

## SUMMARY

2011 was a tough year for the world economy. While the United States struggled to avoid a double-dip scenario and growth in emerging economies slowed slightly (but remained robust), the euro crisis, which started with problems in Greece in 2010, continued to intensify, plunging many European economies back into recession. During the Great Recession in the winter of 2008/2009, most Western countries implemented massive fiscal and monetary stimulus packages to prevent the situation at the time from deteriorating. These policies paved the way for an extraordinary recovery in 2010, but also aggravated underlying fiscal and external imbalances, leading to a massive accumulation of government debt. This year's EEAG report focuses on the resulting crisis in Europe, which is much more than just a sovereign debt crisis.

Chapter 1 of the report discusses the immediate macroeconomic outlook for the global economy. Chapter 2 argues that the euro crisis was fundamentally triggered by major macroeconomic imbalances within the euro area. These imbalances hindered capital flows, while uncertainty surrounding the repayment of government debt and the mid-term economic prospects of individual regions triggered outright capital flight. With European monetary authorities injecting ample liquidity in favour of the banking system, massive capital flight has resulted in huge balance-of-payments imbalances. Risk premiums on government bonds have also risen to levels that are unsustainable for some countries. Chapter 3 analyses Europe's financial architecture. It highlights the need for proper banking regulation and a well-defined framework for crisis resolution in order to create a more stable financial system able to cope with future problems of a similar kind. Chapters 4 and 5 profile two very different countries, Sweden and Hungary, and highlight the lessons that can be learnt from current and past crises. Whereas many European countries may envy Sweden's fiscal discipline, recent economic policies in Hungary seem to bode ill for the country's future. Finally, Chapter 6 looks at the long-term crisis of climate change and argues that the cost

of both emissions and abatement should be equalised across technologies, industries and regions.

### Chapter 1: Macroeconomic Outlook

After recovering in the first half of 2011, global economic conditions have deteriorated considerably since. Europe in particular was forced to revise its growth expectations sharply downwards. By the end of the year the European sovereign debt crisis had spread to member states of the monetary union which were regarded as both liquid and solvent in spring 2011, and had even affected their private sectors. The threat of a massive escalation of the debt crisis has grown significantly. This could have disastrous consequences for the European banking sector. Any attempt to save domestic private banks would heavily strain the public finances of many European states and, in extreme cases, may even jeopardise their solvency.

The high level of uncertainty is negatively impacting financing conditions for banks and companies and looks set to lead to a deferral in consumption and investment. The poor financial situation of private households in some (mainly southern) European countries will continue to require a high level of saving, thus heavily restraining private consumption. Finally, fiscal policy will be very restrictive in 2012 due to high levels of public debt. The negative fiscal impulse to aggregate demand will be particularly strong in the euro-area countries most heavily threatened by the debt crisis (Greece, Portugal, Spain, Ireland, Italy and France). These economies (with the exception of Ireland) will shrink over the coming year.

The adverse effects of any escalation of the debt crisis would not be limited to the euro area, but would also destabilise both the banking sector and the general economic situation in other industrial and emerging economies. The crisis has already affected the economies of Eastern Asia, which have long been developing dynamically. The only ray of light in 2011 came from the US economy, which outperformed expectations last autumn.

Our forecast assumes that the debt crisis can be kept under control. After a tough winter in which several European countries will fall back into recession, a mild recovery will set in for the remainder of the year. The economic slowdown in industrialised countries is expected to slightly dampen economic dynamism in emerging countries. However, supported by both monetary policy, which has recently become more expansionary again, and by growing domestic demand, emerging economies will record significantly higher increases in output than their Western counterparts. Net exports may therefore make a positive contribution to growth in advanced economies and a negative contribution in emerging economies. An anticipated improvement in consumer and producer confidence in advanced economies during the second half of 2012 will stimulate the world economy slightly towards the end of the year.

