le déficit*, May 20.

Eurostat (2010), *Provision of deficit and debt data for 2009 – first notification*, *Eurostat news release*, April 22.

Government of Spain (2010a), *Parliament ratifies the extraordinary measures to reduce the public deficit*, May 27 ([www.la-moncloa.es](http://www.la-moncloa.es)).

Government of Spain (2010b), *The Government approves measures to reduce the public deficit*, May 20 ([www.la-moncloa.es](http://www.la-moncloa.es)).

G20 (2010), *The G-20 Toronto Summit declaration*, June 26-27 ([www.g20.org/pub\\_communiques.aspx](http://www.g20.org/pub_communiques.aspx)).

HM Treasury (2010a), *Convergence programme for the United Kingdom*, January.

HM Treasury (2010b), *Budget 2010*, June.

IMF (2009), *The state of public finances cross-country fiscal monitor*, SPN/09/25, November.

IMF (2010), *Navigating the fiscal challenges ahead*, *Fiscal Monitor*, May 14.

Ministry of Finance (2009), *Aanvullend beleidsakkoord maart 2009*, March ([www.minfin.nl](http://www.minfin.nl)).

Ministry of Finance (2010), *Rapporten Brede Heroverwegingen opgeleverd*, April ([www.minfin.nl](http://www.minfin.nl)).

Ministry of Finance of the People's Republic of China (2010), *Report on the implementation of the central and local budgets for 2009 and the draft central and local budgets for 2010*, Third Session of the Eleventh National People's Congress, March 5.

National Bank of Belgium (2010), "Economic projections for Belgium – Spring 2010", *Economic Review*, June, 7-25.

OECD (2009), *Economic Outlook 86*, Volume 2009/2, November.

OECD (2010), *Economic Outlook 87*, Volume 2010/1, Preliminary version, May.

Office of Management and Budget (2010), *Fiscal Year 2011*, Budget of the US Government.

Prime Minister of Japan and his Cabinet (2010), *Fiscal management strategy (Executive Summary) – For the security and hope of the people*, June 22.

Republic of France (2010a), *Le budget pluriannuel de l'état (2009-2011)*, Le Forum de la performance, June ([www.performance-publique.gouv.fr](http://www.performance-publique.gouv.fr)).

Republic of France (2010b), Prime Minister, Press Release, May 6.

van Riet A. (ed.) (2010), *Euro area fiscal policies and the crisis*, ECB, Occasional Paper 109.



# Energy markets and the macroeconomy

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## Introduction

Energy plays a crucial role in economic life, particularly in the functioning of advanced economies such as the euro area or Belgium. It is involved in every aspect of the daily life of households, in the movement of persons and goods, and as an input in the various production activities. Thus, energy is a substantial element of household consumption expenditure and business production costs.

In recent times, energy prices have been particularly volatile. In particular, having hovered around 20 US dollars per barrel in the 1990s, the price of crude oil has risen steadily since 2004, peaking at almost 150 dollars in mid 2008 before dropping to just under 35 dollars at the end of 2008. Since then, the price per barrel has climbed back, reaching 75 dollars on 16 August 2010 when this article went to press. The expected growth of global demand for energy, generated in particular by the development of the emerging economies, and the increasing scarcity of certain resources are factors which could cause a structural increase in prices in the future, possibly tempered by the expanding use of renewable energy and the downward trend in energy intensity in the industrialised countries. Prices could remain highly volatile, since, apart from the possible influence of financial factors, they are also influenced by the dynamism of demand, the intensity of investment permitting the exploitation of new oil reserves, and the development of new technologies. Economic policies are increasingly taking account of the issue of climate change: measures taken in that connection influence consumption patterns and the setting of energy prices.

Taking account of all these factors, it is vital to know what determines the movement in energy prices and how

shocks affecting global oil prices – which play a major role – ultimately feed into activity and prices. That information is necessary, among other things, to determine monetary policy. That is why the ECB focused on this subject in the Structural Issues Report 2010 which it produced with the Eurosystem NCBs (cf. ECB, 2010). Based largely on the findings of that report, this article highlights the specifically Belgian aspects. The first section describes the main long-term trends in Belgium in regard to production, imports, consumption, energy dependency and energy intensity. The second section analyses the setting of prices on the end product markets and the functioning of those markets. The third section offers a theoretical review of the main mechanisms by which oil prices are transmitted to activity and inflation, and then presents an illustration using simulations based on econometric models. The final section presents the conclusions.

## 1. Long-term trends in energy production and consumption

### Energy production, imports, gross consumption and energy dependency

Energy market equilibrium is the outcome of the interaction between primary energy production, net imports and gross consumption. Primary production is the output resulting from the use of domestic natural resources. Up to 1975, coal was the only source of primary production of energy in Belgium. The gradual abandonment of coal mining led to a steady decline in primary production: from 13.9 million tonnes of oil equivalent (TOE)

<sup>(1)</sup> The authors wish to thank K. Burggraeve, D. Cornille, F. Coppens and C. Swartenbroeckx for their contribution to this article.

in 1960, it dropped to 6 million in 1974, and ceased altogether in the late 1990s. The nuclear industry began to develop in the second half of the 1970s, and reversed the downward trend in primary production of energy. According to statistical convention, the production of nuclear energy is classed as domestic even though the uranium is imported<sup>(1)</sup>. The nuclear industry developed particularly rapidly in the 1980s following the start-up of four additional nuclear power stations; since 1997, production of nuclear energy has remained steady at around 12 million TOE per annum. Development of renewable energy started in the early 1990s, though very hesitantly at first. The growth of the renewable sector over the past twenty years is attributable primarily to the development of solid biomass (wood, biogas and waste). In 2008, it represented 95 p.c. of primary production of energy from renewable sources (or 2 million TOE), the rest being a small and stable amount of hydroelectric power, plus the production of solar energy and wind power- this latter has expanded fairly rapidly since 2004. Taking account of Belgium's characteristics – limited amount of sunshine, high population density, etc. – it is biomass – and more marginally wind power – that offer the main potential for growth in terms of renewable energy.

The development of nuclear and renewable energy has only partially compensated for the lack of oil and natural gas and the gradual closure of the coal mines. Consequently, Belgium has still had to resort to imports to meet its consumption needs. From 1960 to the present day, the pattern of imports has closely matched that of gross energy consumption. This refers to gross consumption, measured at the level of the extraction and production of the various primary energy sources, i.e. before their transformation into final forms of energy (notably electricity and refined oil products).

During the 1960s and for much of the following decade, gross energy consumption increased rapidly in Belgium: from 23.1 million TOE in 1960, it more than doubled in the space of twenty years to reach 49 million TOE in 1979. Net imports grew faster, given the need to compensate for the gradual reduction in the mining of domestic coal deposits; having represented 8.2 million TOE in 1960, net imports exceeded 45 million TOE in 1979. Following the 1973 and 1979 oil shocks, however, the growth of energy consumption slowed down, and even became negative in Belgium, measures having been implemented to limit it and thus reduce the country's energy dependency, mainly its dependency on oil. From 1983 onwards, gross energy consumption began rising again until the early 2000s, and imports mirrored that rise. A peak was reached in 2003-2004, at 59.1 million TOE for gross consumption and 54.1 million TOE for net imports. Since then, energy

consumption and imports have stabilised or even declined slightly, mainly as a result of a fall in energy intensity, as illustrated later in this article.

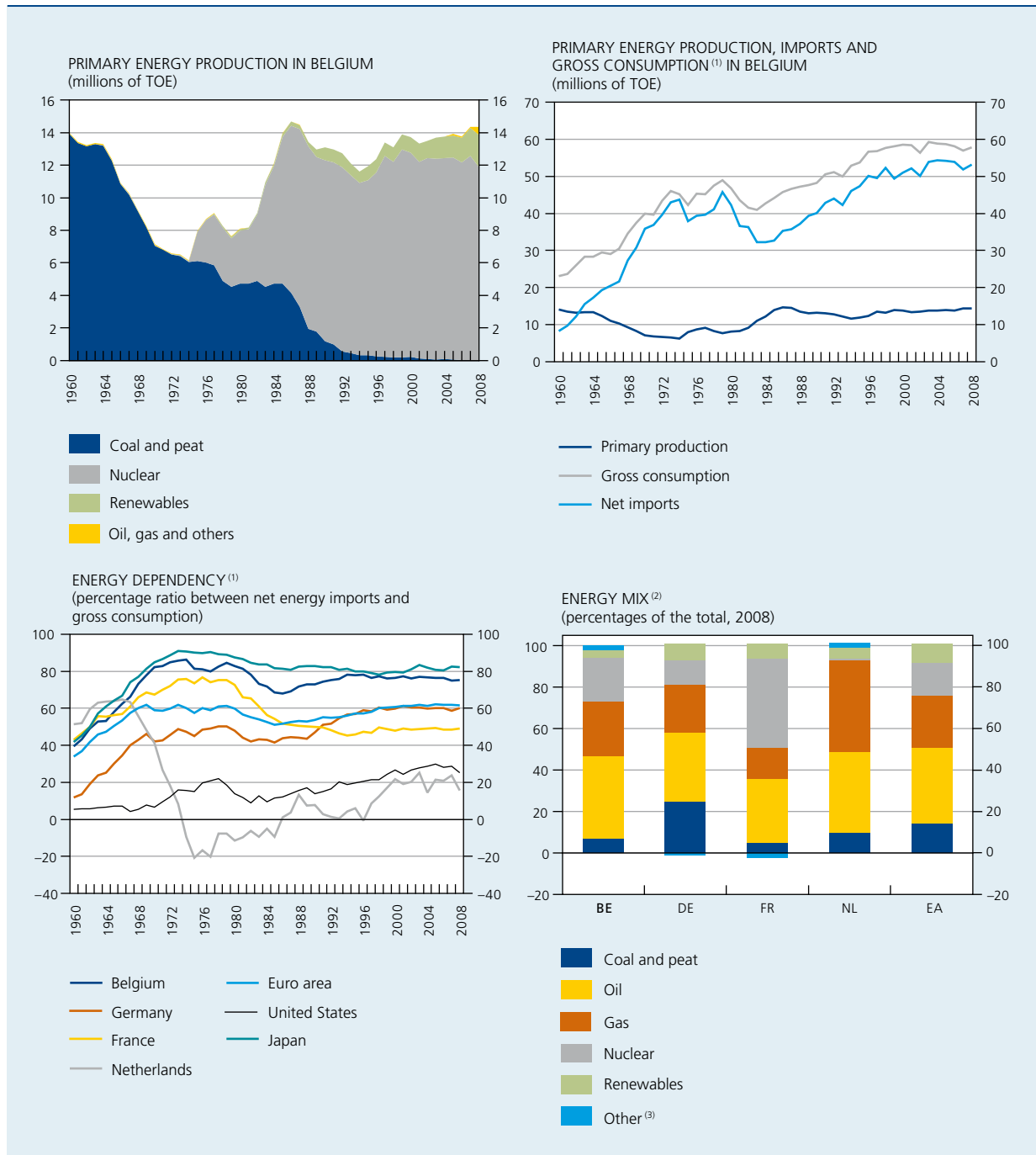
The ratio between net imports and gross consumption of energy provides a measure of energy dependency, which reflects the lack of domestic production capacity to satisfy energy needs. However, account must be taken of the fact that the import statistics include the quantities of petroleum products stored in international marine and aviation bunkers: those quantities do not constitute domestic consumption, but they may be significant, particularly in countries with a high level of port activity, such as Belgium. In 2008 these quantities were estimated at around 9.1 million TOE in Belgium. Leaving that aside, Belgium's energy dependency stood at 75 p.c. in 2008.

Following a steep increase in the 1960s (from 39 p.c. in 1960 to 82 p.c. in 1970), Belgium's energy dependency stabilised and then actually declined until the first half of the 1980s (it was 68 p.c. in 1985). Energy dependency increased again up to the early 1990s, before stabilising at around 75 p.c. In comparison with the euro area, the rise in the dependency ratio was greater in Belgium between 1965 and 1975 since coal production declined faster there, whereas in some euro area countries – especially the Netherlands – gas production expanded. Conversely, in the first half of the 1980s, Belgium recorded a bigger decline in its energy dependency than the euro area, owing to the steeper fall in its energy consumption and a faster rise in domestic production, particularly nuclear energy. During the past twenty years, the energy dependency of Belgium and of the euro area have developed in parallel.

In the end, Belgium is still considerably more dependent than the euro area as a whole, and than neighbouring countries: in 2008, energy dependency was 49 p.c. in France, 60 p.c. in Germany and 25 p.c. in the Netherlands, and 62 p.c. for the euro area as a whole. Energy dependency is influenced by the presence of fossil natural resources and by the direction of the energy mix<sup>(2)</sup>. It is affected by multiple criteria (economic and environmental criteria and those concerning security of supply, etc.). In particular, the decision to develop nuclear or renewable energy has a favourable influence on the dependency ratio, as these two energy sources are produced locally.

(1) Compilation of an energy balance requires conversion of the primary energy sources into their energy equivalent, which pre-supposes knowledge of the calorific value of the various sources. For nuclear, geothermal and solar energy, the primary energy form taken into account for conversion is the heat produced. For other forms of renewable energy – hydroelectric, wind power, tidal energy, wave power, the energy of ocean currents and photovoltaic energy – the conversion is based on the electricity produced. Energy balances are generally expressed in tonnes of oil equivalent (TOE).

(2) Breakdown of gross energy consumption into primary sources.

**CHART 1** PRIMARY ENERGY PRODUCTION, IMPORTS, GROSS CONSUMPTION AND ENERGY DEPENDENCY


Source: IEA.

(1) The contents of international marine and aviation bunkers are included in the net energy imports but not in the gross consumption figures. The energy dependency illustrated here is calculated after deduction of these bunkers from the net imports; it corresponds to the complement of the energy self-sufficiency rate published by the IEA.

(2) Breakdown of gross energy consumption into primary sources.

(3) The category "Other" consists mainly of net imports of electricity.

Thus, Belgium's high energy dependency is due primarily to the absence of fossil natural resources. The development of renewable energy is still fairly small in scale due both to a limited potential and a relatively late public support, but nuclear energy makes a significant contribution.

Against a backdrop of falling coal production and the sharp rise in oil prices in the 1970s, the Belgian authorities opted for a policy of developing nuclear power so as to reduce Belgium's energy dependency. In comparison with the euro area, Belgium's energy mix has a much higher

proportion of nuclear energy (21 p.c. against 16 p.c. for the euro area), but a smaller proportion of renewable energy (4 p.c. in Belgium compared to 9 p.c. for the euro area). The importance of nuclear energy in Belgium is reflected in its share of electricity production (in 2007, around 55 p.c. of electricity was generated by nuclear fuel in Belgium against 30 p.c. in the euro area). Despite the importance of nuclear energy, the ranking of primary energy sources in Belgium – oil is in first place (40 p.c.), followed by natural gas (26 p.c.), nuclear power (21 p.c.), solid fossil fuels (7 p.c.), and renewable energy (4 p.c.) – tallies with that in the euro area, where the figures are 37, 25, 16, 14 and 9 p.c. respectively. In the euro area, some of the fossil resources are of domestic origin.

The low energy dependency of the Netherlands is due to the existence of substantial gas reserves in the North Sea. This energy source therefore accounts for a very large share (44 p.c.) of the country's gross energy consumption. In France's case, it is mainly the decision to make maximum use of nuclear power that accounts for the low energy dependency, as that country has hardly any remaining fossil resources. Nuclear power represents 43 p.c. of gross consumption there, while gas accounts for a particularly small share (15 p.c.). Germany, which has an energy dependency close to the euro area average, is still mining coal and brown coal deposits, and to a lesser extent extracting oil and gas; that country has invested heavily in renewables, not least to compensate for the CO<sub>2</sub> emissions from the use of coal and brown coal, but not so much in nuclear power. In the euro area, some countries are even more dependent on imports than Belgium: that applies to Luxembourg (98 p.c. energy dependency), Ireland (90 p.c.), Italy (84 p.c.), Portugal (82 p.c.) and Spain (80 p.c.). The euro area has a much higher energy dependency than the United States (25 p.c.), a country rich in fossil fuels, but much lower than Japan (82 p.c.).

### Final energy consumption and energy intensity

While gross consumption reflects the primary energy sources exploited in the economy and hence its sensitivity to movements in the prices of energy commodities, final consumption illustrates the consumption patterns of the users, i.e. essentially businesses and households. Final energy consumption is obtained after the primary energy sources (nuclear, gas, solid fuel and oil) have been transformed into usable forms of energy (electricity and refined oil products in particular). Transformation activities – by firms in the energy sector, or by industrial firms themselves in the case of in-house production – and transportation generate losses, connected mainly with the efficiency of electricity generating stations<sup>(1)</sup>. That explains

the lower figure, expressed in TOE, for final consumption (39.6 million TOE in 2007, including for non-energy use), compared to gross consumption (57 million TOE in 2007).

In Belgium, final consumption of energy is divided mainly into petroleum products (50 p.c. in 2007), natural gas (27 p.c.) and electricity (18 p.c.). The principal long-term trends are the growing importance of natural gas and electricity, at the expense of solid fossil fuels (coal). That decline is attributable chiefly to the steel industry, particularly on account of the decline in furnace output. The percentage of petroleum products, which had risen sharply up to the end of the 1970s, has remained fairly stable since then.

The energy product consumption profile varies from one sector to another. Thus, in Belgium, petroleum products account for a significantly larger share of the energy basket of households<sup>(2)</sup> than of industry, owing to household consumption of heating oil. Firms consume proportionately more electricity and solid fuels than households, in relation to other forms of energy. In transport, final consumption consists almost exclusively of petroleum products.

Overall, the product breakdown of final consumption in Belgium is very similar to that in the euro area. Conversely, there are differences in the consumption profile of the main sectors. Thus, Belgian households tend to consume proportionately more petroleum products (32 p.c.) than their counterparts in the euro area (20 p.c.). On the other hand, they make less use of renewable energy to meet their consumption needs (3 p.c. in Belgium compared to 12 p.c. in the euro area). The Belgian industrial sector consumes relatively more gas (43 p.c.) but less petroleum products (8 p.c.) than European industry, where gas and petroleum products account for 33 and 15 p.c. respectively. The structure of the gas transport network is likely to be part of the reason for these differences, as Belgium has an international supply centre in Zeebrugge.

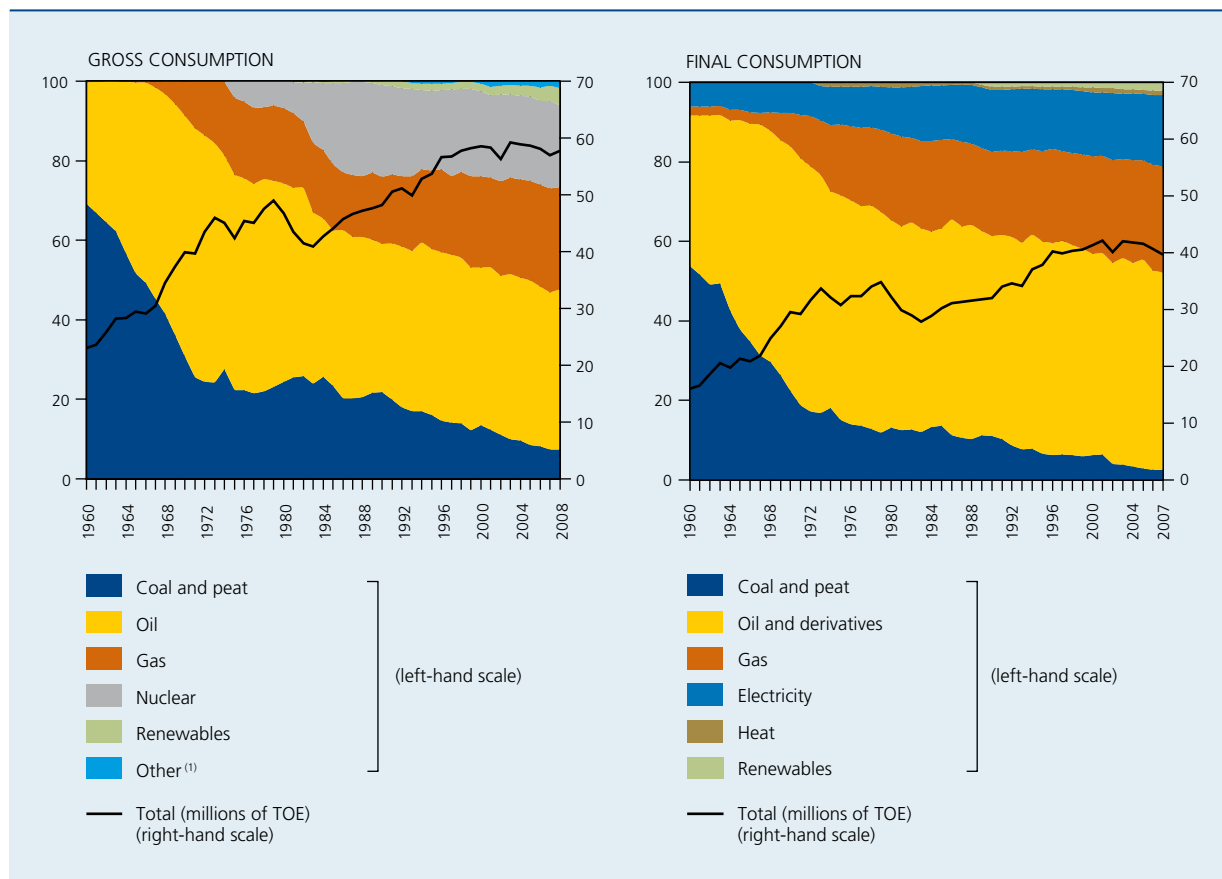
Looking at the breakdown of final consumption by sector, the principal energy consuming sector is industry, which in 2007 represented 36 p.c. of final consumption in Belgium. Next come transport, be it for private or commercial purposes, (28 p.c.), household consumption (excluding transport) (23 p.c.), services (11 p.c.) and agriculture (2 p.c.). From 1990 to 2007, the various sectors in Belgium displayed a divergent final consumption pattern: industry and households reduced their energy

(1) Transformation losses also occur when oil is refined to produce final petroleum products (fuel), but they are smaller in scale than those arising in electricity production.

(2) The final energy consumption of households includes that relating to heating, lighting, and electrical appliances, but not energy relating to private transport (which is included in the final consumption of transport activities).

**CHART 2** GROSS AND FINAL ENERGY CONSUMPTION IN BELGIUM

(percentages of the total, unless otherwise stated)



Source: IEA.

(1) The category "Other" consists mainly of net imports of electricity.

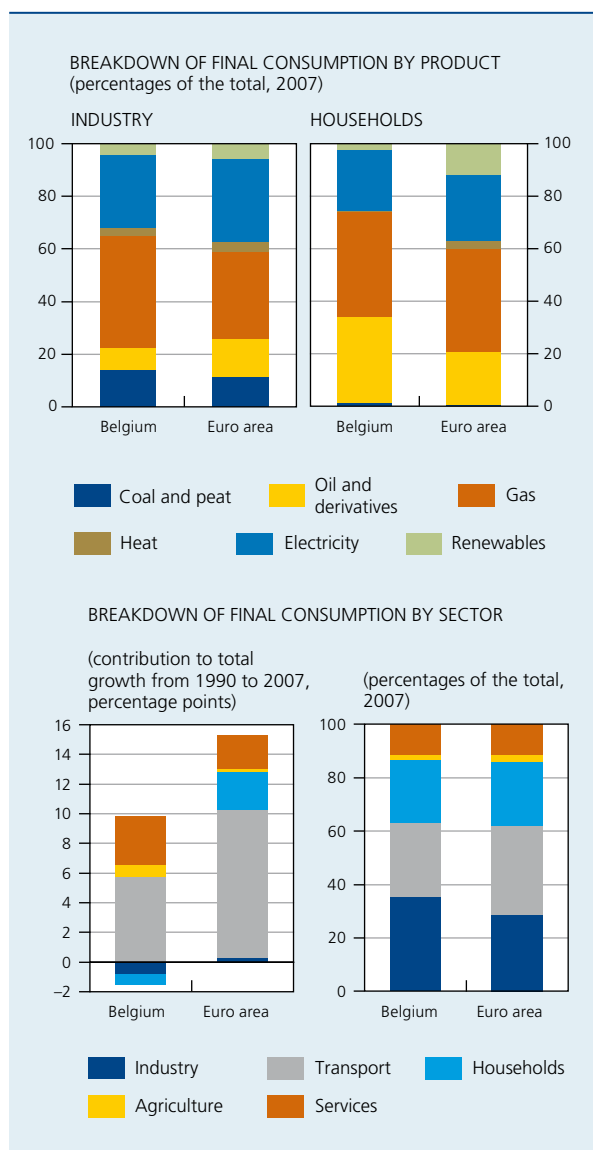
consumption slightly (by 2 and 3 p.c. respectively), while there were large increases in the other sectors: 24 p.c. in transport, 37 p.c. in the service branches, and 50 p.c. in agriculture. In view of the initial weight of each sector in final consumption, it was transport and services that made the biggest contribution to the rise in total final consumption over the period, whereas the contribution of industry and households was negative.

In the euro area, all sectors made a positive contribution to the growth of total final consumption from 1990 to 2007. As in Belgium, the biggest contribution came from transport, but in contrast to Belgian households, those in the euro area made a positive contribution to the increase in energy consumption. The data per country present a very varied picture, with a particularly steep increase in consumption in the southern European countries (especially in Spain, Portugal, Malta and Cyprus), a smaller rise in France and Germany, and a reduction in consumption in the Netherlands and Finland.

In comparison with the euro area, industry represents a considerably larger share of total final consumption in Belgium (36 p.c. against 29 p.c. for the euro area). For proper comparison of national consumption by sector, it is preferable to refer to energy intensity, defined as the ratio between energy consumption and value added<sup>(1)</sup>. This makes it possible to measure the efficiency with which energy resources are used. However, in making comparisons, it is necessary to bear in mind that many factors, such as economic structure, climatic conditions, population density, transport infrastructures and standards of living, influence the final consumption of energy, without giving any indication of efficiency or inefficiency.

(1) The energy intensity calculated on the basis of gross energy consumption is influenced by the methods used in the final production of energy, owing to differences in yields. Thus, if a country makes more use of a production method involving substantial losses, its gross energy intensity is higher. Conversely, the energy intensity calculated on the basis of net energy consumption is unaffected by this factor and is a more appropriate measure of final energy use by firms from the non-energy sectors and households.

**CHART 3** BREAKDOWN OF FINAL ENERGY CONSUMPTION BY PRODUCT AND BY SECTOR IN BELGIUM AND IN THE EURO AREA  
(percentages of the total, 2007)



Source: Eurostat.

Note: The final energy consumption of households includes that relating to heating, lighting and electrical appliances, but not energy relating to private transport (which is included in the final consumption of transport activities).

