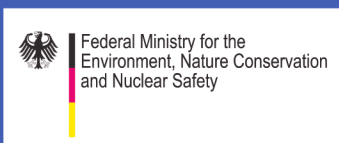
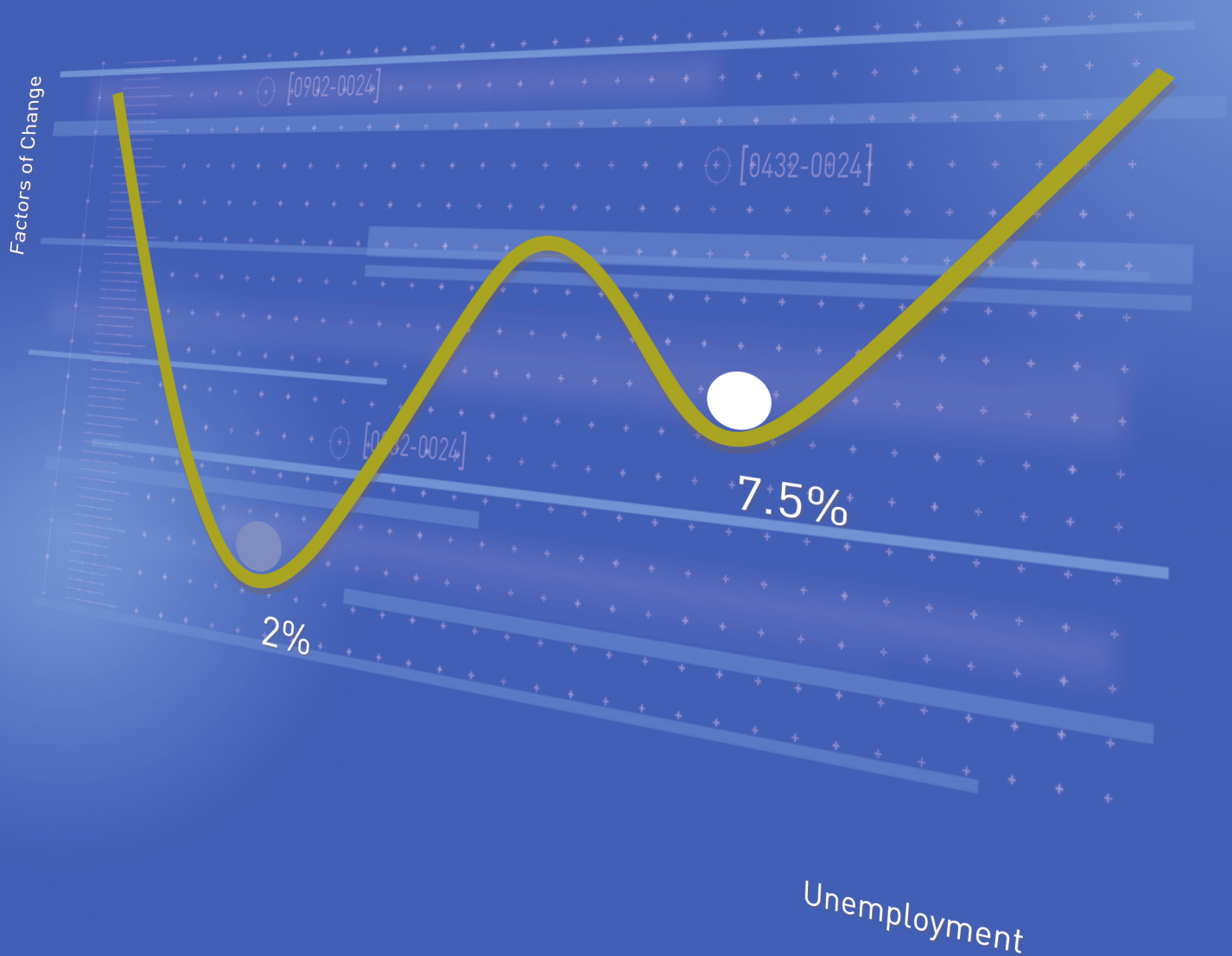


From the financial crisis to sustainability

Carlo C. Jaeger, Gustav Horn, Thomas Lux

with the collaboration of

Daniel Fricke, Steffen Fürst, Wiebke Lass, Lin Lin, Antoine Mandel,
Frank Meißner, Sven Schreiber, Dieter Vesper, Rudolf Zwiener



A study commissioned by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety



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1 Executive Summary

In recent decades, German companies and investors have invested less and less money in modernizing industry, becoming instead increasingly involved in the financial markets. The current crisis has sent massive shock waves through this model. However, the crisis also holds an opportunity for Germany to invest in green technologies and shape globalisation in a positive way: by making the German economy fit for the global markets of the future, and by enabling the country to embark on a path towards solving the global climate problem.

A thorough transformation of production structures to achieve energy and resource efficiency, environmental technologies and climate protection could increase the average growth of the German economy in real terms by well over two per cent in the next ten years. Conversely, if we continue to cling on to our current economic model we can expect only a sluggish economic recovery with an average growth of little more than one per cent per annum. Resolutely steering a new course can bring the unemployment figures down to just under two million people by 2020.

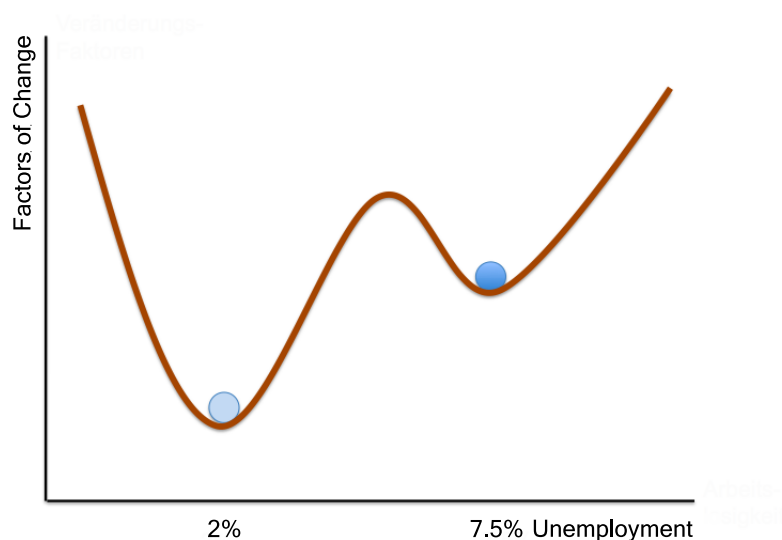
To achieve this, Germany needs a sustainable development strategy. The current growth crisis cannot be overcome by continuing along the same development path we have been treading in recent decades. There is an acute danger of the global financial crisis being regarded as a mere operational glitch, from which we have little to learn beyond the fact that the financial markets need a little additional regulation, while at the same time on the other markets increasing attention is being paid to the lobbyists for old industries.

A “Business-as-usual” strategy means continuing the underemployment of recent decades and undermining the social market economy: because under this strategy the per-capita income in the next ten years will rise by only slightly more than 1% per annum while productivity growth will probably reach around 1.5%. The population decline, combined with the growing proportion of senior citizens in the population, will aggravate the problem still further.

Continuing the Business-as-usual strategy would be a wrong turn in each of the three dimensions of sustainability:

- Ecologically: because the innovation and structural change that are necessary to protect regional landscapes and the global climate would not occur under conditions of slow economic growth;
- Socially: because the gap between rich and poor, between the new and old German states (of former East and West Germany respectively) is widening, and because a large number of young people are living unstable lives on the edge of society. Thus, the polarisation of German society will continue to increase;
- Economically: because Germany will squander its historical locational advantages if it fails to develop new industries and service sectors.

Figure 1: Two long-term equilibria in the German economy



Source: authors' own graph; data source: Ormerod, Rosewell and Phelps 2009.

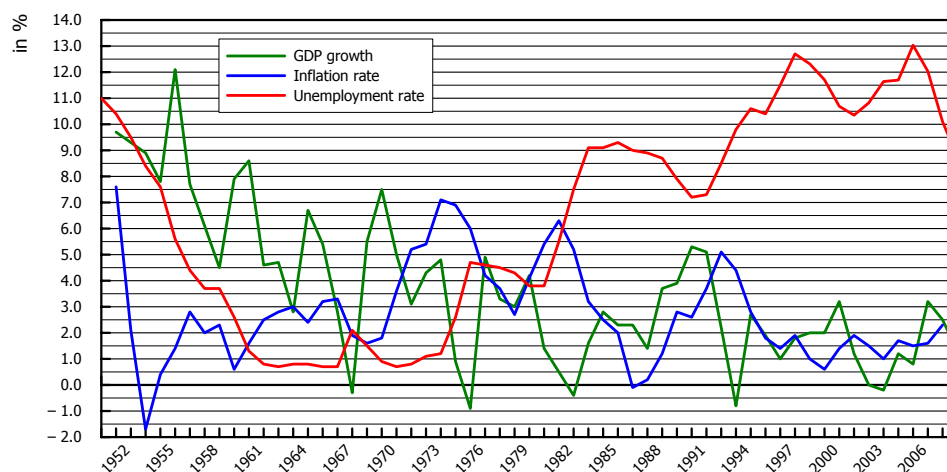
However, the crisis also gives us an opportunity to learn that the play of the markets can produce a range of very different results - some of them decidedly problematic. The market economy does not necessarily produce just one possible equilibrium; it opens up opportunities that can be used in different ways.

For example, in the course of its long-term development, the German economy – with the exception of the catastrophic hyperinflation during the Weimar Republic – has alternated several times between two different kinds of long-term equilibria (Figure 1).

- In an equilibrium of integration (which has been achieved in over half the years since 1870), the employable population has participated to a great degree in the economic process: unemployment fluctuates around 2%. That means that the number of long-term unemployed is very low and that no segment of the population is excluded from the growth in wealth. Inflation also fluctuates around 2%; per-capita income grows by an average of 3% or more.
- In an equilibrium of exclusion, by contrast, a significant part of the employable population is left outside the economic process, since unemployment fluctuates around 7.5%. That not only means that the number of long-term unemployed is high, but that entire segments of the population – often concentrated in particular regions or parts of a city – are excluded from the growth in wealth even if they are gainfully employed. The members of these groups of people then develop life strategies that are no longer

geared to successful participation in the economic process. Inflation fluctuates around 1.5%; per-capita income grows at an average rate of 2% or less.

Figure 2: Long-term equilibria in recent decades



Source: authors' own graph; data source: BfA 2009 and Statistisches Bundesamt 2009c.

Figure 2 gives an idea of the two long-term equilibria since the Second World War. Some ten years after the war, mass unemployment had been overcome; it started again around 1980. There was only a slight difference in inflation in these two equilibria, but, during the equilibrium of integration in this period, economic growth was about twice as high (4%) as in the equilibrium of exclusion (2%).

The current crisis has particularly serious consequences for Germany because in recent decades it has changed from being a high-investment country to a low-investment country. Despite an increase in investment income, the rate of investment has declined steadily. The German economy has slipped from its top ranking in 1970 to a gross rate of investment of 18.2%, which is below the OECD average. This development has led to declining growth rates, ongoing mass unemployment and a gradually ageing capital stock.

The decline in the rate of investment is accompanied, on the one hand, by higher consumption financed by investment income, and, on the other hand, by an increase in investment abroad – although it must be said that German investment income was not predominantly channelled into companies abroad but into government bonds and other financial assets. This development occurred despite the fact that, as a share in the national product, profits rose and the rates of return on investment are by no means lower in Germany than in comparable countries. Overall, the orientation towards export surpluses has tainted the idea of a social market economy with the insidious risks of internal and external conflicts of interest.

Given this starting situation, it is vital that a sustainable development strategy is able to trigger an investment surge in Germany, which will bring the economy back out of its equilibrium of exclusion and into an equilibrium of integration. This is the only way to achieve the innovation and structural change needed to protect the environment at local and global level.

A strategy of this kind is based on the following elements:

- In the short term, it makes sense to stimulate domestic demand by accepting higher deficits, in other words government deficit spending. As the Clinton administration demonstrated, it is possible to reduce a hefty budget deficit in just a few years if public structural expenditure grows more slowly than the economy.
- International coordination, in particular in the context of the EU, is an absolute must: further promotion of German export surpluses will cause difficulties in the euro area without getting Germany out of its equilibrium of exclusion. Because the other European countries will not be able to tolerate for an indefinite period a situation in which they are exporting employment to Germany in exchange for German goods. The sensible response is not to reduce German exports, but to increase German imports. To achieve that, the income of the majority of the population would have to cease lagging so far behind productivity trends – which would mean higher income and corresponding gains in wealth.
- In order to increase net investment – i.e. investment that goes beyond merely maintaining the economy's capital stock – it makes sense to reduce effective taxation of income from investment in business while at the same time increasing the effective taxation of income on non-business investment. The former can be achieved by creating appropriate deduction possibilities in corporation tax, local business tax and income tax. The latter is possible firstly by reducing other deduction possibilities and secondly by introducing or increasing wealth tax and tax on stock exchange transactions.
- Further incentives to make energy-efficiency improvements to buildings are particularly suited to increasing effective demand. Currently energy-efficiency improvements have been carried out in only about one per cent of buildings. If this proportion were to be tripled, it would trigger investment in the building industry, systems engineering and renewable heat generation – thus creating employment.
- Electricity grids, gas and district heating should undergo ecological restructuring and greater use should be made of renewable energies – all within the framework of a long-term European energy strategy. This could make it possible, for example, to use solar energy from Southern Europe and North Africa on a large scale. To boost the volume of freight transported by rail it is vital that bottlenecks in the rail network be dealt with. In many places investment in the sewage system is also needed, parts of which are already over 100 years old.

- Regional clusters in the sustainable energy production sector are one of the most important ways into creating fit-for-the-future industries in Germany. Future developments in the automobile industry would also benefit from them in areas such as optimisation of existing drive systems, but also developing lightweight design technologies and different forms of electric vehicles.
- Supervision of safety and soundness should be introduced for financial markets (a system already successfully practised in Chile). Financial products are approved only if the safety and soundness supervisory body deems them to be transparent and if it is not anticipated that they hold systemic risk. Systemic financial risks should also be further reduced by small transaction taxes which make very short-term speculative transactions expensive.
- The safety and soundness supervisory body can certify instruments for investing money sustainably, making it easier for private investors to invest their money appropriately. Financial incentives for sustainable investment are also advisable.

These elements could trigger a surge of sustainable investment, with which Germany can master the ecological, social and economic challenges of the future.

2 What lies ahead

We shall begin by describing the unique economic situation that Germany faces at the end of 2009, and against this backdrop develop a scenario for how this situation – including its international setting – will evolve unless we consciously and effectively endeavour to find a different perspective. We call this the “Business-as-usual” scenario.

2.1 Starting situation

In late 2008/early 2009, the German economy suffered the deepest slump in exports since the 1950s.¹ In the first quarter of 2009, German industry’s exports stood at around 200 billion euros, which is 21% less than in the same period of the previous year; in April the decline was as high as 29%. For cumulative exports, instead of an annual export demand of around 1,160 billion euros, a total of only 995 billion euros is now expected, which is a 165 billion euro or 15% drop. At the same time, the export surplus has also fallen from around 155 billion euros per annum to less than 85 billion euros – a drop of 45% (Projektgruppe Gemeinschaftsdiagnose 2009b).

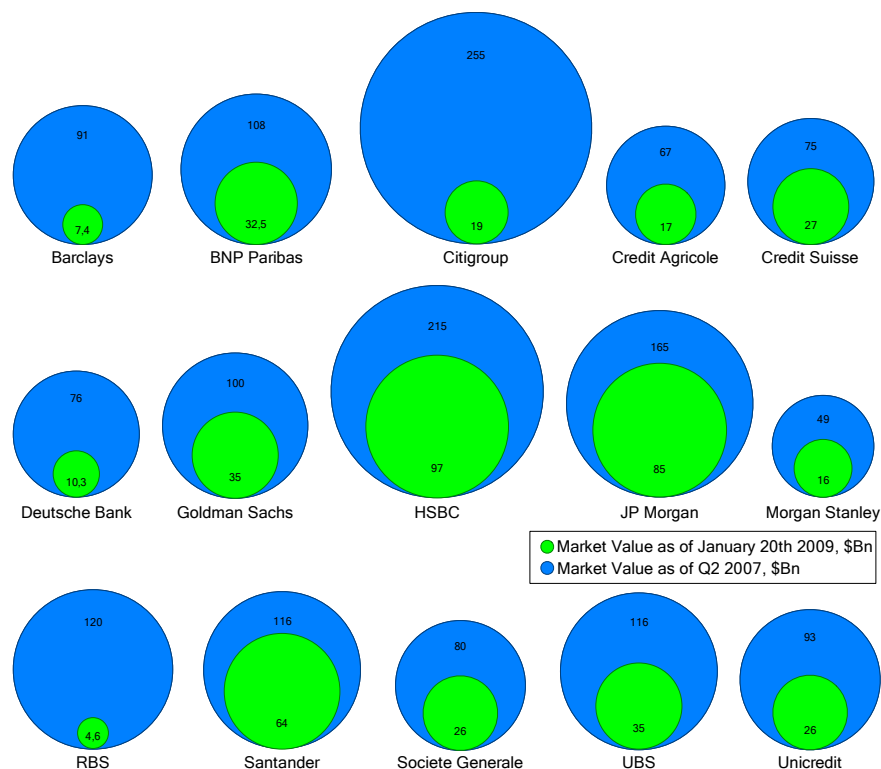
In view of this shock, it is understandable that some people would simply like to return to business as usual. But premature optimism will only make things worse. In the year to come, many of the 1.4 million people who were on short-time working in summer 2009 will become unemployed. In the same year, Germany’s trading partners will once more have a lower demand for imports than in the past. As in other countries, the banks in Germany will struggle to support their devalued portfolios with a capital base that is not strong enough to do the job and will be correspondingly cautious with their lending. And the long-term trend of falling rates of investment in Germany will continue. Under these conditions, the idea that the German economy will emerge stronger from the crisis is a dangerous illusion. In the years to come millions of people will pay a high price if policy is based on this illusion.

What is called for are policies that provide massive stimuli to strengthen the following areas:

- investment,
- growth potential,
- domestic demand,
- export demand.