Within the euro area, economic developments have become increasingly heterogeneous. Export-oriented countries in the North with relatively sound public finances and high international competitiveness (Germany, the Netherlands, Austria, Finland and Luxembourg) recorded above-average GDP growth. The economic recovery in countries with weaker public finances, like France, Italy, Spain and Belgium, on the other hand, tended to be sluggish. Given their fiscal stance, these countries have increasingly felt the distrust of financial markets. Greece, Ireland and Portugal, which are already receiving official help from the so-called “troika” (EU, ECB and IMF), even saw their recession deepen as a result of capital outflow and intensified fiscal consolidation efforts. The convergence process visible until the mid-2000s, whereby the poorer regions were catching up with their richer counterparts, has not only stopped; it has reversed. Domestic demand will be particularly weak in France, Italy and Spain and in the European periphery during 2012 because these countries are expected to perform major fiscal adjustments. Given the relatively sound fiscal situation in the Northern region of the euro area, the refinancing conditions for both the public and private sector are expected to remain favourable here. This should allow domestic demand to remain relatively robust.

Until recently, inflation was on the rise in almost all regions of the world, driven primarily by the hike in energy and food prices in the first half of 2011. In many emerging market economies inflation was increasing due to above-average capacity utilisation rates. In industrialised countries, on the other hand,

rather sluggish domestic economies curbed price increases, allowing monetary policy to remain extraordinarily expansionary. The global economic slowdown and the gradual phasing out of inflationary pressures due to the increase in raw material prices in the first half of 2011 will reduce inflation in all regions of the world. Inflation will, however, remain significantly higher in emerging markets than in industrialised countries.

## Chapter 2: The European Balance-of-Payments Problem

The euro area is currently suffering from a confidence crisis with mutually accelerating runaway processes. The true cause of its problems, however, lies in fundamental distortions that built up prior to the crisis, after interest rates converged in anticipation of the introduction of the euro. The investment boom and expansionary fiscal policy made possible by lower interest rates did create real convergence in Europe, as intended. However, it also induced rapid wage and price inflation in the periphery countries which deprived them of their competitiveness, created huge current account deficits and eventually called into question fiscal sustainability. From 1995 to 2008, the GIIPS countries (Greece, Ireland, Italy, Portugal and Spain) appreciated by 30 percent in real terms compared to their euro area trading partners. This resulted in substantial, and in some cases huge, current account deficits. With the exception of Italy, net foreign debt positions climbed to levels ranging from 86 percent (Ireland) to 105 percent (Portugal).

Once the US financial crisis swept over to Europe, the capital markets were no longer willing to finance these current account deficits and, in some cases, private capital flows even reversed. The reluctance of private capital markets to provide further financing caused the credit-driven bubble to burst and exposed balance-of-payments imbalances within the euro area.

Long before public rescue operations started in 2010, the ECB policy eased the situation with a generous provision of refinancing credit, replacing the missing private capital flows and compensating for capital flight with credit provided through the Eurosystem (ECB and the national central banks in the euro area). More specifically, the ECB policy implied that the national central banks of the periphery created and lent out financial resources that private creditors from other countries were no longer willing to provide, and basically financed most of the current account deficits

of Greece and Portugal in the years 2008–2010 at low interest rates. The Irish central bank also compensated for a huge capital flight of around 130 billion euros, while its Spanish counterpart financed around a quarter of the country's current account deficit. In August 2011 even Italy started to suffer from massive capital flight. Within just six months 190 billion euros left Italy in net terms, a sum that was replaced with refinancing credit provided by the Banca d'Italia.

This refinancing credit to the GIIPS countries was merely compensating for the money seeping away to other euro-area countries. In the receiving countries the abundant liquidity reduced refinancing credit or was lent back to the respective central banks. So the entire process brought about no change in the aggregate money supply for the euro area as a whole: the flows in and out of the individual countries were automatically sterilised by the commercial banks' borrowing from (or lending to) their respective national central bank. The counterpart to all these transactions is that claims and debts have built up between the national central banks within the Eurosystem, with the central banks in countries with balance-of-payments surpluses effectively acquiring net claims on the central banks of countries with deficits (formally the surplus countries' central banks acquire claims on the ECB, which in turn acquires claims on the deficit countries' central banks within the intra-Eurosystem payments system referred to as *Target*). The credit flow between the national central banks was so large that the Bundesbank became a net debtor of the German banking system.