First, it is evident that in most of the major developed economies overall energy intensity – defined here as the ratio between gross energy consumption and GDP – increased in the 1960s and the early 1970s before adopting a downward trend. Starting from a higher level, energy intensity fell more steeply in the United States than in the euro area. In Japan, where it is particularly low, it has remained stable since the mid 1980s. In Belgium, it increased only slightly in the 1960s and in recent decades has followed a downward trend similar to that of the euro area. In the end, however, Belgium's energy intensity

(0.21 TOE per thousand dollars) is well above the average for the euro area and for neighbouring countries (where energy intensity ranges between 0.16 and 0.18 TOE per thousand dollars).

The downward trend in energy intensity in the main industrialised economies is due partly to sectoral shifts – particularly the declining importance of industry in value added, and the corresponding increase in the importance of services, which consume less energy, with the exception of transport. Also, firms have been encouraged to switch to technologies permitting more efficient use of energy, as the rising cost of energy inputs increasingly drove up their production costs. That cost increase was due partly to successive oil shocks, but also to the increasing incorporation in energy costs of externalities relating to climate change and environmental issues.

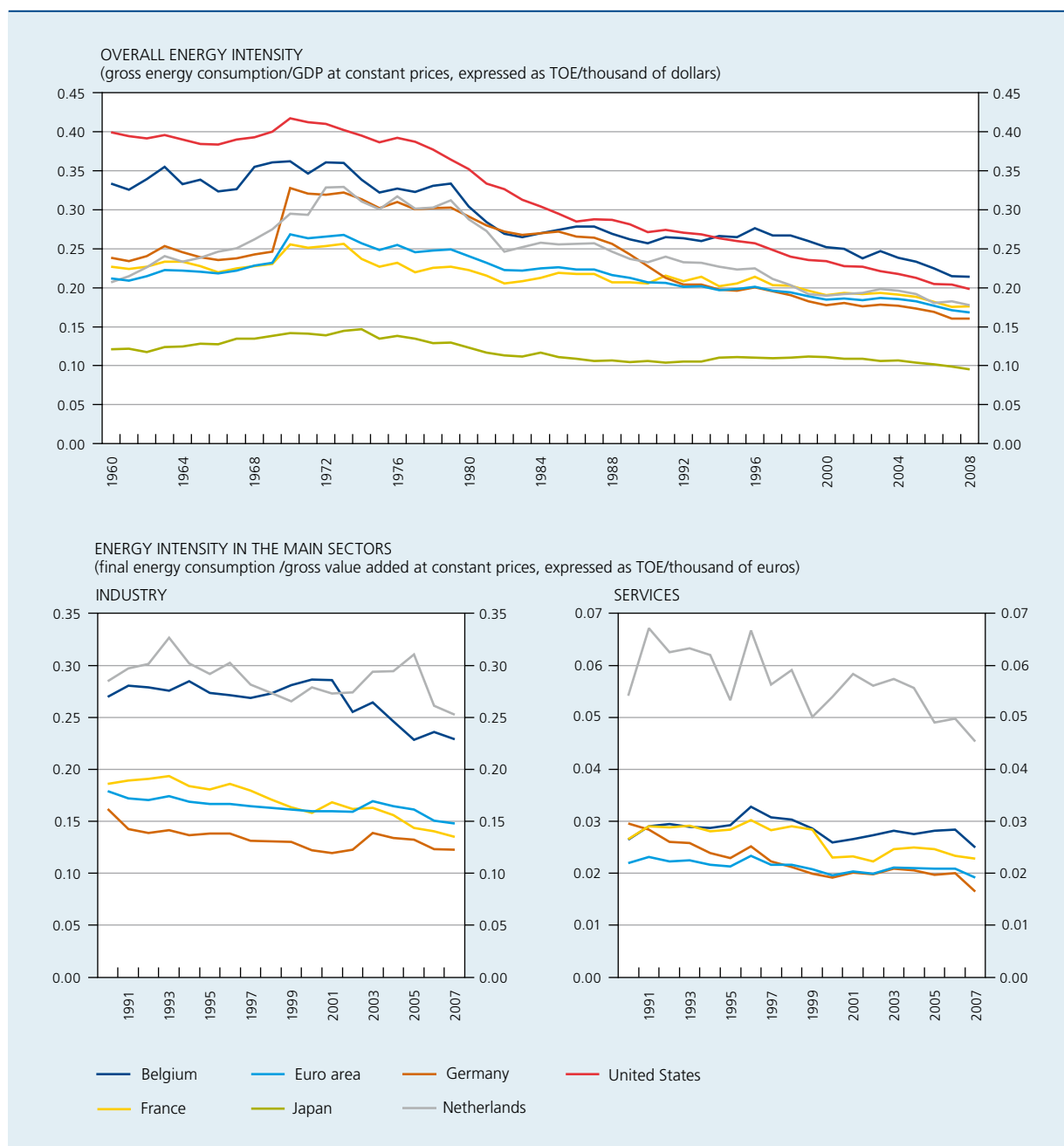
Energy intensity has fallen in both services and industry<sup>(1)</sup> but the decline was more marked in the latter sector. In Belgium, energy intensity fell by 15 p.c. in industry and 5 p.c. in services between 1990 and 2007. In the euro area, the decrease amounted to 17 p.c. in industry and 13 p.c. in services. The energy intensity of Belgian industry is still significantly higher than that of the euro area and that of France and Germany, and is close to that of the Netherlands. Conversely, the energy intensity in services is very close to the euro area average.

The difference in the energy intensity of industry between Belgium and neighbouring countries may be due to intrinsic effects, namely a higher energy intensity in certain branches of activity, structural effects resulting from the over-representation of branches of activity which are particularly energy intensive, or a combination of the two.

To demonstrate the intrinsic effects, it is necessary to have energy intensity figures at the most detailed level possible, whereas the international statistics are generally published at relatively aggregate level. According to those data, energy intensity is higher in Belgium than in each of the three neighbouring countries in the branches of non-metallic minerals, iron and steel, metallurgy and non-ferrous metals, and textiles and leather. The Belgian chemical sector also has a high energy intensity, in line with that in the Netherlands. In contrast, Germany has a low energy intensity in all areas of its industry, and has an average energy intensity which is about half that of Belgium. French industry also seems to have a fairly low energy intensity.

(1) In contrast, in agriculture (not included in the chart), energy intensity remained more or less unchanged between 1990 and 2007. Energy intensity cannot be calculated in the same way in transport, as the energy consumption figures do not distinguish between commercial and private transport, while value added relates only to commercial transport.

CHART 4 ENERGY INTENSITY



Sources: EUROSTAT, EU KLEMS, IEA.

Note: Industry comprises manufacturing industry and the extraction of energy and non-energy products. Services exclude transport but include construction.

Structural effects are said to be unfavourable if the country tends to specialise in a branch of activity which consumes more energy than the industrial average. The branches which traditionally consume the most energy are iron and steel, metallurgy and non-ferrous metalworking, non-metallic minerals, chemicals and petrochemicals. Belgium – like the Netherlands – suffers from an unfavourable structural effect in relation to Germany and France since those branches represent a larger percentage (38 p.c.) of

value added. Those branches represent 28 p.c. of industrial value added in Germany and 25 p.c. in France.

It should be noted that the distinction between intrinsic and structural effects is not clear-cut, since the classes of activity for which data are available are not entirely uniform. They may comprise – to a degree which varies from one country to another – sub-branches which vary in their energy intensity. Thus, petrochemicals and basic

**TABLE 1 ENERGY INTENSITY IN THE MAIN BRANCHES OF INDUSTRY**

(final consumption of energy/gross value added at constant prices, expressed as TOE/thousand of euros, 2007)

	BE	DE	FR	NL
<b>Industry</b> .....	<b>0.23</b>	<b>0.12</b>	<b>0.14</b>	<b>0.25</b>
of which:				
Mining and quarrying .....	0.20	0.08	0.14	0.99
Non-metallic minerals .....	0.60	0.35	0.45	0.40
Iron and steel, metallurgy and non-ferrous metals .....	0.31	0.20	0.19	0.23
Machinery and equipment ..	0.12	0.11	0.07	0.13
Chemicals et petrochemicals	0.40	0.15	0.32	0.53
Transport equipment .....	0.05	0.04	0.06	0.03
Food and tobacco .....	0.18	0.14	0.18	0.37
Paper, paperboard and publishing .....	0.22	0.16	0.16	0.25
Textiles and leather .....	0.17	0.08	0.06	0.05
<i>p.m. Weight in industry of the most energy intensive branches of activity<sup>(1)</sup></i> .....	<i>0.38</i>	<i>0.28</i>	<i>0.25</i>	<i>0.38</i>

Sources: IEA, EU KLEMS.

(1) Iron and steel, metallurgy and non-ferrous metals, non-metallic minerals, chemicals and petrochemicals.

chemicals have an important position in the Belgian chemical industry, as these activities need to be located as close as possible to the place of supply, in this case the port of Antwerp. In general, within the industrial branches of activity, it seems that Belgium specialises in the initial product processing stages, which by their nature consume the most energy.

Information obtained from the input-output tables, the latest version of which dates from 2005, shows that the costs of energy inputs in Belgium represent a proportion of the total production costs of firms (4.9 p.c.) which exceeds the average for the euro area (4.1 p.c.). That figure is 3.5 p.c. in France and 3.3 p.c. in Germany; in contrast, it is 6.3 p.c. in the Netherlands. It should be noted that these weights depend not only on the quantities of energy consumed, but also on the average price of energy products.

The energy consumption of households is above the euro area average, and that is another factor explaining Belgium's higher energy intensity. Thus, over the period from 1999 to 2005, annual consumption of energy for domestic purposes (excluding transport) expressed as TOE per capita was significantly above the average for the euro area and for the neighbouring countries. However, there

was a marked fall in 2006 and 2007, bringing consumption down to Germany's level, though it was still above the figure for France and the Netherlands, and the euro area average.

At first sight, climatic differences do not justify higher consumption in Belgium. Thus, the number of degree-days - the number of degree-days measures the severity of weather conditions over a period of time; it is defined as the number of heating days multiplied by the difference between the outdoor temperature recorded and a desirable indoor temperature - is much the same in Belgium as in the Netherlands and the euro area, and only slightly higher than in France, but considerably less than in Germany.

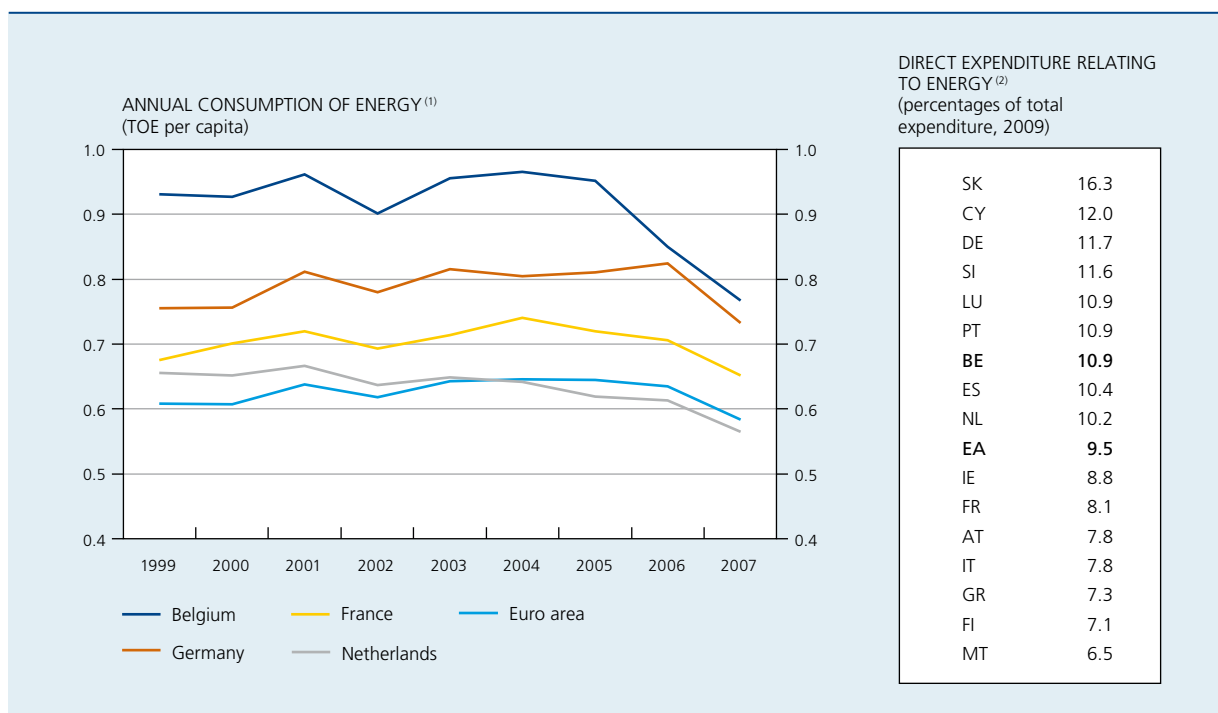
Conversely, the energy efficiency of buildings, which depends on such factors as their age and insulation and the structure of the housing stock (individual homes, blocks of flats), could help to explain the difference in household energy consumption. Thus, according to a recent survey<sup>(1)</sup>, the energy efficiency of residential buildings in Belgium is lagging behind that in neighbouring countries and is below the average for the EU25. In 2005, residential energy consumption averaged 348 kWh/m<sup>2</sup> in Belgium, or 72 p.c. above the EU25 average (the consumption figures were 234 kWh/m<sup>2</sup> in France, 242 kWh/m<sup>2</sup> in Germany and 181 kWh/m<sup>2</sup> in the Netherlands). Other factors, such as the average house size or consumption habits may explain the difference in the average consumption of Belgian households compared to their counterparts in neighbouring countries.

According to the HICP weights for the year 2009, which are considered to reflect the actual weight of each expenditure item in household consumption, the weight of energy-related expenditure - including here that relating to transport - is slightly higher in Belgium (10.9 p.c.) than the average for the euro area (9.6 p.c.). It is also slightly above that of France (8.1 p.c.) and the Netherlands (10.2 p.c.), but slightly below the figure for Germany (11.7 p.c.). A breakdown of the HICP weights into the main products shows that the difference lies mainly in the consumption of gas and electricity, and to a lesser extent heating oil, whereas the weight of expenditure on transport fuel is comparable.

Finally, in addition to that of industry, services and households, the overall energy intensity of the economy also depends on that of transport. Some information is available on road transport, which accounted for around

(1) Cf. Mc Kinsey & Company (2009).



**CHART 5** FINAL CONSUMPTION AND EXPENDITURE ON ENERGY BY HOUSEHOLDS

Sources: IEA, Eurostat.

(1) Consumption relating to heating, lighting and electrical appliances.

(2) Weight of energy products (electricity, gas, heating oil and transport fuel) in the HICP.

83 p.c. of energy consumption in the transport sector in Belgium in 2007. The energy efficiency of the stock of Belgian vehicles is relatively high, with fuel consumption at 5 to 10 p.c. below the European average, due to the high proportion of diesel engines. Conversely, Belgium tops the ranking in terms of kilometres travelled per passenger. The advantageous system of company cars is probably a factor here. In all, fuel consumption per passenger is one of the highest figures in Europe and it is not declining, in contrast to the European trend.

In conclusion, the economy's characteristics in terms of production and supply, consumption mix and energy intensity depend on the interaction of a range of factors relating to physical and geological conditions, the activities developed, and the choices made by the economic agents – businesses, households – possibly in response to incentives created by the government in order to influence them.

As Belgium now has hardly any usable fossil energy resources left, its domestic energy production is characterized by an important share of nuclear power, while renewable forms of energy are proportionately less developed than in the euro area. However, the supply

facilities, via port infrastructures or gas pipelines, have given industry easy access to energy. Industry has a high energy intensity which is also due largely to specialisation in energy intensive branches of activity. Households also contribute to Belgium's high energy intensity.

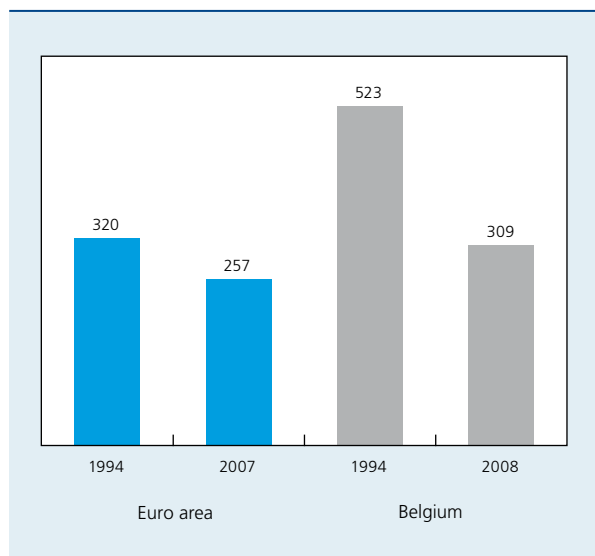
## 2. Functioning of the energy markets and implications for the pricing of energy products

This chapter describes how the energy product markets work and examines the implications for the pricing of these products. It therefore concerns the initial phase of the possible inflationary impact of energy price fluctuations on the international markets, namely their influence on the prices of energy products. The main energy products in the consumption basket are petroleum products – petrol, diesel and heating oil –, natural gas and electricity.

### Petroleum product market

The market in petroleum products features a relatively large number of outlets. Thus, in 2008, Belgium had

**CHART 6** NUMBER OF SERVICE STATIONS PER MILLION INHABITANTS



Source: ECB (2010).

309 service stations per million inhabitants. However, that number displays a marked downward trend. In 1994, there were over 500 service stations per million inhabitants. Moreover, this downward trend has been stronger in Belgium than in the euro area as a whole. Nevertheless, in 2008, the number of outlets in Belgium was still well above the average for the euro area, which at that time totalled around 257 service stations per million inhabitants.

In principle, such a large number of outlets for relatively uniform products should imply keen competition. In practice, only a small number of major distribution chains are active, and they tend to have a high degree of vertical integration. The petroleum product market is therefore relatively highly concentrated. Thus, the market share of the three leading distributors was almost 50 p.c. in 2005 in the euro area. In Belgium, the market concentration thus measured was even greater, at just over 70 p.c. In contrast, it was much lower in France, at around 20 p.c., whereas in Germany it was around the average for the euro area.

Against a backdrop of high market concentration, the decline in the number of service stations may appear to be a problem, but that is not necessarily the case, particularly if it is accompanied by economies of scale and efficiency gains which could ultimately benefit the consumer. Countries with a relatively large number of service stations which therefore have a smaller turnover – as is the case in

Belgium, to some extent – in fact tend to have a relatively high petrol price before tax, whereas countries with larger service stations, such as Germany and France, generally have slightly lower prices.

### Electricity and gas markets

The situation on the electricity and gas markets is significantly different from that on the petroleum product market, as until recently there were monopolies on those markets. But at the instigation of the EU, they were gradually liberalised and deregulated in the late 1990s and during the last decade.

The liberalisation and deregulation of the electricity and gas sectors is a tricky exercise, given that the optimum degree of deregulation – and the resulting degree of competition – is very specific to these sectors. They are in fact highly capital intensive, requiring long-term investments. The financial commitment is therefore substantial, so that – in a context of volatile energy prices – adequate profitability is a precondition for making such investments. Moreover, it is difficult – and even impossible in the case of electricity – to store these products and the transport and distribution networks play a dominant role, leading to the emergence of “natural monopolies”. Thus, vertical integration can yield efficiency gains.

In that context, the EU decided that the transmission and distribution activities would be separated from the others, although cross-shareholdings were still allowed, at least at first. In June 2009, however, the legislation on the subject was tightened up and the various activities will have to be totally unbundled by March 2011. Moreover, businesses and individuals have been free to choose their electricity and gas supplier from 1 July 2004 and 1 July 2007 respectively. The national sectoral regulators and the national competition authorities are also required to monitor pricing on the non-liberalised segments of these sectors, namely transport and distribution, and ensure that there is effective competition.

The United Kingdom was the first country to liberalise the electricity and gas markets, while on the continent, Germany took the lead, followed by Austria, Spain and the Netherlands. In general, the business market was liberalised before the residential consumer market, in accordance with the European legislation on the subject. In Belgium, liberalisation was completed in July 2003 in Flanders and in January 2007 in Brussels and Wallonia. Belgium is therefore in an intermediate position, and liberalised its market somewhat sooner than other countries such as France.

Despite liberalisation, competition on the electricity and gas markets remains limited owing to the generally high degree of market concentration. That is the case in Belgium, a country which has a very significant level of concentration on both the wholesale and the retail market. Moreover, many countries still have some form of price regulation on the residential segment of the electricity and gas markets. That is so in large countries such as France, the Netherlands, Italy and Spain. In Belgium, since the liberalisation of the market, the various suppliers have been free to set their gas and electricity tariffs. Germany has also abolished price regulation.

However, this freedom allowing suppliers on the gas and electricity markets to set their prices does not mean that the Belgian authorities or the sectoral regulator have no influence over certain elements of the consumer price. Thus, the legislation specifies that social tariffs must be applied to certain income groups, and imposes certain public service obligations. Moreover, the Commission for Electricity and Gas Regulation (CREG) supervises the management of the gas and electricity transmission networks, and has power to approve the charges for connection to the transmission networks and the charges for use of those networks. In 2008, its powers were extended. The CREG is also responsible for monitoring competition on the unregulated segment of the electricity and gas markets. Thus, its duties include assessing whether the prices offered by electricity or gas companies are objectively justified by their costs. If the CREG considers that not to be the case, it may forward its findings to the Competition Council.

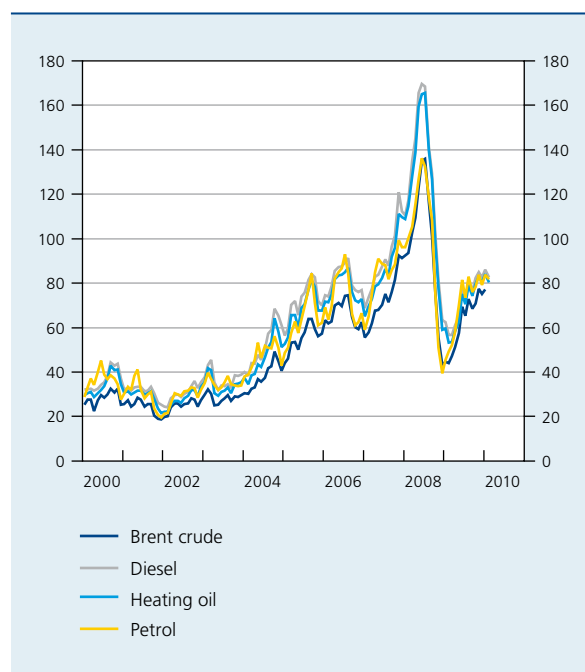
The way in which the energy markets operate naturally has a considerable influence on the pricing of energy products. That pricing is explained in detail below, first for petroleum products and then for natural gas and electricity.

### Pricing of petroleum products

In recent years the price of crude oil has fluctuated widely, and that has had a decisive influence on the movement in consumer prices of petroleum products.

Oil price fluctuations are reflected almost immediately in the prices on the international markets in refined petroleum products. However, that does not prevent what are generally short-lived fluctuations in the refining margins, namely the difference between the price of the refined product on the international market and the price of crude oil. In some cases, there are recurring seasonal effects, such as the rise in the price of heating

**CHART 7** PRICES OF REFINED PETROLEUM PRODUCTS ON THE INTERNATIONAL MARKETS  
(USD per barrel)



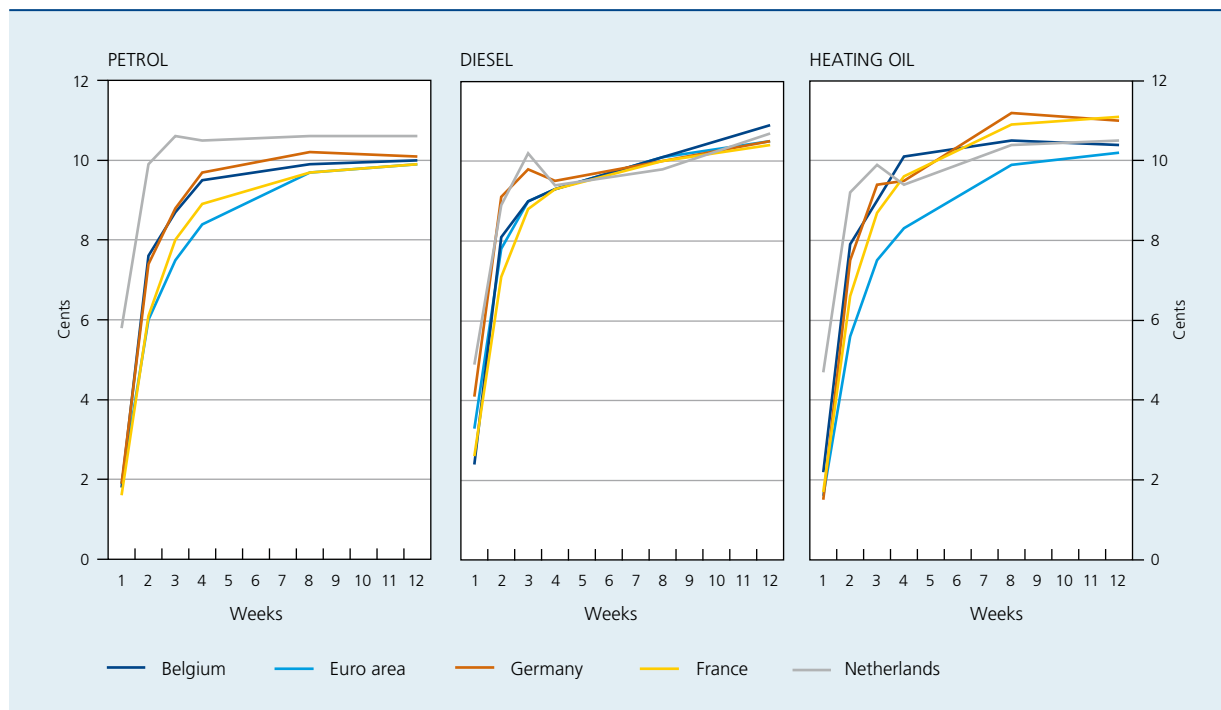
Sources: ECB, Haver Analytics, FPS Economy, SMEs, Self-employed and Energy.

oil in the winter, or an increase in the petrol price during the summer months owing to the “drivers’ season” in the United States. In 2008, the fluctuations in refining margins were very large and persistent, namely upwards for diesel and heating oil and downwards for petrol. The reason is that, owing to the impetus from emerging countries such as China and India, demand not only increased strongly in absolute terms, but there was also a relative shift towards diesel and heating oil, whereas the supply coming from installed refining capacity is highly inelastic. The shifts at the level of relative demand are therefore reflected to a large extent, and certainly in the short term, in the pattern of relative prices of the various refined products.