¹The Business-as-usual scenario is based on the joint analysis of the economic situation in Germany carried out by the leading economic research institutions at the behest of the German Economics Ministry (BMWi). We have also taken into consideration the current scenarios put forward by IWF 2009a, World Bank 2009a and OECD 2009a.

Figure 3: Collapse in company values in the banking sector



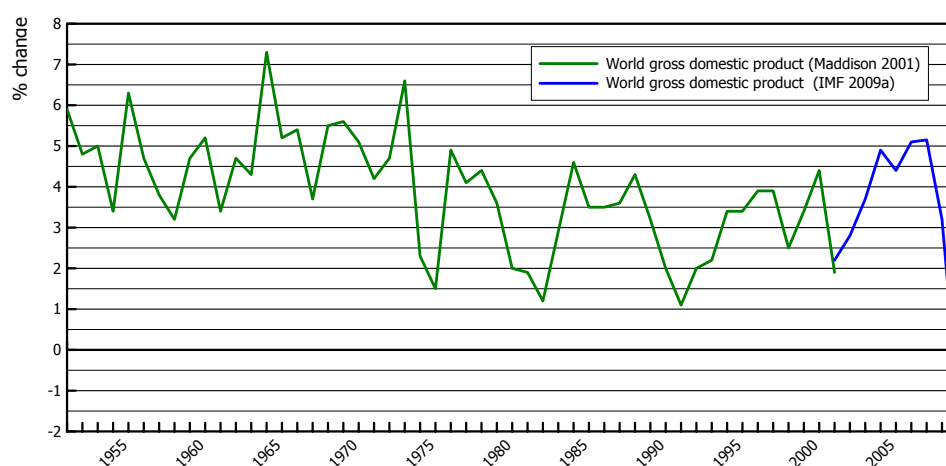
Source: authors' own graph; data source: WKH Financial Services Limited 2009.

Policies of this kind will not be possible unless we take a sober look at the crisis and the actual situation we are in. The immediate cause of the crisis was a combination of speculative bubbles and regulatory shortcomings in the USA's financial sector; researchers will analyse the deeper reasons for a long time to come. In the Anglo-Saxon world the necessity to suddenly value a large proportion of their assets at a far lower price led to a credit crunch and the acute threat of bankruptcy for most American and British banks (cf. Figure 3). That in turn abruptly reinforced the recessionary trends in the real economy. Both developments very quickly sent ripples around the world.

The first effect felt in Germany was a dramatic slump in demand for exports. At the same time, it was revealed that the majority of German financial institutions were suddenly forced to value a large proportion of their assets at a lower price. This puts the performance of the German financial system under enormous threat, and, on the other hand, there is a danger that any signs of an upturn in the real economy could be choked off by a credit crunch.

The globally synchronised recession has meant that in 2009 - for the first time since the Second World War - the world's aggregate economic output shrank at a rate of just over 1% (cf. Figure. 4)².

Figure 4: Year-to-year change in world gross domestic product



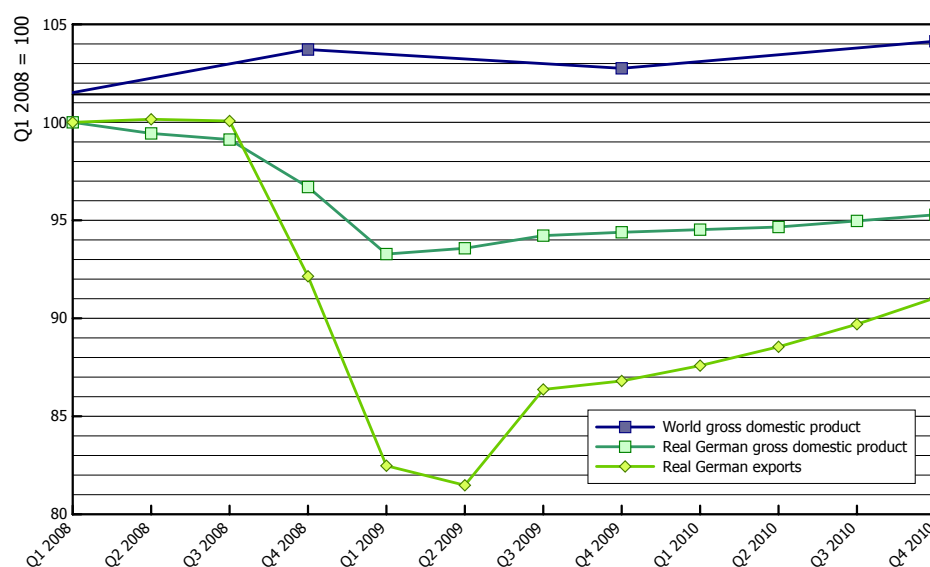
Source: authors' own graph; data source: for 1951-2001: Maddison 2001, for 2001-2009: IWF 2009a.

The volume of world trade has naturally been far worse hit, suffering an overall slump of about 10%. According to (IWF 2009a), the following major economies have been most badly affected by the recession: Japan (-6.2%), Russia (-6.0%), the emerging Asian economies and Germany (-5.6% each). By comparison, the trend in the USA at around -3% and China around +7% (this is, however, based on figures of 13% in 2007 and 9% in 2008) is not as drastic as in Germany.

The effects of the crisis have hit Germany even harder than most other industrialised countries (cf. Figure 5 and Table 1), because in recent decades the German economy has become highly dependent on exports. The concept of the social market economy has been linked to a focus on export surpluses, which is problematic – particularly in an age of globalisation. It has resulted in a distribution policy in which wages have grown more slowly than labour productivity. The fact that, despite the increase in investment income, the rate of investment has steadily fallen, is a cause for particular concern. At the same time, the mercantile orientation has led to above-average restraint in supporting domestic demand in times

² A calculation of global growth rates depends on whether exchange rates and purchasing power parities of currencies are taken into account. This explains the differences between various sources (e.g. OECD 2009a) – it does not, however, change the overall picture.

Figure 5: Germany in the global crisis



Source: authors' own graph; data source: IWF 2009b und Projektgruppe Gemeinschaftsdiagnose 2009b.

Table 1: Germany in the global crisis

| Annual growth rate(%) | 2008 | | 2009 | | | | 2010 | | | |
|------------------------------------|------|-------|-------|-------|------|-----|------|-----|-----|-----|
| | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| World GDP | 3.0 | | -1.1 | | | | 3.1 | | | |
| Real German gross domestic product | 1.3 | | -5.0 | | | | 1.2 | | | |
| | -1.3 | -9.4 | -13.4 | 1.3 | 2.8 | 0.7 | 0.6 | 0.6 | 1.3 | 1.3 |
| World trade | 2.4 | -23.8 | -22.7 | -11.8 | -4.9 | 0.4 | 3.3 | 4.7 | 5.9 | 6.9 |
| Real German exports | 2.9 | | -14.0 | | | | 6.1 | | | |
| | -0.3 | -28.1 | -35.8 | -4.7 | 26.2 | 2.0 | 3.7 | 4.5 | 5.3 | 6.1 |

Source: authors' own table; data source: IWF 2009b, OECD 2009a und Projektgruppe Gemeinschaftsdiagnose 2009b.

of crisis. Overall, the German economy has become increasingly vulnerable due to crises on its most important sales markets.

In Germany, the extremely export-oriented automotive, engineering and chemical industries are particularly hard hit by the global crisis (cf. Table 2). In some quarters they have seen their exports halved. Other areas of the economy, such as craft trades and service sectors, are also increasingly affected by the crisis.

Table 2: High-export industries

| | Production value | Exports | Export share | Employees | Employees dependent on exports | Production value per employee | Employment effect per percentage point change in exports |
|----------------------------------|------------------|---------|--------------|-----------|--------------------------------|-------------------------------|--|
| | €Bn | | | in 1,000 | | €1,000 | |
| Automotive | 330 | 160 | 50% | 975 | 490 | 340 | 4,900 |
| Engineering | 200 | 130 | 66% | 1,050 | 700 | 190 | 7,000 |
| Chemical products | 130 | 100 | 80% | 435 | 350 | 370 | 3,500 |
| Electricity generation equipment | 100 | 45 | 45% | 520 | 230 | 190 | 2,300 |

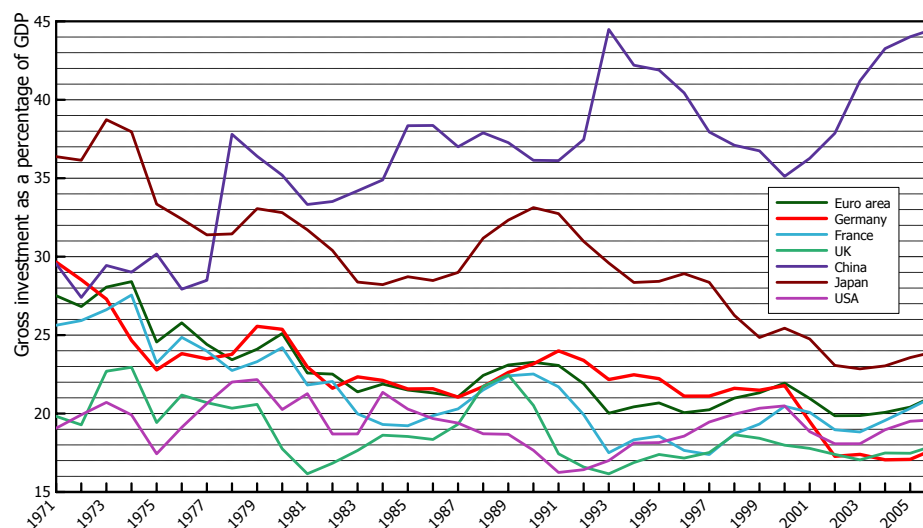
Source: authors' own table; data source: Statistisches Bundesamt 2009b.

The crisis has not yet had a major impact on domestic consumption, because the automatic stabilizers – and other support measures such as short-time working – are delaying the economic adjustments. By contrast, companies have already slashed their investment in machinery and the 2009 level is likely to be 20% below that of 2008.

It is helpful at this point to take a look at the historical development of this situation: the rate of investment has been dropping in Germany for several decades. Today, it is significantly lower than the EU and OECD averages (cf. Figure 6). In 1970, the German economy enjoyed a rate of gross investment of over 25%, ranking second only to Japan among industrialised countries. Since the mid-1990s, the rate of investment in most OECD countries has remained relatively constant, with major declines being seen only in Germany, Korea, the Czech Republic and Japan. Whereas today the latter three countries are still holding their own, or better, despite this decline, prolonged weak investment has put only Germany in a below-average position: today, at 18.2% of GDP, Germany's gross investments are below the international average (20%), putting it in one of the lowest places in the rankings (OECD 2009b). From an economic point of view, this development is alarming, because declining rates of gross investment over a sustained period are tantamount to a gradually ageing capital stock. At the same time, they indicate increasingly weakened technological progress because experiential learning-by-doing processes are continually slowed down.

The problems of the German economy become even more evident if we deduct the investment in replacing stock that is included in the gross investments and look solely at the remaining net investment (cf. Jochem and Jaeger 2008). The rate of net investment today is less than 4% (by way of comparison: in 1970 it was around 15%, in 1990 around 7%). Not only historically speaking, but also by international comparison (see also Sinn 2007), Germany is thus at the bottom of the league at present – irrespective of the current crisis.

Figure 6: An international comparison of investment rates

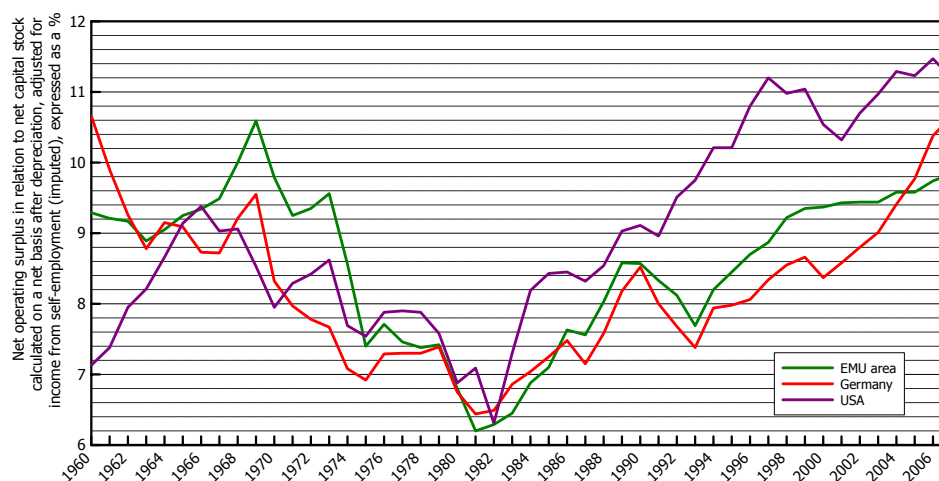


Source: authors' own graph; data source: World Bank 2009b.

It would be naive to believe that a return to the trend before the crisis began would solve the problem. On the contrary, precisely because of the very low-level starting situation. We have to assume that, unless decisive counter-measures are put in place, Germany's weak investment will remain a chronic problem of its economy even after the next upturn. These measures must take into account the fact that in many respects there can no longer be any talk of a "dynamic entrepreneur" in Germany in Schumpeter's sense of the term: because despite systematically declining unit labour costs and internationally competitive rates of return (Figure 7), factors such as growing risk aversion and increasing status consumption have meant that increasingly investment income in Germany is not being invested in business, but more and more in financial assets, on the one hand, or used for luxury consumption on the other.

Particularly worthy of attention is the fact that in the massive rise in German investments abroad before the current crisis, financial investments were higher than direct investments (Figure 8). In other words, people were primarily buying government bonds and other financial assets, while setting up or expanding businesses took a back seat. The high returns on equity from individual finance companies do not, however, mean that financial investments themselves produce higher returns than business investments. In the long-term, the return on the former is 7%, on the latter in excess of 10%. However, it is not only the expected return that is higher; business investments are higher risk and particularly German investors seem to be increasingly shying away from this risk. Since investments in Germany are largely

Figure 7: An international comparison of return on real capital



Source: authors' own graph; data source: Schneider 2008.

financed by investment income, it is vital that action be taken to ensure that in future this income is once more used for business investment.

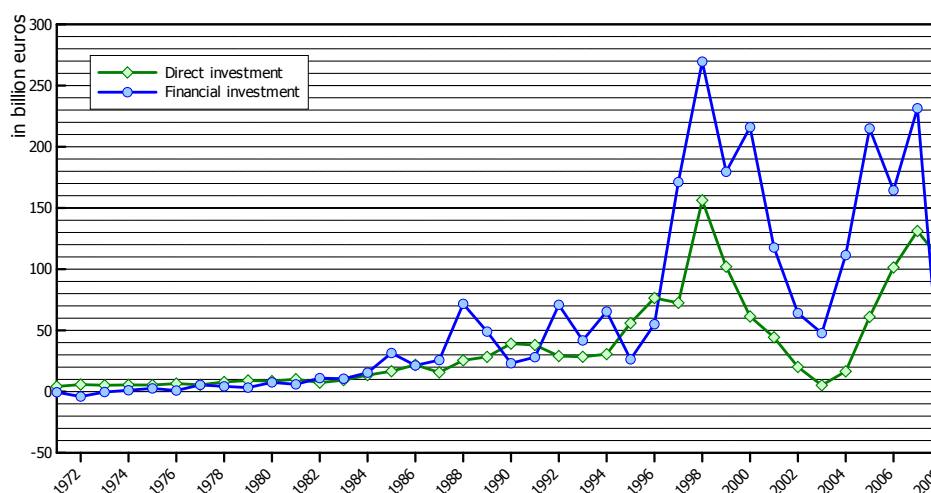
If business investments were relatively weak even before the crisis, the collapse in export demand has eroded them still further. This was caused in the first place by companies' negative sales expectations, which reduced the demand for investment. This effect was reinforced by the fact that the German financial sector had exposed itself to the vastly underestimated risks of the global financial system, so that the deterioration in financing conditions is now driving up investment costs for potential investors.

Industry has been particularly badly affected (cf. Figure 9): whereas in autumn 2008, the majority of companies still had positive investment intentions, by the early summer of 2009, the proportion of companies seeking to expand their investments had fallen to 14%, with the proportion of those looking to reduce their investments rising to 44%. It was not until the third quarter that the situation stabilised, albeit at a low level (DIHK 2009b).

As a result of the above-mentioned factors, the German economy as a whole is looking at a decline in company investment in machinery of around 20% in 2009 and it is expected that particularly large-scale investments and innovative projects – which as a rule have a higher risk potential – will be shelved (KfW 2009).

As a result of the massive demand shortfall and sharp drop in oil prices, there is currently practically no pressure on goods prices. Instead of battling against inflation Germany is more concerned with how to avoid sliding into a deflationary spiral. The expected 0.5 % price rise is markedly below what has been the average for many years. To date the extra money from the central bank has done nothing more than offset the decline in deposits experienced by the

Figure 8: German direct investment and financial investment abroad



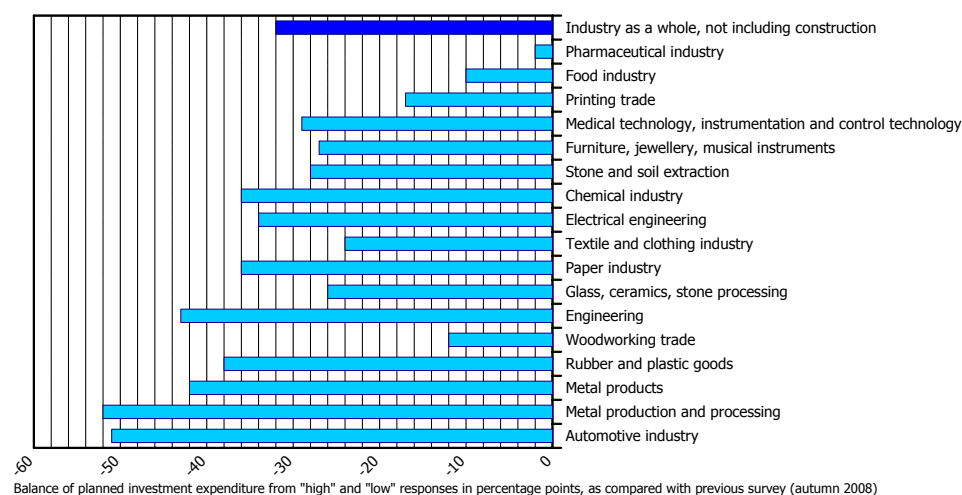
Source: authors' own graph; data source: Bundesbank 2009.

commercial banks– and even that has only been partial. When the crisis is over, this money from the central banks will have to be siphoned off again to prevent inflationary tendencies.