Rebalancing the euro area in the long term calls for an internal realignment of price levels. Essentially, the GIIPS countries have to deflate and/or the core countries have to inflate to reduce the current account imbalances. Both courses of action, however, are fraught with difficulty. Politically, it seems impossible to convince Germans, who once suffered hyperinflation, to accept the inflation alternative; yet the GIIPS countries will also have a hard time deflating, given that the real burden of public and private debt may become unbearable.

To rebalance the euro area in the short-term, measures must be taken to stop capital flight. *Prima facie* a potential measure could be Eurobonds, as they counter easy access to ECB refinancing credit with a cheap, long-term source of finance for governments. However, by eliminating interest differentials, the Eurobonds would relinquish the only equilibrating

force the euro area possesses to limit excessive capital flows and current account imbalances. Eurobonds would bring the euro area back to the dis-equilibrating growth pattern it experienced in the years preceding the crisis. Short-term stabilisation can therefore only be achieved in this way at the price of long-term destabilisation. Indeed, introducing Eurobonds would prevent the internal European realignment process from taking place.

The only way to combine short- and long-term stabilisation needs is via recourse to market-oriented interest rates, which reflect both risk and maturity. While government bonds satisfy this criterion, the ECB's refinancing credit does not, given that the ECB charges a uniform interest rate. This distorts the demand for short-term credit and, in a crisis situation, feeds large capital flights. To address this problem, the euro area could proceed immediately by creating what we call *Euro-standard bills*. These would be bills issued by the respective local governments and collateralised with government property or future tax revenue according to a set of common euro-area rules, giving them a senior status relative to other kinds of government finance. If such bills were available, the ECB could better distinguish between monetary and non-standard operations. If they were used to annually redeem the intra-Eurosystem Target debt, countries would no longer have an incentive to draw excessive refinancing credit, because ECB credit would ultimately reflect market conditions. Euro-standard bills, of course, would not preclude the use of liquidity interventions to manage the crisis.

Systems that effectively discipline Target credits are a good idea in the long-term as they make support decisions more transparent and discretionary, but their potential implications in the short-term are less clear. If the ECB were no longer to offer credit at below-market interest rates to countries facing capital flight, monetary conditions in these countries would be more restrictive, reducing overall demand and arguably increasing the fragility of the banking system. However, providing incentives to slow down, or even reverse, capital outflows from crisis-hit countries is a necessary ingredient of a comprehensive strategy for overcoming the crisis.

The situation in the euro area has been allowed to develop into such a deep crisis that no easy solutions exist; we are left instead with very difficult trade-offs. Providing large-scale help to the crisis-hit countries may avert an immediate financial crisis, although it

may also slow down the necessary realignment of price levels and prolong current account imbalances. However, it entails large risks if liquidity problems turn out to be solvency problems, as these will imply losses for the taxpayers in the countries footing the bill. The losses could lead to a political reaction in these countries that may undermine the viability of the euro in the long term. By the same token, internal devaluations in the crisis-hit countries will be both long and painful, and may stir up political resentment towards the European Union. Although the consequences are difficult to predict, any exit from the euro by a crisis-hit country such as Greece could speed up adjustment in that country, but is likely to increase the pressure on others. Closer fiscal integration is a way of enabling massive support to crisis-stricken countries, but this is not delivered by the fiscal compact, and political support for outright transfers between countries is unlikely to be gained in the foreseeable future.

It is impossible to predict how the euro crisis will develop. Our hope is that the euro area will be able to ‘muddle through,’ but we fear that the process will be long and painful at best. At worst, policymakers will face a situation whereby they have to choose between massive interventions, which could prevent an immediate financial crisis, but may lead to the euro’s demise in the long run because of their political ramifications; and adopting a stricter stance, which could be viable in the long run, but may intensify the financial crisis and deepen economic distress in the short-term.

### Chapter 3: Banking Regulation

The magnitude of the crisis, which originated in the problems with subprime loans in 2007, became systemic in the wake of the collapse of Lehman Brothers in September 2008, and took another systemic turn with the emergence of sovereign debt problems in Europe. It has uncovered severe weaknesses in the regulation and supervision of financial entities and has thrown a spotlight on financial regulatory reform.

Why and how have regulatory mechanisms failed? Have there been new market failures? What can be learnt from the crisis? Does it have direct implications for the financial architecture of the European Union and the euro area?

