

## SUMMARY

This is the seventh report on the European economy by the European Economic Advisory Group (EEAG). For the first time, the contents of the report have been summarised under a common title: *Europe in a globalised world*. All chapters deal in one way or another with the growing interdependence between Europe and the rest of the world. This applies both to the first two chapters, which as in earlier years deal with short- and medium-term macroeconomic issues, and the subsequent three chapters, which deal with longer-term issues.

- *Chapter 1* presents our macroeconomic forecast and analyses monetary and fiscal policy in Europe. Because of the uncertainty about macroeconomic developments in the US and how they will be transmitted to the rest of the world as well as the uncertainty about how decoupled growth in emerging economies has become from the US cycle, a global perspective is more relevant than ever. A crucial issue for macro developments in Europe is how large and persistent the depreciation of the US dollar against the euro will be. *Chapter 2* offers an in-depth analysis of this.
- Chapters 3–5 all deal with various long-term aspects of globalisation. *Chapter 3* analyses the impact of increased economic integration with low-wage economies on Western European jobs: the message is that when taking all effects into account, globalisation is more likely in the end to raise rather than to reduce employment, because it will help making labour markets more flexible. The challenge for policy is to counter adverse income distribution effects, but to do so in a way that employment is not harmed. *Chapter 4* argues against using industrial policy to protect European firms from international competition because of the long-run costs that are likely to arise. Industrial policy should be horizontal rather than sector-based and it should be located mainly at the regional and EU level, but cut back at the national level. *Chapter 5* addresses one of the most long-term issues

for mankind: global warming. The chapter points out that most existing analyses have neglected the supply side. Without a proper analysis of supply-side effects, demand-reducing measures, which are generally regarded as self-evident solutions (such as emission permits, taxes on fossil fuels and the subsidisation of alternative energy sources) risk being ineffective and in fact counterproductive.

### Chapter 1: Macroeconomic outlook and policy

Despite the turbulence in the financial markets caused by the US subprime mortgage crisis, the world economy developed strongly last year. For the fourth year in a row, world GDP grew by around 5 percent. During the second half of last year the risks for a slowdown of the world business cycle increased considerably. The main reasons are the still lasting turbulence in financial markets and the slowdown of the US economy. Together with high energy and food prices, this will restrain the world economy especially in the short run. Nevertheless, firm profits and labour market developments will remain favourable overall.

After approximately three years of continued high growth, the US economy started to cool down markedly at the end of 2005 when the US housing market began to deteriorate. Residential investment has been falling for eight subsequent quarters and real estate prices have dropped and thereby deteriorated the wealth position of home owners. The latter factor, which boosted consumption in the past, now works in the reverse direction. During this year, we will continue to see home owners turn insolvent and house prices to decrease further. However, in view of the still strong world economy and the continued weakness of the US dollar, exports will support US growth. The 2008 performance of the US economy is difficult to predict due to the declining house prices and the subprime crisis, the full impact of which is still unclear. Although recent stock market developments signal grave concerns about cyclical developments, it is not in our view very likely that the US

economy will fall into recession. Recessionary tendencies will be counteracted by both low interest rates and a substantial fiscal stimulus programme. Our forecast is that US GDP will grow by 1.7 percent in 2008. Nevertheless, continuing falls in US real estate prices and enduring turbulence in international financial markets remain substantial downward risks.

The contribution of *Asia* to world economic growth has increased substantially over time. The emerging economies of Asia posted superb GDP growth rates last year, notwithstanding the growth slowdown in the US and the turbulence in international financial markets. Over time, domestic demand has turned into the main engine of growth. Affected by the slowdown in US import demand, exports from the region have already lost some momentum. But domestic demand in the Asian economies remains strong and will probably be able to buffer some of the slowdown in the world economy. So far, the sub-prime crisis in US financial markets has not affected the Asian banking sector. Bank credit supply has continued to be accommodating and the spread between firm and government bonds has hardly widened.