As a result of falling capacity utilisation, the crisis has produced a short-term rise of about 5% in unit labour costs. Due to the decreasing number of hours worked, the fixed labour costs are distributed across fewer hours, causing a rise in labour costs per hour. In view of the current state of the labour market, a reversal in German wage trends of recent decades is not, however, expected: wages have systematically risen more slowly than productivity. In the period 1995-2000, labour productivity rose by 1.9% per annum, whereas real wages rose by around 1.7%, from 2000 to 2005 labour productivity rose by 1.2% per annum, whereas real wages stagnated at 0.0% (EU KLEMS 2007, Görgens 2008). The gap between increase in productivity and wage trends has thus widened since reunification. This has an overall effect on domestic purchasing power and contributes ultimately to greater dependency on exports, but does not increase the rate of investment.

On the labour market, unemployment trends as a lagging economic indicator are still benefiting to some extent from the effects of the last upturn. At approximately 3.35 million (as of September 2009) – of a total of 40 million employees (Statistisches Bundesamt 2009b) – it has not yet risen dramatically. However, the trends in hours worked has already suffered a decline of over 5%, indicating that there is significant underemployment. Correspondingly, the number of people on short-time working in the middle of the year rose to over 1.4 million. The average figure for 2009 will be about 1.2 million.

Figure 9: Germany industry's investment plans (April 2009)



Source: authors' own graph; data source: DIHK 2009a.

2.2 Input from international policies

Against the backdrop of this starting situation, we shall now look first at the Business-as-usual scenario. Let us assume that fiscal policy in the USA, China and other major economies is geared to expansion. This is in the short-term indisputable due to the economic stimulus programmes that have already been approved, since these programmes can only start to have an effect in the course of the next few quarters. In addition to that, let us assume that governments will continue to ensure that the automatic stabilisers can work fully, i.e. that revenue losses do not lead to short-term budgetary consolidation efforts, neither on the expenditure nor revenue side. To some extent further programmes are to be anticipated, but their effect in supporting demand will not be felt until 2010. The measures are not, however, internationally coordinated, which to a large extent takes the edge off their power. That would be even more problematic if short-term budgetary consolidation efforts were on the cards. In the Business-as-usual scenario, governments then stabilize instable banks to such an extent that the global financial system continues to be able to function – although a credit squeeze would be expected.

As a result of the policy of the Obama administration, the US national deficit for 2009 and 2010 will be over 10%. The American economy will shrink by about 2.6 %. Chinese economic growth from 2009 to 2010 will probably fall slightly (by around 10% to 8.0%); negative growth rates have not to date been recorded there (Projektgruppe Gemeinschaftsdiagnose 2009b).

Since, in the Business-as-usual scenario, global economic output stabilizes after 2009 – although until 2011 at a relatively low level (cf. Figure 4) – with the result that the risk

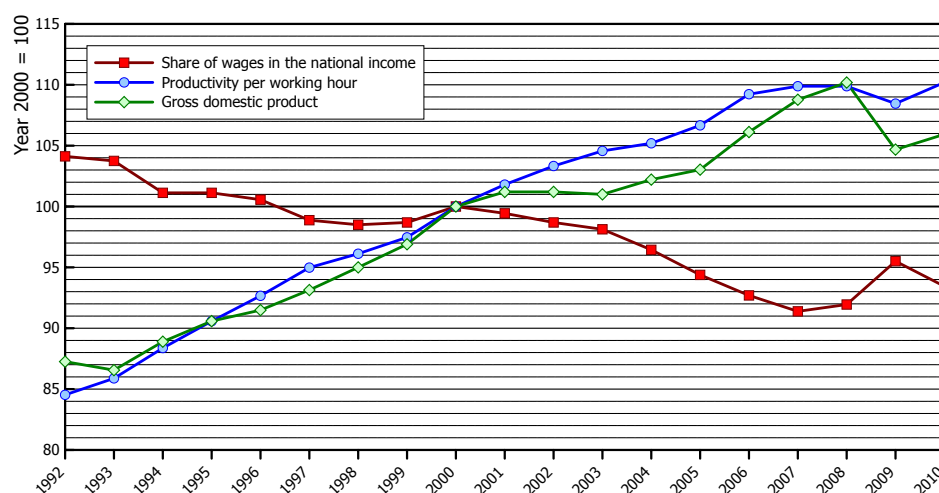
of a global depression disappears, world trade volume will begin to grow again. However, this increase in trade will tend to be tentative, since for the foreseeable future relatively low growth rates are expected for the world economy.

In this scenario the key countries do not exhibit overt protectionism of any kind, but in practice an increase in protectionist steps is seen. The capacity for intergovernmental coordination on a global scale has increased in recent decades as it did during the time leading up to the First World War. There will still be a great deal of rhetoric on the subject in many areas, but the capacity will experience a de facto weakening. The question of whether it will develop in the years to come, or whether it will suffer a massive decline as it did following the wave of globalisation between 1870 and 1914, is wide open.

2.3 Input from German policies

In the international arena, the German government to a certain degree occupies a free-rider position, by deeming its economic stimulus packages I and II to be adequate and pursuing a financial policy that was designed without regard to the crisis. Rising unemployment is causing the gap between productivity and wage trends (cf. Figure 10) to widen, which in turn is weakening domestic consumer demand. For Germany and other countries, too, we assume there will be no short-term budgetary consolidation efforts, which will mean deficits that will be more or less within the limits set by the European Stability Pact. Larger deficits could, however, be brought about by steeply rising expenditure for ALG II unemployment benefit.

Figure 10: Widening discrepancy between wage ratio and productivity in Germany



Source: authors' own graph; data source: Statistisches Bundesamt 2009b, OECD 2009a und Projektgruppe Gemeinschaftsdiagnose 2009b.

The scenario is also based on the well-known current endeavours to rescue the financial sector – e.g. with SoFFin (Financial Market Stabilization Fund) or the “bad bank” scheme. Credit provision to the real economy next year is likely to be too low and therefore suboptimal, even if serious distortions can be avoided. There is, however, absolutely no guarantee of that unless further resolute measures are taken.

Monetary policy: since mid-2008, the ECB has slashed base rates in the euro area to approx. 1%. Although, unlike with the zero interest rate policies in other countries, a further drop would still be possible, the scope for traditional monetary policy to influence the direction of the economy has become very limited. The ECB merely has the option of using quantitative easing, which involves buying up bonds to pump cash into the economy.

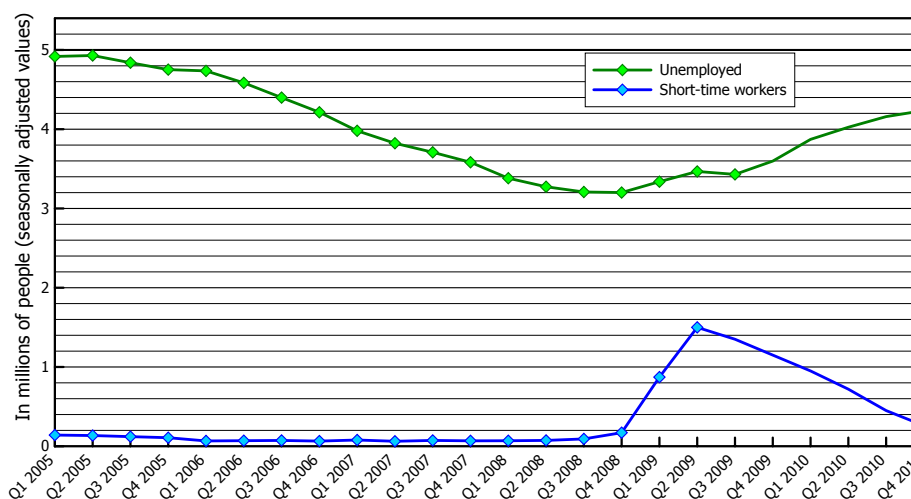
2.4 Short-term economic impact

The free fall both in domestic and world demand for capital goods means that the drastic losses in revenue of the first months of the year will worsen only slightly, so that by the end of 2009 Germany too will begin to see GDP stabilizing. As is generally known, for the year as a whole it is expected to shrink by 5%. By the end of 2009, a decline in volume of work of over 3% is expected. The production decline at the end of 2008/beginning of 2009 has so far only come to a halt; there has not yet been a recovery. Companies will be unable to avoid sending the employees who have been on short-time working – some for prolonged periods – to join the ranks of the officially unemployed. Furthermore, some jobs that were covered by the statutory social insurance scheme have changed their status, being reclassified as “marginal employment” or part-time jobs. Recruitment will remain at a very low level. Ultimately, in the Business-as-usual scenario, over 3.6 million officially registered unemployed are expected by the end of 2009 (cf. Figure 11). This corresponds to an average for the year of about 3.5 million unemployed. If we were to take into account the change in the way unemployment is measured in the official statistics, which was introduced in 2009, the figures would rise by a further 100,000. In addition to that, there is still a high number of short-time workers, which will not have been significantly reduced by the end of 2009.

These developments on the labour market will trigger an increase in adverse private consumption patterns. Firstly, there is a direct loss of purchasing power due to unemployment and short-time working. Secondly, rising unemployment embeds the scale of the crisis more firmly in the public awareness, with the result that people will tend to postpone larger purchases and there will be a general increase in saving for a rainy day. Even by the third quarter of 2009, private consumption will fall by 0.7% by comparison with the previous quarter. For 2010, positive growth is expected - albeit at a low level – but not until the third quarter (Projektgruppe Gemeinschaftsdiagnose 2009b).

The stabilisation will continue at the beginning of 2010, and averaged over the year a moderate growth of about 1.2% will be achieved. The national product (seasonally adjusted) will nevertheless continue to be below that for the same periods in 2006. As a result, unemployment will continue to rise until summer 2010. There is a serious risk that by the end of 2010 it will even exceed the 4.2 million mark. Here again, if we wish to record underem-

Figure 11: Unemployment and short-time working in Germany



Source: authors' own graph; data source: BfA 2009, Statistisches Bundesamt 2009a and Projektgruppe Gemeinschaftsdiagnose 2009b.

ployment as a whole, the annual average of 600,000 people on short-time working needs to be taken into account (here the joint analysis of the economic situation carried out by Germany's leading economic research institutes advocates calculating one short-time worker as being equivalent to 0.2 to 0.25 of an unemployed person, cf. Projektgruppe Gemeinschaftsdiagnose 2009a).

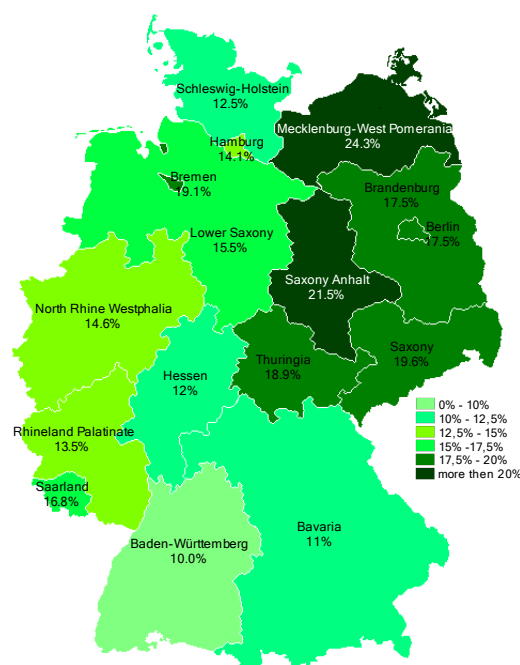
As a result of the extremely sluggish recovery, there will not be a threat of inflation in Germany and the euro zone in 2011 under the Business-as-usual scenario; the risk of deflation is far greater.

2.5 Long-term economic impact

From 2011, the German economy will once more achieve positive – albeit low – growth rates. As a result, it will be 2013 before the gross domestic product gets back to its 2008 level. Sluggish/low productivity growth will mean that even in five years time the employment figures will not have reached their 2008 level.

Under the Business-as-usual scenario, Germany is not expected to achieve its former growth path (in the foreseeable future) because its economic growth will continue to be dependent on export surpluses. Even though Germany's export industry will main its competitiveness in the Business-as-usual scenario, the European and global economy will grow significantly more slowly in the next decade. That alone would push growth rates down to

Figure 12: Poverty ratio in the individual German states



Source: Der Paritätische Gesamtverband 2009.

below the 2% level that has characterised the last two decades. That effect will be reinforced as the rate of investment continues to fall.

Unemployment will remain at a level of 4.2 million until 2013. It will then gradually fall to slightly below four million by 2020, because demographic factors will also ease the situation somewhat. However, it must be stressed that due to permanently higher unemployment, which will include a substantially growing pool of long-term unemployed people, poverty will increase appreciably in Germany.

The robustness of the combination of social market economy and mercantilism will be seriously put to the test under the Business-as-usual scenario – all the more so since there is a clearly regional dimension to the social disparities that will continue to counteract the success of German reunification for a long time to come (cf. Figure 12). Whereas the average poverty rate in Germany is 14.3%, the variations in rates across the individual regions range from 7.4% in the Black Forest to 27% in the region of Western Pomerania. There seems to be a question mark over the goal of establishing “equal living conditions.” In this respect, Germany is a country divided into three, with the poorest regions facing the threat of a continual downwards spiral (Der Paritätische Gesamtverband 2009).

The basic idea underlying the social market economy – achieving a balance between market competition and social solidarity – will tend to be eroded by this development. At the same time, the government's ability to act will be restricted by the fact that sluggish economic growth will make it difficult to achieve the desired and imperative reduction of budget deficits.

2.6 Summing up

- In 2009, the German economy suffered record negative growth of -5%. Its export surplus slumped by about 85 billion euros, investment in machinery by about 45 billion euros. Overall that produced an effective demand deficit of around 130 billion euros. Starting from the low level that produces, moderate growth can be expected for 2010. From 2011, growth rates will most likely remain decidedly low.
- Since the third quarter of 2009, unemployment figures have been rising by up to 100,000 a month. There is therefore a real risk that 4.2 million people will be unemployed by the end of 2010. Unemployment figures will then fall again, but only slowly. Social and regional inequalities will increase massively during the course of this development.
- Both gross and net investment remain alarmingly low, with the correspondingly weak innovation potential that means for the German economy.

3 The strategy of boosting sustainable investment

The Business-as-usual scenario is anything but sustainable. Nevertheless, it remains the most plausible scenario – not least because many actors assume that any alternative will mean additional cost for them in the short-term. That belief stems from the notion of a zero sum game between the generations: in this view of things, the risks of future generations can only be reduced by present-day society as a whole accepting additional sacrifices. Fortunately this is not a reflection of reality. In fact, the dynamics of the market economy create considerable scope for action, even in - and especially in - crisis situations such as the one we are currently facing. To illustrate this, we shall identify two different equilibrium constellations, which the German economy could adopt in the future. We then go on to describe with the help of computer simulations a way of making the transition from one constellation to the other.

3.1 Different economic equilibria

The fact that not only did most economists not recognise the possibility of the current crisis nor was it identifiable in the simulation models of the major central banks and research institutes – not even as a possibility! – speaks in favour of taking factors and circumstances into account that economists have largely ignored in recent decades. One of the most significant of these is the possibility of a multiplicity of equilibria and the role of expectations about the future in selecting these equilibria (Akerlof and Shiller 2009, Colander et al. 2009, Horn 2009, Jaeger and Kasemir 1996).

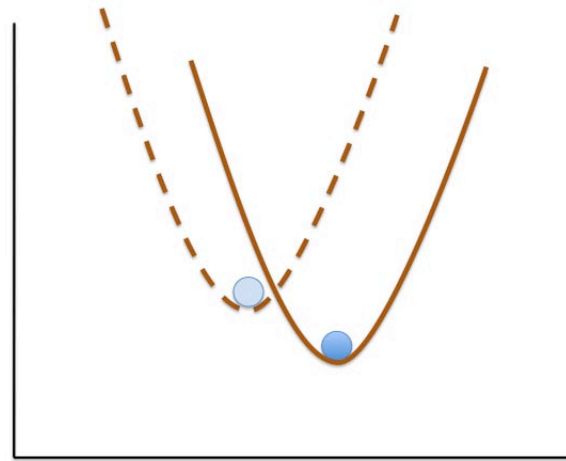
In recent years, economic research has largely confined itself to analysing developments in the immediate environment of a given economic equilibrium (cf. Figure 13). Two outcomes are of particular relevance here. Firstly, it is often possible to estimate how quickly a given economy will be able to process an exogenous shock. Political interventions are only advisable if this would take too long or if unacceptable social hardship would be anticipated along the way. Secondly, certain environmental problems can be described as external effects, which if internalised would lead to a slight shift in the equilibrium to date (cf. the dotted curve in Figure 13)

What was neglected in these analyses was the fact that it is possible for a multiplicity of equilibria to exist and that an economy may reach bifurcation points at which – consciously or unconsciously – a choice between different equilibria has to be made. The fact that economic research concentrated too much on equilibria and their immediate vicinity made it blind to the possibility of a crisis such as the one we are now experiencing.

A statistical survey and historical analysis of the German economy since 1870 shows that three fundamental equilibria can be distinguished (cf. Ormerod, Rosewell and Phelps 2009):

- In an equilibrium of integration (which has been achieved in over half of all the years since 1870), the employable population is integrated into the economic process to a great degree: unemployment fluctuates around 2%. That means there are very few long-term unemployed and no population group is excluded from the growth in wealth.

Figure 13: Situation mit einem einzigen Gleichgewicht



Source: authors' own graph.