We think that regulatory reform should be based on a few basic principles:

1. A central regulatory body (such as the central bank) should have a mandate to maintain financial stability and be in charge of macro-prudential supervision.
2. Monetary policy is not the appropriate tool with which to recapitalise banks.
3. Regulation and supervision should encompass all entities that carry out banking activities.
4. Expected losses of liabilities guaranteed by the government should be covered by a risk premium determined by the market dependent on the risk assumed by the entity. Banks under the protection of the safety net need to limit their range of activities because of market hazard.
5. Institutions that play a key role in the financial system (where the Too-Big-To-Fail doctrine is applied) should be regulated so that they internalise the potential external effects of their bankruptcy. Regulatory standards should be uniform and accompanied by internationally coordinated supervision.
6. A fragmentary approach to financial regulation does not work. It is necessary to consider capital and liquidity needs and the degree of market liberalisation.
7. It is necessary to establish mechanisms to prevent delay of the supervisor’s intervention while the balance sheets of financial institutions deteriorate and capital declines (regulatory forbearance).

Regulation faces the challenge of making the financial system more robust without hindering development, while protecting public interest and innovation and preserving globalisation. We see no contradiction between the stability of the financial system and economic growth, which is a crucial issue given the key role played by the financial system in economic growth. The financial sector needs to restore investor confidence, rebuild its reputation and adapt to the new and stricter regulatory atmosphere created as a result of the impression that the sector enjoyed excessive returns from taking excessive risks in the past. On balance, the reform process seems to be on the right track, with increased capital and liquidity requirements as well as more centralised trading arrangements for derivatives markets, although we shall have to await its implementation to assess its effectiveness. In the euro area with its single currency and many sovereigns, however, the wisdom of giving sovereign debt a zero weighting when calculating a bank's risk exposure is questionable. Proper risk weights for sovereign debt should be used to improve the accuracy of such calculations.

In EEAG (2003), Chapter 4, we argued that there were at least three basic problems with the financial architecture in the euro area. Firstly, we argued that the existing arrangements might not be adequate for financial stability. Secondly, the arrangements hindered European financial market integration to a large extent; and thirdly, they weakened the competitiveness of EU financial markets and institutions. We stated that: “The present gradualist approach may yield more costs than benefits in the long term and may end up proving ineffective. It would be better not to wait for a major crisis to strike in order to put the house in order.” Now that a major crisis has occurred, where does this leave us? In our 2003 report we highlighted the need for clear procedures in the case of crisis lending and crisis management led by the European Central Bank and to establish clear principles guiding fiscal help by a transnational institution. We advocated more centralised supervisory arrangements in banking, insurance and securities in both the mid and the long-term.

The need to reform the European Union's financial architecture is now pressing due to persistent banking problems related to the sovereign debt crisis. The euro area should be stabilised with a credible liquidity facility for solvent sovereigns facing speculative attacks, and with a restructuring facility for insolvent countries. Furthermore, its financial architecture must be completed. The ECB should explicitly assume the function of guarantor of the system (in terms of liquidity provision to banks) and wield sufficient supervisory powers over systemic institutions and exert macro prudential control. It would also be advisable to forge closer links between the European prudential authority and the European System of Central Banks (ESCB). A formal framework of crisis resolution should be established and the chain of command in a crisis situation needs to be clearly identified, with the ECB at its centre. Furthermore, burden-sharing agreements for bank resolution have to be put in place together with a European resolution authority, and accompanied by a European deposit insurance fund for cross-border institutions.

#### Chapter 4: The Swedish Model

During the current economic crisis Sweden has stood out among the EU countries for its strong public finances. At the trough of the recession in 2009 Sweden had the smallest fiscal deficit of all EU countries, totalling only 0.9 percent of GDP. In 2011 Swe-

den even boasted a small fiscal surplus. At the end of the year, consolidated gross government debt was only 37 percent of GDP and the general government sector had a positive net financial worth of 22 percent of GDP. The yield on Sweden's long-term government bonds has fallen below that of Germany as a result.

The main explanation for Sweden's superior fiscal performance is that the country entered the economic crisis in 2008 with much stronger public finances, and has suffered less than other EU states during the crisis.