Changes in consumer prices of petroleum products offer a fairly faithful reflection of the movement in prices of the refined products on the international markets, which are undeniably the main source of price fluctuations. Apart from this volatile component due to imported prices, consumer prices include a gross margin which is relatively constant, incorporating an amount to cover the cost of transporting and distributing the petroleum products, plus excise duty and related charges which vary little on account of their flat-rate structure, and VAT. Excise duty is

## CHART 8 TRANSMISSION OF FLUCTUATIONS IN REFINED PETROLEUM PRODUCT PRICES

(impact of a 10 cent per litre increase in the refining price on the consumer price excluding taxes)



Source: ECB (2010).

the main factor accounting for price differentials between the various petroleum products. It is significantly lower for diesel than for petrol, and practically zero in the case of heating oil.

Econometric analysis<sup>(1)</sup> shows that fluctuations in refined petroleum product prices are very quickly passed on in full in consumer prices. Thus, an increase of 10 cents per litre in the refined petrol price on the international market also triggers a 10 cent increase overall in the consumer price in Belgium. In other words, there is full transmission. Furthermore, that transmission takes place very quickly: it is already practically complete after the third week. The situation is similar in other countries, although transmission is slightly slower in the euro area and faster in the Netherlands. For diesel and heating oil, the analysis produces results similar to those for petrol. For these products, too, transmission in Belgium differs little from that in neighbouring countries, but in the case of the euro area it again seems to be slightly slower for heating oil. The reason could be that in some euro area countries the pricing of petroleum products is still regulated. The fact that transmission in Belgium is similar to that in neighbouring countries shows that the programme contract, which fixes the maximum prices of these products in Belgium, has no significant influence on pricing.

Comparison of the level of consumer prices of petroleum products in Belgium with those in the three neighbouring countries shows that the consumer prices excluding taxes of petrol and, to a lesser extent, diesel are slightly higher in Belgium than in Germany and France, but a little lower than prices in the Netherlands. That is probably attributable both to the fact that petrol stations have a larger turnover and that the market is less concentrated in Germany and France. It therefore seems that there is still some scope, albeit small, for reducing the level of petrol and diesel prices in Belgium by keener competition and economies of scale. That looks much less likely in the case of the pre-tax price of heating oil, which is lower in Belgium than in the three neighbouring countries.

The excise duty on petrol is comparable to that in the three neighbouring countries, so that Belgium's relative position hardly changes in a comparison of the prices including taxes for this product. Conversely, the excise on diesel is significantly lower, so that Belgium has the lowest prices including tax, despite a slightly higher pre-tax price. In the case of heating oil, the pre-tax price advantage is amplified after tax, since the level of excise duty is particularly low.

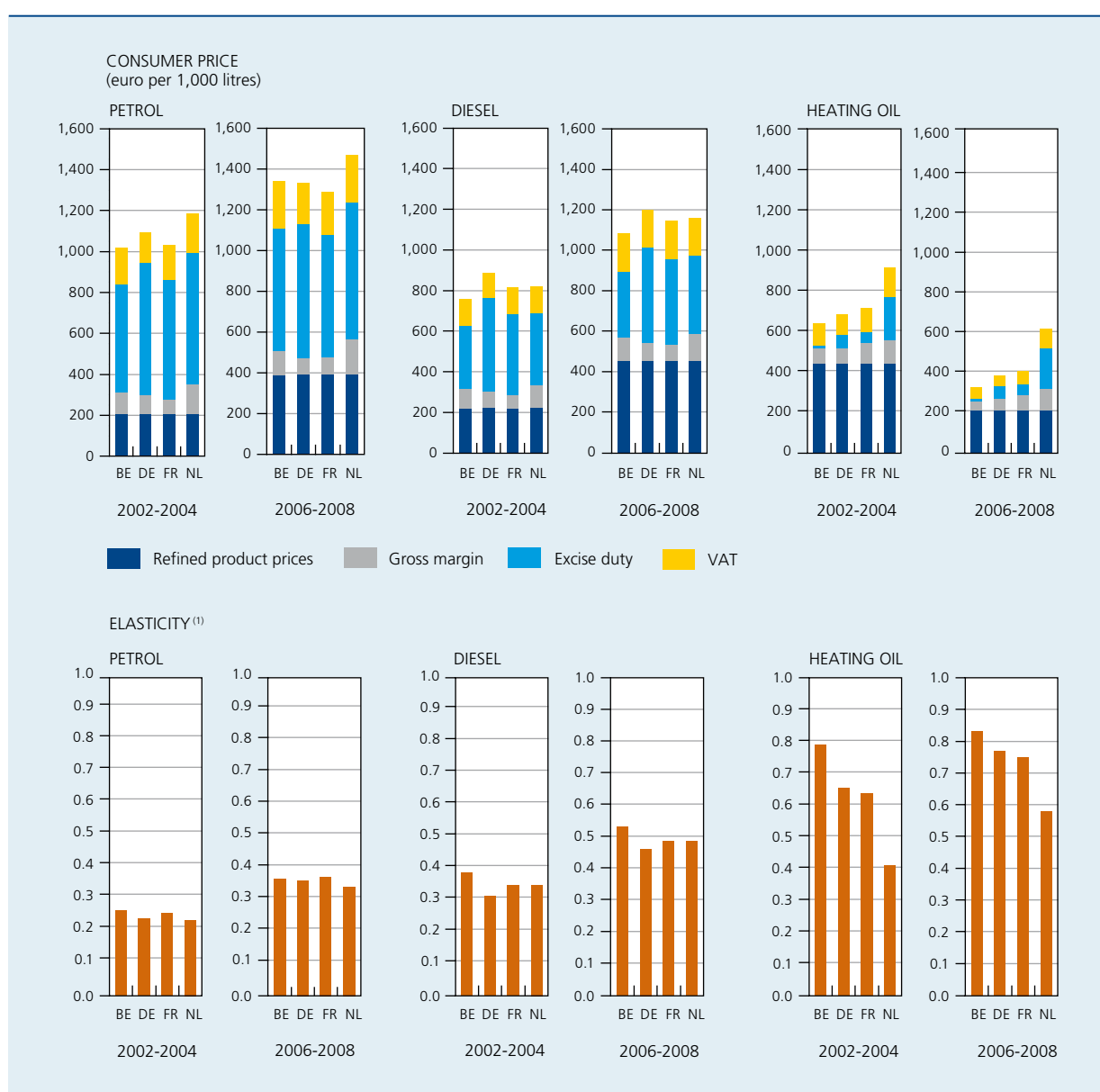
(1) Cf. ECB (2010) for a more detailed presentation of the econometric analysis presented. A more technical account of that analysis is found in Meyler (2009).

Taking account of these structural differences in the respective cost components of consumer prices of petroleum products, the relative weight of refined products in consumer prices also varies, not only between products but also from one country to another. If the gross margin is stable overall and does not fluctuate according to the refined product price, and if the excise duty does not mirror the movement in refined product prices because of its flat-rate structure, the relative weight of refined products also increases as their prices rise. Consequently, the virtually identical transmission to consumer prices of changes in refining prices in absolute terms does not necessarily

result in comparable adjustments to consumer prices expressed in percentage terms. In fact, a percentage change in the price of refined petroleum products will imply a larger percentage change in consumer prices if the weight of refined products in consumer prices is greater, e.g. owing to lower excise duty, a smaller gross margin or a higher price level for the actual refined products.

The elasticity of consumer prices of petroleum products, which measures the relative sensitivity of prices to changes in energy prices on the international markets, is in fact higher for diesel than for petrol, owing to differences in

**CHART 9** STRUCTURE OF CONSUMER PRICES OF PETROLEUM PRODUCTS AND THE IMPLICATIONS FOR THEIR ELASTICITY



Sources: ECB (2010), Haver Analytics, NBB.

(1) The elasticities measure the ratio between the percentage change in the consumer price and the percentage change in the prices of refined products. Thus, for example, an elasticity of 0.3 means that a 10 p.c. rise in the price of refining causes a 3 p.c. rise in the consumer price. These are long-term elasticities.

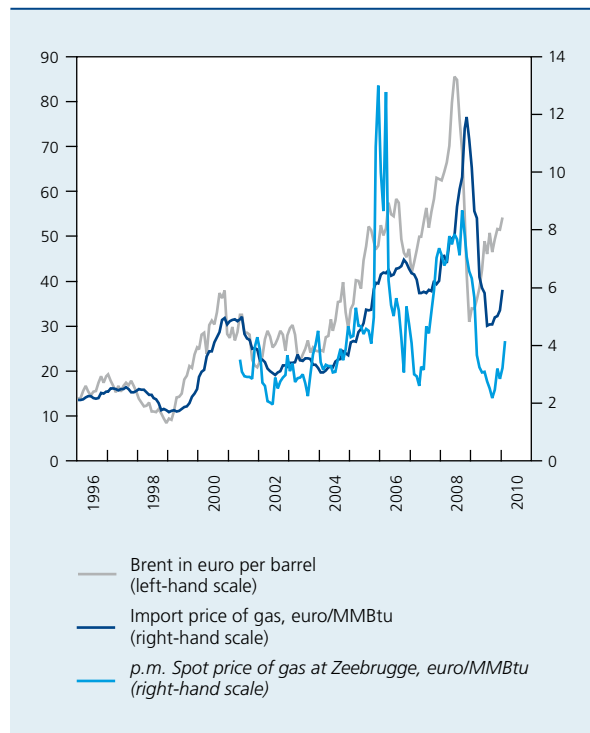
the excise duty and related taxes applicable to these two products. The excise duty on heating oil is much lower than that on diesel, which implies that the former product is even more sensitive to price changes. Moreover, it is evident that the elasticities of petroleum products in general were systematically greater during the period 2006-2008, when oil prices were high, than during 2002-2004 when oil prices were lower. Finally, the elasticity of consumer prices of diesel and heating oil is greater in Belgium than in neighbouring countries, since the level of excise duty on these products and the gross margin for heating oil are lower in Belgium. The relatively low prices of diesel and heating oil after tax may also encourage consumption of these products in Belgium, so that – despite their more moderate price – their weight in the consumption basket is greater than in neighbouring countries. This last factor further augments the already high sensitivity of inflation in Belgium to fluctuations in the prices of energy products on the international markets. Adjusting indirect taxation in Belgium, e.g. by increasing the excise duty on diesel and heating oil, would reduce the sensitivity of inflation to variations in petroleum product prices, because the duty would automatically reduce the elasticity of consumer prices and steer the consumption profile in line with the cost of those products.

### Pricing of natural gas

As in the case of petroleum products, the crude oil price is the main factor determining consumer prices of natural gas. The movement in the crude oil price is in fact a key determinant of import prices of natural gas, even though there is a time lag of several months. It is normal practice for long-term contracts to link the gas price explicitly to the prices of petroleum products. Nonetheless, a wholesale market in gas has gradually been established, where prices are set independently according to specific supply and demand conditions on the gas market. As is evident from the movement in the spot price of gas at Zeebrugge, those prices are more volatile in the short term than the oil price, as natural gas is much harder to store, so that fluctuations in supply and demand have a greater influence on prices. Longer term movements in this specific gas price are more closely linked to changes in petroleum product prices, even though the gas price has recently appeared to diverge from the crude oil price and adopt a downward trend. Many observers explain this as being due to certain excess supply on the gas market, but it remains to be seen whether that will persist.

Changes in the import price of natural gas seem to be the main factor behind the movement in consumer prices of this product. That impression is borne out by econometric

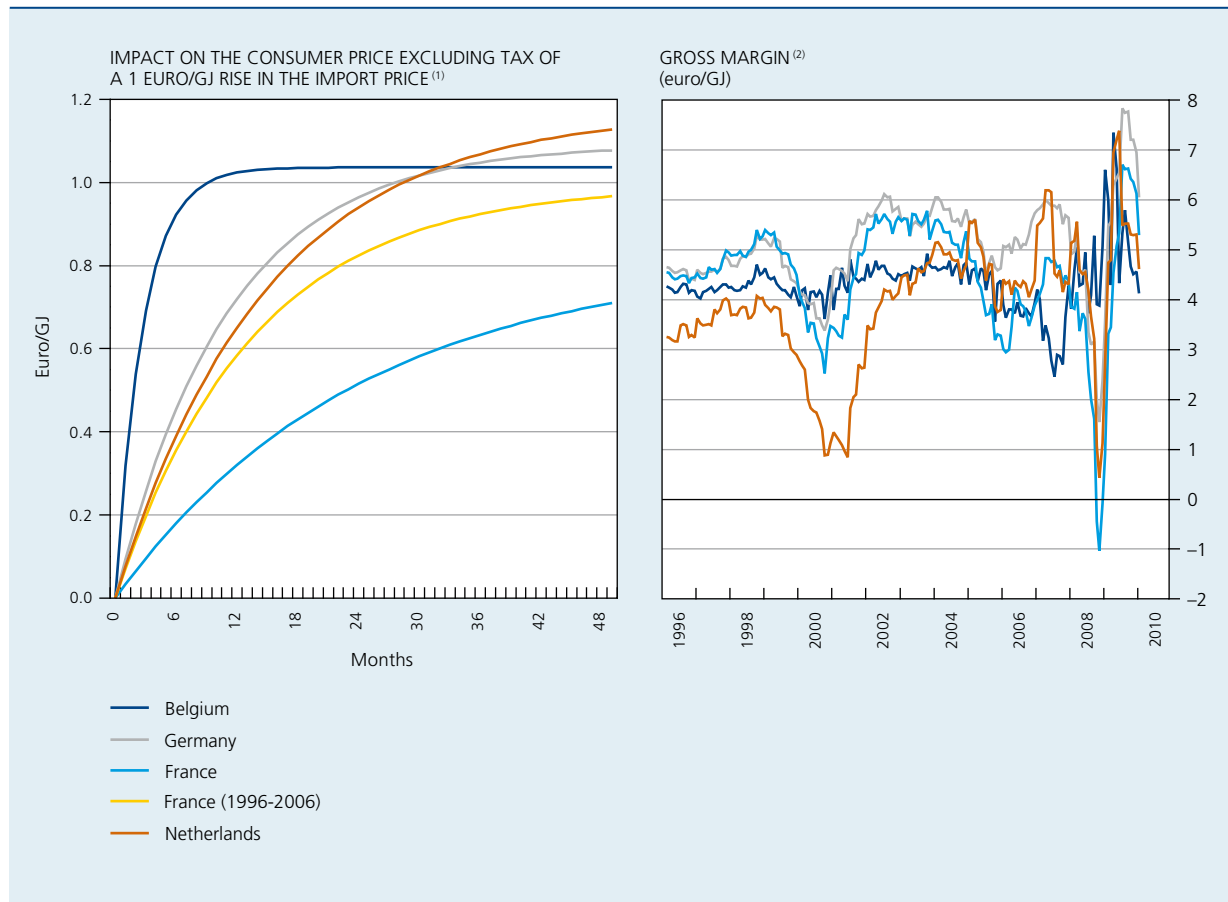
**CHART 10** CRUDE OIL PRICE AND IMPORT PRICE OF NATURAL GAS



Sources: ECB, Haver Analytics, FPS Economy, SMEs, Self-employed and Energy.

analysis in which an error correction model is used to estimate both the long-term ratio between the import price and the consumer price, and the speed of adjustment to that link<sup>(1)</sup>. In Belgium, a one euro per gigajoule increase in the import price of natural gas eventually leads to an increase in the pre-tax consumer price of around one euro per gigajoule. However, the transmission is slower than in the case of petroleum products. Around half of the transmission occurs after two months, and the process is more or less complete after six months. As well as this delayed impact on the consumer, the import price of gas takes around four months to respond to the movement in the crude oil price. Unlike in the case of petroleum products, transmission in Belgium is very different from that in neighbouring countries. In particular, it differs from that in Germany and the Netherlands, not so much by its overall scale – which is slightly greater in the countries mentioned – as by the fact that it is considerably faster. Thus, in Germany and the Netherlands, it

(1) The monthly level of consumer prices in Belgium was obtained as follows: the half-yearly data on price levels obtained from the Eurostat energy data bank for the period 1996-2006 were converted to monthly figures on the basis of the monthly changes in consumer prices of gas recorded in the HICP, with the proviso that for the period prior to 2007, the figures recorded in the HICP were recalculated using the acquisition method. This yielded a homogenous time series for Belgium which is entirely comparable in methodological terms to the recording of prices in neighbouring countries. This series was extrapolated on the basis of the HICP for the period after 2006. For more details on these two data sources and the differences between the payments approach and the acquisition method, see Cornille (2009).

**CHART 11** TRANSMISSION OF FLUCTUATIONS IN THE IMPORT PRICE OF NATURAL GAS


Sources: Haver Analytics, NBB.

(1) Estimated for the period 1996-2010, unless otherwise stated.

(2) Difference between the consumer price excluding tax and the import price.

is more than six months before half of the transmission has taken place, and two years before it is complete. In France, the transmission is even slower and is also very incomplete, especially during the period 1996-2010. The reason is that, during the last few years in particular, the upward influence of the import price of gas in France was only very partially reflected in consumer prices. During 1996-2006, transmission in France corresponded more closely to that in Germany and the Netherlands. There is nothing surprising about the speed of transmission in Belgium since consumer prices of gas, like electricity prices, are adjusted monthly on the basis of tariff-setting formulas, and changes in energy commodity prices are a key factor in that regard. Prices are adjusted far less frequently in neighbouring countries, probably because of the existence of different price regulation mechanisms in France and the Netherlands. In Germany, however, there is no such mechanism. This price regulation may also be the reason why transmission has been so incomplete

in France, especially during the recent upward trend in 2008.

Of course, these differences in the scale and speed of transmission have considerable implications for the movement in the gross margin. In Belgium, the margin remains fairly stable, as one would expect, whereas in the other countries it exhibits marked, and relatively persistent, fluctuations: downwards during the phase of rising import prices – in 2000, 2005 and 2008 –, followed by a recovery, and then upwards when import prices were falling. The particularly limited transmission to consumer prices in France during the latest upward phase actually gave rise to a negative gross margin between late 2008 and early 2009.

In Belgium, the gross margin seems to have increased somewhat recently, and since 2007 has been more volatile than previously. However, that may be because the

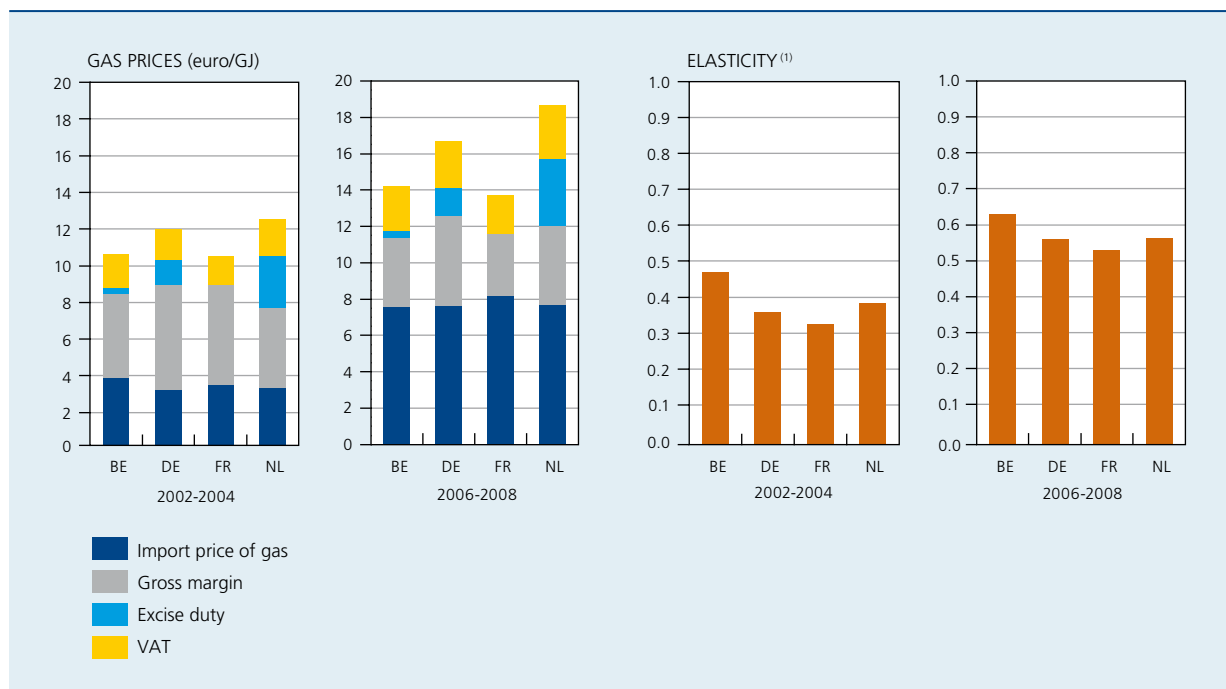
import price used does not reflect the replacement of Belgium's contract with Algeria by a contract with Qatar. The price agreed in the latter contract has not in fact been disclosed. Belgian gas suppliers specifically refer to the conclusion of this new contract as the reason for both the introduction, in January 2007, of the Zeebrugge Hub spot price for gas in the tariff-setting formulas, and the October 2007 increase in the constant used in the energy cost reference index. Since these factors, which have influenced the recorded movement in consumer prices, cannot be taken into account in import prices, it is logical to find a slightly larger and more volatile margin in the recent period. The increase in the network tariffs in 2008 and 2009 may also have made some contribution to the increase in the gross margin in recent years. In the absence of specific data on the import price, the analysis cannot determine to what extent the pricing adjustments made in 2007 – the introduction of the Zeebrugge Hub and the increase in the constant – are justified.

As in the case of petroleum products, the elasticity of consumer prices of natural gas shows a positive correlation with the level of the import price, since the relative weight of this cost factor increases if the import price is higher. That elasticity was therefore also greater for the period 2006-2008 than for 2002-2004. Moreover,

the gross margin is relatively small in Belgium – like in the Netherlands – and the excise duty on natural gas is low, especially in comparison with Germany and the Netherlands, but not compared to France. If these factors are explicitly taken into account, it is Belgium that has the highest elasticity of consumer prices of natural gas. Germany and the Netherlands are in an intermediate position in that regard, while the lowest elasticity is found in France, because of an apparently incomplete transmission.

The elasticities examined here apply in the long term, i.e. after complete transmission. The differences found in this context are attributable largely to factors capable of objective assessment, such as the level of excise duty and the gross margin, and are not due to differences in the overall scale of transmission, except in the case of France. They therefore do not reflect fundamental distortions in pricing in Belgium. It therefore seems that higher volatility of consumer prices of natural gas in Belgium is justifiable but could be corrected, as in the case of diesel and heating oil, by increasing the excise duty on natural gas. The impact of that higher elasticity on recent movements in natural gas prices and inflation may prove relatively significant, in view of the scale of the energy price fluctuations on the international markets in recent years.

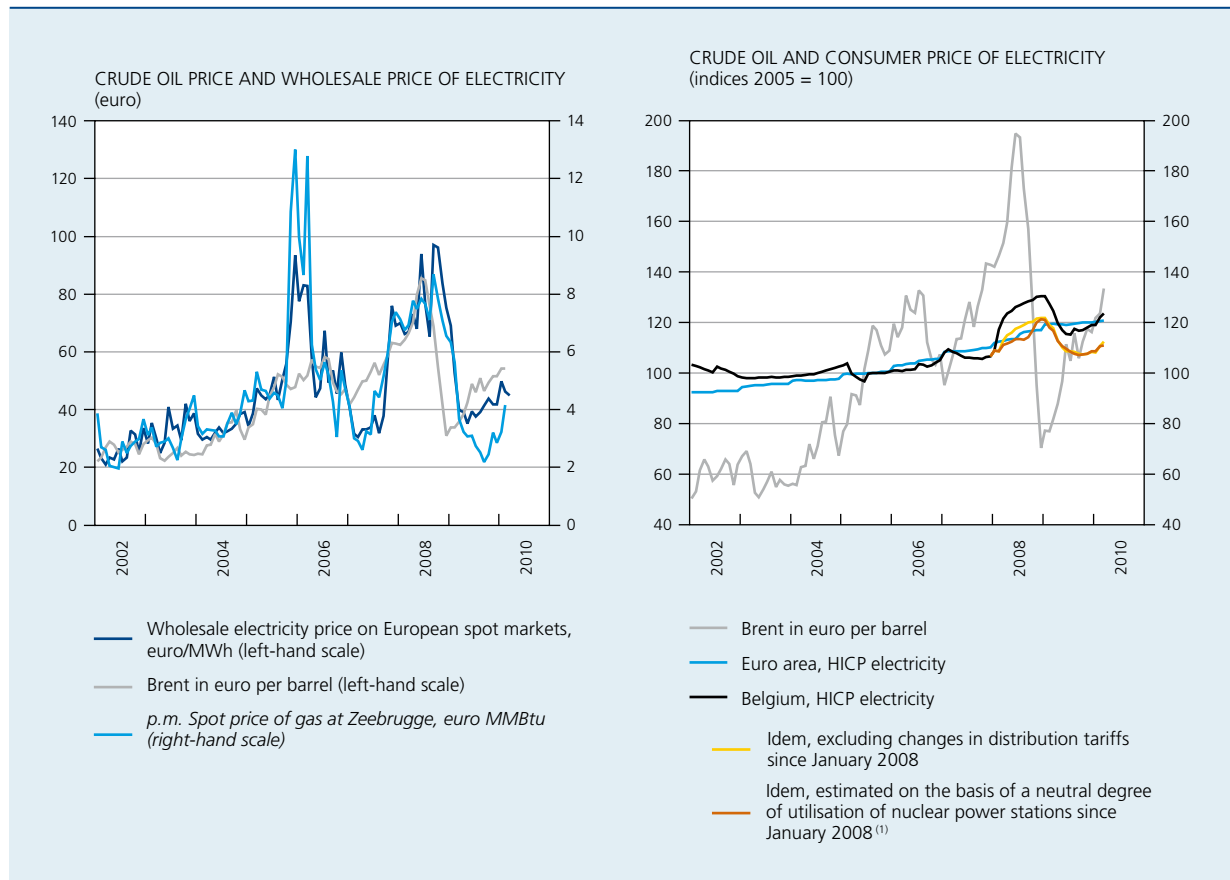
**CHART 12** STRUCTURE OF CONSUMER PRICES OF NATURAL GAS AND IMPLICATIONS FOR THEIR ELASTICITY



Sources: Haver Analytics, NBB.

(1) The elasticities measure the ratio between percentage changes in consumer prices and percentage changes in import prices. Thus, for example, an elasticity of 0.5 means that a 10 p.c. increase in the import price causes a 5 p.c. increase in the consumer price. These are long-term elasticities.



**CHART 13** TRANSMISSION OF FLUCTUATIONS IN COMMODITY PRICES TO THE PRICE OF ELECTRICITY


Sources: ECB (2010), NBB.

(1) In the formula for the tariff indexation parameters the variable which represents the degree of utilisation of nuclear power stations is held at 1 from January 2008.