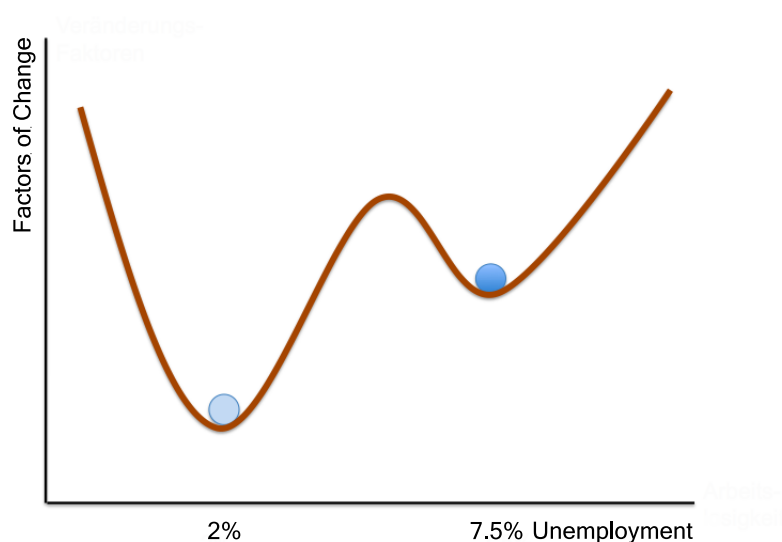
Inflation also fluctuates around 2% and the per-capita income grows by an average of 3% or more.

- By contrast, in an equilibrium of exclusion, a considerable portion of the employable population remains outside the economic process, since unemployment fluctuates around 7.5%. That means not only that there is a large number of long-term unemployed but also that entire population groups – often concentrated in individual regions or neighbourhoods– are excluded from the increase in wealth, even if they are gainfully employed. The members of these groups develop life strategies that are no longer geared to successful participation in the economic process. Inflation fluctuates around 1.5%; per-capita income grows by an average of 2% or less.
- Hopefully of mere historical interest is equilibrium of hyperinflation in which unemployment can be relatively low – below 3% –, but inflation accelerates exponentially at a pace that can only be sustained for a couple of years at most.

If we rule out the threat of hyperinflation, the German economy will without doubt be able to remain after the current crisis in an equilibrium of exclusion. Established technologies will be perfected, whereas new technologies will be developed only tentatively. This is the Business-as-usual scenario; it corresponds to the current expectations of the actors involved in Germany – as the low investment level that has persisted for years clearly attests.

However, the current crisis can open up the way for a transition to an equilibrium of integration, in which low unemployment and high growth go hand in hand. To put it in the

Figure 14: Two long-term equilibria in the German economy



Source: authors' own graph; data source: Ormerod, Rosewell and Phelps 2009.

dry language of economic analysis: two different equilibria are possible. Figure 14 illustrates a situation of this kind.

3.2 The transition to a new equilibrium

The decisive question is thus how can Germany find a way out of the equilibrium with exclusion. To do this it needs a credible vision for the future, in which by taking concerted action with industry and society, the state develops a strategy that readjusts the expectations of the actors and takes the economy to a permanently higher level of investment. A strategy of that kind stresses that the current crisis also holds opportunities for industry and society and it wholeheartedly puts in place all the measures needed to do this.

If “business as usual” is not an appropriate path to follow, R&D efforts on a larger scale, combined with a workforce upskilling campaign that is embedded in a far-reaching innovation process, are needed. This can only succeed as part of a surge of sustainable investment, which increases the German economy’s growth potential and also realises that potential.

Because in view of the challenges presented by global shortages of energy, water and raw materials and the dramatic pace of climate change, on the one hand, and the industrial changes in sectors such as the automobile industry, on the other hand, the only credible vision for the future is to re-orientate the German economy to make it “fit for the future.” In this process, the ecological challenge will become an incentive to develop far-reaching

innovations, which will also improve both the quality of life in Germany and the country's global competitiveness.

If Germany seizes this historically unique opportunity to undertake an across-the-board reorganisation of its production structure, gearing it to energy and resource efficiency, environmental technologies and climate protection, it will be able to emerge stronger from this crisis. There are several reasons for this:

1. A paradigm that seeks to mobilise industry and society to take concerted action must have a positive appeal for all stakeholders. "Fitness for the future/sustainability" has this, since it mobilises the know-how of actors and the entrepreneurial spirit of the elite to find an answer to the global energy and climate crisis.
2. "The markets of the future are green" – actors as different as Jeff Immelt, head of the US General Electric Corporation, Siemens CEO Peter Löscher, and Prince El Hassan bin Talal, President of the Club of Rome, have endorsed this statement. Various studies have shown that environmental and energy technologies are the major key markets of the future, because shortages of energy and resources and the climate will generate high demand in these areas. Germany is already well positioned in these fields and can – simply by maintaining its current world market share – benefit hugely from growing global demand.
3. Increasing energy efficiency has a strong effect on employment: for example, a significant increase in building refurbishment results in higher employment in the construction industry, Germany's most labour-intensive sector.
4. Investment in energy and resource efficiency and in renewable energies generates second-round effects on growth and employment because they produce cost savings across all sectors. In the following years less coal, oil and gas are imported. Households and companies then have higher disposable income, which tends to boost domestic demand.
5. Investment in efficiency and renewable energies have the effect of providing "insurance" against global price shocks in the commodities markets: thus, the IEA forecasts that immediately after the current crisis oil prices will rise again to significantly more than \$100 per barrel, because energy demand will pick up again and the oil supply will not have been increased. Economies that become less dependent on coal, oil and gas imports therefore reduce their vulnerability to price risks.

The economic crisis is an enormous challenge, but it also holds the opportunity to encourage investment in directions that have a promising future – both with regard to developments in Germany and export opportunities on global markets. A strategy of this kind would put companies in a position to once again hold their own with the world's best and to exploit the potential that the future holds, particularly in the field of "green" technologies.

3.3 The possibility of boosting sustainable investment

In view of the current crisis, any strategy must achieve three interconnected objectives if it is to be effective:

- step up investment in business in Germany,
- strengthen German domestic demand,
- accelerate the German economy's long-term growth dynamic.

This requires a package of clearly focused measures in a number of different fields of action (see below). The first task involved is to offset the slump in effective demand as far as possible.

The second task is to ensure that the German economy can rely on a sound financial system with a sufficient supply of credit to make it possible to overcome the crisis.

And the third task is put short-term measures in place to set in motion developments that will be sustainable in the long-term. This threefold task can be accomplished using a strategy to boost sustainable investment. We shall illustrate this below using a Strategy-driven scenario that can be compared with the Business-as-usual scenario described in Chapter 2.

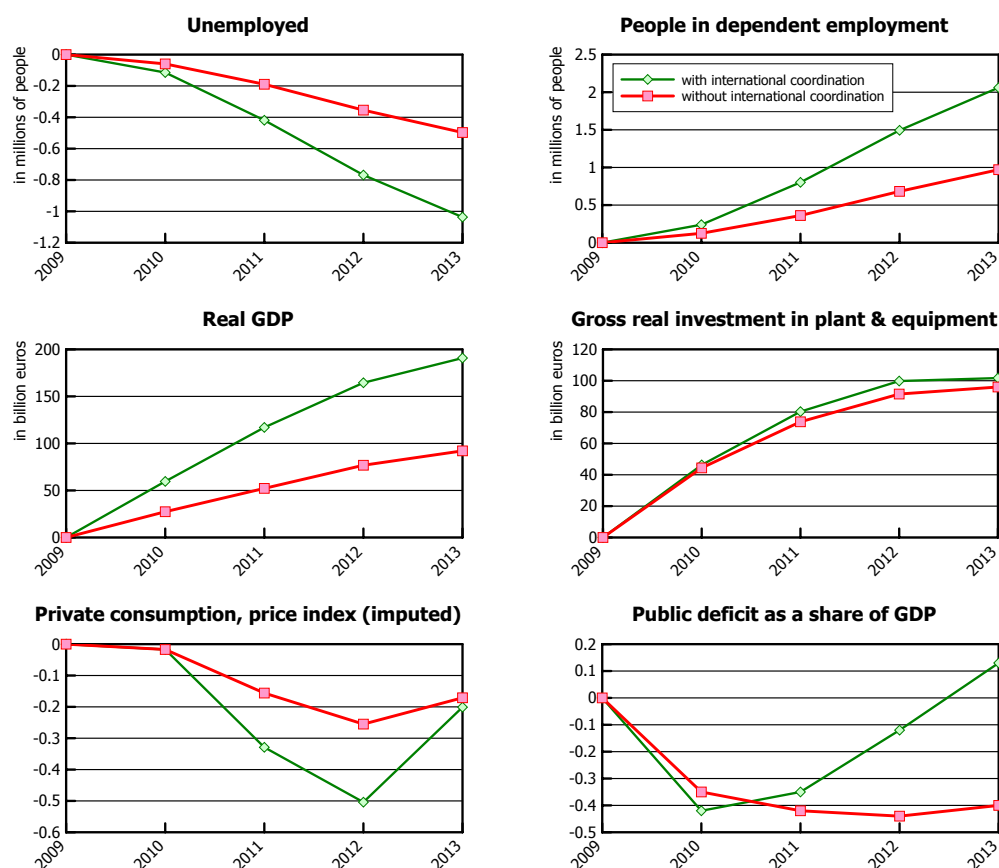
A surge of sustainable investment from 2010 to 2013 could increase private investment by a total of 70 billion euros per annum and government investments by a total of 30 billion euros per annum. Three flanking developments are essential here. Firstly, an increase in public spending (e.g. on short-time working accompanied by retraining), secondly parallel increases in demand among the major trading partners (who in this respect are more willing to take action than Germany), and thirdly measures to overcome the imminent credit crunch.

Working in cooperation with the other EU countries, the proposed strategy can reduce the number of unemployed by about one million over a four-year period (cf. Figure 15). Without international cooperation, the effect would only be just over half as great; it would also be scarcely possible to reduce the deficit without this kind of cooperation. Since the majority of German exports are to the EU region, the majority of those to France, cooperation between these two countries, which are probably the most significant for Europe, is of the utmost importance.³

International cooperation, which is in Germany's own interest here, can only work in this context if Germany reduces its export surpluses. That does not mean that exports have to be reduced; on the contrary they will rise more rapidly because the internationally coordinated approach will mean that effective demand in France and other areas importing German products will also rise more rapidly. What is crucial, however, is that German imports also rise; that would mean that domestic demand and the prosperity of the German population that accompanies it would also grow more quickly.

³In a preliminary study to this report, a far more ambitious scenario was analysed, in which the number of people unemployed remained constant from 2009 to 2010, beginning to fall in 2011. That would require prolonged periods of short-time working on a massive scale – and even more intensive international cooperation.

Figure 15: Strategy-driven scenario with and without international coordination (by comparison with the Business-as-usual scenario)

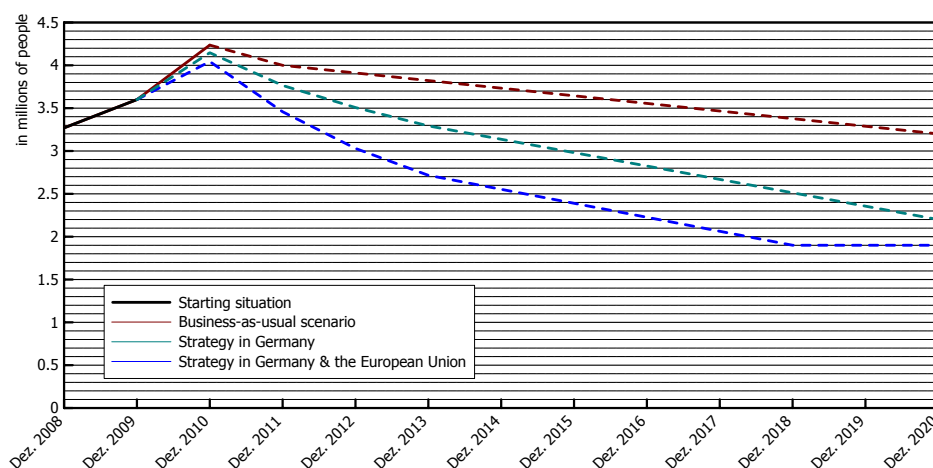


Source: authors' own calculations.

Particular attention must be paid to the fact the number of people in employment increases by about two million, whereas the number of people unemployed drops by “only” one million. This stems from the fact that an increase in demand activates the “hidden reserve” of people who are employable but are not registered unemployed – a development that is also relevant for family policies.

The developments outlined relate initially to dynamics in the vicinity of an equilibrium of exclusion – for that reason they can be simulated with relative ease, because this environment has been relatively well researched in recent years in econometric studies and can be described in a good approximation by quasi-linear models. A reduction in unemployment figures to around 2.5 million in four years would bring the economy a good deal closer to an equilibrium of integration. In that context, non-linear dynamics become important, but the

Figure 16: Unemployment in Germany in the Strategy-driven scenario and Business-as-usual scenario



Source: authors' own graph; data source: for 2008, 2009 and Business-as-usual scenario 2010: Projektgruppe Gemeinschaftsdiagnose 2009b.

data needed for their detailed simulation is not currently available. However, one extremely important fact has been identified by the analysis of the past: transitions between the different equilibria – when the time is ripe – happen within just a few years and most definitely in less than ten years.

Thus, if a strategy to boost sustainable investment were maintained in the next ten years, we could expect the number of unemployed to fall below two million before 2020 (cf. Figure 16).

Initially a significant percentage of the new jobs created will be in the construction industry, which, as a result of energy-efficiency improvements to the majority of Germany's building stock, could experience a relatively rapid boost in demand. In subsequent years, more and more sectors would contribute to employment growth as rational energy use; education and health become the cornerstones of an economic structure that is fit for the future.

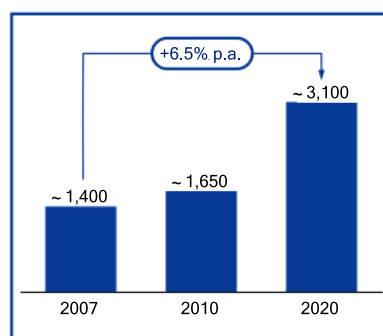
4 What we can do

In the same way as we did for the Business-as-usual scenario, we shall now develop a Strategy-driven scenario, in which concrete measures are put in place to bring about a transition from an equilibrium of exclusion to an equilibrium of Integration, which was explained in the last chapter. It will be seen that this transition can be made in the next decade without painful disadvantages for individual population groups – provided that a common will to make it happen can be established.

4.1 Starting situation

However, within the Strategy-driven scenario the question of which global key markets of the future will crystallise and how Germany is positioned in these markets is of central significance for its further development. A credible vision for the future based on this might emphasise that the current crisis also holds opportunities for industry and society. If Germany seizes this historically unique opportunity to undertake an across-the-board reorganisation of its production structure, gearing it to “fitness for the future” it will be able to emerge stronger from the crisis: it would put companies in a position to hold their own with world’s best once again and to exploit the potential that the future holds, particularly in the field of “green” technologies (Roland Berger 2007, McKinsey Deutschland 2009), auszuschöpfen (cf. Figures 17 to 19).

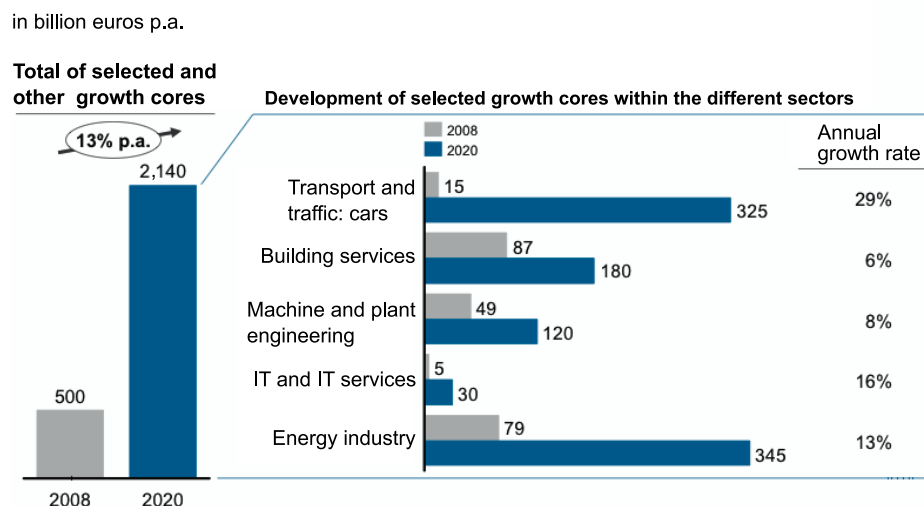
Figure 17: Trends in the world market for environment technologies 2007-2020



Data in billion euros; Source: BMU (Hrsg.) 2009 S. 14.

Even in the year before the crisis began (2007), the market shares of German companies in the six key environmental technology markets were impressive: environmentally friendly energies and energy storage: 30%; energy efficiency: 12%; raw material and material efficiency: 6%; closed cycle management: 24%; sustainable water management: 10%; and

Figure 18: Global market potential in growth cores



Source: McKinsey Deutschland 2009 S. 23.

sustainable mobility: 18%. The world market volume of these six markets alone is around 1,400 billion euros (2007) and is likely to double and more in the next 10 years (2020: over 3,000 billion euros). Since environmental technology in Germany generated 8% of the national product in 2007, this share could almost double to 14% by 2020 (BMU (Hrsg.) 2009, cf. Figure. 19). The economic crisis is an enormous challenge, but it is also holds the opportunity to encourage investment in directions that have a promising future – both with regard to developments in Germany and export opportunities on global markets.