Sweden's sound public finances in recent years contrast starkly with its situation in the early 1990s, when Sweden suffered a deep economic crisis similar to that currently affecting Ireland and Spain. Its fiscal deficit reached 11 percent of GDP in 1993, while consolidated gross government debt totalled 73 percent of GDP in 1996. The crisis triggered a tough fiscal consolidation programme, which turned the deficit into a surplus in 1998. The government debt-to-GDP ratio has been steadily decreasing since the mid-1990s.

The fiscal crisis of the 1990s forged a broad consensus in Sweden that its fiscal house must be kept in order in the future to prevent the country from ever ending up in a similar situation again. This consensus was codified into a strict fiscal framework. It consists of the following pillars:

1. A top-down approach for the adoption of the budget in Parliament. Once a decision has been taken on overall government expenditure and its allocation between different expenditure areas, an individual expenditure item cannot be raised unless some other expenditure item within the same area is reduced correspondingly.
2. A surplus target for the fiscal balance whereby general government net lending should total 1 percent of GDP over a business cycle.
3. A ceiling for central government expenditure, which is set at least three years in advance.
4. A balanced budget requirement for local governments.
5. A pension system designed to guarantee long-term sustainability as contributions, not benefits, are defined.
6. A system whereby the government budget is monitored by a number of government agencies, which most recently include a Fiscal Policy Council with special provisions to safeguard its independence.



In addition, the framing of fiscal policy decisions probably contributed to increased budget discipline. The budget process is based on an evaluation by the Ministry of Finance of the so-called *scope for reforms*. It is defined as the total sum of tax decreases and expenditure increases which can actively be decided by the Parliament and which are compatible with the fiscal surplus target. The *scope-for-reform* estimate forms the basis of the government's internal budget negotiations. In recent years, it has also been accepted by the opposition parties, which have kept their budget proposals within the limits of this estimate.

On the whole, fiscal rules have been respected in Sweden. However, this is not because they are exceptionally stringent. There are no strong commitment devices or sanction mechanisms in the case of violations of the rules. There are no stipulations that past deviations from the fiscal balance target must be compensated for in the future, as is the case with the Swiss and German debt brakes and as is now envisaged as a general principle to be adopted by all countries in the euro area according to the new European fiscal compact. Instead, the Swedish system relies to a large extent on a high degree of fiscal transparency. This seems to impose high reputation costs on governments that renege on their own targets. It also means that voters have access to good information on fiscal policy, making it easier to hold politicians accountable.

It nevertheless remains difficult to assess the extent to which Sweden's recent favourable fiscal performance depends on its fiscal framework, and the degree to which its fiscal performance (and fiscal framework) is a consequence of the political consensus on budget discipline that emerged in the wake of the 1990s crisis. It is probably tempting to assign too much credit to the fiscal framework and too little to the psychological and political change of mind-set that is perhaps reflected in the absence of reforms to the fiscal framework since the 1990s.

It is also true that good fiscal performance does not depend entirely on decisions in the fiscal sphere. General macroeconomic conditions are also crucial. Fiscal discipline is much easier to achieve with high output growth than with a stagnating economy both in the short and in the long run. Sweden's budget consolidation in the 1990s was greatly facilitated by a large real exchange rate depreciation that raised both net exports and output. The real exchange rate depre-

ciation was achieved by large currency depreciation, an option not available to the crisis-stricken countries in the euro area. Sweden's strong fiscal performance after the consolidation phase was also supported by higher growth levels than those seen in the other large EU economies, or than in Sweden itself previously. Factors like comprehensive tax reform in the early 1990s, extensive and early product market deregulation, a high level of R&D expenditure and wage bargaining reforms have probably contributed to Sweden's good growth performance over the last fifteen years.

The Swedish fiscal experiences suggest the following lessons for other countries:

- A deep fiscal crisis may help to create a broad and long-lasting consensus on the merits of budget discipline.
- Well-defined fiscal objectives, fiscal transparency and a qualified economic-policy debate may be more important to achieving fiscal discipline than binding rules with strong formal enforcement mechanisms.
- The framing of budget decisions, and specifically a well-defined process for evaluating the scope for active tax and expenditure decisions, may be of great importance.
- Budget discipline does not only depend on decisions within the fiscal sphere. Output growth is crucial. Growth-enhancing reforms may be necessary to raise long-run growth. In the short run, the ability to achieve a substantial real exchange rate depreciation that stimulates net exports is of paramount importance for economies with serious competitiveness problems.