In addition, prices in Belgium are adjusted considerably faster than in neighbouring countries. In 2008-2009, the speed of transmission undoubtedly played a major role. Thus, the upward phase was passed on almost in full in Belgium, as was the downward phase which followed. In contrast, in the neighbouring countries, the upward phase – which was significantly more gradual – was interrupted since natural gas prices on the international markets have since begun falling again. The principle of passing on changes to the consumer is not in doubt, certainly not in regard to lasting changes, because it is a key signal encouraging consumers to make more rational use of energy. However, it is questionable whether the immediate transmission to the consumer of every change in the international price of natural gas is appropriate. Consumers are probably less able to withstand that volatility than gas suppliers, who are now assured of a relatively stable gross margin.

### Electricity pricing

The wholesale price of electricity displays a strong correlation with the movement in energy commodity prices, such as the price of Brent oil, but particularly the import price of gas. That seems entirely logical, since electricity prices on a competitive market should in theory correspond to the marginal production cost of the marginal electricity generating station, and the latter is often gas-powered.

On the other hand, consumer prices of electricity seem to have a lower correlation with the development in energy commodity prices. That is partly because production costs other than the cost of the energy commodity are considerably higher than in the case of gas and petroleum products. Other factors which weaken this link are the level of network costs, the variety of energy inputs used, and price regulation in certain countries. In future, however, the link could become clearer if the trend towards an increase in the percentage of electricity traded on the stock markets continues, and if – as is beginning to

happen in Belgium – more suppliers offer industrial and even residential consumers tariffs which are indexed to wholesale prices.

In all, the pricing mechanism on the residential segment seems to be based on average costs rather than marginal costs, and that probably reflects to some extent the consumers' preference for less volatile and more predictable prices. Nonetheless, the great complexity of electricity production makes it more difficult to analyse than the production of gas and petroleum products.

In regard to consumer prices of electricity in Belgium, the rise recorded in 2008 – in contrast to what was seen in the euro area – is attributable mainly to an increase in transport and distribution tariffs, combined with an increase in the indexation parameter which reflects the energy cost, principally following the increase in the cost of commodities and a fall in the degree of utilisation of nuclear power stations<sup>(1)</sup>. It is also this indexation parameter that accounts for the fall in electricity prices recorded in Belgium since the beginning of 2009. So, electricity prices are more sensitive to developments in energy commodity prices than in the euro area. These developments are examined in greater depth in the article entitled "The increased volatility of electricity prices for Belgian households: an analysis based on the specific characteristics of pricing by Belgian electricity suppliers", also published in the present review.

### 3. Impact of crude oil price fluctuations on inflation and activity

Taking account of the prominence of energy products in both the production process and consumption patterns, fluctuations in crude oil prices may have a considerable impact on inflation and economic activity. That impact is described below, first from a conceptual angle and then using an econometric simulation.

#### Conceptual framework

From a theoretical point of view, an oil price shock feeds into inflation by various channels, and the effects are not felt simultaneously. A distinction is generally made between direct effects (impact on energy product prices as such) and indirect effects reflecting the pass-through of firms' increased production costs in the prices of non-energy goods and services. The indirect effects vary according to the energy content of those other goods and services: for example, they will be greater in the case of chemicals or transport services, which

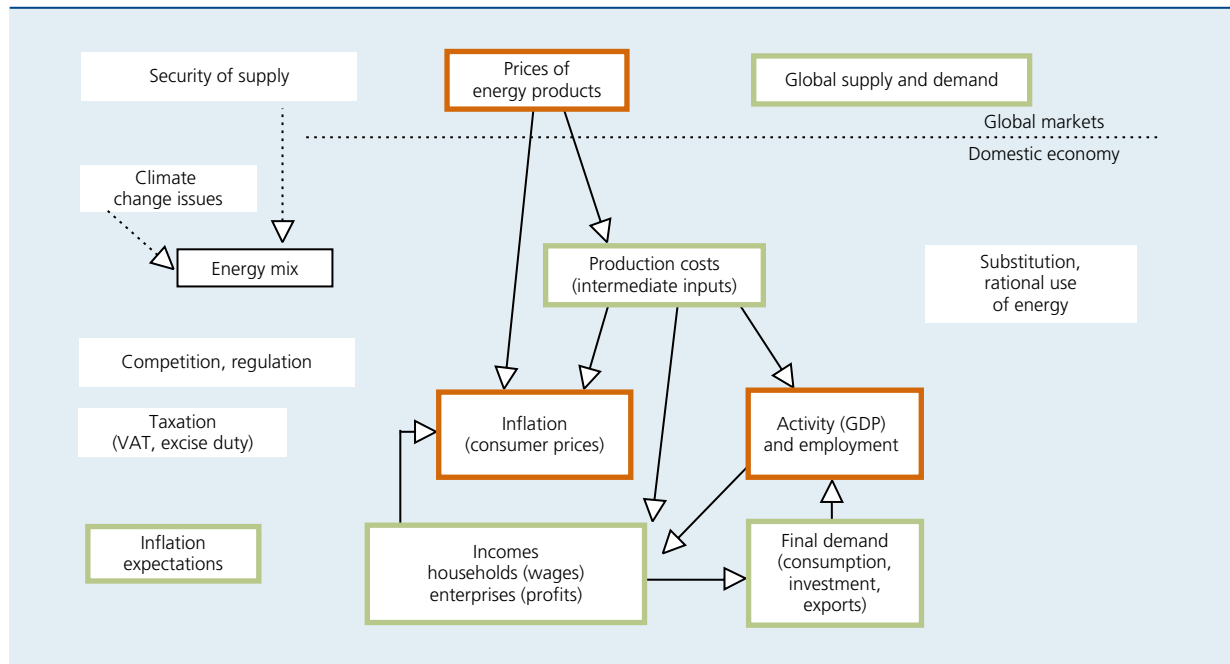
have a substantial energy content, than for other goods or services. These direct and indirect effects are called "first-round" effects because they raise the prices of these goods without affecting the underlying dynamics of inflation as a whole. Conversely, the "second-round" effects which generally do not appear immediately, are seen when the economic agents adapt their behaviour in terms of pricing and wage-setting to safeguard their profits or wages in real terms. In so doing, they amplify the initial increase in inflation. That effect is more marked if inflation expectations are revised upwards; it is therefore essential for monetary policy to have a credible medium-term price stability objective.

A shock affecting oil prices may have numerous consequences in terms of economic activity, depending in particular on the way in which the initial shock is passed on in other prices. It is usual to identify three channels for transmission to activity: the terms of trade effect, the supply effect and the demand effect. The terms of trade effect is due to the rise in the price of imports in relation to the price of exports, since most developed economies are net importers of energy. It makes the economy poorer. Unless it is offset by a decline in savings, it tends to depress domestic demand. The demand effect is connected with the impact of the rise in energy prices on inflation, as the higher prices reduce the disposable income of households and hence their consumption expenditure. The supply effect has to do with the importance of energy as an intermediate input necessary for the production of other goods and services. In the short term, firms react to an increase in their production costs by raising their selling prices or cutting their margins; in the medium and long term, firms may try to reduce their use of more expensive energy, e.g. by rationalising usage. In general, they cut their level of production (especially if demand is falling), and that leads, *ceteris paribus*, to a reduction in investment, employment and wages.

Many factors interfere in this process: the nature of the oil price shock – caused by supply or demand – its persistence, the energy intensity of production and consumption methods, and the energy mix. The functioning of the energy markets, and particularly the degree of competition and regulation, affect pricing on that market. Finally, the taxes and excise duty which governments levy on the products affect the prices set, and tax incentives may modify the energy "basket" of households and firms.

(1) The use of nuclear generating capacity influences the pricing as follows: the lower the rate of use, the more the gas price is taken into account in the pricing formula. In 2008, when gas prices were rising steeply, major work was in progress in the nuclear power stations. As those power stations came back into use, the effects of the rise in this factor diminished, while gas prices declined, like those of the other energy inputs.

CHART 14 TRANSMISSION OF ENERGY PRICES TO INFLATION AND ACTIVITY



Source: NBB.

### Econometric simulation

In connection with the Structural Issues Report 2010 mentioned above, econometric simulations were carried out to assess the impact of an oil price shock on inflation and activity in the euro area countries. These simulations were based on national structural models used by central banks for the purpose of the Eurosystem's macroeconomic projection exercises. The exercise entailed simulating the effect of a permanent 10 p.c. increase in the dollar price of crude oil. The basis used for the simulations was harmonised as far as possible: it was assumed that exchange rates were unaffected, monetary and fiscal policies remained unchanged, and the economic impact was confined to each country. This last assumption means that, for a given country, external demand will not be affected by any decline in consumption in other countries, but only by a loss of competitiveness on the part of domestic exporters owing to the increased cost of energy inputs. Competitors' export prices were assumed to remain unchanged, causing the influence of that channel to be overestimated. Despite the efforts to achieve harmonisation, it is necessary to bear in mind that there are still differences between the national models used for this exercise. The results must therefore be interpreted with caution.

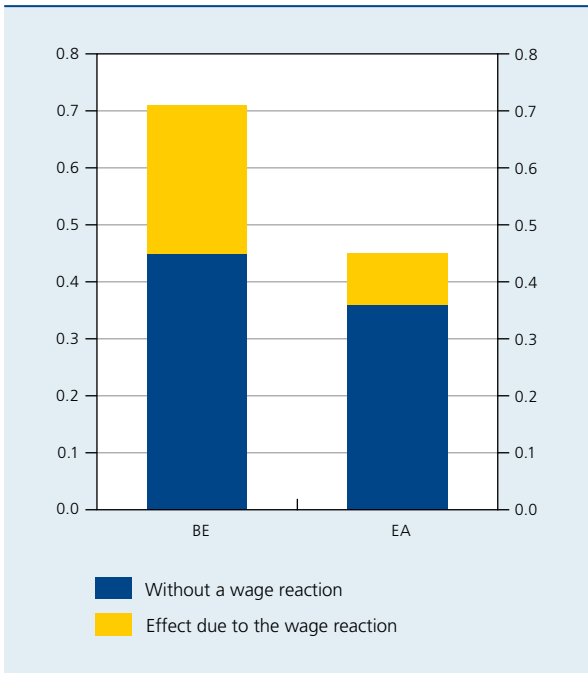
Taking account of the secondary effects via labour costs, a 10 p.c. increase in the oil price would increase the HICP over three years by 0.71 percentage point in Belgium and 0.45 percentage point in the euro area. The inflationary effect of an oil price shock is greater in Belgium for two reasons. First, the direct first-round effect on energy product consumer prices is higher. That stronger direct effect is in line with the finding set out above whereby the elasticity of consumer prices of energy products in Belgium, in response to a movement in international energy prices, is greater than in the rest of the euro area or in the three neighbouring countries. Moreover, that effect is reinforced by the fact that, in Belgium, energy products hold a more important position in the consumption basket and therefore have a higher weight in the HICP. Second, in view of the existence of wage indexation in Belgium, the risk of second-round effects and their scale are greater than in other euro area countries. The effects attributable to the reaction by wages are greater because, owing to the indexation mechanism, nominal hourly wages react almost immediately to the initial shock, even though part of the initial shock is neutralised by the use of the health index as the reference for indexation.

Regarding the impact on activity, a 10 p.c. rise in oil prices would reduce the level of GDP in Belgium by 0.46 percentage point over three years. The scale of the negative

**CHART 15**

**IMPACT ON THE HICP OF A 10 P.C. INCREASE IN THE PRICE OF CRUDE OIL**

(cumulative percentage differential after three years compared to the basic scenario with no oil shock)



Sources : ECB (2010), NBB for Belgium.

impact on activity would be greater than in the euro area, where it is estimated at 0.24 percentage point.

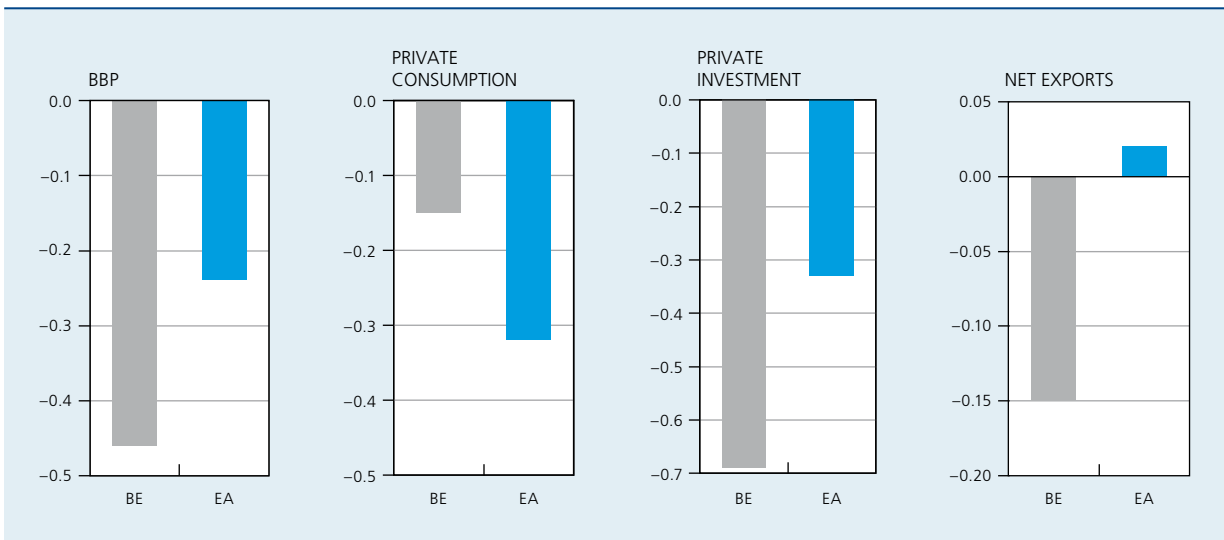
For Belgium, the effect on activity is due largely to net exports, following a very marked negative response by exports, whereas imports show a smaller decline. Owing to the indexation mechanism, a price-wage spiral is triggered, causing a deterioration in competitiveness. The negative reaction of investment is also stronger in Belgium than in the euro area, as production and business investment in Belgium have a higher energy content than elsewhere, and business competitiveness worsens. Conversely, the fall in private consumption is small in Belgium compared to the euro area, as indexation limits the decline in real wages.

The scenario adopted in this simulation is based on a simplified view of the system of wage-setting in Belgium : it disregards the fact that the wage norm fixed by the interprofessional agreements refers to forecasts for the evolution in labour costs in neighbouring countries. If the need arises, it is possible to adjust for any derailment in the recorded movements in labour costs compared to neighbouring countries. That mechanism enables the social partners to limit the negative effects of oil shocks on inflation and activity. In fact, a simulation based on the assumption that labour costs are unaffected by the increase in oil prices shows that the effect on inflation and activity is significantly attenuated in Belgium. Thus, the impact on inflation with no wage reaction comes to 0.45 percentage point, compared to 0.71 with a wage reaction, and the negative impact on economic activity is 0.37 percentage point, against 0.46.

**CHART 16**

**IMPACT ON ECONOMIC ACTIVITY OF A 10 P.C. INCREASE IN THE PRICE OF CRUDE OIL**

(cumulative percentage differential after three years compared to the basic scenario with no oil shock ; differential in percentage points for the contribution of net exports to the change in GDP)



Sources : ECB (2010), NBB for Belgium.

## Conclusion

Compared to other euro area countries, Belgium is relatively sensitive to oil price shocks in terms of both inflation and economic activity. That sensitivity is due primarily to the relatively high energy intensity resulting in part from a specific industrial structure in that area, namely the over-representation of energy intensive branches of activity, such as metallurgy, chemicals and non-metallic minerals, and specialisation in the initial product processing stages in those branches of activity. In addition, the consumption of energy products by Belgian households is also higher than in the euro area. Since Belgium no longer has any fossil fuels, and renewable energy is not yet well developed there, it has a high degree of energy dependency on other countries. The management and, if possible, reduction of the energy intensity of both the production process and consumption habits therefore present a major challenge, not only for environmental reasons, but also for macroeconomic reasons, as demonstrated in this analysis.

The Belgian economy's greater vulnerability to oil price shocks is augmented by a range of other factors. Some of them concern the functioning of the energy markets and the pricing of energy products, while others relate to the functioning of the product and labour markets in Belgium.

The first range of factors include the low level of excise duty and related taxes on diesel, natural gas and

particularly heating oil. Consumer prices of these energy products are consequently more sensitive to fluctuations in the crude oil price in Belgium. Also, the consumer price of gas and electricity reacts much faster than in neighbouring countries to fluctuations in prices on the international energy markets. That is due to the mechanism whereby consumer prices are adjusted monthly via tariff-setting formulas based partly on the movement in the price of energy commodities; that practice is unique in Europe. Thus, the suppliers' gross margin is largely stabilised, and the uncertainty associated with energy price volatility mainly affects the consumer. In other euro area countries, prices are adjusted less frequently and in some cases they are still subject to some form of regulation. More generally, despite liberalisation, the effective degree of competition on the gas and electricity markets is still very low, both in Belgium and in the other euro area countries.

Moreover, the indexation applied in Belgium, not only to wages but also to certain prices, heightens the economy's sensitivity to oil price shocks, even though the use of the health index partly neutralises the initial shock. Owing to indexation, there are second-round effects on inflation, and economic activity suffers a stronger negative impact via a significant fall in exports due to the loss of competitiveness, even though private consumption is relatively well protected. However, that additional negative impact can be curbed by constant monitoring of Belgian competitiveness, in accordance with the 1996 law on the promotion of employment and the safeguarding of competitiveness.

## Bibliography

ECB (2010), *Energy markets and the euro area macroeconomy*, Structural Issues Report.

Cornille D. (2009), *Pricing methodology: What is the reason for the greater volatility of consumer prices of gas and electricity in Belgium?*, NBB, Economic Review, 4.

Mc Kinsey & Company (2009), *Pathways to world-class energy efficiency in Belgium*, study commissioned by the Federation of Enterprises in Belgium (FEB/VBO).

Meyler A. (2009), *The pass through of oil prices into euro area consumer liquid fuel prices in an environment of high and volatile oil prices*, Energy Economics, 31, pp. 867-881.

# The increased volatility of electricity prices for Belgian households

An analysis based on the specific characteristics of pricing by Belgian electricity suppliers

François Coppens\*

## Introduction

Every year there are various studies<sup>(1)</sup>, notably the NBB Annual Report, that analyse Belgian inflation measured by the Harmonised Index of Consumer Prices (HICP). The contribution of energy products to inflation measured in that way is a constantly recurring theme. It is found that energy products are often not only the reason for the Belgian inflation gap in relation to the euro area, but are also largely accountable for the volatility of the Belgian index figure.

Until recently, only one energy source proved to be a factor here in most cases, namely oil (and its derivatives). Since the end of 2007, however, crude oil prices have ceased to be the only variable accounting for both the inflation gap and the volatility. Since then, the movement in consumer prices of natural gas and electricity has also played a significant role. A decade ago, both energy markets were still tightly regulated and virtually monopolistic. At the instigation of the European Commission, there has been a strong tendency towards deregulation not only in all European countries but also elsewhere, and that has naturally had an impact on pricing.

The timing of that deregulation varied. In Germany, it took place as early as 1998, in the Netherlands in 2004 and in France not until 2007. In France, household tariffs remained largely (over 95 p.c.<sup>(2)</sup>) regulated even after deregulation. In the Netherlands, though household electricity prices are more in line with the market, price changes are submitted to the regulator who checks whether they are “reasonable”. This system, known as the “safety net method”, stipulates that the suppliers must submit every tariff change to the regulator four weeks in advance of implementation. The regulator then assesses whether the tariff increase is fair in view of the costs incurred by the supplier. If the proposed tariff does not conform to the maximum limits set by the regulator, the supplier is given the opportunity to explain the increase. If, after completion of this procedure, the regulator judges the tariff to be unreasonable, then the supplier has a maximum tariff imposed on him. Different maximum tariffs may apply for green and grey electricity<sup>(3)</sup>. On the German and British markets, the competition authority and the regulator respectively conduct *ex post* checks to see whether tariff changes are “reasonable”.

The (full) deregulation of the Belgian household energy markets took place at different times in the various regions. Flemish consumers were free to choose their supplier from July 2003; households in Wallonia and Brussels were able to do so from January 2007. Apart from market deregulation, Belgium also made methodological adjustments to the recording of the HICPs for natural gas and electricity between 2005 and 2007. According to recent

\* The author would like to thank L. Aucremanne, D. Cornille, G. van Gastel, C. Swartenbroekx, D. Vivet and J.-P. Pauwels for their contributions to this article.

(1) NBB (2008), NBB (2009), NBB (2010), NAI, Price Observatory (2009), Cornille D. (2009), ECB (2010).

(2) NAI, Price Observatory (2009), CRE (2010).

(3) Brattle Group (2009). For more information on the “safety net method”, see <http://www.energiekamer.nl/nederlands/gas/levering/tarieftoezicht.asp>.

research, the change in the method of measuring the HICP is not the only reason for the high volatility: the primary cause is deregulated pricing. Above all, further investigation is needed into the factors which explain why fluctuations in energy commodity prices play such a significant role<sup>(1)</sup>.

This study analyses pricing on the electricity market for private consumers. The first chapter outlines the issue, comparing electricity prices for households in Belgium, the Netherlands, Germany and France. The data used originate from Eurostat's data banks. The second chapter examines in greater depth the pricing mechanisms on electricity markets for private consumers. Suppliers apply fixed and variable tariffs which vary according to the consumption profile, while social tariffs are also a factor. The third and most important chapter of this study examines the underlying parameters which may account for the greater volatility of Belgian electricity prices, focusing in detail on the mechanisms used in variable-price contracts. The pricing method used in variable-price contracts appears to be very specific to the Belgian market and is the most likely reason for its atypical behaviour. The fourth chapter focuses briefly on whether such pricing mechanisms are also used in neighbouring countries. The fifth chapter sets out the conclusions.

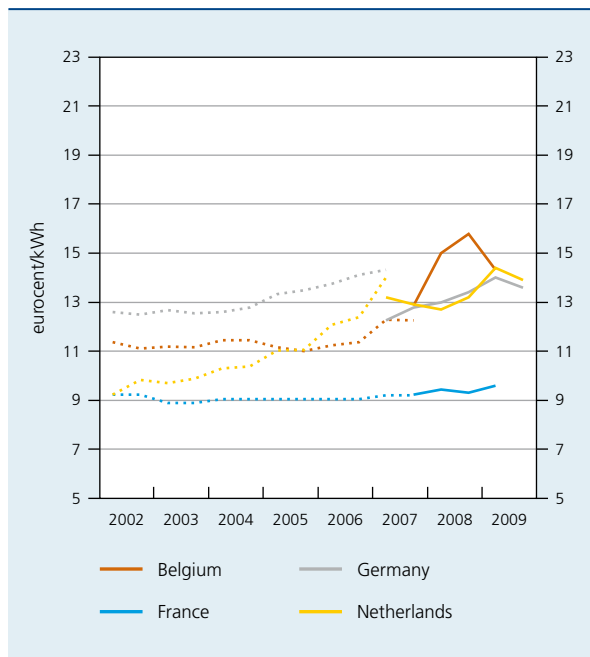
## 1. Electricity prices in Belgium and in neighbouring countries

### 1.1 Eurostat time series<sup>(2)</sup>

Eurostat collects data on the prices of electricity consumed by households in the various Member States. The households are divided into various consumption profile classes according to the number of kilowatt hours (kWh) consumed. The information is updated in the form of half-yearly time series<sup>(3)</sup>. In 2007 there were changes in the method of producing those time series. From the 2007 recording year onwards, the figure corresponds to the weighted<sup>(4)</sup> average over the half year; before that it was the value on the first day of the half year. Up to 2007, consumer class "Dc" was defined as the category with annual consumption of 3,500 kWh, including 1,300 kWh at the off-peak tariff. From 2007, class "Dc" covers households with annual electricity consumption between 2,500 and 5,000 kWh. These methodological changes imply that the pre-2007 figures are not comparable with the data compiled since 2007.

The time series for Belgium and for neighbouring countries are set out in the charts 1 and 3. Chart 1 shows the

**CHART 1** ELECTRICITY PRICES FOR CONSUMER PROFILE DC, PRICES EXCLUDING TAX



Source: Eurostat.

prices excluding tax for class "Dc". The break in the series is indicated by the switch from a dotted line to a continuous line.

Up to 2007, prices in Belgium were between prices in France and those in Germany. In the Netherlands, electricity prices for private consumers were initially lower than those in Belgium, then higher from 2005 to 2007. After the break in the method that pattern changed. However, the break also coincided with deregulation of the sector, making it difficult to ascertain the exact reason for this altered pattern.

In France, the break is not expressed in the prices, but French private consumption of electricity is still largely determined by regulated tariffs. In Germany, prices for households fell significantly after the break; in the Netherlands, the difference is small, though prices did increase less strongly after the break. In Belgium, there was no serious impact on prices at the time of the break, but the profile of prices since the break is totally different from the previous picture. After the break, prices (excluding tax) were highest in Belgium until the end of 2008. In the first half of 2009, energy prices exhibited some convergence, except in France.

(1) Cornille D. (2009), NBB (2010), NAI, Price Observatory(2009), ECB (2010).

(2) <http://epp.eurostat.ec.europa.eu/portal/page/portal/energy/introduction>.

(3) FPS Economy, SMEs, Self-employed and Energy (2010).

(4) The weighting takes account of consumption in each month and of the supplier's market share in that particular month.

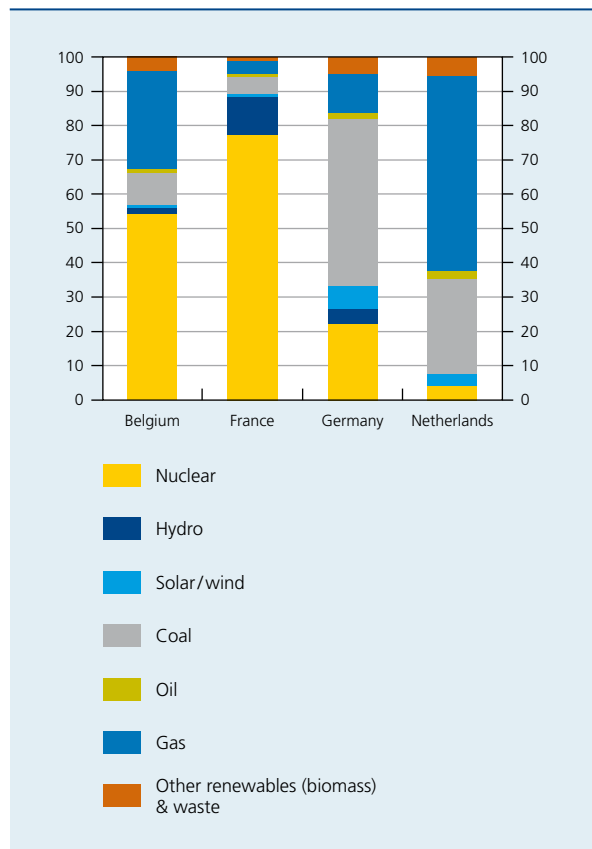


Some studies<sup>(1)</sup> cite the varying mix of generating facilities and the steep increases in fossil fuel prices during the past decade as possible explanations for the divergent electricity prices in the different countries. Chart 2 shows the fuel mix for Belgium and neighbouring countries. That mix might account for the difference between prices in Belgium and those in France. However, Germany and the Netherlands use more fossil fuels than Belgium, so that the explanation must be sought elsewhere in those two cases.