#### *The European economy*

For the second year in a row, the *European Union* managed to grow at a rate of close to 3 percent in 2007. In particular, growth dynamics in Germany, Spain and the UK helped achieve this positive result. On a country level, strong domestic demand was usually the main contributing factor. Non-residential investment remained an important factor behind demand growth. Because of positive labour market developments, consumption gained momentum again. Real wage increases last year were small and below those of the US and Japan. But because of the exchange rate developments, the cost competitiveness position of European countries deteriorated substantially. Nevertheless, net exports again contributed positively to GDP growth in the euro area.

After the outbreak of the credit crisis, producer confidence in the EU has started to crumble. Because of the appreciation of the euro and the consequent reduction of US imports, growth in the European Union will fall during the first half of this year, bringing economic growth back to its potential. Also a slower expansion of investment in Europe is con-

tributing to lower growth. The output gap, however, will remain positive allowing employment to increase further. But since inflation will remain high, especially during the first half of this year, and wage increases are likely to stay moderate, private consumption will increase more or less at the same pace as last year. Overall, GDP growth will level off to 2.1 and 1.8 percent this year in EU27 and the euro area, respectively.

Over the last two decades there has been a very significant fall in the rate of wage increase in most EU countries. These low wage increases are often seen as a major cause of weak private consumption. We find that the main causes of the decline in nominal wage growth are lower inflation (associated with low-inflation policy of central banks) and lower productivity growth. Declining union density in many countries and moves towards more corporatism in some have also contributed somewhat.

The economic upswing in 2007 continued to reduce fiscal deficits and government debt throughout Europe last year. Although total government expenditures did increase somewhat, tax revenues grew even more. In a majority of countries, the consolidation of public finances continued. In particular in Germany, but also in Hungary, Italy and Portugal, measures were implemented to reduce the structural budget deficit. In the two years to come, fiscal policy will, however, turn expansionary again.

In the euro area, the monetary conditions have tightened over the last two years. This is explained by the steady increase in the main refinancing rate of the ECB (in eight steps since December 2005 – two of which took place in March and June last year) and the appreciation of the euro during the same period. During the course of 2007, the euro appreciated by more than ten percent against the US dollar. Despite this tight monetary policy stance, inflation has surged in recent months. During the last two months of 2007, the annual inflation rate went above three percent. Also during the first months of 2008, inflation will remain well above the ECB target of two percent. The restrictive monetary policy stance will bring inflation back to around two percent in 2009.

#### *Real estate markets and the financial system*

The real estate crisis in the US and its repercussions worldwide play a prominent role in the assessment

of the current and future business cycle developments in the world. Not only do real estate prices affect the profitability of building houses and thus residential investment, they are also a fundamental determinant of household wealth and hence of private consumption. Furthermore, and as suggested by developments during the past months, developments associated with real estate markets can jeopardise the stability of the financial system. A sharp rise in home foreclosures and defaults on subprime mortgages in the US during last summer led to a re-evaluation of related mortgage-backed securities. As it was – and to some extent still is – unclear to what extent and where most of the losses from the US mortgage loans will hit the banking sector, banks became reluctant to lend to each other. To prevent interbank money markets from becoming illiquid, central banks around the world had to step in. Although banks report that recent tensions are hampering their access to funding and are causing a tightening of credit standards, at least up until now, interest rates for non-financial corporations and households loans in Europe do not appear to have been affected by much. Neither have credit volumes so far. Because of the robust growth in other parts of the world economy and the interventions of central banks worldwide, the repercussions from the real estate crisis in the US are likely to be much less severe than has recently been suggested in much of the press.

## Chapter 2: How far could the dollar fall?

How much dollar depreciation should Europe and the world expect in the future as a consequence of the US external imbalance? To what extent will the dollar fall be accompanied by a global realignment of Asian currencies, supposedly reducing the pressure on the euro? Early on, leading economists concluded that eliminating a current account deficit of five percent of GDP in an economy like the US would require a real exchange rate depreciation of between 35 and 50 percent. Meanwhile, from its peak in 2002 to the beginning of 2007, the dollar lost almost one third of its value in real terms (CPI-based). Against the major currencies the fall was much more pronounced, about 40 percent in real terms: against the euro the fall has been almost 50 percent in real terms.