## Chapter 5: The Hungarian Crisis

Hungary was the frontrunner of market reforms among the former socialist countries in Central-Eastern Europe, gradually liberalising its economy in the 1980s. At the beginning of the 1990s, it seemed to be in the best position to converge fast with the European Union in terms of both income levels and institutional quality. However, this convergence has stalled since 2005. An expansive fiscal policy and the accumulation of a large external debt prior to the global economic crisis in 2008 made Hungary one of the most financially vulnerable countries in Europe. Moreover, recent policy measures aimed at improving the fiscal balance and the financial position of private

households have tended to undermine, rather than strengthen, the security of property rights and private contracts. By the end of 2011 Hungary once again was financially vulnerable and asking for help from the IMF.

Hungary posted relatively rapid growth in terms of GDP per capita between 1995 and 2004. During this period Hungary was keeping up with its Visegrad peers (The Visegrad Group is an alliance of four Central-Eastern European states: the Czech Republic, Hungary, Poland and Slovakia, formed in 1991 for the purposes of cooperation and supporting their European integration) and was converging to the old EU countries in terms of GDP per capita. However, since 2005 it has been growing more slowly than its peers and no longer appears to be converging to the old EU countries. Breaking down Hungarian growth into various factors reveals that its total factor productivity (TFP) has been growing at a relatively slow pace since 1995. Only faster capital accumulation and increased hours worked made Hungarian growth comparatively respectable. Unless TFP picks up, we expect Hungary to eventually diverge from the rest of Europe as margins of convergence through hours worked and capital accumulation are gradually exhausted. Weak investment levels in recent years suggest that this process has already started.

Labour market trends also suggest that Hungary is different from the other Visegrad countries. It has a comparatively low employment-population ratio. This low ratio can be explained by both labour demand factors (higher labour-related taxes make it expensive for firms to hire) and labour supply factors (an excess supply of unskilled labour and a generous pension and benefit system that allows individuals to drop out of the labour force).

Unlike its peers, Hungary has been subject to the EU's excess deficit procedure ever since it joined the European Union in 2004. Between 2002 and 2010 the general government's deficit either exceeded or was close to 5 percent of GDP. In addition, Hungary's fiscal policy is characterised by a strong election cycle, which was only broken by the financial crises in the run-up to the 2010 election. This policy has repeatedly led to rapid debt accumulation followed by a large fiscal correction before the cycle of debt accumulation started again. These developments clearly indicate that Hungary's fiscal institutions are weak. Successive governments have been unable to commit to a sustainable fiscal policy. Hungary has experimented with

several institutional set-ups since 2008. It established an independent fiscal council with its own staff to provide forecasts and monitor fiscal expenditure in a detailed and transparent way. However, when this council criticised the government's 2011 budget proposal, it was replaced by a three-member panel with a remit limited to merely expressing its broad opinion on the budget bill. A limit on public debt is now also enshrined in the constitution. Without independent forecasts and analyses of fiscal policy, however, it is unlikely that the new institutional arrangements will eliminate the election cycle and ensure that fiscal policy becomes sustainable.

The financial crisis of 2008 hit Hungary early on, obliging the country to request IMF assistance in late October 2008. Hungary's high public and external debt positions made it financially very vulnerable. Its fiscal behaviour in the past explains why public debt was so high. External debt was mainly driven by heavy international borrowing prior to 2008 by Hungarian banks, which offered loans denominated in foreign currency both to households and firms. This borrowing in foreign currency led to the build-up of a sizeable unhedged foreign liability position in the balance sheet of households and firms. These liabilities were largely denominated in Swiss francs and, to a lesser extent, in euros. Between September 2008 and March 2009 the Hungarian currency depreciated by 26 and 33 percent vis-à-vis the euro and the Swiss franc respectively. By November 2011, the depreciation vis-à-vis the Swiss franc had reached 66 percent compared to September 2008, putting a significant strain on many balance sheets. It will take time for the balance sheets of both households and firms to recover. Until then, economic growth in Hungary is likely to remain subdued.