Chart 3 shows electricity prices including tax.

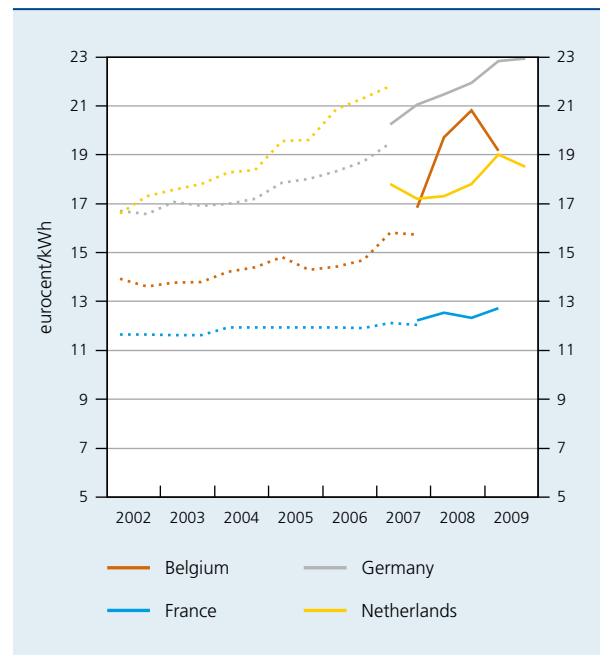
It should be noted that, after the break, as a result of levies, taxes and VAT, prices in Germany were again the highest. In 2007 and 2008, Belgium had the second highest prices including taxes, levies and VAT. In the first half of 2009, prices in Belgium subsided again to the level in the Netherlands. In the case of the Netherlands, there was a notable decline in levies, taxes and VAT after the break<sup>(2)</sup>.

**CHART 2** FUEL MIX IN BELGIUM AND IN NEIGHBOURING COUNTRIES (FIGURES BASED ON PRODUCTION IN 2007)



Source: IEA (2009).

**CHART 3** ELECTRICITY PRICES FOR CONSUMER PROFILE DC, PRICES INCLUDING TAX



Source: Eurostat.

International price comparisons are a difficult exercise and the interpretations must be nuanced on account of the characteristics and regulations specific to the respective countries. Deregulation of the sector necessitated its unbundling into various segments: production, transmission, distribution and supply<sup>(3)</sup>. The prices recorded by Eurostat contain those four components. In Belgium, for example, the unbundling was much more radical than in Germany and France, and that is a potential source of tariff differences. The same applies to the public service obligations of the Belgian distribution system operators.

## 1.2 HICP for electricity

Charts 1 and 3 show price levels. Inflation figures – which were mentioned in the introduction – indicate price changes. To exclude seasonal influences, changes in one month are usually calculated with respect to the corresponding month in the previous year. Chart 4 shows the Belgian consumer price index for electricity supplied to households and the “year-on-year changes”. The time series is issued monthly. There is a break in this time series, too, from 2005 for Flanders and from 2007 for Belgium.

(1) ECB (2010).  
 (2) This is confirmed in NAI, Price Observatory (2009).  
 (3) See Coppens F. and D. Vivet (2004).

Before 2005 (Flanders) and before 2007 (Wallonia and Brussels) the HICP index was based on annual bills (this was called the “payment approach”); from 2005/2007 it was produced on the basis of monthly tariff calculations requested from the regional regulators (the “acquisition approach”)<sup>(1)</sup>. As a result, before 2007 prices were an average of the preceding twelve months, and since 2007 it is “instantaneous” prices that have been used<sup>(2)</sup>. Switching from annual averages to “instantaneous” monthly prices normally heightens volatility<sup>(3)</sup>.

The HICP series calculated is an average of all consumption profiles; it therefore does not only reflect the pattern for “Dc”. The HICP for Belgium is recorded inclusive of taxes. The index already begins to rise slightly by the end of 2007; at the beginning of 2008 it increases very sharply. However, it is not until the beginning of 2008 that the year-on-year changes become greater. This indicates that in the final months of the year the index figure is generally already higher as a result of a seasonal effect. That effect is eliminated in the year-on-year changes which are always measured in relation to the same month in the previous year.

A quick comparison of charts 2, 3 and 4 reveals that in both the Eurostat time series of electricity prices and the HICP time series the pattern from the end of 2007 is very different from that prevailing previously. Cornille D. (2009) shows that the greater volatility compared to the euro area is due not only to the change in the recording method but also to the pricing mechanisms applied on the deregulated markets, particularly in the rapid transmission to consumer prices of changes in the primary fuel prices.

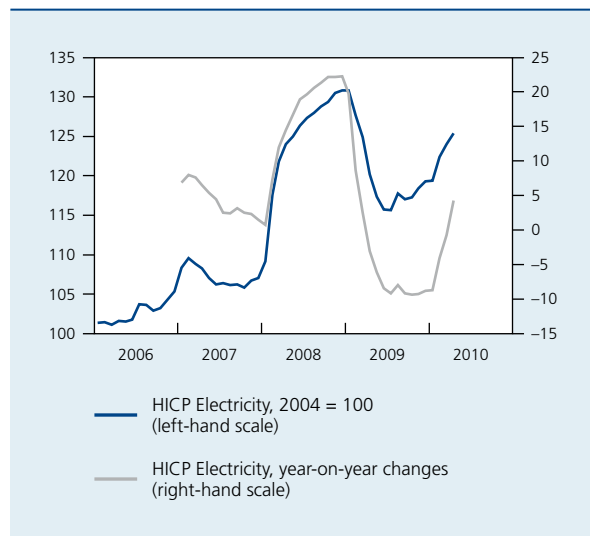
The next chapter goes into more detail on the electricity market pricing mechanisms.

## 2. Pricing mechanisms on the Belgian electricity market (for households)

### 2.1 Prices in a deregulated electricity sector

Deregulation of the Belgian electricity sector took place at different times in the respective regions. However, the new structure is the same in Flanders, Wallonia and the Brussels Capital Region. The sector was divided into four segments: production, transmission, distribution and supply. Production and supply have been deregulated; transmission and distribution remain as strictly regulated monopolies after the break-up. This brief summary is confined to household supply (for a fuller account of deregulation, see Coppens F. and D. Vivet (2004)). On

**CHART 4** INDEX OF BELGIAN ELECTRICITY PRICES FOR PRIVATE CONSUMERS



Source: Belgostat.

the deregulated Belgian electricity market, individuals can conclude a contract with the supplier of their choice who then supplies the household with electricity in return for payment. The supplier buys in the electricity from a chosen producer. The energy purchased is then transported via the transmission network (high voltage and network structure) and the distribution network (low voltage and radial structure).

At the end of a given period (usually one year) the supplier invoices an amount to the customer (“household price” in figure 1). The supplier uses the amount collected to cover his expenses: (a) the “energy price” to the producer, (b) the transport charges to the transmission system operator and the distribution system operator, and (c) the levies, taxes and VAT to various entities (the government, the regulator, the ombudsman, nuclear liabilities, etc.). After paying all those expenses and levies, the supplier is still left with a margin which he uses to pay his own operating and investment costs and other expenses (e.g. the public service obligations<sup>(4)</sup>). The components of the invoiced price are shown in figure 1.

(1) The payment method considers the price at the time of payment for the goods; the acquisition method takes the price at the time of purchase (acquisition).

(2) See also Cornille D. (2009).

(3) In statistics, it is a well-known fact that the standard deviation of the arithmetical average  $\bar{x}$  is smaller than that of the variable itself. For an arithmetical average of “n” terms:

$$s_{\bar{x}} = \frac{s_x}{\sqrt{n}}$$

Calculation of an annual average therefore reduces the standard deviation (a measure of volatility) by a factor of roughly 3.5.

(4) Including the costs of purchasing compulsory green certificates.

When analysing price movements, it is therefore necessary to clarify the price in question, i.e. whether it is only the price of the electricity (the energy price) or the energy price plus the supplier's margin, or the price including both the supplier's margin and transport costs, or the total price including levies, taxes and VAT.

In the case of household supplies, it is not possible to distinguish between the energy price and the supplier's margin as it is not known how much the supplier pays to the producer for the energy. Transport costs (transmission and distribution charges) are regulated and are published on websites of the regulator (CREG) and the distribution system operators<sup>(1)</sup>. The levies, taxes and VAT are also known.

The Eurostat time series comprise the energy price, the supplier's margin and the transport costs. There is a series including taxes, levies and VAT, and a series which excludes them.

The Belgian HICP-EL is based on an all-in tariff. The prices therefore reflect not only changes in energy prices and the supplier's margin but also changes in transport charges and levies, taxes and VAT.

The sections which follow analyse part of the price that suppliers invoice to households. The part that is analysed concerns the energy price and the supplier's margin, i.e. excluding transport charges and levies, taxes and VAT. The prices used to calculate the consumer price index also include transport charges, levies, taxes and VAT. Since the transport costs (principally the distribution charges<sup>(2)</sup>) have risen steeply during the period under consideration, the index is adjusted for changes in distribution tariffs.

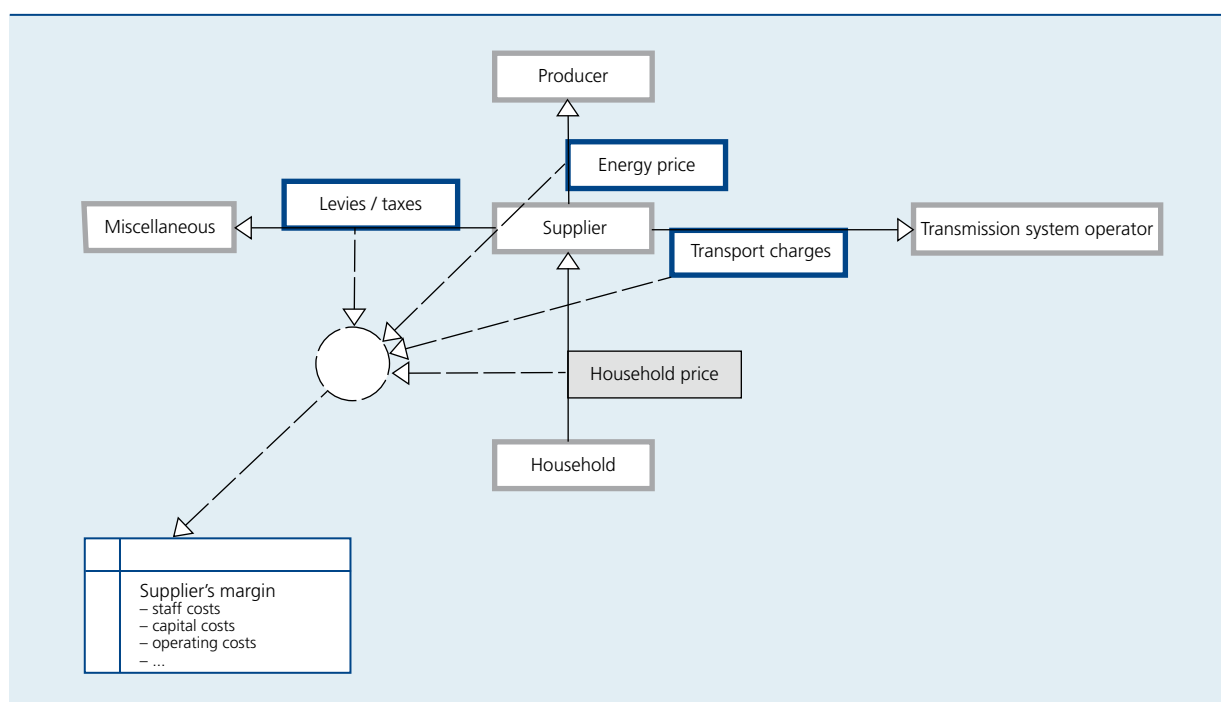
## 2.2 Indexation of prices in variable contracts ; the "Ne-Nc index" and the "Ne-lem index"

Most Belgian household supply contracts are based on a variable price. This means that the price is adjusted monthly in line with an index (in just the same way that rents are adjusted annually in line with the health index). The aim of that indexation is that the supplier's income is adjusted as his own expenses increase, enabling him to maintain a "normal" margin during the term of the contract (see figure 1). Such adjustment of prices in line with market developments is also found in other markets. For example, on the banking market, in the case of variable-rate contracts, mortgage interest rates are adjusted periodically in line with market rates.

(1) [http://www.creg.be/nl/transporte\\_nl.html](http://www.creg.be/nl/transporte_nl.html).

(2) CREG (2007), p. 37, CREG (2009c).

FIGURE 1 COMPONENTS OF THE PRICE CHARGED TO HOUSEHOLDS



Source : NBB.

In contrast, fixed-price contracts stipulate a price which is fixed for one or two years, but it will usually be slightly higher because the supplier charges an extra margin to cover the uncertainty over future prices. Here, too, it is possible to draw an analogy with mortgage interest rates: the interest rate on fixed-rate contracts is slightly higher than on contracts with variable interest rate formulas.

Most contracts for the supply of electricity to Belgian households are variable-price contracts, though the percentage has been declining, especially since the end of 2008. In 2007, variable-price contracts represented a 94 p.c. share; in 2008 that fell slightly to 93 p.c., and in the first ten months of 2009 it dropped to 86 p.c.<sup>(1)</sup>

The supplier is free to decide the indexation mechanism. In most cases, however, the chosen method is indexation based on two parameters. Table 1 sets out the leading suppliers and the indexation parameters which they use. The parameter Ne reflects the movement in wage and material costs, while parameters Nc and lem reflect changes in fuel costs. The market shares of the suppliers are calculated on the basis of the number of access points which they served on the Belgian market in 2009 figures. The number of access points is the most relevant criterion for the private market<sup>(2)</sup>.

The parameters Ne and Nc already existed before deregulation (but the method of calculating Nc was modified in 2004<sup>(3)</sup>). Both parameters are composed of partial indices. The parameter Ne consists of an index that reflects the movement in labour costs (in the metalworking industry) and an index that tracks the cost of materials. The parameter Nc reflects the cost of fuel (oil, coal and natural gas), but also the costs associated with the nuclear capacity utilisation rate. For the exact formulas, see annex 1. The monthly figures for Nc and Ne are published on CREG's website.

Supply contracts with variable prices indexed on the basis of Nc and Ne state the price of the power supplied as a function of Nc and Ne. In most cases, the price consists of several tariffs specified on the supplier's tariff schedule (they also vary from one supplier to another, hence the exponent "l" in formulas (1) and (2)). For a given consumption profile (e.g. 3,500 kWh per annum, including 1,500 kWh at the off-peak rate), it is possible to calculate the total coefficient of Nc and Ne (for more details, see annex 2). For the "Ne-Nc index" in eurocent/KWh, the formula is as follows:

$$Ne - Nc - \text{index price}^l = a_{Ne}^l \cdot Ne + a_{Nc}^l \cdot Nc \quad (1)$$

The coefficient  $a_{Ne}$  and  $a_{Nc}$  can be calculated on the basis of a supplier's tariff schedule (see annex 2). If the monthly

**TABLE 1** PARAMETERS USED AND MARKET SHARE HELD BY THE VARIOUS SUPPLIERS ON THE BELGIAN HOUSEHOLD ELECTRICITY MARKET

Supplier	Market share (p.c. of access points)	Parameters used
Electrabel Customer Services	66.5	Ne, Nc
SPE/Luminus	19.5	Ne, lem
Nuon	5.3	Ne, Nc
Essent	3.1	Ne, Nc
Distribution system operator	2.2	mixed form
Lampiris	2.1	fixed only
Others	1.3	–
<b>Total</b>	<b>100.0</b>	

Sources: CREG, CWAPE, VREG, BRUGEL (2010).

values of the parameters Nc and Ne are substituted in the formula (1), it is possible to calculate the "Ne-Nc index" for that consumption profile.

Table 1 shows that most players on the private market use such a formula in their variable price contracts. SPE/Luminus uses a formula of this type, but replaces the parameter Nc with another parameter lem (see annex 3). The formula for that supplier is therefore:<sup>(4)</sup>

$$Nc - lem - \text{index price}^l = a_{Nc}^l \cdot Nc + a_{lem}^l \cdot lem \quad (2)$$

The parameter "lem" reflects the movement in gas prices at Zeebrugge, the movement in electricity prices on the Belpex power exchange, and the movement in coal prices<sup>(5)</sup>.

Table 1 shows that some suppliers only offer fixed-price contracts. The network operators use a mixed structure. The distribution system operators (DSOs) are the supplier of last resort; if a customer is unable to pay his bills, there is a very strict procedure permitting the supplier is to terminate that customer's contract. The customer is then assigned to the DSO for his region. The DSO must supply the customer with electricity at a price not exceeding the

(1) Source: CREG.

(2) Calculation of the market shares on the basis of the energy supplied accords too much weight to large consumers other than households.

(3) CREG (2008a), CREG (2009a). Moniteur belge/Belgisch Staatsblad (2001), Moniteur belge/Belgisch Staatsblad (2004).

(4) That is also true of "Ebem", which is a smaller supplier having the municipality of Merksplas as its sole shareholder.

(5) For completeness, it should be noted that, in some contracts, SPE/Luminus also uses another parameter (lec) which is even more closely linked to the movement in Belpex prices. See annex 2.

**TABLE 2** PRICE COMPONENTS INCLUDED IN THE VARIOUS TIME SERIES

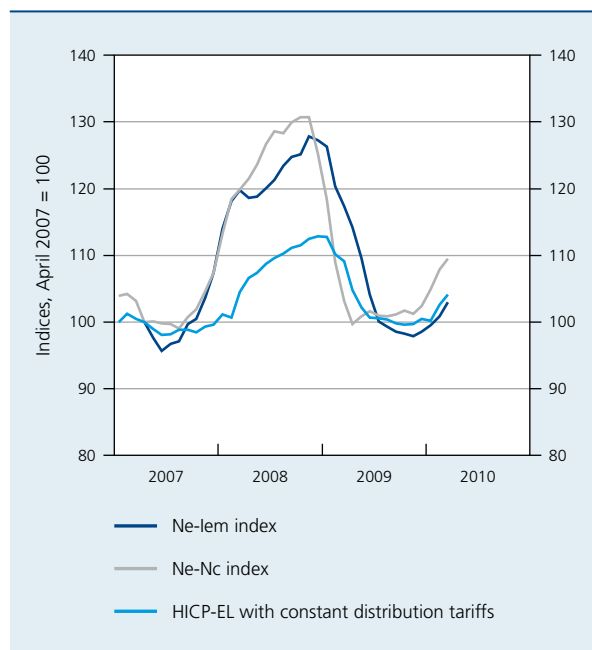
	Eurostat	IPCH-EL	HICP-EL with constant distribution charges	Index price
Energy price . . . . .	X	X	X	X
Supplier's margin . . .	X	X	X	X
Transmission costs . .	X	X	X	
Distribution costs . . .	X	X	constant	
Levies, taxes and VAT . . . . .	– or X	X	X	

Source: NBB.

weighted average price charged by suppliers active in the DSO's region<sup>(1)</sup>.

The Ne-Nc index price was calculated for a number of tariff schedules. Chart 5 shows one example, together with the HICP index for electricity. It also shows the movement in the Ne-lem index price. The Ne-lem index has only been used since October 2008. It was calculated retroactively from April 2007.

**CHART 5** THE ADJUSTED HICP-EL (WITH CONSTANT DISTRIBUTION TARIFFS), THE NE-NC INDEX AND THE NE-LEM INDEX



Source: Cornille D. (2009) for the HICP-EL with constant distribution tariffs, own calculations for the Ne-Nc index and for the Ne-lem index.

The “Ne-Nc index price” and the “Ne-lem index price” reflect the energy price and the supplier’s margin; the transmission and distribution costs are not included, nor are the taxes. The HICP for electricity was therefore adjusted for the change in the distribution tariffs<sup>(2)</sup>. Thus, chart 5 shows an HICP-EL with constant distribution costs. When comparing electricity prices it is necessary to take account of the components included (see table 2).

It should be noted that the Eurostat price (in charts 1 and 3) contains more components than the index price analysed in detail later in this article. That explains why the Eurostat price is higher, and unless there is a negative correlation between the components, that will also tend to enhance the volatility.<sup>(3)</sup>

Chart 6 shows on the right-hand scale the year-on-year changes in the adjusted HICP-EL and on the left-hand scale the annual changes in the Ne-Nc and the Ne-lem indices.

It therefore seems that, especially in the case of the year-on-year changes, the adjusted HICP-EL and the Ne-Nc and Ne-lem indices follow a very similar pattern (except for one scale factor, as the units on the axes are different). The Ne-Nc index for a given month was calculated here on the basis of the values of Ne and Nc for that same month. However, in the contracts the suppliers apply a formula which takes account of the values of the parameters for the preceding month, which explains why the HICP curve lags behind the Ne-Nc index curve.

It should be noted that perfect similarity cannot be expected either for the Ne-Nc index or for the Ne-lem index, as the adjusted HICP is an average market price. Table 1 shows that many suppliers index on the basis of Ne and Nc, which may explain why the HICP for electricity and the Ne-Nc index display a similar pattern. The deviations are due to the use of different weighting coefficients for Ne and Nc by different suppliers and for different consumption profiles, since there are some contracts which are not indexed on the basis of Ne and Nc (fixed price contracts or indexation based on other parameters).

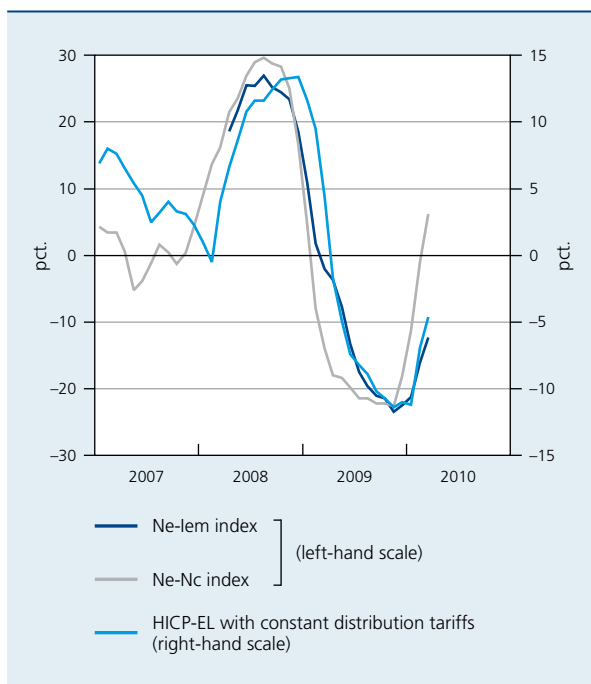
In regard to the HICP with constant distribution tariffs, it must also be borne in mind that, while adjustments were made for the changes in the distribution tariffs, that does not apply to the distribution tariffs themselves, or to the transmission tariffs, and that also tends to even out

(1) CREG (2010a).

(2) CREG (2007), p. 37, CREG (2009c).

(3) That follows from the sum formula for the standard deviations;  $s_{x+y}^2 = s_x^2 + s_y^2 + 2r_{xy}s_x s_y$ , where  $s_x^2$  is the variance of the variable x and  $r_{xy}$  is the correlation between the variables x and y.

**CHART 6** ADJUSTED HICP INDEX AND THE NE-NC AND NE-LEM INDICES  
(year-on-year changes)



Source: Own calculations on the basis of tariff schedules and Cornille D. (2009) for the HICP with constant distribution tariffs.

the relative changes in the index. Relative changes in the price level include, in the denominator, the price level at the start of the period, and that is higher if the (constant) distribution tariffs are included.

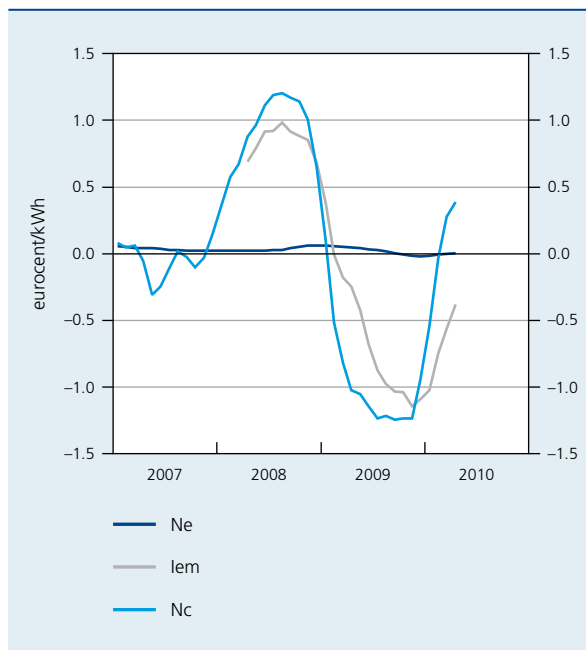
### 2.3 Influence of the chosen tariff schedule on the movement in the Ne-Nc and Ne-lem indices.

The Ne-Nc/Ne-lem index price calculations and charts in this study were based on a typical tariff schedule of one supplier. These tariff schedules show the supplier's values for the coefficients of Nc/lem and Ne. Calculations were also done on the basis of other examples, but that had no significant impact on the conclusions.

For all tariff schedules, the ratio between the weights of Nc or lem and Ne is much smaller than the ratio between the amplitudes of the variation in Ne (Nc). That is why the tariff schedule chosen does not really matter in the context of the year-on-year changes.

The amplitude of the change in Nc and lem is up to 30 times greater than for Ne. Since the index price is a weighted sum of Nc/lem and Ne (see formulas (1) and (2)),

**CHART 7** YEAR-ON-YEAR CHANGES IN NC, IEM AND NE



Source: Own calculations.

so long as the weight of Ne is not too great in relation to that of Nc/lem, the year-on-year changes in the Ne-Nc index price are dictated mainly by the changes in Nc/lem.

### 2.4 Frequency of price adjustments: rapid transmission and lack of information and transparency

The indexation parameters Ne, Nc and lem are calculated monthly, which also implies that the electricity price in variable-price contracts changes every month. The data which the regional regulators submit for the calculation of the HICP are based on those monthly price changes.

Since private customers are invoiced annually, they do not notice these monthly changes. However, their invoices are based on a price which is adjusted monthly. For that purpose, their annual consumption which is noted once a year is divided among the months of the preceding year on the basis of "synthetic load profiles" (SLP) validated by the regulator. An SLP indicates the distribution of consumption for each quarter of one year for a typical consumer. On the basis of that (statistically estimated) distribution it is therefore possible to separate the typical user's consumption into peak and off-peak usage. In other words, the SLP can be used to convert the total annual consumption into an (estimated) monthly consumption, and break that down into peak and off-peak consumption. The monthly

consumption figure thus calculated is then multiplied by the index for the month in question.