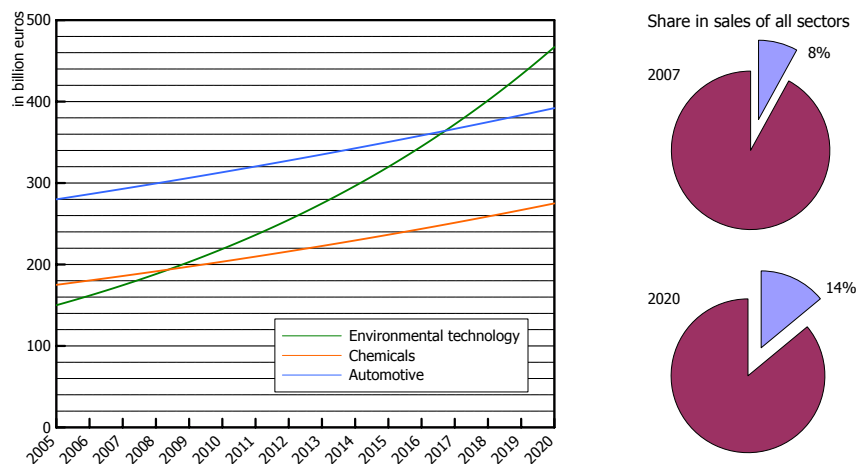
Many of our major international competitors have already set their course accordingly – in their economic stimulus programmes for example. German industry has been in an excellent position to date, but the bar has been raised and that trend will continue in the future. Often industry is only able to achieve the requisite technological progress by closely collaborating with politicians (Jänicke and Jacob 2008, Jochem and Jaeger 2008). Politicians must not misdirect industry in this situation – by omitting to send the right signals or by sending the wrong ones – but must call for and actively promote a change towards “fitness for the future.”

4.1.1 Fields of action

To implement the strategy to boost sustainable investment clearly focused measures in a number of fields of action are necessary. They include:

- Cluster creation. Traditionally, Germany has always had extremely successful innovation clusters, such as those in the engineering industry in Baden-Württemberg. If

Figure 19: Sales forecast for environmental technologies in Germany



Source: authors' own graph; data source: BMU (Hrsg.) 2009, Berger 2009.

sustainable investment is to be boosted, finding ways of strengthening new clusters is a priority. Examples might be nanotechnology in the Rhineland, solar technology in various states in Eastern Germany, environmental engineering in the Ruhr region, to mention just a few. Successful innovation clusters cannot be created to order, but without close interaction between companies, the public sector and societal actors they can neither come into being nor flourish.

- **Upskilling and R&D.** Germany's vocational education system is one of its greatest competitive advantages. For decades it has not been adequately promoted and in particular it has not been sufficiently geared to the economy of the future. Defining new fields of work that direct traditional strengths such as inventive talent and quality consciousness towards new challenges such as energy efficiency and quality of life is just as imperative as short-term retraining schemes for employees whose future lies in unfamiliar areas of work. R&D must be more closely linked to workforce upskilling processes than in the past and can increasingly provide impetus for new products processes and services. To achieve this, education and research must be developed in close synergy with sustainable investment.
- **Energy and infrastructure** are necessary for the different areas of the economy: electricity grids, district heating/gas, rail networks, IT infrastructure (broadband provision) and sewerage. Thus, for example, to achieve the economically rational and ecologically imperative expansion of renewable energies – which Germany has been working towards for a long time – it is crucial that we begin today to step up efforts in the areas of upgrading and expanding the grid. This is particularly true for electricity grids, but also for networks to deliver gas and district heating. Furthermore, the expansion can-

not be confined to Germany. A long-term European energy strategy needs concerted efforts, including in expanding and upgrading grids. In the area of rail networks, a number of bottleneck areas urgently need to be upgraded to get more freight transported by rail; with regard to IT infrastructure, Germany must have nationwide broadband provision (at least 50 Mbit/s cables). In the field of wastewater disposal, investment is also needed in the sewerage systems, some of which are already over 100 years old.

If Germany is to meet its climate protection targets in the medium term, the energy industry must become completely CO₂-free. This will require massive investment starting in the next few years, particularly in the field of renewable energies. Also on the agenda are wider use of combined heat and power generation, efficient upgrading of the portfolio of fossil-fuel power stations and trialling and possibly market launch of CCS technologies.

- Energy efficiency: in the field of increasing efficiency in use of energy there is a high economic and technological potential in all sectors. Germany has a massive investment backlog with regard to buildings. Currently energy-efficiency improvements are carried out in only about 1% of buildings per year, so that if this trend continues the building stock will not reach an efficient level for another 100 years. The goal must be to treble the rate of energy-efficiency improvements carried out to over 3%, triggering massive investment in the construction industry, systems engineering and renewable heat generation. It should be noted that measures to this effect would also create demand in property services and trade.

In industry the use of efficient motors, pumps and machinery and the introduction of corporate energy management systems will bring huge benefits for users and machinery manufacturers. Contracting from private households, companies and the public sector also makes it possible to improve efficiency without investment on the part of energy users, which is ideal in terms of risk-averse action (or investing). Decisive for the effectiveness of all efficiency measures is the willingness of investors and users to change their own energy use patterns. In this respect there is an information deficit which needs to be dealt with using appropriate campaigns; most investors overestimate the costs of carrying out energy efficiency improvements, while underestimating the savings that can be made (BMVBS (Hrsg.) 2007).

- Transport: efficient mobility is a key market of the future. This includes optimisation of existing drive systems, but, more than that, the development of electric vehicles as a future market. Competitive advantages and market share are at stake for the German automobile industry and they will be seriously jeopardised unless industry catches up with missed developments opportunities within a very short time. Market incentive programmes to convert entire fleets of vehicles to electric can provide decisive impetus for the German economy. In the field of public transport, an upgrade of the fleet (buses and trams) and trains will provide new investment stimuli.

- Economic stimulus measures are always in danger of their effect being dissipated due to the strength of international interdependencies. About 80% of Germany's foreign trade is with its European partners. International coordination of green investment measures in the fields of energy, infrastructure, buildings and industry to stimulate the economy should therefore be sought with the major foreign trading partners. As a historical example of that kind of cooperation, the "Schmidt – Giscard d'Estaing – Initiative" can be cited, which ultimately led to the founding of the G7 (today's G8).

4.2 Input from German policies

The strategy to boost sustainable investment is not simply a matter of individual measures that will produce the desired effect in a mechanical fashion. It is far more a question of whether a common political will grows up, which will work towards a vision of sustainable development and which in the years to come will be translated into a raft of concrete measures. The first steps can be defined with relative precision; how later steps are defined will depend on practical experience.

4.2.1 Basic principles

The strategy rests on the following five principles:

- Clear communication and implementation of the strategy as part of concerted action. In the same way as the central banks announce their money market strategies, the action of the government will be made public and implemented using a transparent mix of financial and regulatory measures.
- Tax incentives, flagship projects and a revamp of the financial sector will create a positive investment climate. At the same time, a raft of incentives will encourage investors to invest in business in Germany, instead of channelling their disposable income into financial assets and/or luxury consumption.
- Consumers will similarly be encouraged by a raft of incentives – included carefully targeted increases in income – to direct their spending towards sustainable consumption patterns.
- The main European customers for German products will be invited within the framework of the EU to take part in a coordinated approach to increasing demand, which will involve Germany abandoning its past reluctance. This also includes increasing funding for and fast-tracking the implementation of cross-border infrastructure projects (electricity grids, rail networks, gas pipelines etc.).
- The strategy will be adjusted annually, depending on how the parameters or influencing factors develop and on changes in background conditions. This depends on real-time observation of the following developments in particular: (a) demand for capital goods,

(b) the extent to which owners of wealth invest in business, and (c) how private consumption develops.

4.3 Measures

A strategy to boost sustainable investment can be implemented taking the above-mentioned principles into account and based on the measures proposed below. Although the Strategy-driven scenario starts from the same initial situation and is subject to the same background conditions as the Business-as-usual scenario (cf. Chapter 2), the economic consequences over the next few years with regard to economic growth, employment, export opportunities etc. are – as outlined above – far more positive.

If in the years to come, the background conditions should turn out to be different from the prognosis outlined in Chapter 2 – e.g. as a result of international developments – the individual measures described below can – and indeed must – be adjusted accordingly. There are notes on this in the Annex to this report.

The necessary measures are divided into three stages – first year, second year and subsequent years – reflecting the appropriate time for implementing the policies in question. Before each stage a review must be undertaken to check if the conditions of the Business-as-usual scenario still exist or if adjustments are needed.

4.3.1 Phase 1: first year

In the first year, measures must be put in place in the follow areas:

Strategy communication

- Explain to the public the strategy to boost sustainable investment and the proposed measures that are to be put in place in the first year (in the same way that the central bank's monetary policy objectives are announced).
- Explain to the public the effect on employment of short-term budget deficits within a long-term growth strategy.
- Explain to the public the European dimension of the strategy.

General investment incentives

- Set up climate and innovation funds as public private partnerships: these funds support SMEs and efficiency technologies, in particular by reducing investment risks. An important function of the funds is to support business start-ups, particularly companies working in the field of renewable energies and efficiency technologies.
- Use tax law to create incentives to promote business investment by lowering corporation tax and possibly local business tax, while at the same time raising effective taxation of investment income that is not reinvested. To that end, the conditions for tax relief

will be redefined while maintaining top tax rates. Recipients of investment income can reduce their tax burden by increased investment. The bottom line is additional gains.

Financial markets

- Avoid financial risks by setting up a “safety and soundness supervisory body.” The remit of this body would not be to replicate the complicated and often misleading rankings of private credit rating agencies, but to issue a licence for financial products if they are deemed to be transparent and robust – the burden of proof would be on the providers of such products. The safety and soundness supervisory body would then develop a certification procedure for funds and financial services providers that concentrate on sustainable investment. Certified products would then be eligible for tax concessions.
- To avert or overcome a credit crunch the fact that - due to toxic assets - German banks simply do not hold enough equity in their portfolios must be taken extremely seriously. That means that even the deployment of measures that are currently taboo will have to be soberly considered. They might include consolidating the state-backed regional banks (Landesbanken) or the closure, forced merger, or nationalisation of undercapitalized private banks. If these possibilities are under serious discussion – and actually have to be implemented should the need arise – it could make sense to give undercapitalized banks massive financial support and at the same time offer government guarantees on private investment.

Measures relating to infrastructure

- Issue guarantees and loans for short-term investment in broadband cables in rural areas.
- Achieve an agreement on European electricity and gas grid projects (see below).

Measures in trade and industry and households

- Investment allowances to promote the replacement of existing machinery with energy-efficient pumps/motors.
- Stimulus programmes for climate protection to increase the use of efficient appliances in light industry, trade, services (lighting, heating/refrigeration systems, pumps etc.).
- Set up on a nationwide scale 500 local “energy efficiency learning networks” for trade and industry, in which companies exchange information on and experience with measures on energy saving.
- Introduce investment allowances for energy efficiency technologies based on the scheme that existed until the mid-1980s that provided investment allowances on investment in environmental protection (Article 4a of the Investment Allowance Act, [Investitionszulagengesetz]).

- Introduce a “social energy efficiency programme” for households with transfer income: energy advice and replacement of inefficient household appliances for recipients of Hartz IV unemployment benefit, housing benefit, basic pension etc., since firstly these are the people who are most hard hit by rising energy costs and secondly the entirety of costs recouped from energy saving have the effect of directly boosting consumption.

Measures in the transport sector

- Investment allowances for procurement of modern public transport systems.
- Widen research measures to include new drive technologies, electric vehicles and 2nd generation biofuels.

Measures in the building sector

- Improve implementation of the Energy Conservation Regulation [Energieeinsparverordnung] by tightening up regulatory law, better controls and the introduction of local learning networks.
- Optimisation of the tax depreciation rules for particularly energy-efficient products and machinery: special capital allowance rate in the year of purchase.
- Massive increase in the funding available to promote energy-efficiency improvements.
- Special capital allowances for energy-efficiency improvements in buildings, on the same lines as the scheme that operated in Eastern Germany in the 1990s and Article 82a of the Implementing Regulation on Income Tax [Einkommensteuereinführungsverordnung].

Measures in the energy sector

- Push the offshore wind power strategy using investment incentives; upgrade and extend the grid to enable offshore wind farms to be expanded quickly.
- Stimulus programmes for climate protection for mini CHP units.
- Programme to replace old power stations; build new efficient power stations and shut down old coal-fired plants.
- Ramp up the market launch programme for renewable energies to facilitate widespread use of renewable heat technologies.

Other sectors

- Extend short-time working arrangements with retraining for 400,000 employees, distributed equally across the following five sectors:
 - environmental technology in the building sector,

- environmental technology in industry,
- environmental services,
- health services, and
- general services.

European coordination

- Publicly visible agreement on European measures to stabilise effective demand.
- Publicly visible agreement on public procurement of energy efficient products.
- Embed the safety and soundness supervisory body in the EU.
- Set up European climate and innovation funds (for more on the concept underlying these funds see above).
- Focused establishment of a European high-voltage direct current transmission grid with a view to using wind power all along the Atlantic coast from Scandinavia to Morocco and solar energy in conjunction with Southern European and North African countries. In an initial stage the necessary transmission lines could be laid from Germany to Scandinavia and Great Britain. Any initiatives here from industry and NGOs working towards a vision of a European electricity grid fed by renewable energy should be strengthened.

4.3.2 Phase 2: second year

The second phase is characterised firstly by a consolidation of measures begun in the first phase. Secondly, a raft of tax and regulatory measures will be passed and implemented in the second phase.

General incentives/tax measures

- Increase the effective taxation of investment income that is not re-invested in business while at the same time further lowering tax rates on investment income that is reinvested.
- Revenue-neutral changes to value-added tax rates, so that only socially relevant or ecological products and services enjoy reduced tax rates.
- Expand the climate and innovation funds.

Measures in the infrastructure area

- Increase incentives in the law regulating the energy industry to promote grid expansion while at the same time tightening sanctions for failures to carry out agreed grid expansion work.

- Funding programme for sewerage systems upgrade in local authorities.
- Step up federal government investment in the rail network to eliminate bottlenecks.

Measures in the energy sector

- Change the permitting criteria for power stations (introduce more stringent efficiency requirements).
- Changes to planning law to improve investment conditions for onshore wind repowering.

Measures for trade and industry, and households

- Make the possibility of claiming energy-related tax reductions conditional on energy management systems in industry.
- Compulsory introduction of intelligent electricity meters (smart meters).

Measures in the transport sector

- Abolish electricity tax on public rail transport.
- Ecologically ambitious revision of how private usage of company cars is taxed to ensure that an incentive for businesses to use CO₂-efficient cars is created.

Measures in the building sector

- Amendment of the Energy Conservation Regulation to include more stringent requirements.
- Establishment of a right to heating cost support for tenants in cases where energy-efficiency improvements have not been carried out and support for the introduction of energy-saving contracting schemes.
- Creation of a revenue-neutral link between land transfer tax and inheritance tax and a building's energy consumption (on the same lines as CO₂-related car tax).

Other sectors

- Definition of new, broader job descriptions centred on sustainability and creation of actual job opportunities:
 - Targeted expansion of the vocational education system as a high-status quality that gives Germany a competitive advantage over other business locations,
 - Encourage students to make the transition from vocational schools to higher education,

- Set up training programmes at universities to keep people abreast of the latest research.

European coordination

- Germany advocates strongly for the EU to establish bilateral partnerships for sustainable development on a global scale. The Joint Implementation and Clean Development Mechanisms developed to promote climate protection are used intensively in this.

4.3.3 Phase 3: subsequent years

Phase 2 measures are further developed, with special attention being paid to the following policy areas:

Fiscal policy

- Reduce the national deficit – using a strategy modelled on the method by which the Clinton administration reduced the country's deficit from over 5% of the national product to zero in the five years between 1994 and 1999. To achieve this, a distinction was made between cyclical and structural expenditure, the long-term growth trend of the past was estimated, and the structural share of public spending was kept systematically lower than revenue during this trend – which was constantly corrected. The first decisive point is that it is essential to avoid any attempt to reduce the deficit by raising tax levels (which, as experience has shown, makes it even more difficult to reduce public spending), and secondly that no attempt is made to limit the cyclical components of the budget (since that would merely inhibit growth). To reduce structural expenditure, the government's ability to make its policies stick is vital.

Infrastructure, energy, efficiency, transport and buildings

- Observe the impact of the investment incentives introduced and the legal framework. If necessary make adjustments. Introduce new market launch programmes as soon as new technologies are mature enough. This could include for example a market launch programme for electric vehicles.

Other sectors

- Restructure the health system to focus more on prevention, with schemes to encourage natural lifestyles taking high priority (e.g. with a view to reducing the incidence of cancer, cardiovascular disorders or Alzheimer's).

4.4 Financing

To finance a surge of sustainable investment of this kind three options can be distinguished:

- a) deficit spending and debt reduction to stimulate investment,
- b) deficit spending and mixed financing,
- c) cost-neutral adjustment of tax incentives.

In all three cases, it is crucial that any changes to the structure of tax incentives include re-setting the incentives in a way that ensures that a greater part of investment income is channelled into business investment; because it is from this income that investment in Germany is financed. Net investment stands at around 100 billion euros per annum, with Germany having seen a massive reduction in the rate of investment (gross and net) in recent decades. Net investment as a proportion of investment income fell from 43% in 1991 to about 18% in 2008.

The aim of the proposed strategy is to double the volume of net investment. Businesses pay around 50 billion euros to the state in the form of corporation tax, land/property tax, local business tax and other taxes on investment income. Income on investments is then taxed again through capital gains or income tax. Overall investment income in Germany totals around 650 billion euros, of which about 100 billion euros go to the treasury. To increase net investment it would make sense to reduce tax levels on investment income that is reinvested in business and at the same time raise the level of tax on investment income that is not channelled into business investment.

The former can be achieved by further reductions in corporation tax and possibly local business tax and by making income that is reinvested in business tax-deductible. The latter can be achieved by reducing other deduction possibilities (changes in top tax rates are not such a good idea: currently the effective income tax from the 650 billion euros investment income is less than 10%, although relevant top tax rates stand at 40%). A possible wealth tax, which has been the subject of increased discussion recently (DIW 2009, estimated tax revenue: 25 billion euros), could be used for this purpose; it would, however, mean that investment income that is reinvested in business would have to be treated as an allowable deduction under a tax of this kind.

This incentive structure would give owners of wealth the opportunity to reduce their tax burden by increasing their business investment. The risk that, instead of investing more, they might move their wealth out of the country is not very high. Despite the fact that the effective taxation of investment income in the EU varies between 10% and 40%, this has not triggered any great movement of capital (European Commission 2005). And the country in Europe with the heaviest taxation of non-reinvested investment income – Denmark – received the Economist's "best place to conduct business" award (The Economist 2008) als "best place to conduct business" ausgezeichnet. Factors such as the workforce's level of education, infrastructure, macroeconomic stability and openness to private business seem to carry more weight than level of taxation of private income. If all these factors are right, the proposed

incentives are more likely in the end effect to attract more investment from abroad than to drive out domestic investment.