The centre-right government of Hungary, which won a two-third majority in parliament in spring 2010, has embarked upon a series of unconventional economic policies. It has introduced taxes on financial institutions, which are much higher than similar taxes proposed in Europe. The government has also only levied crisis taxes on sectors dominated by foreign-owned firms. Another of its new policies was the introduction of a flat personal income tax rate of 16 percent, accompanied by an increase in other taxes on labour, and nationalised private pensions to plug the hole in fiscal revenues created by the flat tax. The government has also unilaterally changed the private loan contracts between banks and households to ease the strain on households' balance sheets caused by bor-

rowing in foreign currency before the crisis and by large-scale Hungarian currency depreciation since then. These measures have created new distortions across sectors, while undermining fundamental institutions such as private contracts and property rights. Such measures are unlikely to prove conducive to long-term growth.

Overall, low TFP and investment growth, combined with the lengthy process of repairing corporate and private household balance sheets and the new government's distortionary policies, suggest that Hungary will experience relatively slow economic growth in the years to come.

## Chapter 6: Pricing Climate Change

Burning of fossil fuels is the main cause of climate change. By burning the carbon content of fossil fuel, carbon dioxide is produced and quickly spreads into the global atmosphere. This increases the greenhouse effect, thereby changing the earth's energy balance. Concern over the negative consequences of climate change has led to a large array of policy measures aiming at reducing fossil-fuel consumption.

Europe remains heavily dependent on fossil fuels. Over the period 1990–2008, the share of fossil fuels in total energy consumption fell only modestly, from 83 percent to 77 percent. Renewable energy production has increased at a fast rate, but nevertheless contributed a mere 8.4 percent to total energy consumption in 2008. These average values mask substantial variations between countries. The share of renewable energy in Sweden was 32 percent in 2008, for instance, while in the United Kingdom it totalled 2.6 percent. Making Europe fossil-fuel independent is a formidable task; indeed even satisfying the 20 percent target share of renewable energy in 2020 poses major challenges. Cleverly constructed policy measures are required to meet that target. Current policies, however, leave a lot of room for improvement.

Firstly, it is far from clear that policies to reduce demand for fossil fuels in the European Union have any effect at all. Indeed, such policies are likely to reduce the world market price of fuels, thereby boosting consumption (leakage) in other regions of the world. Furthermore, policies that speed up the arrival of alternatives to fossil fuels may also speed up the extraction of low-extraction-cost oil at the very least – a mechanism which has been labelled “The Green

Paradox” (see EEAG (2008), Chapter 5). The main threat to the climate, however, is not low-extraction-cost oil, but coal. If all of the world's oil supplies were to be burned, the ensuing climate change would most likely be moderate. That is not the case with coal. The fact that coal has a fairly high extraction cost relative to its price mitigates the green paradox and the leakage effects.

Secondly, emission of CO<sub>2</sub> from fossil fuel is an externality that is independent of the source. Therefore, policies to reduce fossil fuel use should neither discriminate between different uses nor between users in different countries. In reality, however, discrimination is the rule in Europe. The law of one price for emissions should instead apply, equalizing the cost of emissions as well as of abatement across technologies, industries and regions. In accordance with many studies on the subject, we show that the externality cost incurred by burning fossil fuels has a likely value of between 10 and 100 euros per ton of CO<sub>2</sub>. To pin down a more exact number, value judgments about the subjective discounting of future generations must be made.

Thirdly, the current system of emission rights leads to business cycle variations in the price of emissions – high current demand drives up prices and vice versa. The fact that potential damages induced by emitting carbon are very long-lived implies that damages are not likely to depend on current business cycle conditions. Business cycle variations in the price of emission rights are therefore a sign of inefficient policies. A system to stabilise these prices within a range that takes account of reasonable estimates of the externality cost should therefore be considered.

Fourthly, if climate externalities are internalised by taxes or quotas, arguments can be made for special subsidies to technologies with learning externalities. However, we show that current estimates of such learning externalities appear far too small to motivate the major differences in subsidies across different technologies that plague European energy markets. In particular, the feed-in tariffs that make it several times more profitable to reduce emissions by solar panels on private houses than to use large off-shore wind power farms, for example, are costly and probably hinder rather than foster a shift towards reducing dependency on fossil fuels.