The invoice price paid by a household with a variable-price contract is therefore a weighted average of the monthly index prices. The weighting is based on a load profile which is considered to indicate that household's consumption. Most consumers are unaware of the monthly price changes, and are given little information about the price which they pay in a particular month; they only find out the prices ex post, when receiving the invoice<sup>(1)</sup>. An obligation to give prior notice would perhaps lead to less frequent price changes in view of the menu costs involved<sup>(2)</sup>. That information obligation could also enhance transparency and, furthermore, provide the incentives required to modify consumption. However, it is necessary to ensure that the menu costs do indeed lead to less frequent price changes, and are not just added on to the invoice.

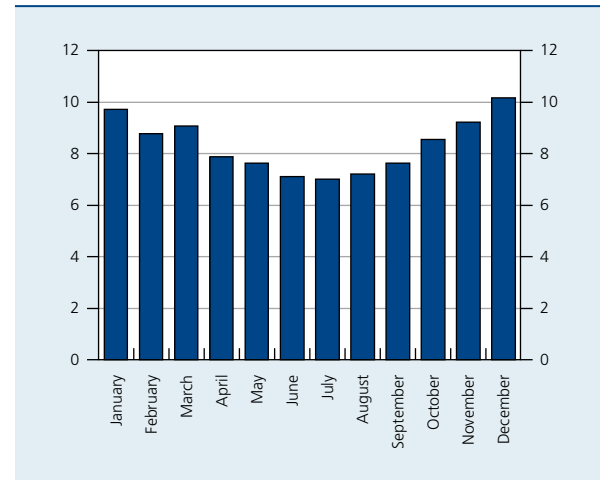
Menu costs may be among the reasons for the existence of indexation formulas. Prices under existing contracts can only be increased subject to very stringent conditions, because consumers must be given the opportunity to change their supplier, and that implies that they must be notified of price rises. That entails menu costs and deters suppliers from making frequent formula adjustments. Provided the indexation mechanism is explicitly described in the contract, however, the law does allow price increases on the basis of indexation formulas<sup>(3)</sup>.

For completeness, it should be noted that even if consumers modify their behaviour, that will only influence their total annual consumption and therefore only have an indirect impact on the cost of consumption in a particular month. The load profiles are determined by the regulator, and in the case of a fixed load profile the allocation of the annual consumption among the various months will take no account of a household's modified behaviour. To rectify this, it would be necessary to take monthly consumption readings. That is a possible application for "smart meters"<sup>(4)</sup>.

By way of illustration, chart 8 shows a simplified SLP (monthly instead of quarterly). During the summer months, consumption is clearly assumed to be lower. On the basis of the SLP depicted, the difference between the acquisition price (i.e. the price which changes every month) and the invoiced price is shown in chart 9.

(1) Most suppliers publish prices monthly on their websites, so price-conscious consumers can find that information if they want to.  
 (2) Menu costs are the costs associated with changing prices, e.g. the alteration and replacement of price lists or menus in restaurants.  
 (3) See the Law on market practices and consumer protection of 6 April 2010.  
 (4) "Smart meters" are meters equipped with computer hardware. They offer many possibilities: they can be read remotely, they can measure consumption continuously, and they can measure and record the individual consumer's load profile, etc.

**CHART 8** A SIMPLIFIED LOAD PROFILE  
(percentage of annual consumption)

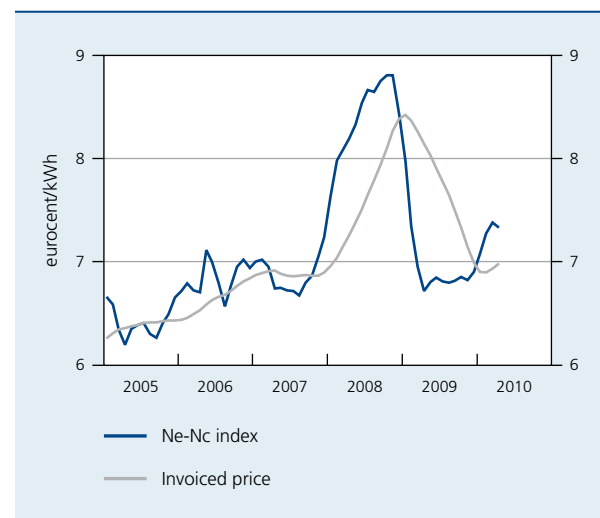


Source: Own calculations based on a VREG load profile.

Chart 9 shows the Ne-Nc index price changing month by month. For each month, it also shows how much a household invoiced in that month would pay for its consumption during the preceding twelve months. This is therefore the weighted average Ne-Nc index and the price which the private consumer "sees".

The less volatile invoiced price is a direct consequence of averaging. That also applies to the delayed effect: the price change is recorded later. However, a steep upward trend is also evident in the invoiced price.

**CHART 9** DIFFERENCE BETWEEN NE-NC INDEX AND THE (AVERAGE) INVOICED PRICE



Source: Own calculations based on a VREG load profile.

The chapters which follow will examine the underlying characteristics of pricing on the electricity market for private consumers.

### 3. Analysis of the components of the electricity price for households

#### 3.1 Analysis of the components of the calculated Ne-Nc index

##### 3.1.1 Breakdown into components of the Ne-Nc index

The above analogy between the Ne-Nc index and the HICP for electricity merits more detailed analysis. For that purpose, the parameters Nc and Ne are broken down into their sub-indices and the contribution of each sub-index to the total Ne-Nc index is then examined. Formula (1) can therefore be broken down further by using the definitions of the parameters Ne and Nc (see annex 1). Chart 10 breaks down the Ne-Nc index into its components. The parameter Ne consists of a constant (Ne-cst), labour costs (Ne-s) and material costs (Ne-Mx). The height

of the three bars shows the trend in Ne (see formula (3)). In addition, there are the contributions made by the parameter Nc (see formula (4)). One sub-component of Nc remains constant (Nc-cst); another sub-component depends on the nuclear capacity utilisation rate (Nc-fnu) and a third depends on the movement in the coal price (Nc-coal); there is also a contribution that depends on the movement in oil prices (Nc-oil), and finally, a component reflecting the movement in gas prices (Nc-gas). This factor also depends on the use of nuclear facilities: in the case of a high capacity utilisation rate, it may generate negative values for Nc-gas<sup>(1)</sup>.

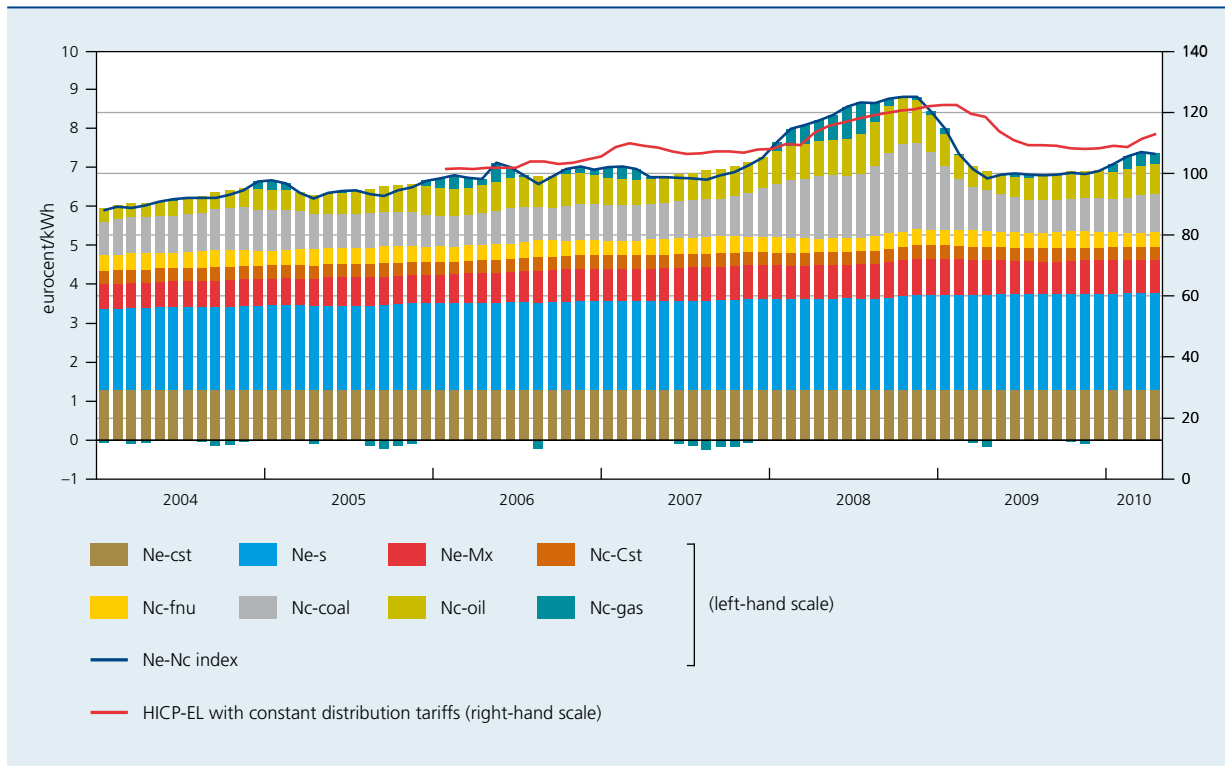
$$a_{Ne} \cdot Ne = Ne\_cst + Ne\_s + Ne\_Mx \quad (3)$$

$$a_{Nc} \cdot Nc = Nc\_cst + Nc\_fnu + Nc\_coal + Nc\_oil + Nc\_gas \quad (4)$$

The blue line in chart 10 shows the movement in the Ne-Nc index price (including all positive and possibly negative contributions); the adjusted HICP was also included (on the right-hand scale).

(1) For an example, see annex 1 and/or CREG (2008a).

CHART 10 COMPONENTS OF THE NE-NC INDEX FOR SETTING TARIFFS



Sources: CREG, own calculations.

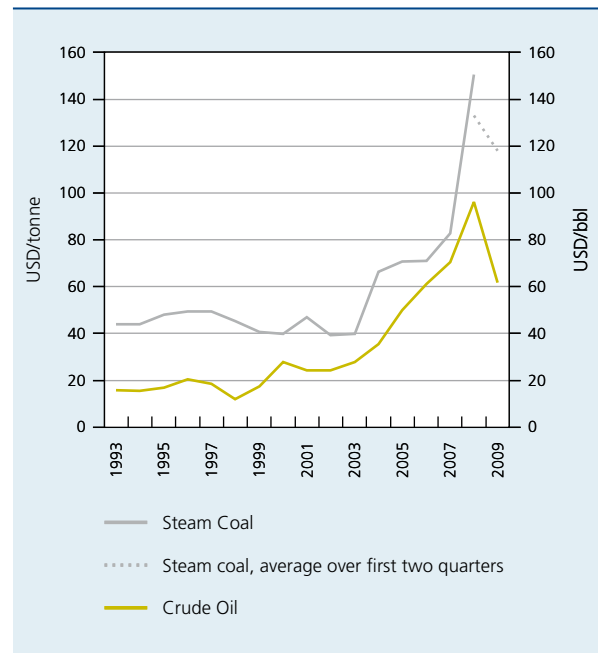


The contribution from parameter Ne is only rising slowly, with little volatility. The largest fraction of the total price depends on the contributions of this parameter Ne. Parameter Nc therefore appears to be the cause of the volatility. Its influence is significant throughout the period, but increased sharply in 2008; in the second half of that year the contribution of the Nc parameter almost equalled that of the Ne parameter.

In addition, coal prices clearly had a particularly large impact in the period from late 2008 to early 2009. During that period, Belgian import prices for coal increased sharply, as is evident from chart 11. Since the 2009 data were not yet available, the average of the first two quarters is also shown. The trend in that average gives some idea of how prices may have moved between 2008 and 2009. Up to 2003, coal import prices were relatively flat; after that, an initial price rise in 2004 was followed by a strong increase in 2008, resulting from the surge in demand for coal. Apart from coal prices, transport costs – which are included in import prices – also increased sharply in that period as a result of higher demand for transport capacity.<sup>(1)</sup> At the end of 2008, prices declined

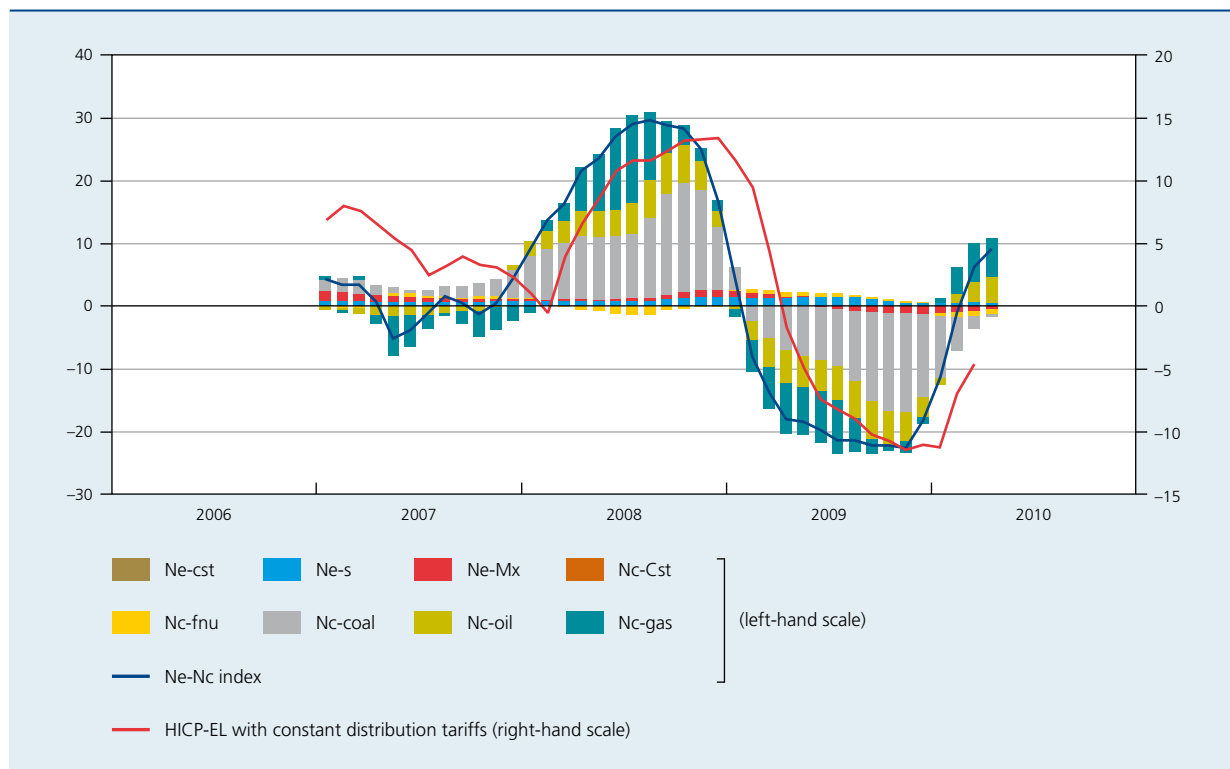
(1) OECD/IEA (2010).

**CHART 11** BELGIUM'S ANNUAL AVERAGE IMPORT COSTS (INCLUDING INSURANCE AND TRANSPORT) FOR COAL AND OIL



Sources: OECD/IEA (2010).

**CHART 12** SUB-INDICES OF THE NE-NC INDEX FOR SETTING TARIFFS (year-on-year changes)



Sources: CREG, own calculations.

owing to the global economic crisis. Crude oil prices are shown on the right-hand scale. In 2008 they increased more moderately than coal prices. The trend in oil prices also represents a smaller weight in the Nc parameter (see annex 1). The large coal price increase and the heavier weight of coal in the Nc account for the importance of that component in chart 10.

The prices in chart 10 include only energy and supply costs (see table 2), i.e. no transmission and distribution costs and no taxes and VAT either. In July 2009 the energy price accounted for roughly 55 p.c. of the total price excluding VAT (see VREG (2010), p. 43), so that a price of 8.8 eurocent/kWh corresponds to a total price excl. VAT of 16 eurocent/kWh. If the VAT is also taken into account, then this price is consistent with chart 3.

The varying contributions to the year-on-year changes are shown in chart 12.

Since the end of 2007, the Ne-Nc index has been rising year-on-year. At first, that was due mainly to the rise in coal prices. At the beginning of 2008 that effect was reinforced by rising oil prices. Shortly after that came a third increase attributable to the natural gas price, whether or not combined with the nuclear capacity utilisation rate (see annex 1). At the end of 2008, the effect of the gas price and the nuclear capacity utilisation rate disappeared, but prices continued to rise steadily as a result of the increase in coal prices. In 2009, there was a "mirror" effect in which the falls in the Ne-Nc index were triggered by the combination of falling gas prices and changes in the nuclear capacity utilisation rate; later they were reinforced by reductions in the prices of coal, in particular, but also oil.

Fluctuations in coal and oil prices need not mean that the electricity is produced from coal or oil, as in some long-term natural gas contracts the price is linked to movements in coal or oil prices.

The fact that changes in the Ne-Nc index and the HICP follow much the same pattern strongly suggests that the volatility is due to the use of the parameter Nc, especially owing to its coal price component. The combination of the gas price and the nuclear capacity utilisation rate is also a contributory factor.

### 3.1.2 Nuclear capacity utilisation rate and the impact of changes in natural gas prices

The coefficient of changes in the price of natural gas in the formula for Nc is not constant, as it depends on the nuclear capacity utilisation rate (see annex 1). The

change in this "natural gas component" is therefore due to both changes in the natural gas price index and changes in that coefficient. However, that change can be broken down into a component that depends on the nuclear capacity utilisation rate and a component that depends on the movement in the price of natural gas. There is also a component consisting of the interaction between the two changes. This breakdown is explained in annex 4 and depicted in chart 13. The chart data are expressed in eurocent/kWh, which is different from the unit used in chart 12 (percentages). Chart 13 therefore also shows the year-on-year change in the Ne-Nc index in eurocent/kWh.

The chart shows the changes in the term "Nc-Isptgas" from chart 12 broken down into three elements (see annex 4):

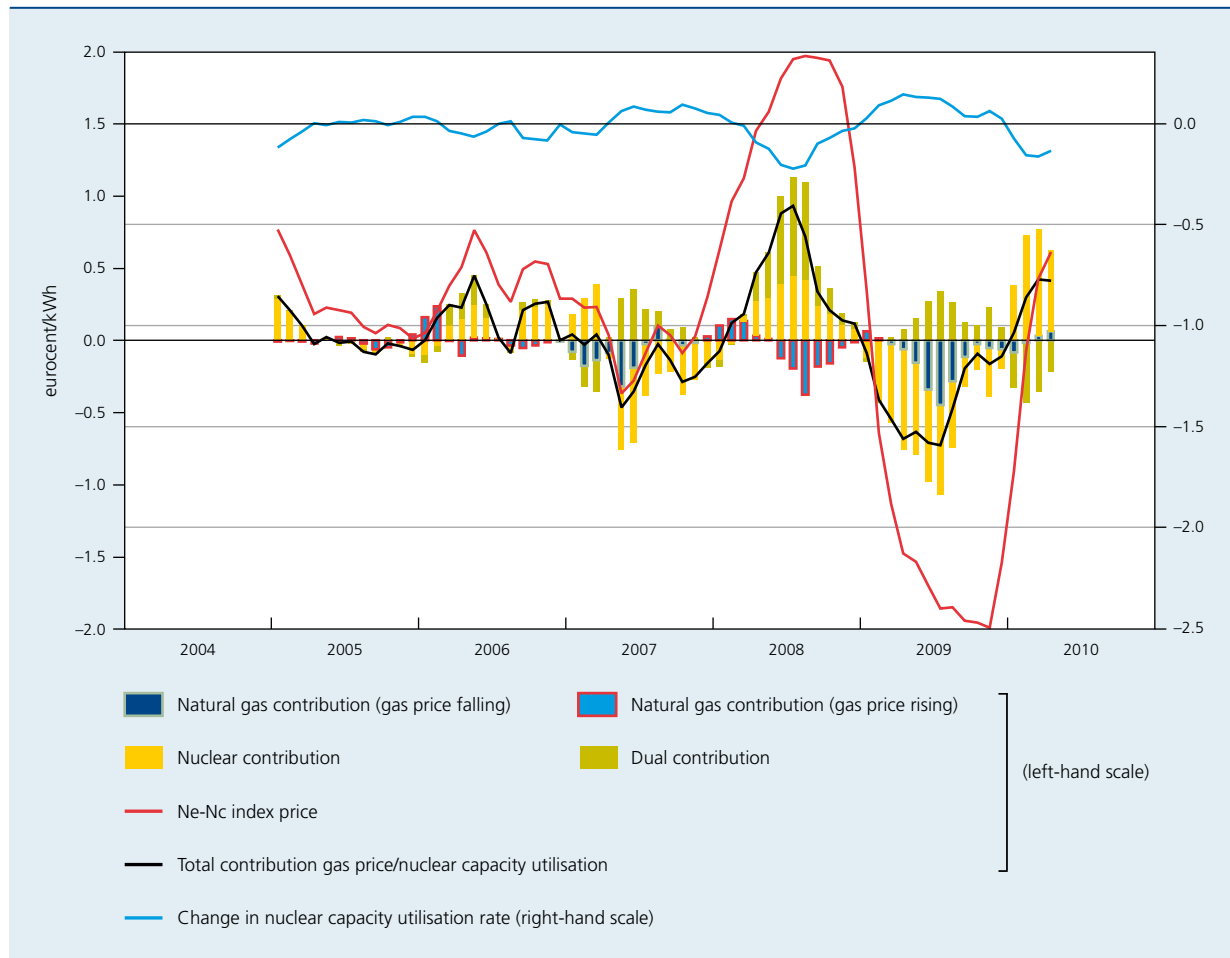
- "nuclear contribution" indicates what the change would have been if the gas price index had remained constant, i.e. if it is only the nuclear capacity utilisation rate that has changed
- "natural gas contribution" similarly indicates what the change would have been if the nuclear capacity utilisation rate had remained constant, i.e. if it is only the gas index figure that has changed
- the preceding two situations are hypothetical, as in practice, both the gas price index figure and the nuclear capacity utilisation rate are variable; there is therefore also a third component called the "dual contribution".

The sum of those contributions is equal to the total (year-on-year) change in the Nc-Isptgas component. It is stated as the "total contribution of gas price/nuclear capacity utilisation".

Since the coefficient  $(1 - Ifnu)$  may have a negative value, that contribution may be negative even if the gas price increases. The blocks indicating the "gas contribution" are therefore outlined in red for the periods in which the gas price is rising and in green if it is declining.

Chart 13 shows that in mid 2008 the contributions of the combined natural gas price/nuclear capacity utilisation rate to the total parameter were due primarily to changes in the nuclear capacity utilisation rate. That lower utilisation rate was due to maintenance work and/or other problems (particularly the replacement of steam generators for Doel 4 and Tihange 3 and the reloading of fuel in Doel 2, 3 and 4 and in Tihange 2 and 3). In the second half of 2008, the gas price increased but that exerted downward pressure on the price. At the beginning of 2009, the improvement in the nuclear capacity utilisation rate exerted downward pressure on the Ne-Nc index. That effect was augmented by a decline in the gas price index.

**CHART 13** ANALYSIS OF THE CONTRIBUTION OF CHANGES IN THE NATURAL GAS PRICE  
(year-on-year changes)



Sources: CREG, own calculations.

Chart 14 simulates the impact of the nuclear capacity utilisation rate. It shows what the Ne-Nc index would have been if the nuclear capacity utilisation rate had remained constant since January 2004. In comparison with chart 10, which depicts the real situation, it appears that the price of natural gas would then have had far less influence; in these hypothetical circumstances, the steep price increases would then have occurred somewhat later (around mid 2008).

### 3.2 Analysis of the components of the Ne-lem index

#### 3.2.1 Breakdown of the Ne-lem index

A similar analysis of the separate components can also be conducted for the Ne-lem index. That index, like the

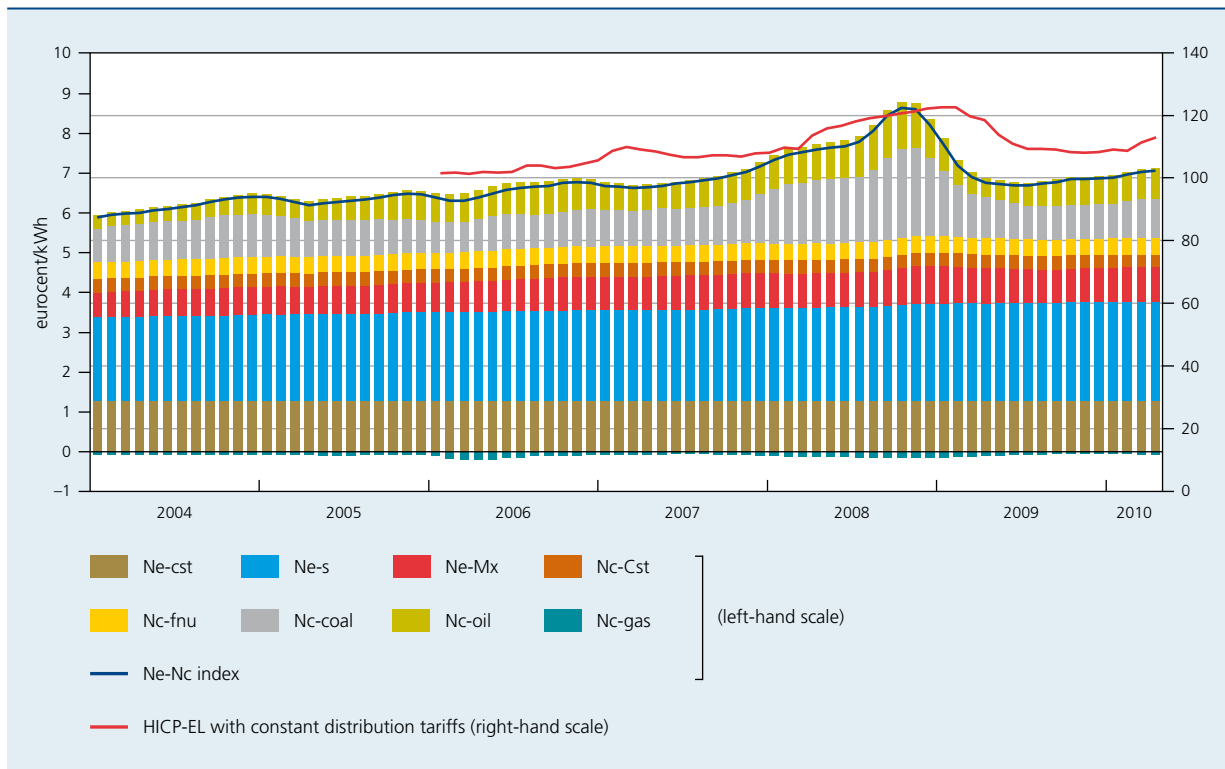
Ne-Nc index, is made up as follows (see also formula (2) and annex 3):

$$a_{Ne} \cdot Ne = Ne\_cst + Ne\_s + Ne\_Mx \quad (5)$$

$$a_{lem} \cdot lem = lem\_cst + lem\_dah311 + lem\_coal311 + lem\_Belpex311 \quad (6)$$

This breakdown is also illustrated in chart 15. Here, too, the parameter Ne is the most significant and the most stable component. Comparison of charts 10 and 15 shows that the weight of Ne is roughly the same in formulas (3) and (5). In chart 10, the parameter Nc was responsible for the volatility; here it is the parameter lem. The comparison of charts 10 and 15 also reveals that the constant element in lem is greater than in chart 10. Both lem and Nc reflect the movement in fuel costs, so that this constant term reflects the part of the fuel costs that changes little (if at all). That applies, for instance, to

CHART 14 SIMULATION – HIGH NUCLEAR CAPACITY UTILISATION RATE



Sources : CREG, own calculations.

the cost of nuclear power stations, HEP stations, wind turbines etc. That constant term reduces the volatility but not the level.