Assessments of the real dollar depreciation required to correct the large current account imbalances of the US play an important role in the debate, as they

can provide a natural anchor for expectations of the value of the dollar in the medium and the long run. The world has already experienced ample swings in the dollar-euro exchange rate. Early on in the decade, this rate almost reached 80 dollar cents per euro; under current circumstances one cannot rule out a fall to as low a level as 1.60 dollars per euro. But can the exchange rate be expected to remain persistently at such a level? Or is the current development of the dollar exchange rate yet another example of dramatic overshooting in currency markets? This chapter addresses these questions by reconsidering in detail the specific mechanisms by which real dollar depreciation is an essential step towards global adjustment.

First, we argue that the largest estimates of real dollar depreciation (in the range of 35–50 percent in real terms) usually assume a very strong adjustment in the *domestic* relative prices of non-tradable goods (services) within the US and abroad. The experience of the 1980s and econometric evidence suggest that strong movements in these relative prices are not plausible. Most of the adjustment works through international relative prices: the terms of trade (export relative to import prices) and the real exchange rate (domestic relative to foreign consumer prices) move closely together.

Second, we discuss recent contributions that, building on general-equilibrium trade models, actually predict much milder scenarios of real dollar depreciation. Real depreciation between 10 and 20 percent may well be enough to achieve sustainable current account adjustment.

What does this mean for Europe? Early assessments of the equilibrium exchange rate between the euro and the dollar, especially the ones based on purchasing power parity, by and large pointed to values between 0.90 and 1.30 dollars per euro. In early 2008, at 1.48 dollars per euro, the dollar has probably already overshoot the value that would be required for global rebalancing – especially if Asian countries end their (explicit or implicit) pegs to the dollar. This does not, however, by any means rule out the possibility that the dollar could fall much more in the short and medium term, especially if central banks in countries with large dollar reserves started shifting out of them. If so, there could be a further severe deterioration of the cost competitiveness of the euro-zone, which could reinforce any slowdown.

### Chapter 3: Globalisation and jobs

Much of the Western European debate on globalisation has focused on the risk that increased competition from foreign workers with low wages will cause job losses. This could occur because of import competition, outsourcing or labour immigration. The fears in the public debate stand in stark contrast to the views of most economists, who tend instead to stress the long-run welfare gains from international integration.

#### *Unemployment and labour market rigidities*

The unemployment risks from globalisation arise mainly because labour markets in Western Europe may not be flexible enough. If globalisation leads to a fall in demand for labour as a whole or for certain categories of labour such as the unskilled, employment will suffer in the presence of rigidities that prevent downward wage adjustments. Increased trade with low-wage economies leads to a contraction of labour-intensive sectors in advanced economies and to an expansion of skill- and capital-intensive sectors. But if wages are rigid, there will be an overexpansion of the skill- and capital-intensive sectors and too large a contraction of labour-intensive sectors. The result is then unemployment, especially among the low-skilled. Such unemployment would prevent the aggregate gains from increased international integration from being realised.

However, in a complete analysis one should not take rigidities in Western European labour markets as given. Instead, the extent of trade integration and international factor mobility are probably important determinants of these rigidities. So, to gauge the long-run effects one must analyse how the rigidities themselves are affected by globalisation. We argue that globalisation could increase labour market flexibility to such an extent that adverse employment effects are unlikely in the longer term. It might even be the case that globalisation promotes employment when one takes all effects into account. If so, globalisation will not be a curse for employment in Western Europe; instead it could turn out to be a blessing.

#### *Six arguments why globalisation might be good for employment*

We analyse a number of mechanisms through which globalisation might help raise employment in Europe by reducing market imperfections:

1. International outsourcing to low-wage economies (imports of intermediary inputs) imply cost savings, which give rise to positive *scale effects* on domestic labour demand. This could very well outweigh the negative labour demand effects resulting from substitution of foreign for domestic labour via such imports.
2. Increased trade integration implies *stronger competitive pressures* and thus larger sensitivity of product demand to prices. This tends to reduce firms' price-cost mark-ups and increase the demand for output and thus also the labour demanded by producers.
3. An increased sensitivity of product demand to prices also has the indirect effect of increasing the *sensitivity of labour demand* to wages. The larger possibilities of substituting intermediary inputs produced by foreign labour for domestic labour works in the same direction. A higher sensitivity of labour demand to wages raises the costs in terms of employment losses of high wages and therefore strengthens trade union incentives for wage moderation.
4. The potential threat that employers can offshore production and close down domestic production facilities improves the *relative bargaining position* of employers vis-à-vis unions. Hence, the outcome of wage negotiations will be closer to the bargaining goals of employers.
5. Globalisation may trigger changes in *labour market institutions*. By reducing the market power of domestic firms, the rents to be shared between owners and unions become smaller. This reduces the gains from collective bargaining for employees and could therefore contribute to deunionisation. In addition, the political incentives to uphold government regulation supporting high wages (generous unemployment benefits, rules allowing unions wide scope for strike action, favourable conditions for union membership etc.) are likely to be weakened by globalisation: when the possibilities of employers to move production abroad to low-wage locations increase, such regulation becomes less effective in securing high wages, as the costs in terms of lower employment rise.
6. Finally, trade with low-wage economies has implied *terms-of-trade gains* for advanced economies, that is increases in export prices relative to import prices. Such a development implies that producer prices increase at a faster pace than the CPI. Hence, real product wages (wages relative to the product prices of domestic firms) tend to rise

more slowly than real consumption wages (wages relative to the CPI), which is beneficial for employment.

#### *Empirical research on globalisation and jobs*

Although earlier research had problems substantiating that trade integration with low-wage economies shifts demand away from the low-skilled to the high-skilled, more evidence in favour of this has been accumulating in the more recent literature on international outsourcing. Less interest has been devoted to the issue of how overall employment in advanced economies is affected by trade integration. There are only a few studies of overall labour demand, which on the whole fail to find adverse effects when scale effects are taken into account.

The problem with labour demand studies is that they examine the relationship between employment and wages, but do not take possible wage responses to globalisation into account. We instead make an attempt to capture the “general-equilibrium” effects of globalisation on unemployment and employment. This is done by augmenting conventional regressions of these variables on a number of labour market institutions (the unemployment benefit replacement rate, the tax wedge, the degree of corporatism etc.) with variables such as trade openness, import dependence, and the extent of capital mobility vis-à-vis low-wage economies. The exercise is crude and should be interpreted with caution. Yet, it is noteworthy that we fail to find adverse employment effects of globalisation if we control for labour market institutions and the business cycle. If anything, the results suggest positive effects instead.

#### *What to do and what not to do*

An absence of adverse employment effects – or the possible existence of positive effects – does not imply that economic policy-makers should not respond to globalisation. It is likely to raise wage inequality and shift the functional income distribution in favour of capital. So, an important task of economic policy is to try to allocate the aggregate gains from globalisation in a “fair way” and see to it that groups which might otherwise lose out (or receive only small gains) also share the benefits. It is this, rather than to prevent employment losses, that

is the likely main challenge to economic policy from globalisation.

However, redistribution policies should be pursued in such a way that they support – and do not counteract – the general policy objective of raising employment. This speaks strongly against such policies as rises in unemployment benefits and the imposition of minimum wages (as are now being implemented in Germany). Measures such as retraining schemes, government support to displaced workers through severance pay, wage insurance (for displaced workers taking up a new lower-paid job), and employment tax credits to low-wage earners in general are more promising. They serve to compensate potential losers from globalisation for wage losses, but do not distort the incentives for employment. At the same time, such attempts to ensure a fair sharing of the gains from globalisation also have costs. So, although some policy interventions to deal with the income distribution consequences of globalisation are justified, one should carefully weigh the benefits of this against the costs.

### **Chapter 4: Globalisation and industrial policy**

Fears of globalisation and deindustrialisation have given rise to new demands for industrial policy intervention. The background is the emergence of new international players like China and India, and the greater competition worldwide, which calls for significant restructuring in advanced economies. Proposals for targeted industry aid and the promotion of “champions” have become frequent. France has been at the forefront of this approach. These arguments have come on top of the traditional ones of aid and protection for strategic industries related to national security. This raises a number of issues. What role should industrial policy play in the face of globalisation? Is there still scope for traditional sector-based policy? Must EU industry be defended? And at what levels of government should industrial policy be formulated?