In the current situation, an investment-oriented incentive structure of this kind would have to be brought in gradually. As long as unemployment continues to rise, budget deficits remain desirable. It does not make sense to reduce them until the crisis has been overcome. And, even then, a reduction will not primarily be achieved by raising taxes but by exercising spending discipline. We have set out some basic ideas on tax policy in the next section; we look in more detail at the problems of taxing financial markets in the Annex. Below, we explain all three options for financing a surge of sustainable investment.

a) Deficit spending and debt reduction to stimulate investment

In view of the gravity of the current crisis it makes absolute sense to refrain from implementing a short-term scheme to fund the public investment mentioned in the measures. Instead, in this option, a timetable of just under ten years has been set for the complete reduction of the budget deficit. In this approach, the deficit increases in the first year, after which it is gradually reduced. The short-term increase in the public debt can thus be linked with the explicit plan to bring the public debt back down to 60% of GDP over the next ten years by stepping up the pace of economic growth.

b) Deficit spending and mixed financing

As an alternative to funding public investment entirely through deficit financing, using other kinds of taxes to wholly or partially fund it can be considered:

- Tax on stock exchange transactions. The original thought behind this kind of tax is the fact that the current volume of financial transactions surpasses the so-called “real economy” by several orders of magnitude. Just the face value of options traded worldwide currently amounts to around 150,000 euros per person on the planet. A negative external effect of financial transactions can be caused by the volatility of the financial markets causing resources in other markets being wiped out. This problem could be countered by taxes that align the volume of the financial markets back to a level that is closer to the rest of the economy. The potential tax base of a tax on stock exchange transactions averaged in excess of 5,000 billion euros per annum between 2005 and 2008. Assuming a tax rate of 0.5% and unchanged turnover, that would generate over 25 billion euros in tax revenue; even if the turnover were halved, it would still generate 12.5 billion euros. It is crucial that tax on derivatives and currency turnover be included since - “a million miles from the world of the small investor” – they can unleash huge waves of speculation.
- Tax on fuel elements. Taxing nuclear fuel rods would be a good way of skimming off windfall profits from energy suppliers: the introduction of emissions trading has enabled nuclear power stations to pass on CO₂ costs and include them in the price of their electricity – despite the fact that firstly they did not actually incur any extra cost and secondly it is not commercially justified by new investment nor politically intended.

Taxing nuclear fuel at 2 cents per kWh could generate 3 billion euros per annum without any effect on the price of electricity, since the marginal costs of operating nuclear power stations remain below the market price for electricity.

- As well as introducing new taxes, it would also of course be possible to raise the rates of existing taxes, such as value added tax, for example. An increase in the value added tax rate would, however, have a counter-productive effect on attempts to stimulate the economy and, based on experience, would be offset by lax budgetary discipline. What would, however, be constructive would be to revise the range of value added tax rates so that – as we suggested above – only socially and ecologically relevant products and services are eligible for reduced rates.

c) Revenue-neutral restructuring of tax incentives

In the light of the current crisis, the Keynesian arguments for deficit spending, which were scorned for so long, have suddenly gained widespread approval among decision-makers and opinion-makers. Nevertheless, many of the traditional reservations remain, not least in Germany where the historically justified concern over currency stability produces scepticism towards the idea of massive budget deficits. We shall therefore also consider here the option under which targeted investment incentives are created without increasing the public budget. That means we shall present measures for financing the investment strategy that leave the overall tax burden for private individuals unchanged and are able to achieve a mix of incentives that fulfils the criterion of preserving revenue neutrality.

If to this end, investment income that is reinvested in business is less heavily taxed while, at the same time, investment income that is not reinvested is more heavily taxed, a clear incentive for increased investment is created. In this way, effective demand and technical progress through learning by doing can be accelerated without deficit spending. In order to achieve the same effect as under a) and b), tax incentives would, however, have to be greater, i.e. non-invested profits and/or wealth would incur greater taxation, which would mean that it would also be possible to fund an increase in the national budget. As put forward in what is known as the Haavelmo theorem,⁴ it could also have a positive effect on employment.

By reducing tax concessions for high income earners and introducing a higher personal tax rate for high income and wealth, it would be perfectly possible to generate an additional 100 billion euros in revenue. For example, DIW (DIW 2009) estimates the revenue that could be achieved solely by raising wealth tax to the European average could total 25 billion euros. A further 20 billion euros of revenue could be achieved by taxing stock exchange transactions. Another source of additional revenue would be to raise inheritance tax on non-investment capital. There is no doubt that this could finance a large-scale programme of public measures. The basic pattern - by which taxation of business investment is reduced at the same time as re-invested investment income is taxed at a lower rate - remains. As well as easing the tax burden on investment, higher tax revenue could also be used to finance

⁴The Haavelmo theorem argues that the full extent of public spending (financed by tax revenue) increases income, since – unlike with private households - there is no savings rate.

appropriate measures – e.g. more investment grants for energy-efficiency improvements to buildings.

4.5 Short-term economic impact

As shown in Figure 16, under the strategy to boost sustainable investment it is possible to reduce the number of people unemployed by over a million within four years; in less than ten years it can be pushed down to below two million.

Of course, the question of possible bottlenecks arises under which strengthening effective demand will not lead to higher employment but higher inflation. Generally speaking, the risk of inflation in the first two years can be seen as extremely low. Furthermore, in the area of investment in machinery there is currently substantial overcapacity both in terms of workforce and capital, so that for the orders of magnitude under consideration there is no cause for concern that a bottleneck might arise. This is all the more true in that if necessary in individual cases equipment can be imported. In fact it should be imported, since Germany's trading partners cannot otherwise be expected to increase their imports from Germany.

The situation in the building trade and for building-related services is different. The former employs a workforce of about 600,000, the latter even more. The widespread use of prefabricated building methods and the computer means that the share of unskilled workers in these sectors has dropped markedly. Although bottlenecks caused by a lack of machinery are unlikely here, the possibility of workforce overcapacity needs to be carefully reviewed.

Let us look at the situation in 2009 by way of an example. According to the Federal Employment Agency [Bundesagentur für Arbeit], about 150,000 people were registered unemployed in the German building trade. This was about 25% of the total number of jobs in the construction industry. This category of employee is readily available to the German labour market and could be instantly deployed if the pace of building activity were to pick up.

Furthermore, a significant proportion of unemployed people could be retrained and within about six months acquire the skills needed to work in the building trade or building-related service industry. Since the proposed measures for sustainable refurbishment of buildings will last for years, there are realistic employment prospects here. In other words – provided appropriate retraining programmes are launched – there is no need to fear inflationary bottlenecks in the building industry.

4.6 Long-term economic impact

In the subsequent years further increases in employment can be achieved – albeit at a slower pace. With coordination at European level, it would be possible to reduce structural unemployment by 2020, so that essentially there will still be one million unemployed people, who will be in the position of seeking a new job for a few months within a well-functioning market dynamic. There will also be just under a million people who for a range of very different

reasons, mostly not of their own making, are not able to help German companies remain competitive in a globalised economy.

By comparison with the Business-as-usual scenario, under which it experiences growth of just over 1%, the German economy will enjoy long-term growth in real terms of around 3%. This would enable the “new German states (in Eastern Germany) to free themselves from the poverty trap, developing new locational advantages especially in the fields of health and tourism.

If European coordination fails, the equilibrium achieved through the strategy to boost sustainable investment will not be as far away from the equilibrium under the Business-as-usual scenario. Economic growth would then in real terms be about 30% slower, i.e. would be around 2% per annum. It would be possible to reduce, but not completely eliminate, structural unemployment by 2020. Whether that would be a politically acceptable path to take is not clear.

The strategy to boost sustainable investment would make the environment industry into a new employment driver. There would be increased symbiosis between industrial production and high-end services such as engineering. The traditional export industries – automobile, mechanical engineering and chemicals – would continue to be successful, although they would lag behind the environment industry. Some sections of traditional industries would also remain successful because they would focus on sustainable development and evolve into pioneering areas of the environment industry.

5 Tax policy in a sustainable growth strategy

In recent years, a great deal of energy has gone into using tax measures in an attempt to stimulate investment. Unfortunately the measures taken have had no effect. If a surge of sustainable investment is to be triggered, it is crucial that this past experience be taken into careful consideration. We therefore describe this experience below in both qualitative and quantitative terms, recall the arguments in the debate at the time and then go on to discuss concrete possibilities for creating tax incentives to encourage a surge of sustainable investment. Taxation of financial markets is explored in a separate Annex.

5.1 Corporate profits, investment and tax burden

Tax reform has topped the political agenda for as long as anyone can remember. It includes taxation of profits and wealth. Ten years ago, Germany witnessed an extensive reform of its corporate taxation system. It represented the conclusion of a long-raging political debate on the fundamental question to what extent tax policy influences private investment activity and is able to stimulate overall economic growth. The outcome was that corporation tax rates were significantly lowered and the tax base broadened. This put the corporate taxation system on a completely new footing. Until then taxation had been based on high marginal rates of tax, but the tax base was narrowed by favourable rules governing determination of profit, particularly by international comparison.⁵ Added to that there was a wide range of tax concessions designed to achieve regional and structural policy goals. The bottom line was that effective tax rates were – and still are – often considerably lower than the nominal rates.

The 1990s also saw decisive developments in the taxation of wealth. Wealth tax was levied until 1997, after which it was abolished. It was a non-earnings-related tax based on the value of the taxable entity's (natural person or legal entity) net wealth (gross wealth minus debts). As well as wealth tax in the strict sense, property tax and inheritance tax are also counted as wealth taxes. The Federal Constitutional Court [Bundesverfassungsgericht] found the way in which wealth tax was levied at the time to be unconstitutional, on the grounds that real estate was given preferential treatment over other kinds of assets. However, instead of putting a higher value on real estate, as the ruling called for, and thus taxing it more heavily, the German government of the time decided to stop levying wealth tax altogether – partly because the top income tax rate at the time was 53% (plus a solidarity surcharge to help pay for reunification). This situation regarding wealth tax still exists so that, by comparison with other countries, wealth in Germany is taxed at only a very low level. People on low incomes have to spend their entire income on consumption, which (apart from rent payments) is subject to value added tax. Capital accumulation thus remains non-taxable and is only later indirectly taxed in the form of taxation of the additional income.

The intention behind the recent corporation tax reforms was to improve conditions on the supply side and make Germany more attractive to foreign investors. The first step in this

⁵This was particularly true for depreciation conditions. However, emphasising the "principle of prudence" in valuing assets opened up many opportunities for creating hidden reserves.

direction was a radical lowering of tax rates: the 2001 reform lowered the rate of corporation tax on both distributed and retained profits to 25%; it had previously stood at 40% and even earlier (for retained profits) at 50% (from 1990) and 56% (before 1990). Secondly, what was known as the half-income assessment method was introduced, whereby shareholders are partially - 50% to be precise - liable to tax on dividends as part of their personal income tax.⁶ In the case of joint stock companies, dividends received are not liable to tax. Furthermore, gains on the disposal of shares in a joint stock company held by another joint stock company are exempt from tax. To fund this, the depreciation rates for moveable and fixed assets were lowered and the depreciation periods for tax purposes extended. The declining balance depreciation rate was lowered from 30%, or a maximum of three times the regular straight line rate (under the AfA or tax depreciation rules), to 20%, or a maximum of twice the regular straight line rate (under the Afa rules). The Act on fiscal measures to stimulate growth and employment [Gesetz zur steuerlichen Förderung von Wachstum und Beschäftigung] (Bundesrat 2006) restored this rate for 2006 and 2007 to its original level in an attempt to boost the economy.

In 2008, in a second stage of reform, corporation tax rates were lowered again, this time to 15%. At the same time, the local business tax burden was reduced. Here too the federal government's stated aim was to give a signal to international investors: not only was investment encouraged, at the same time low nominal tax rates reduced the incentives for transfers of losses to Germany (cf. Bundesregierung 2007). However, the low rates relativise the incentive effect of high depreciation rates on investment. Depreciation rates of that kind act as an incentive when tax rates are high. Some years ago they stood at 50% or more, which meant that depreciation rates were able to vastly lower the effective tax rate.

As a result of the net easing of the burden on profit income, visibly positive stimuli for investment activity and therefore for economic development were expected. These expectations were not met. In fact, historical data do not indicate any connection between effective tax burden, investment activity, and trends in the corporate profits of joint stock companies.⁷ This is in a way no surprise since the general investment climate depends to only a small degree on the design of the tax system. Primarily sales expectations dominate investment activity. From the perspective of the supply side, i.e. cost factors, labour costs carry far more weight. Furthermore it has to be taken into account that a generally lower level of taxation also reduces financial scope for public infrastructure provision.

Table 3 and Figure 20 depict the relevant data for joint stock companies from 1991 to 2008. What is striking is the effective taxation on profits (corporation tax and local business

⁶Personal capital income gains are now liable to capital gains tax. The fact that for the majority of equity owners the capital gains tax rate is lower than the typical marginal rates of tax means that capital income enjoys preferential tax treatment. Debt financing also has tax advantages over equity financing. Whereas in debt financing interest paid on corporate loans is tax deductible, so that only investors are subject to the capital gains tax rate, equity in companies is taxed twice over: under corporation tax and through the capital gains tax paid by investors. In the past, this double taxation was prevented through the imputation credit system or at least reduced using the half-income assessment method. The double taxation creates an incentive to distribute company profits through interest on shareholder loans, instead of transparently reporting them as profits.

⁷There are no comparable data for partnerships.

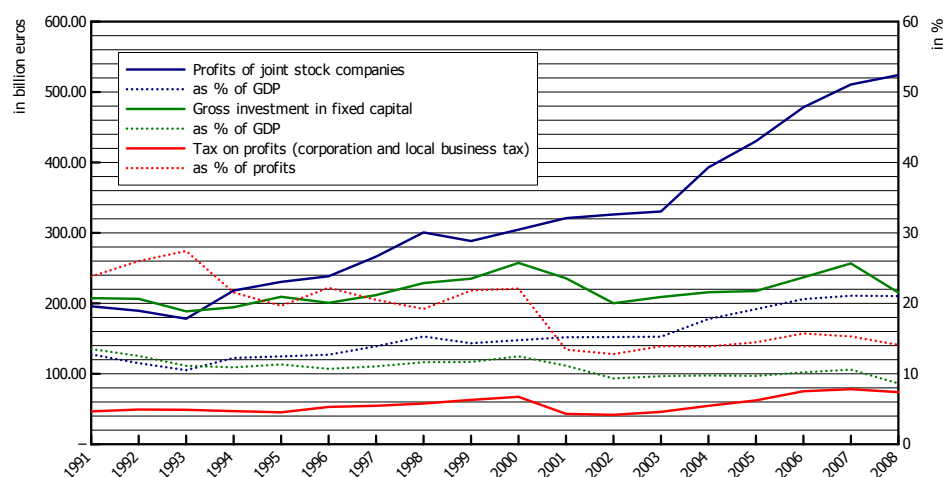
taxes) combined with strong expansion of the profit/income ratio. This development actually indicates a favourable environment for increased investment. In fact the share of gross investment of joint stock companies in GDP fell dramatically from 13% at the beginning of the 1990s to less than 9% in 2008. Even if we ascribe the high values in the period after unification to Eastern Germany's need to "catch up" and see the 2008 values as being already influenced by the crisis, the fact remains that investment was not stimulated at all (on the contrary there was a decline from around 11% to just under 10%).

Table 3: Profits, investments and tax burden of joint stock companies in Germany

| Year | Profits of joint stock companies (€Bn) | as % of GDP | Gross investment in fixed capital (€Bn) | as % of GDP | Tax on profits* (€Bn) | as % of profits |
|------|--|-------------|---|-------------|-----------------------|-----------------|
| 1991 | 195.80 | 12.76 | 207.38 | 13.51 | 46.63 | 23.82 |
| 1992 | 189.45 | 11.51 | 206.40 | 12.53 | 49.26 | 26.00 |
| 1993 | 178.16 | 10.51 | 188.64 | 11.13 | 48.88 | 27.44 |
| 1994 | 218.16 | 12.25 | 194.44 | 10.92 | 47.00 | 21.54 |
| 1995 | 230.48 | 12.47 | 209.32 | 11.32 | 45.28 | 19.65 |
| 1996 | 238.43 | 12.71 | 200.74 | 10.70 | 52.97 | 22.22 |
| 1997 | 266.34 | 13.90 | 211.71 | 11.05 | 54.59 | 20.50 |
| 1998 | 300.69 | 15.30 | 228.81 | 11.64 | 57.75 | 19.21 |
| 1999 | 288.46 | 14.34 | 235.01 | 11.68 | 62.95 | 21.82 |
| 2000 | 304.64 | 14.77 | 257.40 | 12.48 | 67.31 | 22.09 |
| 2001 | 320.98 | 15.19 | 235.58 | 11.15 | 43.12 | 13.43 |
| 2002 | 326.16 | 15.22 | 200.15 | 9.34 | 41.73 | 12.79 |
| 2003 | 330.40 | 15.27 | 209.02 | 9.66 | 45.98 | 13.92 |
| 2004 | 393.00 | 17.78 | 215.76 | 9.76 | 54.53 | 13.88 |
| 2005 | 430.19 | 19.18 | 217.53 | 9.70 | 62.25 | 14.47 |
| 2006 | 478.32 | 20.60 | 236.90 | 10.20 | 75.22 | 15.73 |
| 2007 | 510.72 | 21.08 | 256.67 | 10.59 | 78.13 | 15.30 |
| 2008 | 524.02 | 21.03 | 215.25 | 8.64 | 73.94 | 14.11 |

*Corporation and local business taxes; Source: Statistisches Bundesamt 2009c.

Whereas in the early 1990s the profit ratio of joint stock companies and the economy's gross investment rate were similarly high, in 2008 the profit ratio surpassed the rate of investment almost two and a half fold. This development was not constant but occurred in cyclical fluctuations. The bottom line is that a historically high profit-income ratio is accompanied by a historically low tax burden and a historically low rate of investment on the part of joint stock companies.