Chart 16 shows the year-on-year changes in the weighted lem components. The year-on-year increases in 2008 seem to be due mainly to the rising prices of natural gas (lem-dah311) rather than the price increases on Belpex. Coal prices played only a minor role in 2008. In 2009 there were similar changes but in the opposite direction.

Indexation on the basis of the Ne-lem index seems to make sense for suppliers whose intermediate costs depend on the gas price, electricity exchange prices and coal prices. That does not necessarily mean that they buy from coal producers. For example, it is possible that long-term contracts for buying natural gas are indexed to the movement in coal prices. However, indexation on the basis of a production mix is justified only if the purchase production mix is relatively constant. In practice that is hard to verify because – as already mentioned – suppliers can buy from any chosen producer. The production mix therefore has to be derived indirectly from the purchase mix. Use of the Belpex index may be sensible if shortfalls are only rectified

by buying on Belpex or if some of the supplier's purchase contracts are linked to that exchange index.

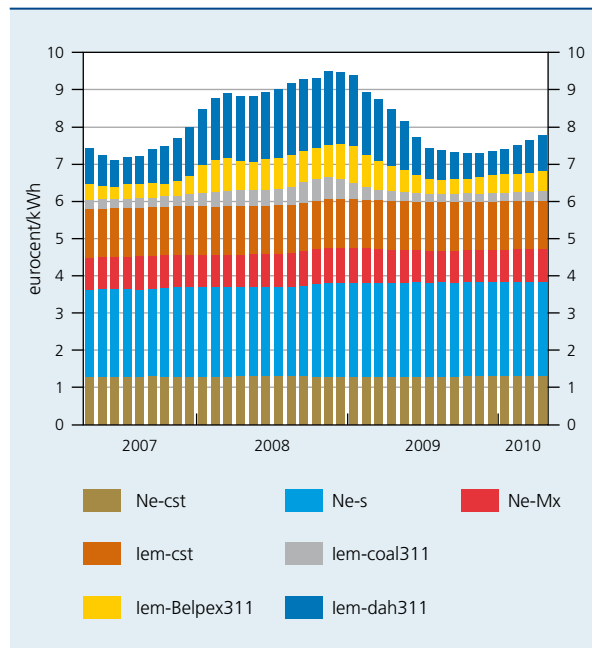
### 3.2.2 Comparison of the changes in the Ne-Nc index and The Ne-lem index

Chart 17 compares the changes in the lem index with those in the Nc index. The year-on-year changes in the lem component of the Ne-lem index are due mainly to fluctuations in natural gas prices and, to a lesser extent, electricity prices on Belpex and coal prices.

The changes in Nc are due to fluctuations in coal and oil prices and changes in the natural gas component (remember that that component comprises two elements, namely the nuclear capacity utilisation rate and the index of natural gas prices). The gas component of Nc is broken down further in chart 17c. This shows that the movement in that component is determined mainly by the changes in the nuclear capacity utilisation rate.

It is also evident that the movement in gas prices in lem differs from the index reflecting the gas price changes in Nc.

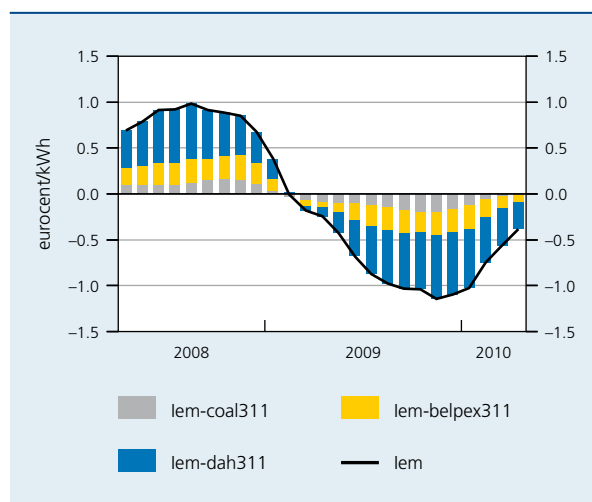
**CHART 15** COMPONENTS OF THE CALCULATED NE-IEM INDEX FOR TARIFF SETTING



Source: Own calculations.

Nc and lem both show the movement in fuel costs. The varying composition of these two parameters Nc and lem is therefore due to differences in the supplier purchase structure. Suppliers who use Nc assume a mix of purchases from producers who generate electricity on the basis of nuclear energy, oil, natural gas and coal, where

**CHART 16** COMPONENTS OF THE IEM INDEX FOR TARIFF SETTING (year-on-year changes)



Source: Own calculations.

natural gas is a substitute for nuclear energy in cases where less use is made of nuclear power station capacity. Since the formula for Nc gives those fuels a fixed weight, it is implicitly assumed here that all suppliers who use Nc also have the same purchase mix in regard to primary fuels. Suppliers who use the parameter lem consider that the costs of their purchase mix depend on the gas price, electricity exchange prices and coal prices.

Both fuel index figures contain a constant term. That term is relatively more significant for the lem index.

There is no component relating to CO<sub>2</sub> emissions, nor to the costs of the public service obligations (particularly the purchase of the green electricity certificates which have to be submitted annually).

### 3.3 Suppliers' costs and indexation of selling prices

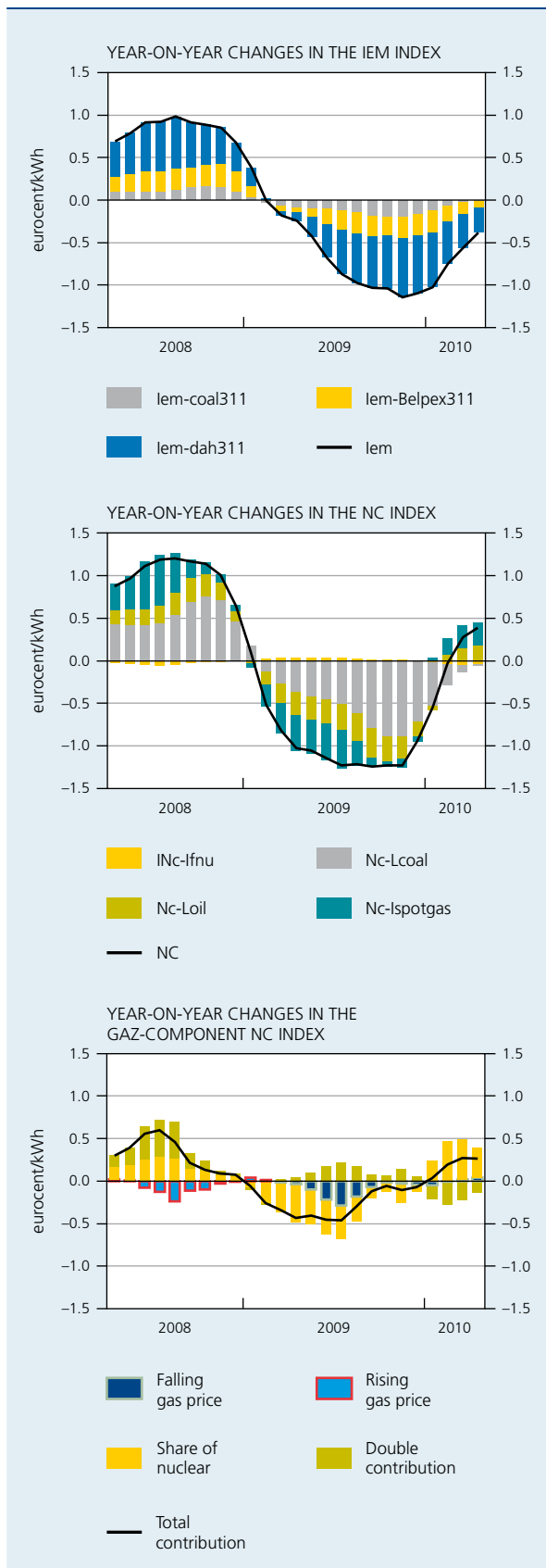
It is clear from the foregoing that the volatility of the HICP for electricity is almost certainly due to the indexation mechanisms used in the variable-price contracts. That indexation of selling prices is justified by the variability of the costs of suppliers' purchases. As a result, the supplier has to adjust his selling prices in line with his purchase costs in order to maintain the level of his margin.

The Ne and Nc indices were already in use before 2007. However, the definition of the parameter Nc was adjusted in 2004 (see the new definition in annex 1<sup>(1)</sup>) because the old definition was based on confidential data<sup>(2)</sup>. After deregulation, it was therefore no longer possible to use the old formula. The pre-2004 Nc formula refers explicitly to the composition of the fuel mix used in the production of electricity<sup>(3)</sup>. It defined Nc on the basis of the monthly expenditure on the various fuels, and therefore took implicit account of monthly changes in the mix. The new formula no longer does that; it therefore implicitly assumes a constant fuel cost mix. For more information on the old definition of Nc, see annex 5.

The parameter lem came into use in 2008. However, that parameter cannot in itself explain the greater volatility in the HICP for electricity because it only applies to a small share of the market. The lem index was introduced because the parameter Nc inadequately reflected the costs of the supplier in question.

(1) Moniteur belge (2004).  
 (2) CREG (2003).  
 (3) Moniteur belge (2001).

CHART 17



Source : Own calculations.

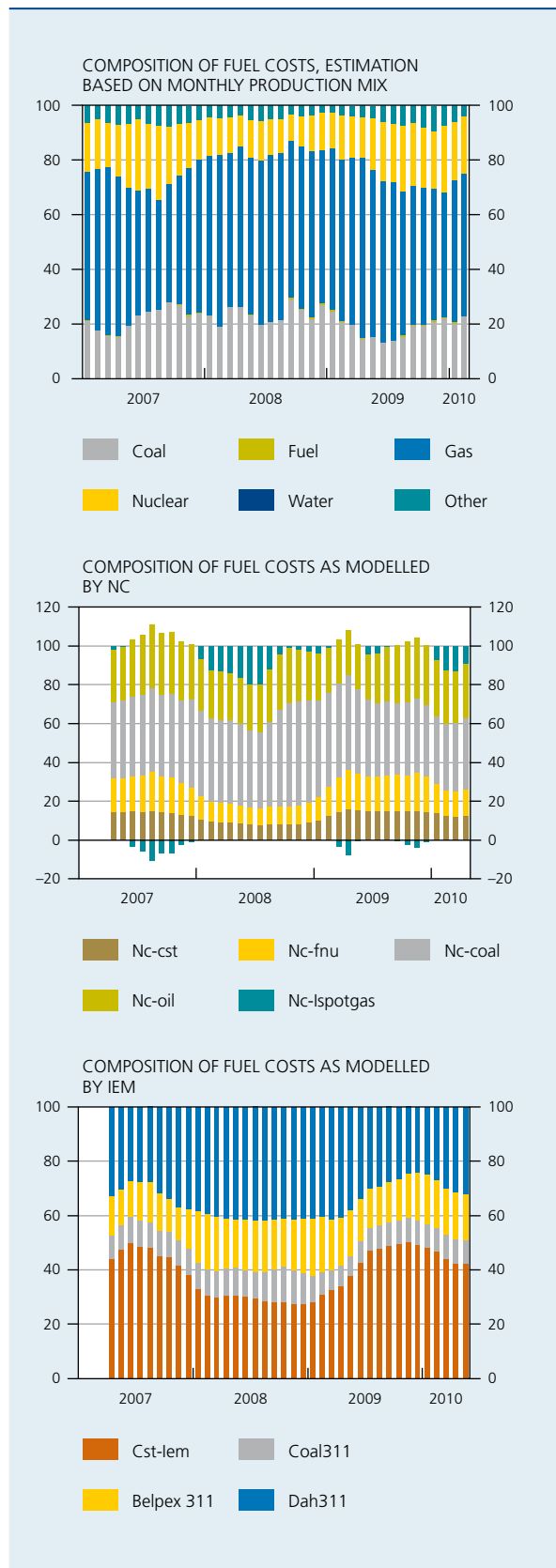
On a liberalised market, suppliers are free to determine their indexation formulas. Ideally, that indexation formula should reflect the supplier's costs. In theory, the use of different formulas by the various suppliers should lead to price differences and hence to shifts in demand in favour of the producers offering the cheapest production mix. However, these theoretical conclusions are based on a number of fundamental assumptions. For example, it need not be that households are perfectly and fully informed. The preceding chapters have shown that the use of different indices (Ne, Nc, lem, etc.) and different, variable weights for each index increases the complexity and reduces transparency. The difference in frequency between price adjustments and invoicing also implies that the private user only knows *ex post* what price he is paying. The price which changes every month is often published on the website. The search for the cheapest supplier (inherent in the efficient operation of a free market) assumes that every household makes the effort to compare that information again on the internet every month, and furthermore is capable of estimating the effect on the invoiced price for the months ahead. That entails knowledge of the underlying calculation algorithms.

The supplier's costs are determined by his purchase mix; the underlying production mix can only be calculated or estimated indirectly; furthermore, it may vary. The question is therefore whether the volatility of fuel costs and the variability of the purchase mix (and hence of the fuel costs) should be passed on to households.

The indexation formula used should reflect the supplier's cost structure. If the components are wrong, if the required components are absent or if the weightings are incorrect, the price charged to households will have no connection with the real costs. Free competition between the various suppliers ought to correct that. On the deregulated market, Nc and lem should therefore reflect the movement in fuel costs for the entire Belgian production capacity, or at least for that part of the capacity that supplies households with electricity on the regulated market. However, it is difficult to separate the part of the capacity used to supply households; for that reason, an attempt is made to break down the monthly costs of the entire capacity into the costs of the fuels used.

The ELIA website gives monthly injection data per technology, distinguishing between coal, oil, gas, nuclear, HEP and other power stations. On the basis of that monthly production mix in a given period it is possible to calculate average fuel costs for production during that period (for more details, see annex 6). For that purpose, production costs per technology are estimated. On the basis of the indices for the fuels (I-spotgas, I-oil, I-Coal) and assuming that the fuels for nuclear, HEP and other power stations

**CHART 18** RELATIVE CONTRIBUTION TO FUEL COSTS – COMPARISON



Sources: Own calculations.

remain unchanged over the period, it is possible to estimate the year-on-year changes in the average fuel costs for the entire capacity on the basis of an initial price. Those fuel costs can easily be broken down by type of fuel (see annex 6) to give the relative fuel cost structure (see chart 18). This chart shows that over the period considered, gas was the principal fuel cost component, followed by coal. Chart 18 compares those relative contributions with the relative contributions of the various components of Nc and Iem.

The composition of fuel costs in chart 18 differs from the structure of the indices Nc and Iem, though the latter should reflect the suppliers' fuel costs. That does not necessarily imply that the parameters Nc and Iem ought to be identical with the fuel costs for the entire Belgian production capacity, because every supplier is free to purchase from any chosen producer. The market share of the suppliers who use Iem is small (see table 1). The fuel mix of those suppliers may therefore deviate from that of the Belgian capacity as a whole, which could explain the differences between the first and third parts of chart 18.

In view of the large share of suppliers using Nc, however, one could expect some similarity, but that is not the case. This need not mean that Nc is a poor reflection of the fuel cost pattern, because other explanations are possible: long-term purchase contracts for gas may be indexed to the price of coal, or the part of the production capacity used to supply households may differ in its composition from the capacity as a whole.

It is also worth mentioning that the share of the fuel costs that hardly ever changes (the constant) is greater in the Iem index. Once again, this does not mean that the cost pattern is misrepresented, because the costs depend on the supplier's fuel mix.

However, it is surprising that the formulas for Nc and Iem are clearly based on a fuel mix which remains constant over time. Yet on a liberalised market suppliers are free to modify their buying, there may be changes in the producers' production facilities, and the fuel mix may also be modified in the event of changes in relative fuel prices. For completeness, it should be noted that price increases under existing contracts are very strictly regulated by the consumer protection law. However, indexation formulas are permitted so long as the indexation mechanism is explicitly spelt out in the contract<sup>(1)</sup>.

Note that no account is taken of the costs of emission rights or public service obligations.

(1) See the law of 6 April 2010 on market practices and consumer protection.

## 4. Fuel costs and pricing in neighbouring countries

This article has shown that the Belgian HICP for electricity exhibits a very close correlation with the Ne-Nc index and the Ne-lem index, and is therefore most likely to reflect the method of indexation in the variable-price contracts of Belgian households. As a result of that indexation mechanism, changes in the parameters are very quickly reflected in the prices charged to private consumers. The question is whether such price index formulas are also used in other countries. On the basis of information available to the public it is not easy to check how selling prices elsewhere are adjusted in line with fluctuations in costs, particularly the direct or indirect fuel costs incurred by electricity suppliers.

In some neighbouring countries, households are still in most cases supplied with electricity at regulated tariffs (that is so in France, where over 95 p.c. of prices are still regulated)<sup>(1)</sup>, or mechanisms have been incorporated to limit the frequency of price changes and/or to assess whether the price changes are reasonable (that is the case in the Netherlands where the NMa Energiekamer checks whether price changes are fair)<sup>(2)</sup>. On the German and British markets, the competition authority and the regulator respectively conduct ex post checks to see whether tariff adjustments are reasonable.

To find out whether domestic electricity prices are also aligned with production costs in other countries, this chapter examines whether there is any correlation between the movement in fuel costs (expressed by the indices I-coal, I-spotgas and I-oil used in the parameter Nc) and the HICP index for electricity in Belgium and in neighbouring countries. The correlations calculated are set out in table 3.

The correlations were calculated for the period January 2007 to March 2010. It should first be pointed out that

**TABLE 3** CORRELATION BETWEEN HICP-EL AND THE VARIOUS COMPONENTS OF NC

	Coal	Oil	Spotgas
Belgium .....	0.685	0.513	0.682
Germany .....	-0.057	-0.163	-0.025
France .....	-0.075	-0.079	-0.167
Netherlands .....	-0.057	-0.349	0.114

Sources: Own calculations based on Eurostat (HICP) and CREG (sub-indices).

the HICPs are calculated on the basis of an all-in tariff (see table 2) and that they therefore include components other than the energy price. The Belgian HICP seems to show a positive correlation with all sub-indices. The French and German HICPs have a (slight) negative correlation with the fuel indices. The Dutch index tracks the movement in the gas price. However, the correlation with the oil and coal indices tends to be negative.

Nevertheless, it should be noted that the findings in table 3 must be interpreted with due caution, especially as the various fuel indices have a strong mutual correlation. That is undoubtedly attributable to an underlying common factor, namely developments in the emerging economies which caused a surge in demand for energy in the period considered. Table 3 thus presents total correlations. For example: owing to the strong correlation between the coal index and the oil index, the link between coal and the HICP includes a component connected with fluctuations in oil prices.

The correlations calculated show that, over the period considered, the HICP came under upward pressure as a result of an increase in any of the fuel indices, whereas neighbouring countries experienced multiple effects which partly cancelled one another out. Yet on the basis of this table, it seems rather unlikely that, in neighbouring countries, changes in fuel costs were passed on to households via automatic, monthly adjustment.

## Conclusions

Sources of energy (oil, gas and electricity) have already formed the subject of analysis in various studies on the Belgian harmonised index of consumer prices. Before 2007 the movement in the oil price (and prices of derivatives) was a significant explanatory variable in the pattern of inflation. Since 2007, natural gas and electricity have also made a major contribution to the divergence between the Belgian HICP and the European average.

This article took a closer look at the method of pricing electricity. It shows that there is a very close correlation between the HICP for electricity and the indexation mechanisms which electricity suppliers use in their variable-price contracts. That indexation is based on certain parameters, the commonest being Ne, Nc and lem. The Ne index reflects changes in labour and material costs. The current definition of the Nc index has applied since

(1) NAI, Price Observatory (2009), CRE (2010).

(2) Brattle Group (2009). For more information on the "safety net method", see <http://www.energiekamer.nl/nederlands/gas/levering/tarieftoezicht.asp>.



2004, and that parameter reflects the movement in the cost of the fuels which producers use. Most producers use the Nc index. The lem index is different from Nc, but also tracks the movement in fuel costs.

The parameter Ne is relatively stable. The Nc index is more volatile because its constituent components – the prices of coal, oil and gas, and the nuclear capacity utilisation rate – have become more volatile. The lem index is also more volatile, mainly because of major changes in the price of its natural gas component.

In a totally free market, prices should in theory reflect the costs of efficient producers. Sufficient transparency and competition are also required to ensure that the market mechanism can be fully effective. If these conditions are not entirely fulfilled, corrective measures can be applied by means of greater regulation.

On the Belgian deregulated market, electricity suppliers are free to choose their indexation parameters. In principle, the indexation formulas used should reflect the costs of efficient production. It is not possible to confirm that theoretical assertion on the basis of a rough estimate of fuel costs and analysis of the formulas.

Prices charged to households are adjusted monthly on the basis of the said indexation formulas. However, invoicing takes place annually. The annual consumption is converted to a monthly figure on the basis of pre-defined (and therefore approximate) load profiles. Annual invoicing implies that users are unaware of the volatility, but it also means that they do not know in advance what price they are paying. That is not conducive to transparency, yet the free market must be transparent in order to operate efficiently. Transparency is further reduced by the use of different indices, all with their own variable weightings.

Compulsory advance notice might reduce the frequency of price adjustments in view of the associated menu costs. That information obligation could also enhance transparency, as well as encouraging people to modify their consumption. However, it would be essential to ensure that the menu costs lead to less frequent price changes, and are not passed on in higher bills while the frequency of changes remains the same. A periodic but less frequent adjustment in line with market prices, by analogy with the variable interest rates on mortgage loans, is another approach worth investigating.

The more rapid transmission of changes in the parameters does provide an explanation for the greater volatility of Belgian electricity prices, though the question is whether the parameters actually reflect the suppliers' costs. On a

free market, the free choice of the indexation formula and parameters used should lead to prices which reflect the suppliers' costs. That could not be demonstrated on the basis of a rough estimate of the production costs of the production capacity as a whole. A rough estimate of the average fuel costs of the Belgian production facilities reveals that the cost structure differs from the indexation formulas. There are various factors which could account for that: suppliers can purchase electricity from the producer of their choice, so that the mix may differ from the mix of Belgian production capacity. Strictly speaking, it is necessary to consider the mix of that part of the capacity which is used to supply households with electricity, but that is difficult to isolate.

Conversely, it is true that the formulas for both Nc and lem assume a fixed fuel mix. Nevertheless, that mix is not constant: there may be changes in the production capacity, variations in relative fuel prices influence the mix, etc.

Some components affecting the price of electricity are not included in the formulas. Examples are the costs of emission rights and public service obligations.

In practice, it is not feasible to take constant account of these factors, as that would lead to frequent adjustments and substantial menu costs. The "safety net" method used in the Netherlands could offer a solution here. This method stipulates that the suppliers must submit every tariff change to the regulator four weeks in advance of implementation. The regulator then assesses whether the tariff increase is fair in view of the costs incurred by the supplier. If the proposed tariff does not conform to the maximum limits set by the regulator, the supplier is given the opportunity to explain the increase. If, after completion of this procedure, the regulator judges the tariff to be unreasonable, then the supplier has a maximum tariff imposed on him. Different maximum tariffs may apply for green and grey electricity<sup>(1)</sup>.

As a result of this method, the problem of the complex structure of suppliers' costs, in which fuel costs are only one element, is transferred from the consumer to the regulator. Furthermore, the regulator has access to the supplier's internal operating data. That is absolutely essential in order to assess whether the tariffs correspond to the costs.

In an efficient market, there would be no need for the "safety net" method if consumers could readily compare the various suppliers' tariffs and if they could also readily switch their supplier.

(1) For more information on the "safety net method", see <http://www.energiekamer.nl/nederlands/gas/levering/tariefteezicht.asp>.

In neighbouring countries, the consumer price indices are less volatile than in Belgium. It was not possible to establish any link between the HICP-EL of neighbouring countries and the indices used in Belgium in variable-price contracts. That suggests that those other countries may apply a different method of adjusting selling prices in line with the suppliers' costs. Moreover, electricity prices are often still regulated in neighbouring countries (France) or prices are adjusted far less frequently ("safety net" method in the Netherlands).

The indexation formulas used in Belgium imply that all changes in primary fuel prices are passed on quickly and virtually in full in consumer prices: that is not the case in neighbouring countries.

## Bibliography

Moniteur belge/Belgisch Staatsblad (2001), "Ministerial Decree laying down maximum prices for the supply of electricity", 15 December.

Moniteur belge/Belgisch Staatsblad (2004), "Ministerial Decree amending the ministerial decree of 12 December 2001 laying down maximum prices for the supply of electricity", 19 March.

Belpex (2009), *Activity Report 2008*.

Brattle Group (2009), *Assessment of the effects of tariff regulation on the Dutch residential retail markets for energy*, Brattle Group, June.

Coppens F. and D. Vivet (2004), "*Liberalisation of network industries: is electricity an exception to the rule?*", NBB, Working Paper 59.

Cornille D. (2009), "Methodology of pricing: what is the reason for the greater volatility of consumer prices for gas and electricity in Belgium?", NBB, *Economic Review*, December, 49-60.

CRE (2010), *L'ouverture des marchés de détail de l'électricité et du gaz, bilan 2009*, Paris, 1 March.

CREG, CWAPE, VREG, BRUGEL (2009), *Development of the markets in electricity and natural gas in Belgium, 2008*, Press release.

CREG, CWAPE, VREG, BRUGEL (2010), *Development of the markets in electricity and natural gas in Belgium, 2009*, Press release.

CREG (2003), *Opinion on the new definition of the parameter Nc*, A030717-CDC-205, 17 July.

CREG (2007), *Annual report 2007*.

CREG (2008a), *Electricity tariffs, price review parameters – definitions*, 4 September.