#### *The objectives of industrial policy*

The Lisbon Agenda of the EU states that: “The main role of industrial policy at EU level is to proactively provide the right framework conditions for enterprise development and innovation in order to make the EU an attractive place for industrial investment and job creation, taking account of the fact

that most businesses are small and medium-sized enterprises (SMEs).” A broad interpretation of industrial policy would include microeconomic policies (antitrust, innovation and internationalisation policies), the provision of broad infrastructures (in transport, telecommunications, education, science and research) and sector-based aid to companies. In a narrower sense, industrial policy refers only to the sector measures directly aimed at companies and industries.

We believe that the most important challenge of industrial policy in the EU is to foster the competitiveness of its companies and the productivity of the economy in order to raise the welfare of European citizens. With this aim in mind we recognise that there are several arguments that favour an active sector-based industrial policy. Such arguments include: providing suitable incentives for companies to enter and exit the market; helping to achieve a strategic edge in the international market; assisting in efficient (and fair) restructuring of declining industries; leveraging positive external effects; helping to coordinate investment; and alleviating imperfections in the capital market.

#### *Adverse side effects of industrial policy*

However, although it is easy to find strong *theoretical* arguments that can justify sector-based industrial policy and state aid, the implementation *in practice* is associated with very large problems likely to undo the potential benefits and result in net welfare losses. Sector-based interventions

- require highly detailed information on the industry, which is unlikely to be available;
- can trigger strategic behaviour from rival countries with potential spiralling trade reprisals;
- are often captured by specific interests for the purpose of rent seeking;
- can restrict competition to the detriment of consumers and damage production efficiency with long-run adverse effects on international competitiveness; and
- are often costly to the public both because of the direct tax costs and because of the indirect costs as higher taxes induce distortionary behavioural responses.

These considerations argue strongly against letting globalisation pressures lead to a revival of traditional sector-based industrial policy. In particular, we argue

that protection of productive sectors must be limited in time with credible and irrevocable commitments, and must maintain a healthy level of competition between companies. This applies especially to declining industries where established interests tend to prolong protection well beyond what is required in terms of efficiency and fairness. These considerations are particularly important as the fast pace of globalisation is likely to strengthen the demand for such protection, at the same time as the costs of locking resources into declining sectors and thus relinquishing – or postponing – the gains from reallocation of resources to more productive uses have probably become much larger.

#### *The case for horizontal industrial policy*

European countries still allocate an important – though shrinking – portion of their spending to sector-based policies (for example, in steel, shipbuilding and coal). However, an increasing share is allocated to so-called horizontal policies that affect various sectors more equally. Such policies include support for R&D activities, training of human capital, provision of infrastructure, promotion of internationalisation (brand image, sales networks, etc.) and aid for SMEs.

A microeconomic framework that maintains efficient functioning of markets is crucial for competitiveness. In most EU countries, there appears to be plenty of margin to increase competition in the services industry: in transportation, telecoms, healthcare, the energy sector, professional services, retail trade, and also in the knowledge industry (universities and research centres).

There are many good reasons for the establishment of regulations, such as the protection of the labour force or the environment. Regulation should also be established in situations where competition is not workable, such as with natural monopoly segments like transport or distribution in electricity and gas markets. In general, though, regulation should be non-intrusive and, in particular, the “cost of doing business” in a country should be kept low. It is worrying that the costs of doing business appear to be high in some Southern European countries, such as Greece and Italy, and also in some new EU countries, such as Romania, the Czech Republic, Slovenia, Hungary and Poland. These countries would be well advised to introduce much lighter regulation

as in the UK, Ireland, the Nordic countries, Estonia and Lithuania.