Figure 20: Profits, investments and tax burden of joint stock companies in Germany

Source: Statistisches Bundesamt 2009c.

5.2 The fundamental purposes of corporate taxation

We should not fail to mention that in the period under review here international competition to lower taxes intensified and all the national governments were at great pains to create a more favourable tax environment and improve conditions for attracting international capital into the country. However, in Germany, where the export-oriented growth model was pushed so hard, the very opposite effect occurred, inducing export of capital – often as financial capital.

This raises the question as to the purpose of corporate taxation. It can be argued that it is not the companies themselves but only their owners that have an inherent taxable capacity, so that taxation of profits is merely pre-emptive taxation of its shareholders. In principle, it would be possible to dispense with separate taxation of companies. However, without taxation, there would be a greater tax advantage in ploughing profits back into the company. Tax incentives for increased investment also work better if companies are taxed. To some extent it is also argued that, as beneficiaries of public goods, corporations should also contribute to financing them.

The justification for levying local business tax, which plays a major role in the financial system of local authorities, has a different basis. The cost-of-service principle applied communally is used as the justification for this tax: local authorities incur costs arising from the activities of local businesses, which often cannot be charged to those businesses on a costs-by-cause principle; costs are therefore defrayed through flat-rate taxation. In this light, business-based taxes can be seen as the counterpart to business-oriented local authority expenditure and taxes levied on households such as income tax, which they play a part in gen-

erating, as the counterpart to household-oriented local authority expenditure. The incentive provided is also decisive since, due to the existence of local business tax, local authorities have an interest in attracting companies to locate in their area.

Basically one of the most important outcomes of economic research on the impact of taxes is the statement that taxing accumulation of capital usually causes efficiency losses. That is often mistakenly taken to mean that taxing capital income is a problem. However, the opposite is the case: taxing capital income increases society's wealth, provided investment is excluded from taxation. In that case, economic growth and the productivity dynamic associated with it are accelerated by a process of learning by doing – which over time puts owners of wealth in a better, not poorer, position.

5.3 How would taxation need to be changed?

A word in advance: replacing local business tax and corporation tax by other forms of tax would cause enormous political problems (especially with regard to local authority revenue).

5.3.1 Tax measures to promote investment

It is striking that rates of investment were higher in the past. The tax system then provided effective investment incentives: anyone who invested paid lower taxes and anyone who did not invest paid high taxes. The instrument used here involved generous depreciation allowances. Investment relief and investment bonuses have a similar objective. The higher the nominal tax rate and the depreciation allowance, the greater the tax saving effect.⁸

One of the primary ways of facilitating generous depreciation allowances is to allow declining balance depreciation. Unlike in the typical case of straight line depreciation, in which the same amount is depreciated each year, the declining balance method allows decreasing amounts to be written off each year: Under this method, a fixed percentage – set by the legislator – of the asset's net value in the previous year is applied. In the initial investment years, profits are reduced more than when the straight line method is used. Tax payments are therefore deferred. The after tax interest on the deferred payments to the tax authority is what gives declining balance depreciation the effect of deferring tax, i.e. companies enjoy a liquidity advantage. The liquidity advantage becomes a long-term advantage if the tax savings are reinvested. Since, under the declining balance depreciation method, an asset can never be fully depreciated, a switch to straight line depreciation is planned. Declining balance depreciation is particularly advantageous if an asset can be depreciated over a long period of time.

Under the Corporation Tax Reform Act [Unternehmensteuerreformgesetz] of 2008, the declining balance depreciation method may be used only for moveable assets purchased

⁸In certain cases, using an after-tax basis for investment appraisal results in the net present value after tax being higher than the net present value before tax, i.e. it is taxation that makes the (real) investment lucrative ("tax paradox").

(manufactured) on or before 31 December 2007. For purchases from 2008 onwards, German tax law did not allow any possibility for using declining balance depreciation. This was the consequence of the lower tax rates. As a response to the financial and economic crisis the German government in its first economic stimulus package decided to reintroduce declining balance depreciation for a limited period in order to stimulate business investment. Declining balance depreciation may be used for any assets purchased in 2009 or 2010. The depreciation rate is 2.5 times the straight line depreciation or a maximum of 25 per cent; the declining balance depreciation rule allowed 30 per cent. Calculations of how advantageous this rule is show that the advantages of declining balance depreciation – based on the sum invested – can be estimated at 2 to 4.5%.⁹ The extent of the advantage depends primarily on the tax rate, the depreciable life of the assets and the interest rate the calculation is based on. But the depreciation rate itself also plays an important role.

5.3.2 Investment allowances and subsidies

Declining balance depreciation is not the only means of creating investment incentives. Investment allowances and tax concessions are tried and tested tools. In Germany, investment allowances are used to steer investment towards particular regions (states in Eastern Germany). Investments are eligible for the allowance only if five years after their procurement:

- they are part of the fixed assets of a company's premises in the assisted area;
- they remain on the premises of a company in the processing industry, a company providing production-related services or an accommodation business in the assisted area;
- they are not used for private purposes more than 10% in a year.

The currently applicable allowance rates of 12.5% and 25% (for small and medium-sized businesses respectively) will be reduced in the next few years – by 2.5 percentage points for large companies and 5 percentage points for SMEs. The investment allowance scheme is scheduled to be phased out in the long-term.

In addition to investment allowances, regional structural policy provides for investment grants (under the remit for reducing regional disparities, for which federal and state governments share responsibility). These funds are allocated on application in the form of a grant; only investment projects in the specially defined assisted areas are eligible (BMW 2009). There is a hierarchy of assisted areas based on the regions' economic weakness. The funding rates are linked both to the region's economic power and the size of the company. For example, for investment projects in what are called A-assisted areas, small companies can receive a grant covering up to 50% of the purchase costs, medium-sized companies 40% and even large companies are eligible for 30%. In the C-assisted areas, the maximum rates are capped at 35%, 25% and 15%.

⁹Model calculations carried out by the Department of Business Administration and Controlling at Münster University.

In addition to investment allowances and grants, there are numerous other forms of financial assistance and tax concessions which the state uses in an attempt to influence economic development in general and corporate investment activity in particular. Often, and in a best case scenario, it is a question of providing tax incentives or start-up assistance to new companies entering the market, accelerating future developments and their market implementation, or offsetting international competitive distortions. In this way, market outcomes that are undesirable in terms of allocation or distribution policy can be corrected and the requisite structural change facilitated. Currently, financial assistance and tax concessions granted by the federal government and accounted for in its Subsidy Report total almost 22 billion euros, although a falling trend can be observed (Bundesregierung 2007 Ziff. 22). The total volume of subsidies awarded at federal, state and local authority level (including ERP), is estimated to be in excess of 50 billion euros (Bundesregierung 2007 Übers. 5).

All these indications show that economic policymakers have a comprehensive range of instruments - both qualitatively and quantitatively - with which to raise the overall rate of investment and create incentives for environmentally sustainable economic activity. In cases where there are financial restrictions on creating new kinds of stimulus, we must clarify which traditional stimuli have outlived their usefulness. It is obvious that many subsidies have been granted over the years and will continue to be in the future. However, subsidies should not be used as a way of permanently propping up particular branches of the economy or products. Assistance with market entrance or measures to keep businesses afloat while they adapt to structural change are only intended to be temporary - even in the rationale of subsidy policies.

5.3.3 Changing the background conditions

The state's range of instruments for stimulating investment activity in general offers plenty of opportunities for giving the idea of environmentally sustainable economic activity a prominent place. It is first and foremost the tax conditions that need to be changed. Taxation of financial markets has a special status which will be discussed in the Annex to this report.

From a general point of view, it makes sense when considering taxing profits to reintroduce nominally higher tax rates while at the same increasing depreciation possibilities.¹⁰ This would create a greater incentive to invest in physical capital.¹¹ The question is whether, when using the declining balance depreciation method, the limit of 2.5 times the straight line depreciation up to a maximum of 25% is sufficient. In view of the urgent need to raise the corporate rate of investment, the limit should be raised to three times the straight line depreciation up to a maximum of 30%. At the same time, the nominal corporation tax rate should be significantly raised. A rate of 30% would seem appropriate. The higher the tax rate, the more depreciation allowances reduce the tax burden.

¹⁰The diminished local authority revenue from local business taxes as a result of the lower income from businesses can be offset in other places.

¹¹Here no distinction is made between investment of a general nature and investment that is geared to environmentally sound economic development. To promote only tax measures that encourage environmentally sound investment, an appropriate catalogue would first have to be developed, defining the key features of environmentally sound investment.

In a further stage, measures that aim to reintroduce wealth tax should be put in place.¹² Taxes on wealth do not distort the factor input as much; at the same time they reduce wealth inequality. The OECD also uses this line of argument to call on Germany to tax wealth more.¹³

Here too it would be possible to create investment-oriented incentives, for example, if, when calculating the basis for assessment, new additions to fixed assets were granted full or partial exemption. The question is to what extent fiscal objectives should be pursued in reintroducing wealth tax. A decision would also have to be taken on whether only natural persons, only legal entities, or both categories should be liable for wealth tax.

In Europe, personal wealth tax is the predominant form of wealth tax. The wealth of legal entities is taxed only in Switzerland, Luxemburg and Iceland. Wealth tax exists in a number of states in the USA. In Switzerland, revenue from corporate wealth tax totals 0.3% of GDP, in Iceland 0.4% and in Luxemburg 2.3%. A 0.4% share in Germany would correspond to about 10 billion euros. The potential revenue from taxing personal wealth in Germany is estimated to be around 20 billion euros, which would be 0.8% of gross domestic product (cf. Bach 2009). That figure is based on the condition that business assets and life assurance would be fully liable to tax and that property and business assets be taxed on the basis of fair market value. In the case of inheritance tax, which like property tax is a form of wealth tax, significantly higher revenue could be generated, because its tax base could similarly be broadened by a revaluation of this kind.

There is also an urgent need to update the basis of assessment for property tax, i.e. incorporate fair market values to a greater extent. That could generate appreciable extra revenue for public budgets (in this case: local authority budgets) (cf. Bach 2009).¹⁴ In both cases the tax base could also be broadened by abolishing general exemptions and cutting back allowances. They could be replaced by regulations on specific exemptions, which would in turn create incentives for environmentally sound production methods.

For example, inheritance and land transfer tax could be used as incentives for energy-efficiency improvements; after all, change of ownership of a building is a particularly propitious time to carry out refurbishment projects. One idea would be to waive land transfer tax if energy-efficiency improvements to bring the building up to “passive building standard” were carried out within a specified period after purchase. In the case of inheritance tax, a bonus-malus system could be developed based on the condition of the building at the moment of inheritance and the refurbishment subsequently carried out by the new owner (cf. Meyer 2008).

Finally, a decision must be made on whether and to what extent investment allowances and other forms of financial assistance should be used to promote more environmentally

¹²The recently introduced capital gains tax has presumably lowered further the effective tax rate on investment income particularly for the wealthy.

¹³www.oecd.org/document/29/0,3343,de_34968570_34968795_42147613_1_1_1_1,00.html

¹⁴However, it should be noted that higher property taxes would have an effect on the construction of residential rental property, because these taxes are rolled over. Like value added tax, property tax has a regressive effect, i.e. lower-income sectors of society are in relative terms harder hit by an increase of this kind.

sound production processes. Subsidies of this kind have the advantage that all businesses benefit from them, irrespective of whether they make a profit or not. Particularly young, innovative companies often have a problem making sufficient profit in the start-up phase. They, above all, rely on subsidies of this kind, especially since these strengthen their equity base and facilitate their access to capital markets.

When deciding on the specific details of the instruments to be used, policymakers can draw on experience with regional economic development programmes and the financial assistance detailed in the federal government's official Subsidy Report. In this context, the financial resources that the state would have to make available must be given consideration. Their extent does not depend solely on the potential volume of investment for environmentally friendly products, but also on the funding rates. A funding rate of 30% of eligible costs should be considered. This rate is based on the maximum funding rates for large companies available in the regional economic development programmes scheme. Given an (assumed) annual investment volume of 50 billion euros – this would correspond to a rise in the private rate of investment of 2% of GDP – funding totalling 15 billion euros per annum would be required. The first question to clarify here is to what extent double funding (e.g. in conjunction with regional economic development programmes) should be permitted and, if it should, whether caps on funding should be set. The higher the funding rates and the lower the investor's own contribution, the greater the risk of misallocation. Secondly, consideration should be given to the possibility of reducing to a greater extent than to date the financial assistance classified in the Subsidy Report. In some cases, they have been granted for far too long, with the result that the principles and objectives of subsidy policies – namely to be used primarily in a temporary capacity – have been contravened. Saving money here will make proportionately more funds available to promote environmentally sustainable economic activity.

6 A final word

Germany is still mired in one of the worst economic crises since the end of the Second World War. Although the public remains unaware of this due to the fog of confusing reports, it is nevertheless a fact that the actual repercussions of the crisis will only be revealed gradually. On the basis of currently foreseeable political measures, unemployment figures are expected to exceed four million at the end of 2010 – and there is a danger that unemployment will persist on this scale in subsequent years.

After the Great Depression of 1929 – which the current situation is dangerously approaching – investors' negative expectations were turned around by the arms race that culminated in the Second World War. In today's world, there is a potentially historic vision that enables investors to have positive expectations without a destructive impact: the vision of sustainable development. With the proposed strategy to boost sustainable investment, Germany can reverse the current trend and abandon the equilibrium of exclusion that has lasted over three decades.

The strategy can be described by five principles, which – depending on how things actually develop – will be implemented using a sequence of measures in such a way that a surge of sustainable investment is triggered. It could kick in by 2010 and noticeably gather speed by 2011.

In the Annex below we demonstrate that the strategy is robust enough to survive the uncertainties of the future: it can be adapted to suit different background conditions so that the advantages of the strategy remain intact.

In this way, the social market economy, the very foundations of which are threatened by current developments, can be renewed and expanded in line with the principles of sustainable development.

Annex

A Taxing financial markets

The proposal to tax financial market transactions goes back to Keynes (Keynes 1936). He assumed that prices of securities – contrary to the efficient market hypothesis – do not necessarily reflect a “fundamental value,” because market participants are subject to powerful mood swings that fluctuate between optimism and pessimism – and that, in view of the enormous uncertainties of the future, the markets cannot function without these moods. Mood swings of this kind can bring about abrupt changes in prices, without the fundamental information necessarily having changed. Of course, “fundamental” changes can also have a significant effect on market prices.

This development is favoured by high liquidity and low transaction costs and means that investors do not think about what a security might actually be worth but speculate on the basis of how other market participants view it. Prices of securities therefore do not necessarily approach any fundamental value, not even in the long-term, although they do fluctuate around such a value. In and of itself, this discrepancy between actual prices and the idea of fundamental values is not detrimental to macroeconomic development. What is detrimental, however, is the fact that it can cause a sub-optimal resource allocation, since investment is channelled into businesses that are unprofitable in the long-term (see below). Furthermore, there is increased pressure on companies to generate short-term profits thereby penalising long-term investment – clearly an undesirable effect particularly in terms of sustainability. This imbalance between financial market activity and real activity is conducive to macroeconomic instability. However, the far more serious problem is the tendency toward herd behaviour, which can cause simultaneous market collapses and financial crises.

Keynes saw the introduction of a tax on stock exchange transactions as an – at least partial – solution to these problems. Tobin took up the idea and made a case for introducing a 1% tax on all transactions in the currency markets (Tobin 1978). Taxes of this kind would make short-term speculative transactions unprofitable without impeding long-term stabilising investment. The disproportionate taxation of short-term speculation would give securities a longer holding period and thus reduce the volume of transactions. Overall the tax would raise not only the direct transaction costs (in the form of tax payments), but also the indirect transaction costs (e.g. in the form of higher bid-ask spreads due to lower market liquidity). Between 1996 and 1998, average share transaction costs (direct and indirect) in Germany were about 0.377% of the transaction value (cf. Domowitz et al. 2001). In this period alone in Western Europe, encouraged partly by technological progress in online trading and the increasing competition among stock exchanges, a drop in average transaction costs from 0.52% to 0.432% per transaction was observed, and the trend in costs has been falling ever since (cf. Oxera Consulting Ltd. 2009). Thus, the rise in costs caused by the tax rates currently being proposed (between 0.01 and 0.5%) would not be so steep as to completely cancel out the continual fall in transaction costs of recent decades (cf. Pollin et al. 2003). Furthermore, the tax would have only a marginal effect on longer term investment, so that a large-scale flight of capital is not to be expected. In this regards, recent study on behalf of the European Commission (see Oxera Consulting Ltd. 2009), has shown that domestic investors,

particularly in the major centres, prefer to trade in domestic securities ("home bias"). For that reason, cross-border transactions on the capital market typically incur higher transaction costs, so that the threat of a flight of capital could disappear of its own accord, provided the tax is not set at too high a level.¹⁵ To sum up, it can be said that it would be relatively simple to introduce and levy a tax on stock exchange transactions.

However, it must be noted that it will not necessarily be possible to achieve the main goal being pursued by taxing stock exchange transactions, namely to curb the volatility of the financial markets. The reason is that the volatility depends on three partially independent factors: the behaviour of the real economy, the herd behaviour of financial market participants and the attempt of market participants to overcome financial crises once they have occurred (cf. Pollin et al. 2003). Whereas a tax on stock exchange transactions could positively influence the first two factors, it would have a negative effect on the third factor, since it would create lower liquidity during a crisis. Thus volatility would not necessarily decrease as a result of introducing a tax on stock exchange transactions. For that reason it is no surprise that empirical studies on taxing stock exchange transactions do not paint a uniform picture of its effect on volatility: some authors envisage volatility decreasing (cf. for example Jones and Seguin 1997), others envisage a rise in volatility (cf. for example Hau 2006) or no significant effect (cf. for example Roll 1989). Simulation studies reach similarly contradictory conclusions,¹⁶ for example that the migration of speculators and the lower volume of transactions might have a destabilising effect. Nonetheless, the tax will reduce the size of the herd, since speculative behaviour will become expensive. Another often cited argument against the tax is that the higher transaction costs would increase the cost of capital for businesses and the desired effect on real investment would fail to materialise as a result. Pollin et al. 2003 argue, however, that the risk premiums in a financial market stabilized by the tax would tend to drop and thus more than offset the contrary effect of the rise in transaction costs. Despite its unclear impact on volatility, the tax would, however, generate substantial tax revenue.