CREG (2008b), *Annual report 2008*.

CREG (2009a), *Failure of pricing on the liberalised Belgian electricity market and the reasons for it*, Study (F)090126-CDC-811, 26 January.

CREG (2009b), *Components of prices of electricity and natural gas*, Study (F)090519-CDC-872, 19 May.

CREG (2009c), *Report TE2008 on the distribution network tariffs applied by electricity distribution network operators in the 2008 operating year*, 19 March.

CREG (2009d), *Annual report 2009*.

CREG (2010a), *Detailed rules on the calculation of the margin for the purpose of determining the maximum electricity prices to be charged to unprotected customers whose contracts have been terminated*, Decision (B)100429-CDC-964, 29 April.

CREG (2010b), *The feasibility of introducing progressive pricing of electricity in Belgium*, Study (F)100610-CDC-972, 10 June.

EBEM, *Tariefkaart voor levering aan consumenten and klein zakelijk verbruik*, tariff schedule.

ECB (2010), *Energy markets and the euro area macroeconomy*, Structural Issues Report, June.

ECS, "*ElectrabelEnergyPlus*", tariff schedule.

FPS Economy, SMEs, Self-employed and Energy (2008), *The energy market in 2007*.

FPS Economy, SMEs, Self-employed and Energy (2010), *Survey of electricity prices on the residential market*.

GEMIX (2009), *The ideal energy mix for Belgium in 2020 and 2030*, 30 September.

IEA (2009), *IEA statistics – electricity information*, Paris

Luminus, "*Luminus Actief*", tariff schedule.

NAI, Price observatory (2010), *Price analysis: Annual Report 2009 of the National Accounts Institut*, Brussels, February.

NBB (2008), *Report 2007, Economic and financial developments*, February.

NBB (2009), *Report 2008, Economic and financial developments*, February.

NBB (2010), *Report 2009, Economic and financial developments*, February.

NMa (2009), *Marktmonitor Nederlandse kleinverbruikersmarkt voor electricity and gas, juli 2007-juni 2008*, The Hague, January

Nuon, "*Nuon Flex*", tariff schedule.

OECD/IEA (2009), *Key world energy statistics*, Paris.

OECD/IEA (2010), *Energy prices and taxes, quarterly statistics, fourth quarter 2009*, Paris.

VREG (2010), *Marktmonitor 2009*.

## Annex 1 : Definition of the parameters Nc and Ne

This annex (based on the document CREG (2008a)) explains the parameters Nc and Ne. The values of these parameters are published on CREG's website in the form of monthly time series calculated as follows:

The parameter Ne reflects the movement in labour and material costs and is defined as:

$$Ne = 0,425 + 0,390 \frac{s}{8,88131} + 0,185 \frac{Mx}{141,51}$$

where s gives the change in wages in the metalworking industry and Mx tracks the cost of materials.

The parameter Nc reflects the prices of primary fuels and is defined as:

$$Nc = 0,214 + 0,260.I_{fnu} + 0,375.I_{coal} + 0,240.I_{oil} + 1,195.(1 - I_{fnu}).I_{spotgas}$$

$I_{fnu}$  is an index which indicates the nuclear capacity utilisation rate, measured against an initial value. This figure may therefore be greater than one.

$I_{coal}$ ,  $I_{oil}$ ,  $I_{spotgas}$  respectively give the changes in prices of coal, oil and natural gas. They are also indices measured in relation to a base period.

## Annex 2 : Calculation of the coefficients of nc and ne on the basis of one supplier's tariff schedule

A typical supplier's tariff schedule contains the following (considering only the energy price and a supplier's margin):

- a fixed tariff component expressed in eurocents per annum. This fixed component is a multiple of the parameter Ne published by the CREG.

$$\text{Thus } T_{fix} = c_f \cdot Ne$$

- a peak rate tariff which combines the parameters Ne and Nc. It is expressed in eurocents per kWh.

$$\text{Thus } T_{peak} = c_{p,e} \cdot Ne + c_{p,c} \cdot Nc$$

- an off-peak tariff which combines the parameters Ne and Nc. It is expressed in eurocents per kWh.

$$\text{Thus } T_{low} = c_{l,e} \cdot Ne + c_{l,c} \cdot Nc$$

- possibly a night-time tariff which combines the parameters Ne and Nc. It is expressed in eurocents per kWh.

$$\text{Thus } T_{night} = c_{n,e} \cdot Ne + c_{n,c} \cdot Nc$$

On the basis of this information combined with a particular consumption profile, it is possible to determine an index that summarises everything in one formula comprising only Ne and Nc. By definition, a consumption profile determines consumption per type of tariff. The profile therefore comprises three types of consumption (a quantity consumed at peak rates, a quantity consumed at off-peak rates and a quantity consumed at night-time rates), all expressed in kWh. The respective types of consumption are represented as  $(q_p, q_l, q_n)$ . For example, for the consumption profile "3,500kWh per annum, including 1,500 at the off-peak rate", this becomes (2000 kWh, 1500 kWh, 0 kWh).

The formula is fairly simple to derive.

For consumption of  $(q_p + q_l + q_n)$  the annual bill comes to

$$T_{fix} + q_p \cdot T_{peak} + q_l \cdot T_{low} + q_n \cdot T_{night}$$

If the formulas for the different types of tariff are substituted, we get

$$c_f \cdot Ne + q_p \cdot (c_{p,e} \cdot Ne + c_{p,c} \cdot Nc) + q_l \cdot (c_{l,e} \cdot Ne + c_{l,c} \cdot Nc) + q_n \cdot (c_{n,e} \cdot Ne + c_{n,c} \cdot Nc)$$

If we work out and restate the formula, we get

$$(c_f + q_p \cdot c_{p,e} + q_l \cdot c_{l,e} + q_n \cdot c_{n,e}) \cdot Ne + (q_p \cdot c_{p,c} + q_l \cdot c_{l,c} + q_n \cdot c_{n,c}) \cdot Nc$$

This is the consumption paid for  $(q_p + q_l + q_n)$

Per kWh that gives us the following formula

$$\frac{(c_f + q_p \cdot c_{p,e} + q_l \cdot c_{l,e} + q_n \cdot c_{n,e})}{(q_p + q_l + q_n)} \cdot Ne + \frac{(q_p \cdot c_{p,c} + q_l \cdot c_{l,c} + q_n \cdot c_{n,c})}{(q_p + q_l + q_n)} \cdot Nc$$

This is a formula that gives total consumption according to the parameters Nc and Ne.

## Annex 3: Definition of the parameters lem and lec USED BY LUMINUS

Since May 2008, the electricity supplier Luminus has stopped using the parameter Nc and switched to an alternative parameter of which two variants were defined, namely lem and lec. The parameter lec is more closely linked to daily prices on the Belpex exchange.

The two parameters were defined as follows:

$$I_{em} = 0,684633 + 0,03856 \cdot DAH311 + 0,006321 \cdot Belpex\ 311 + 0,002479 \cdot Coal311$$

$$I_{ec} = 0,3423165 + 0,01928 \cdot DAH311 + 0,003161 \cdot Belpex\ 311 + 0,00124 \cdot Coal311 + 0,034555 \cdot Belpex$$

The coefficients of lec are therefore half those of lem and the term "Belpex" was added.

The suffix 311 indicates that the index figure is a quarterly average of the prices. In the case of DAH that is a quarterly average of the gas price at the Zeebrugge Hub. Belpex311 is the (quarterly) average price on the Belpex electricity exchange, and Coal 311 is the average coal price taken over three months. The Belpex variable with no suffix is the average price on Belpex over the past month.

Note that the coefficient of Coal 311 is expressed in a different unit (tonne/€). The coefficients of DAH311, Belpex311 and Belpex are in MWh/€.

## Annex 4: Analysis of the contribution of changes in the gas price

The coefficient of the gas price index in the formula for  $N_c$  depends on the nuclear capacity utilisation rate. However, the total contributions of the last term in the formula for  $N_c$  can be broken down as follows:

If the last term is written as  $c_{gas} \cdot I_{gas}$ , then the change in that term between two periods "1" and "2" is equal to  $c_{gas}^{(2)} \cdot I_{gas}^{(2)} - c_{gas}^{(1)} \cdot I_{gas}^{(1)}$ .

This can be rewritten as:

$$\begin{aligned} c_{gas}^{(2)} \cdot I_{gas}^{(2)} - c_{gas}^{(1)} \cdot I_{gas}^{(1)} &= c_{gas}^{(2)} \cdot I_{gas}^{(2)} - c_{gas}^{(1)} \cdot I_{gas}^{(1)} + c_{gas}^{(2)} \cdot I_{gas}^{(1)} - c_{gas}^{(2)} \cdot I_{gas}^{(1)} \\ &= c_{gas}^{(2)} \cdot \Delta I_{gas} + \Delta c_{gas} \cdot I_{gas}^{(1)} \end{aligned}$$

The term in  $c_{gas}^{(2)}$  implicitly depends on the change  $\Delta c_{gas}$  and should therefore be rewritten as  $c_{gas}^{(2)} = c_{gas}^{(1)} + \Delta c_{gas}$ , ultimately giving us

$$c_{gas}^{(2)} \cdot I_{gas}^{(2)} - c_{gas}^{(1)} \cdot I_{gas}^{(1)} = c_{gas}^{(1)} \cdot \Delta I_{gas} + \Delta c_{gas} \cdot I_{gas}^{(1)} + \Delta c_{gas} \cdot \Delta I_{gas}$$



## Annex 5: Old definition of the parameter $Nc$

For a detailed definition of the parameter  $Nc$ , before it was revised in 2004, see the 12 December 2001 issue of the *Moniteur belge*. This annex contains a simplified version to describe the differences between the old and new definitions, as those differences explain why the old definition offered a better reflection of the costs.

It should also be noted that the old formula was devised before deregulation, in a period when suppliers and producers were still vertically integrated. In that context, suppliers have a better idea of the cost of the fuel used.

On the deregulated market it was no longer possible to use the old formula because it was based on internal corporate data which ceased to be in the public domain after deregulation.

In the *Moniteur belge*/Belgisch Staatsblad (2001),  $Nc$  is defined for a given month "m" as  $Nc^m = \frac{Ce^m}{Ce_{reference}}$ , where

$Ce^m$  represents the average fuel costs in that month.  $Ce^m$  is defined in more detail in the text of the law.  $Ce^m$  is calculated monthly. In simple terms, it can be said that  $Ce^m$  is the weighted average of the cost of the fuel used, namely the costs of nuclear fuel and fossil fuels. The weighting is based on the percentage of the fuels in the mix during the month in question.

$$Ce^m = \frac{1}{3} \sum_{i=2}^4 [s_{nuke}^y \cdot C_{nuke}^{m-i} + (1 - s_{nuke}^y) \cdot C_{other}^{m-i}] + EC^m$$

where

- $Ce^m$  is the value of  $Ce$  for month m
- $s_{nuke}^y$  is the percentage of nuclear production in year y
- $C_{nuke}^{m-i}$  is the nuclear energy production costs in month (m-i), in €/kWh
- $C_{other}^{m-i}$  is the average cost of fossil fuels and imports in month (m-i), in €/kWh
- $EC^m$  is an adjustment term. The first part of the formula uses the annual percentage of nuclear energy. That figure may vary from month to month, and the EC-term adjusts for that.

The formula for  $Ce$  is very different from that for  $Nc$  in annex 1. The latter assumes that there are fixed ratios for coal and oil, and that gas and nuclear are complementary. In contrast, the formula for  $Ce$  is based on the costs incurred in the month in question.

## Annex 6: Average fuel costs for a given production mix

It is possible to calculate the average fuel costs for a given production mix in a given period.

Example: month  $m$  in which, for technology  $t$ , the quantity produced (in MWh) is represented by  $q_t^{(m)}$  and the fuel costs (in €/MWh) by  $fc_t^{(m)}$ . The total fuel costs in that month are obtained by adding together the various technologies:

$$FC^{(m)} = \sum_t q_t^{(m)} \cdot fc_t^{(m)}$$

The average fuel costs are obtained after division by the total quantity produced. The contributions of the various technologies in the mix can be identified as follows:

$$\overline{fc}^{(m)} = \sum_t \frac{q_t^{(m)}}{q^{(m)}} \cdot fc_t^{(m)}$$

where  $q^{(m)}$  is the total production in the month in question.

# Summaries of articles

## Lessons from the crisis: Monetary policy and financial stability

The article examines the link between monetary policy and financial stability in the context of the recent financial and economic crisis. It aims to draw lessons from those recent events and to examine the implications for monetary policy. More specifically, it asks whether, apart from its price stability mandate, monetary policy should play a more significant and pro-active role in safeguarding financial stability.

The first section reviews the pre-crisis consensus on monetary policy. Economic developments in recent decades had shifted the focus of monetary policy to the link between price stability and economic growth, while the issue of financial stability had taken a back seat. In the prevailing macroeconomic context, known as “the Great Moderation”, a clear consensus on monetary policy emerged in terms of objectives, strategies and the institutional framework. Moreover, the dominant view was that monetary policy makers should take account of asset prices and other financial variables only in so far as they have implications for the future trend in activity and inflation over a period of approximately two years, typically taken as the relevant period for monetary policy. The monetary policy strategy of the Eurosystem is largely in line with this pre-crisis consensus. Unlike most other central banks, however, the Eurosystem has a unique two-pillar strategy in which the monetary pillar pays explicit attention to financial developments. Although initially aimed at identifying risks to price stability, it gradually focused more on aspects of financial stability.

The second section draws a number of provisional lessons from the crisis. First, the recent crisis has provided evidence that price stability is not sufficient to maintain financial stability and macroeconomic stability in general. Second, not only has the continued firm anchoring of inflation expectations enabled monetary policy-makers to respond appropriately during the crisis, but it is also destined to remain one of the key elements of future monetary policy. Furthermore, recent research has revealed recurrent patterns which may help to identify financial vulnerabilities in the run-up to a serious financial crisis. However, it is still hard to identify financial imbalances in real time, and further research in this field is desirable.

The debate on whether, in the future, monetary policy should make a greater contribution to financial stability and perhaps be given a broader mandate is still ongoing. However, some key points are already becoming clear. Financial stability should in the first place benefit from a strengthening of prudential policy, and particularly from the conduct of a macro-prudential policy. Moreover, a successful macro-prudential policy makes it easier to conduct monetary policy; it prevents monetary policy from being over-burdened or confronted by serious policy dilemmas, so that it can continue to focus on the primary goal of price stability. In principle, this does not imply any significant modification of the existing monetary policy frameworks. Nevertheless, it is necessary that monetary

policy takes full account of its impact on the risk-taking behaviour of the various economic agents. In addition, greater importance should be attributed to analysis of the formation of financial imbalances. That is not at odds with the priority of the price stability mandate, because the crisis clearly showed that risks to financial stability in the longer term also imply risks to price stability. However, it does assume an extension of the monetary policy horizon. If that horizon is actually extended, that should preferably be made explicit, as it would clarify the monetary policy strategy and increase accountability.

JEL Codes: E58, E61

Key words: financial stability, price stability, monetary policy, macro-prudential

### Rebalancing the global economy

The article examines to what extent the recovery of the global economy could gain support from a more balanced growth of global demand than in the past. Despite the gradual recovery of the global economy, it remains highly uncertain when – or even whether – growth can return to the often very vigorous pace prevailing before the crisis, especially as that dynamism was in many countries largely based on macroeconomic distortions which were most clearly apparent in the growing current account surpluses and deficits on the balance of payments, as is evident from our analysis of the figures from 1995 onwards.

At the Pittsburgh summit in September 2009, in the Framework for Strong, Sustainable, and Balanced Growth the G20 leaders agreed that deficit countries should support private savings and strive towards fiscal consolidation. They will not only need to modify their spending patterns but will also have to transfer their focus to the export sector. To offset the shortfall in demand from these deficit countries, the surplus countries are called upon to reduce their dependence on exports and tap domestic sources of growth.

The authors examine the actual policy implications of this for the US, China and the euro area. Although a number of countries have already adopted a range of policy measures which are a move in the right direction, restoring the balance of global demand remains a major challenge, not least on account of the difficult-to-implement but no less essential structural reforms, or the time required to push those reforms through. It will be no easy task to restore the macroeconomic equilibrium, achieve a broad consensus and create the conditions for strong, sustainable and balanced growth, in line with the G20 aims. The movement towards a new global balance risks becoming a protracted process, with the possibility of a worldwide growth slowdown in the meantime.

JEL Codes: E21, E22, E41, E42

Key words: G20, United States, China, euro area, saving, investment, balance of payments current account

### Strategies and measures aimed at consolidating public finances

The article outlines the current budgetary situation, explains why consolidation plans are urgently needed and provides an answer to the question as to what form those plans should preferably take. It also contains an insight into the strategies aimed at consolidating public finances.

The financial crisis and the resultant economic recession have seriously undermined the health of public finances in almost all the developed economies. Budget deficits and public debt have risen sharply and these budgetary problems will not disappear automatically once the economy has fully

recovered from the recession. On top of this, the budgetary impact of the ageing of the population could drive up budget deficits and cause public debt to rise even more quickly.

To restore the sustainability of public finances, extensive consolidation efforts are required in a wide range of countries. Although a rapid and significant consolidation effort implemented simultaneously by a large group of countries could act as a brake on the economic recovery to some extent, a postponement of consolidation efforts, on the other hand, could shake the confidence of economic agents, give rise to financing risks and trigger a strong rise in interest rates. To remove doubts about the creditworthiness of countries, it is therefore advisable not to delay the announcement of concrete and credible austerity plans, even if the measures will only be implemented in the years to come. The timing and scope of consolidation efforts are dependent on country-specific circumstances.

The scope of the consolidation efforts needed in most countries means that no limitations can be imposed with regard to the composition of consolidation plans. However, preference needs to be given to structural measures that reduce non-growth-promoting government expenditure or can dampen the increase in ageing-related expenditure. In spite of the already heavy burden of compulsory taxation in many countries, extra government revenues cannot be ruled out.

Most countries have now begun preparing budgetary exit strategies. So there is some prospect of budgetary objectives that will herald a return to healthy public finances. In some countries, concrete austerity measures have already been worked out in the meantime. In other countries, plans of this type have yet to be detailed. However, firm government action is urgently required for this latter group of countries too, all the more so since postponing the necessary consolidation efforts would entail major risks.

JEL Codes: E62, H60, H62, H63

Key words: fiscal policy, budgetary consolidation, austerity plans, government debt

### Energy markets and the macroeconomy

The article looks at the energy markets from a macroeconomic perspective. It first describes the main trends in the production and consumption of energy. Belgium is characterised by a high degree of energy dependency, since it no longer has any fossil fuel resources and renewable energy is not yet well developed in the country. Moreover, its economy has a high energy intensity, due to specialisation in energy-intensive sectors and high consumption of energy products by Belgian households.

The operation of the energy markets and the implications for the pricing of energy products is examined in a second part. The pass-through of fluctuations in the price of crude oil onto consumer prices of petrol, diesel and heating oil is both fast and full, in Belgium as well as in the neighbouring countries. However, because of the low level of excise duty on diesel and particularly on heating oil, consumer prices charged for these energy products in Belgium are more sensitive to fluctuations in the crude oil price. Also, the Belgian consumer price of gas and electricity reacts much faster than in neighbouring countries to fluctuations in prices on the international markets, since in other euro area countries, prices are adjusted less frequently than in Belgium and in some cases they are still subject to some form of regulation. More generally, despite liberalisation, the effective degree of competition on the gas and electricity markets is still very low, both in Belgium and in the other euro area countries.

Finally, the impact of fluctuations in crude oil prices on inflation and economic activity is discussed. In addition to its high energy intensity and strong reactions of its energy consumer

prices to oil price fluctuations, the Belgian economy's sensitivity to oil shocks is heightened by the indexation mechanism it applies, even though the use of the health index partly neutralises the initial shock. However, that additional negative impact can be curbed by constant monitoring of Belgian competitiveness, as prescribed by a 1996 law on the promotion of employment and the safeguarding of competitiveness.

JEL Codes: E31, E37, E64

Key words: energy markets, oil, inflation, pass-through, Belgium

### [The increased volatility of electricity prices for Belgian households: An analysis based on the specific characteristics of pricing by Belgian electricity suppliers](#)

Several studies have shown that the Belgian harmonised index of consumer prices for electricity (HICP-EL) has become more volatile since the end of 2007. The increased volatility can be observed not only for the past behaviour of the index, but also relative to other countries' indices. A study of the National Bank of Belgium has shown that methodological changes in the method of registering the base data collected for calculating the index are not the only reason. It has concluded that differences in the price-setting behaviour in the deregulated electricity markets are a more plausible explanation for this volatility.

The article analyses the Belgian price-setting mechanism in detail. Most households have signed variable-price contracts with their electricity supplier. The variable price in such contracts is aligned to suppliers' costs using indexing parameters. One of the parameters reflects changes in wages and material costs (the parameter  $N_e$ ), while other parameters follow the changes in fuel costs (several parameters are used, the most representative being  $N_c$  and  $l_{em}$ ). These parameters are computed and published by the regulator on a monthly basis.

The main findings in the article are that (1) the evolution of the HICP for electricity is strongly correlated with a linear combination of the above-mentioned parameters, (2) this linear combination is ahead of the HICP by one or two months, (3) the monthly indexation implies a fast transmission of the parameter changes to consumer prices, (4) the monthly price changes combined with the annual invoicing frequency increase the complexity and reduce the transparency, moreover, users have only *ex-post* knowledge about the price, which limits price comparability, and (5) the indexing formulae assume a fixed fuel mix. In practice, however, the fuel mix changes because suppliers switch their purchase contracts to other producers, because of fluctuations in relative fuel prices and because the composition of the production capacity is changing. Suppliers also entail costs that are not taken into account by the formulae (e.g. costs of greenhouse gas emission rights and green certificates).

It is also worth mentioning that no signs of the existence of similar indexing mechanisms were found in neighbouring countries.

JEL Codes: E31, L16, L94

Key words: harmonised index of consumer prices, electricity

## Abstracts from the working papers series

191. The incidence of nominal and real wage rigidity: An individual-based sectoral approach, by J. Messina, Ph. Du Caju, C. Filipa Duarte, N. Lynggård Hansen, M. Izquierdo, June 2010

The paper presents estimates based on individual data on downward nominal and real wage rigidities for thirteen sectors in Belgium, Denmark, Spain and Portugal. The methodology follows the approach recently developed for the International Wage Flexibility Project, whereby resistance to nominal and real wage cuts is measured through departures of observed individual wage-change histograms from an estimated counterfactual wage-change distribution that would have prevailed in the absence of any rigidity. The authors evaluate the role of worker and firm characteristics in shaping wage rigidities. They also confront our estimates of wage rigidities with structural features of the labour markets studied, such as the wage bargaining level, variable pay policy and the degree of product market competition. They find that the use of firm-level collective agreements in countries with rather centralised wage formation reduces the degree of real wage rigidity. This finding suggests that some degree of decentralisation within centralised countries allows firms to adjust wages downwards, when business conditions take a turn for the worse.

192. Economic importance of the Belgian ports: Flemish maritime ports, Liège port complex and the port of Brussels – Report 2008, by C. Mathys, July 2010

The paper is an annual update of the study made by the NBB on the economic importance of the Flemish maritime ports – Antwerp, Ghent, Ostend and Zeebrugge – the port of Brussels and the Liège port complex.

Each port's contribution to the national economy is estimated on the basis of the analysis of its economic, social and financial situation over the period from 2003 to 2008. The three variables concerned in the main developments are value added, employment and investment. The study also highlights the port sector's indirect effects in terms of value added and employment. The social balance sheet is briefly summarised in one section. The analysis of the financial results is based on the study of the return on equity, liquidity and solvency ratios.

193. Wages, labor or prices: How do firms react to shocks?, by E. Dhyne, M. Druant,  
July 2010

Survey results in 15 European countries for almost 15,000 firms reveal that Belgian firms react more than the average European firm to adverse shocks by reducing permanent and temporary employment. On the basis of a firm-level analysis, the paper confirms that the different reaction to shocks is significant and investigates what factors explain this difference. Although the explanatory value of the variables is limited, most of the explanatory power of the model being associated with the dummy variables coding for firm size, sector and country, the variables investigated provide valuable information. The importance of wage bargaining above the firm level, the automatic system of index-linking wages to past inflation, the limited use of flexible pay, the high share of low-skilled blue-collar workers, the labor-intensive production process as well as the less stringent legislation with respect to the protection against dismissal are at the basis of the stronger employment reaction of Belgian firms. On the contrary, employment is safeguarded by the presence of many small firms and a wage cushion.



## Conventional signs

–	the datum does not exist or is meaningless
e	estimate by the Bank
n.	not available
p.c.	per cent
p.m.	pro memoria

# List of abbreviations

## Region or country

BE	Belgium
DE	Germany
IE	Ireland
EL	Greece
ES	Spain
FR	France
IT	Italy
CY	Cyprus
LU	Luxembourg
MT	Malta
NL	Netherlands
AT	Austria
PT	Portugal
SI	Slovenia
SK	Slovakia
FI	Finland
EA	Euro area
UK	United Kingdom
EU25	European Union, excluding Romania and Bulgaria
US	United States

## Others

AOW	Algemene ouderdomswet (General law on old age)
BEA	Bureau of Economic Analysis
BIS	Bank for International Settlements
BRUGEL	Energy regulator for the Brussels Region
CBO	Congressional Budget Office
CEIC	CEIC Data Company Ltd
CO <sub>2</sub>	Carbon dioxide

CPI	Consumer Price Index
CRE	Commission de régulation de l'énergie (Energy regulator for France)
CREG	Commission de régulation de l'électricité et du gaz (Energy regulator for Belgium)
CWAPE	Commission wallonne pour l'énergie (Energy regulator for the Wallon Region)
DSO	Distribution System Operator
EC	European Commission
ECB	European Central Bank
EU	European Union
FPS	Federal Public Service
G7	Group of Seven
G20	Group of Twenty
GDP	Gross domestic product
Gj	Gigajoule
HICP	Harmonised Index of Consumer Prices
ICT	Information and Communication Technologies
IEA	International Energy Agency
IMF	International Monetary Fund
KLEMS	Capital (K), labour (L), energy (E), materials (M) and service inputs (S)
kWh	Kilowatt hour
MMBtu	Mega British Thermal Unit
MWh	Megawatt hour
NAI	National Accounts Institute
NBB	National Bank of Belgium
NEI	National Export Initiative
NMa	De Nederlandse Mededingsautoriteit (Energy regulator for the Netherlands)
OECD	Organisation for Economic Co-operation and Development
PPP	Purchasing Power Parity
R&D	Research and development
SLP	Synthetic Load Profile
SMEs	Small and medium-sized enterprises
TOE	Tonne of Oil Equivalent
UN	United Nations
VAT	Value added tax
VREG	Vlaamse Reguleringsinstantie van de elektriciteits- en de gasmarkt (Energy regulator for the Flemish Region)
WTO	World Trade Organization

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