#### *The appropriate level for industrial policy*

A final important issue is the level of government at which industrial policy should be located. For several reasons, we believe that where possible, policy should be formulated at the regional level. First, there are information advantages at a regional level: regional government can monitor economic activity in more detail than can be done at the national or supra-national level. Second, it is inevitable that production and consumption externalities are felt most strongly at the regional level. Third, lobbying and capture is probably less prevalent at the regional level. Fixed costs of lobbying mean that lobbyists tend to concentrate their resources on those policy makers who have most influence over resources, that is at the national level. Lobbying at the level of individual regions is likely to offer much smaller returns.

Competition between regions to attract firms can generate information and limit capture. It can produce efficient outcomes when the deadweight loss of taxation is low and regions are asymmetric in the sense that external benefits of firms' location are unevenly distributed. This seems indeed to be the case, as there is substantial diversity in the performance of EU regions, which is not diminishing over time (despite convergence across nation-states).

But there is also an important role for the EU to play in providing a framework of common rules to internalise externalities and limit rent-shifting incentives. For example, it could be argued that European funds (such as R&D support) should be allocated on a merit basis through competitive bidding procedures which should be decided by committees of experts insulated as much as possible from political pressures. The model of the European Research Council to allocate funds to science, modelled after the US National Science Foundation, is a good example.

The EU is well placed to determine general horizontal industrial policy measures that respond to the challenges posed by globalisation. This is partly because it is capable of internalising the externalities that cross national borders, and which are becoming increasingly more relevant. Perhaps more importantly, the EU can benefit from greater economies of scale in addressing the issues which arise as a result of globalisation. An example would be to set a common energy policy that diversifies supply sources and the port-

folio of technologies in a large integrated EU energy market.

In sum, we believe that the national level is in many cases the most unsuitable one for deciding industrial policy. Rather policy should be set at either the regional level or the EU level. For a number of reasons, these two levels are generally in a better position to design policy measures to confront globalisation. This is so because of the strong local external effects and information advantage at the regional level and because of the economies of scale that can be exploited at the EU level.

### **Chapter 5: Global warming**

To date, the public policy discussion of climate change has focused on the reduction of demand for fossil fuels, the implicit assumption being that lower demand will automatically lead to less use of these fuels and therefore to less of CO<sub>2</sub> emissions into the atmosphere. For example, this way of thinking characterises the celebrated Stern report. The flaw in this reasoning is that it neglects the supply side. As in other markets, the extraction of fossil fuels is determined by the interaction of demand and supply. A fall in demand, leading to lower prices of fossil fuels, will be translated into a fall in extraction only to the extent that market supply shrinks after a price decline. For this reason, proper policies to fight global warming require an analysis of the supply side. Such analysis has so far been more or less neglected.

The consumption-reducing measures by some Western countries will be in vain if owners of fossil fuel resources do not cut back their supply. Without supply cuts, world energy prices will fall so much that other countries consume and burn exactly the quantities not demanded by the "green" countries. Countries doing little with regard to climate protection will enjoy an implicit subsidy on their energy demand resulting from the restraint of the green countries. China and India will continue to step up their CO<sub>2</sub>-intensive growth policies and Americans will drive even more SUVs than they would otherwise do.

The supply of fossil deposits that nature has made available is independent of the price reactions that the consumer countries can influence. If the market supply that resource owners make available from nature's total supply is also independent of such price

reactions, improvements in housing insulation, the conversion to bio diesel and the construction of cars with lower fuel consumption will be useless from the point of view of reducing CO<sub>2</sub> emissions. California's windmills and solar-panelled roofs and France's nuclear reactors will make no contribution to addressing global warming as they are supplied only in addition to fossil energy. Thus, what happens to global warming depends on how the resource owners behave. Unfortunately, it is not elected leaders in stable democracies, such as Arnold Schwarzenegger or Angela Merkel, who will determine the pace of climate change, but people like Hugo Chávez, Mahmoud Ahmadinejad, Putin's oligarchs and the Arab oil sheiks.

*The time path of extraction and demand-management policies*

The difficulty of predicting the behaviour of resource owners results from the fact that their supply decisions are inherently *intertemporal* ones, which are governed by different economic considerations than the supply decisions of producers of reproducible commodities. The insight that it is not only current prices, but also expected future prices, that influence the rate of extraction of non-renewable resources is key to analysing the supply of fossil fuels. The supply reactions that do occur will depend on the whole future time path of prices. The decision problem of resource owners can be characterised as one where they choose between (i) extracting the resource now and investing the proceeds in financial markets to earn a future financial return; and (ii) keeping the stock in the ground and benefiting from future price rises as the resources turn scarcer.

The time path of fuel fossil prices expected by suppliers will depend on how they expect policies designed to affect demand to develop over time. If today's demand restrictions are not expected to continue in the future, then suppliers will defer extraction. If future restrictions are expected to be stricter, then suppliers have an incentive to extract more now. Suppliers' decisions will depend on both demand restrictions implemented at present and the expectations of future restrictions.

It follows that measures to reduce the demand for fossil fuels may not work. For resource extraction to be slowed today, it is not enough with such demand-reducing measures today. In addition, sup-

pliers must expect these measures to be loosened over time such that it becomes profitable to defer extraction until a future date when prices will be higher than would otherwise be the case. But such a development is extremely unlikely. Instead, the opposite evolution of demand restrictions is almost certain. As global warming increases, the calls for measures to address climate change will likely grow louder, resulting in increasingly strict demand-reduction policies in the future. (Also, the difficulties to agree internationally on such policies and the desire to give both producers and consumers time to adjust give a strong incentive to phase in all demand-reducing measures slowly over time.) As resource providers anticipate such developments, they will intensify extraction today. This *green paradox* may be one of the reasons why world consumption of fossil fuels and output of carbon dioxide has increased unabated in recent years, despite the Kyoto Protocol.

*What might work?*

In light of this "green paradox" of environmental policies, the measures currently demanded by governments that ratified the Kyoto Protocol have little in common with policy efforts that would be truly effective in reducing global warming. Meaningful measures would have to be of other types.

One useful measure – not immediately obvious to most people – could be the introduction of worldwide withholding taxes on capital income along with a closing of tax havens. The consequence would be a deterioration of the investment alternatives of resource owners, which would increase the relative profitability of keeping fossil fuel resources in the ground.

This would counteract the current tendency to overextraction that results from "insecure property rights", that is the uncertainty on the part of current resource owners (mainly with respect to oil in politically unstable countries) regarding whether they – or their "dynasties" will be there to reap the returns from extraction in the future. It would thus also help slow down global warming. Doing this would be advisable even in the case of secure property rights, as markets in general tend to neglect the negative externalities resulting from global warming and to extract fossil fuels more rapidly than what would be socially efficient. (Slowing down global warming would make it possible to improve the living stan-



dard of future generations without reducing the living standard of current generations, by tilting the portfolio composition of bequests from man-made capital above ground to natural capital under ground.)

If an emissions trading system is to work, it must become truly comprehensive. This means it would have to include all customer countries and be without any loopholes such that demand reductions in one part of the world do not lead to price reductions that only stimulate demand elsewhere. The implication would be that customer countries form a worldwide *monopsony* that can dictate quantities and force the resource exporters to supply the desired amounts.

What remains as policy options goes beyond the attempts to modify supply and demand for fossil fuels but seeks the solution in storing CO<sub>2</sub>-generated by combustion processes away from the atmosphere. There are two promising alternatives. The first one is to exploit the technical possibilities of *sequestering* carbon dioxide, that is storing it in liquid form underground. The second one, which should be given top priority, is *reforestation*, as forests are the largest absorbers of carbon under human control. Currently, deforestation is leading to the release of more carbon dioxide than that emitted by the whole transportation sector. If reforestation were to replace forest destruction, global warming could be slowed down significantly.

The economics of climate change and the economics of exhaustible resources are closely intertwined, for in essence the problem of global warming is the problem of gradually transporting the available stock of carbon from underground into the atmosphere, with useful oxidation on the way. Unfortunately, most policy proposals ignore this insight and seek to reduce carbon demand without concern for the price path of carbon and the corresponding supply reactions. This oversight may result in the green paradox of measures actually increasing the fossil fuel extraction they are intended to reduce. To find useful policies that mitigate the problem of global warming, we must remember that economics teaches us to pay attention to both demand and supply.