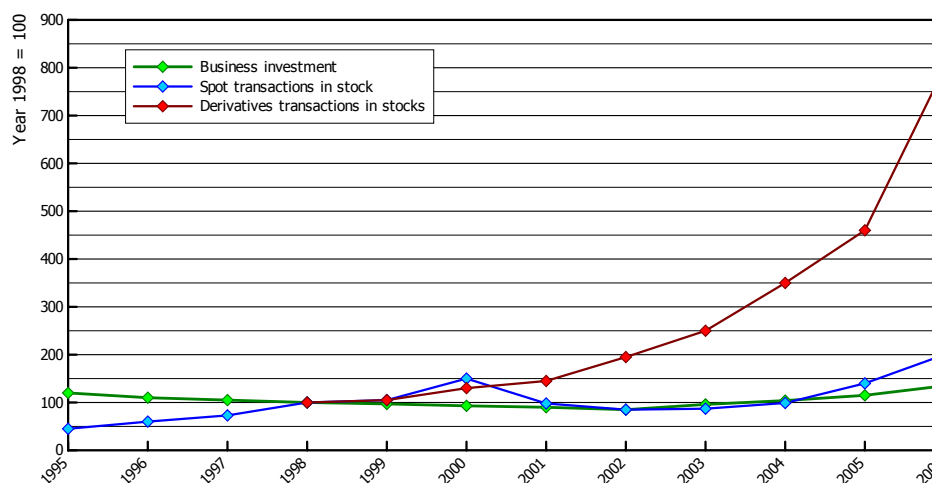
The debate that has currently re-ignited in Germany over the introduction of a tax on stock exchange transactions is being fuelled first and foremost by the rapid increase in global financial transactions, which is also being cited as an important factor in the recent financial crises.¹⁷ The current volume of transactions on the financial markets markedly surpasses the real economy, so that it is often pointed out that the financial markets are becoming detached from the real economy. Figure 21 illustrates this development: while spot transactions in stocks and business investment have followed fairly similar developments since 1995 (despite the fact that the stock exchange transactions are more affected by business cycles), the derivatives market (with underlying shares) has seen disproportionately strong growth over

¹⁵Sweden, however, is a warning example (see Umlauf 1993). There a tax of this kind was abolished in 1991 because a great deal of trading activity migrated from Stockholm to London. However, that was probably primarily because London outperformed Stockholm as a financial centre.

¹⁶Cf. Ehrenstein 2002, Westerhoff 2003; Westerhoff 2004a; Westerhoff 2004b und Hanke et al. 2007.

¹⁷We would like to note, however, that the current debate on a stock exchange turnover tax remains a purely German phenomenon: the topic was not mentioned at all at the G20 summit in Pittsburgh, for example.

Figure 21: Business investment and financial markets in Germany



Source: Schulmeister, Schratzenstaller and Picek 2008.

the last ten years. This indicates that a substantial proportion of the derivatives traded are used for short-term speculation.

The financial market can be roughly divided into the credit market (debt capital), the securities market and the currency market. Against the backdrop of a looming credit crunch, additional taxation of credit markets, which would make debt capital more expensive for companies, is not an option, so that we are looking here solely at taxation of the two latter markets. Securities (bonds and shares), derivatives (options, swaps, futures and certificates) and foreign currencies are traded on these markets.

Sales of securities on German stock exchanges (including online trading) totalled 7,067,279 billion euros in 2007, 5,005,352 billion euros in 2006 and 3,803,493 billion euros in 2005 (Quelle: <http://www.deutsche-boerse.com>). As a result of the financial crisis, sales in 2008 and 2009 are markedly lower than in 2007, so that in the following we have assumed an average annual volume of sales of 5000 billion euros. In 2008 derivatives turnover on the stock market was approximately 104.2 billion euros (Quelle: <http://www.deutscher-derivate-verband.de>). In 2007, it was 190.89 billion euros (about 15.9 billion euros per month), of which 101.82 billion euros came from trade in investment certificates and 88.93 billion euros from options and knock-outs. In 2006, the turnover was 127.6 billion euros (about 10.6 billion euros per month). For 2009, the monthly average is only 4.3 billion euros, so that a total turnover of only about 51.6 billion euros can be expected. The importance of taxing this market lies firstly in the high risk and therefore speculative potential associated with the traded securities. Secondly, it is possible for investors to use derivatives to take synthetic positions allowing them to speculate directly on the underlyings (cf. Pollin et al. 2003). The tax should therefore be levied consistently across different markets. It should, however, be

noted that to a great extent derivatives in particular are not traded on stock exchanges at all, but over-the-counter (OTC), i.e. negotiations take place directly between the counterparties. It would therefore make sense to tax these transactions as well, albeit at a lower rate, since OTC transactions typically incur higher transaction costs compared to stock transactions. The problem is, however, that there are very few estimates of the scale of magnitude of this (unregulated) market. The BIS publishes detailed semi-annual figures on notional amounts of OTC derivatives outstanding in the G10 countries including Switzerland, classified by aspects such as type of product and maturity but not by place of trading (source: <http://www.bis.org/statistics/derstats.htm>). For example, in December 2008, contracts with a notional value of USD 591.9 billion were outstanding.

Currency contracts are often traded OTC as well, so only a partial picture can be backed by figures. Furthermore, turnover figures for the forex transactions of individual countries are very rarely published. The last survey was carried out by BIS in 2007 (source: <http://www.bis.org/publ/rpfx07t.pdf>). According to this, the average daily turnover in Germany in April 2007 was USD 99 billion (April 2004: USD 118 billion). Assuming 250 trading days in a year and taking a historical exchange rate of 1.35 euros/US dollar as the basis for calculations produces an annual turnover of about 33,412.5 billion euros (2004: 35,683.2 billion euros).

Due to the uncertainty about turnover figures, the following estimate of hypothetical tax revenue must be seen merely as a rough guide. Furthermore, turnover of OTC derivative transactions has not been taken into account. Assuming a flat-rate tax of 0.5% (0.01%), produces tax revenue of 192.32 billion euros (3.84 billion euros), i.e. roughly a tenth of German GDP. An unrealistically steep 50% reduction in the volume of transactions would still produce 96.16 billion euros (0.01%: 1.92 billion euros). However, it should be pointed out that if such a tax were to be introduced, the rates should be adapted to existing inequalities in the transaction costs for different market segments. Thus Pollin et al. (2003) propose the following tax rates: 0.5 % on shares, 0.01% each year until maturity on bonds, 0.02% of the nominal value of the underlying on futures, 0.5% of the transaction value on options and 0.02% each year until maturity on swaps. Consideration would have to be given to the question of whether these tax rates should be adopted for Germany.

On the incidence of the tax, it can be said that above all financial institutions such as banks and hedge funds would have to bear the brunt of the tax, since they are the major actors in the financial markets. Otherwise, the people who appear on the financial market as private investors are relatively affluent and would therefore have to pay the remaining share. The high degree of competition in the banking sector makes it seem unlikely that the tax would be passed on to the banks' "small" customers.

Finally, an important effect of a tax on stock exchange transactions is that it would increase public awareness of the discrepancy between expectations of short-term profits, which guide most investment decisions, and the long-term opportunities and risks that are of key importance for sustainable development.

B Robustness of the strategy

B.1 Overview

The Strategy-driven scenario shows how the strategy to boost sustainable investment can be used under the conditions of the Business-as-usual scenario and what impact it has under these conditions. In the following, we shall assess the robustness of the strategy.

To that end, we show how the strategy can be implemented if the economic and political background conditions develop in a way that is different from that envisaged in the Business-as-usual scenario. Four different scenarios are depicted. For each of these scenarios we begin by outlining the consequences that are to be expected if the proposed strategy is not implemented. We then go on to look at how the strategy to boost sustainable investment can be implemented under a series of differing conditions and what consequences can then be expected.

The robustness of the proposed strategy is assessed for the following scenarios:

- Business-as-usual scenario (subjective probability 50%),
- global green recovery (subjective probability: 10%),
- the markets are self-healing (subjective probability: 20%),
- stagflation (subjective probability: 10%),
- disaster (subjective probability: 5%),
- massive surprises (subjective probability: 5%).

B.2 Global green recovery

This scenario is currently at the centre of many debates around the world. A sober assessment of the chances of it actually happening gives no grounds for great euphoria and German domestic policy cannot set a development of a global nature as a target. Nevertheless, it is extremely important that we examine this policy to determine whether it is compatible with the global green recovery scenario.

B.2.1 Starting situation

In this scenario, the U.S. economy responds to the stimuli created by the Obama administration to make climate protection and sustainable development the basis of a new growth model on a large scale. Industries that have come under intense pressure as a result of the crisis (automobile, energy) are looking for new possible courses of action and are supported by state investment grants. Green tech is recognised and used as a growth driver.

China and India – worried that energy prices will rise again and with an eye to the American growth markets – are stepping up their efforts to develop efficiency technologies and renewable energies. Together with the USA, they become the driving force behind an ecological industrial revolution. Japan's new vehicle technologies and mobility concepts make it the world market leader in the automobile sector.

B.2.2 Input from international policies

The ecological restructuring of industry boosts economic growth in active countries. This in turn triggers a recovery in demand for capital goods.

B.2.3 Economic impact

The German economy loses its competitive advantages, because it concentrates on perfecting outmoded product lines instead of developing new products and services. The automobile industry has major adjustment problems. Economic growth stands at 1%-2%, unemployment declines slowly. In 2020, three million people are still out of work.

B.2.4 Impact on climate issues

In 2020, greenhouse gas emissions are about 35% below their 1990 level; the 40% target has not been achieved.

B.2.5 Key features of the strategy

The basic measures are largely implemented and in 2010 short-time working is necessary for only 300,000 (instead of 600,000) employees, bringing about savings of 15 billion euros. The budget deficit can be reduced more quickly, funding for the European flagship projects

doubles (20 billion instead of 10 billion euros). European coordination of the strategy proves to be relatively easy under the conditions of the *global green recovery*.

B.2.6 Impact of the strategy

The economy grows at 2%-4%, the number of people unemployed at the end of 2011 drops to below three million (compare with the Business-as-usual scenario).

German industry becomes the world market leader in environmental engineering and related services. The engineering industry consolidates its position above all by developing flexible engineering projects with knowledge-intensive service providers. Increasing domestic demand boosts imports as well as exports, avoiding macro-economic imbalances, especially with France and the USA.

In 2020, greenhouse gas emissions are about 45% below their 1990 level and continue to fall at a rate of about 3% per annum. It proves possible to significantly slow global emissions – not least by using “made in Germany” technologies and a trend reversal on a global scale becomes a possibility.

B.3 The markets are self-healing

This scenario consists of a rapid return to the general equilibrium that was disturbed by the distortions in the financial markets. It represents the benchmark of traditional economic theory. Most central banks, ministries of economics and economic media organisations are guided by the belief that the role of politics in the current crisis is to accelerate the implementation of this scenario as much as possible. The issue of choosing between different possible equilibria does not arise. Economic policy measures on extending short-time working that have already been put in place and the German government's economic stimulus packages have at best a supportive effect but are not the reason for the recovery.

B.3.1 Starting situation

In this scenario, the global recession has only a short-term impact on the real German economy. The recession has already bottomed out by the second quarter of 2009. Early recovery trends seen in the German economy from September 2009 (and coming to some extent as a surprise) prove to be lasting. The 5% drop in economic output in 2009 is offset by a renewed increase of 6% the following year (as a result of the low starting level and missed opportunity for growth), triggering considerable optimism. The markets correct their expectations of financial turbulence and once more act on the global belief that the fundamentals are encouraging.

Massive consolidations take place in the financial sector, after which the volume of credit rises again. A brief flare up of inflationary tendencies in the USA is extinguished by a bilateral agreement between America and China, with China accepting a revaluation of its currency against the dollar and the American central bank successfully reducing the money supply in the USA. The tension among Japan, Germany and China on the one hand as exporting countries, the USA as a global importer, and France on the other hand, continues. It is expected to be resolved in the long-term through adjustments in exchange rates and interest rates.

B.3.2 Input from international policies

The Keynesian measures are seen as helpful but excessive and are gradually wound down. The recession is seen as a manageable deviation from the trend and brings about some isolated changes in how the financial markets are regulated. European coordination of economic and industrial policy does not get beyond a few tentative attempts.

B.3.3 Economic impact

The German economy retains its competitive advantages, but global growth is lower than in the past. Economic growth in Germany stands at around 1%, unemployment declines only slightly more quickly than in the Business-as-usual scenario. The German economy maintains a pronounced focus on foreign trade as a growth driver, cementing its susceptibility

to international crises. Wage restraint continues. In 2020 – partly as result of low domestic demand – three million people are still unemployed. Energy dependency becomes more and more of a problem for Germany and Europe. China and the USA secure their influence in Africa and the Middle East.

B.3.4 Impact on climate issues

Once the crisis is over, global emissions continue to rise, despite political declarations of intent to the contrary. Fears that the crisis could flare up again hinder concrete environmental policy efforts at international level. In 2020, greenhouse gas emissions in Germany are about 30% below their 1990 level, falling a long way short of the 40% target.

B.3.5 Key features of the strategy

The Business-as-usual measures are extensively implemented here, in a similar way to in the global green recovery scenario. Here too only 300,000 (instead of 600,000) employees have to go on short-time working in 2010, saving 15 billion euros. Less is spent on European coordination (10 billion euros), because it offers little prospect of success in the next few years at least. The budget deficit can be reduced relatively quickly.

B.3.6 Impact of the strategy

The economy grows at 2%-3%, the number of people unemployed at the end of 2011 is under four million (compare with Business-as-usual scenario).

The long-term impact is similar to that of a *global green recovery*. German industry becomes world market leader in the green tech sector including related services. Increasing domestic demand boosts imports as well as exports, avoiding macro-economic imbalances, especially with France and the USA. However, the development is less dynamic; in 2020, there are still around 2.5 million people unemployed.

In 2020, greenhouse gas emissions are 40% below their 1990 level and continue to fall at a rate of about 3% per annum. Germany grows slowly but surely into the role of a “global leader” in the field of climate policy.

B.4 Stagflation

The task of pumping liquidity into the markets on a vast scale in situations of acute crisis and then siphoning it off again at the right moment can be achieved if the “right moment” can be identified early enough and prompt action can then be taken. But, the time lags in today’s economic processes, which are difficult to estimate, and the inherent dynamics of political decision-making processes mean that there are no guarantees. That gives rise to the possibility of stagflation, which is a particularly difficult situation for policymakers.

B.4.1 Starting situation

In 2010, an upturn begins in individual sectors of the world economy, while in many areas stagnation still prevails. At the same time, inflation begins to accelerate in a number of different countries, first and foremost the USA.

B.4.2 Input from international policies

The major trading nations take protectionist steps on the quiet. In 2010, the international economic situation deteriorates to such an extent that massive additional measures have to be put in place. However, they remain poorly coordinated.

B.4.3 Economic impact

There is no effect worth mentioning on the demand side. At the same time, the inflation rate rises to over 5%, due to the combination of soaring energy costs and surplus liquidity, whereas unemployment stagnates.

The inflation rate falls, while developments in growth and employment are far too weak. Important parts of the world economy, in particular the German economy, are struggling with persistent stagflation, the worst of which will not be overcome until 2015.

B.4.4 Impact on climate issues

Climate policy is clearly no longer a priority. Nevertheless, low economic growth enables the German government to achieve its reduction targets. However, from 2015 the lack of ecological innovation becomes noticeable. As a result the government fails to achieve its reduction targets.

B.4.5 Key features of the strategy

From 2010, the basic measures are adjusted as follows. To counter the threat of inflation, the German government encourages the ECB to siphon off liquidity on a massive scale. To that end, it steps up expenditure on European cooperation and increases the budget deficit to 10% of GDP. The additional public spending is used, apart from for European cooperation, to boost domestic demand by issuing consumption vouchers and fast-tracking energy-efficiency

improvements to buildings. Overall, the strategy implemented resembles the approach of U.S. policy in the Reagan/Volcker years, albeit with the decisive difference that today's vision of sustainable development facilitates a palpable improvement in the day-to-day living conditions of a large part of the population, instead of the social hardship of that period. One of the main ways of achieving it will be to boost incentives to invest in business, by increasing taxation on investment income that is not channelled into business investments to an effective level of 40%, while granting full tax exemption on business investment and, in the case of ecologically desirable investment, providing targeted subsidies.

B.4.6 Impact of the strategy

The inflation rate falls, while the European economy – partly thanks to the German government's commitment to achieving a coordinated European approach – quickly gains momentum again. The social conflicts that have emerged during the period of stagflation (zero sum game between social groups and different economic regions) are defused because a surge of sustainable investment increases available resources, while liquidity is vigorously siphoned off.

The short-term decline in greenhouse gas emissions continues as a result of the long-term expansion of efficiency technologies and renewable energies. In 2020, emissions are 40% below their 1990 level.

B.5 Disaster

The public debate on the whole pays no heed to this scenario, but it must be included in any serious risk assessment. As historians have shown, the signs of economic recovery that are evident in 2009 could turn out to be nothing more than a flash in the pan in the way that the stock exchange rally in 1930 seemed for a moment to signal the end of the Great Depression.

B.5.1 Starting situation

The Obama package has not been effective across the board. A credit card crisis is brewing in the USA, which will force new write-offs, property prices continue to fall, the economic stimulus programmes put in place worldwide are beginning to fizzle out, as they did in Japan in the 1990s. More banks become insolvent, consumption and investment collapse. Growth in China slows considerably. Worldwide expectations of an end to the recession deteriorate. Unemployment in the USA soars to over 15%, social unrest in developing countries and emerging economies threaten international security and are accompanied by an increase in terrorist attacks. There is no doubt that this kind of development is unlikely, but it would be naïve to rule it out completely.

B.5.2 Input from international policies

Despite rhetoric to the contrary, the leading economic nations fall into protectionist patterns. Hectic diplomacy and symbolical gestures characterise the public debate.

B.5.3 Economic impact

The German economy's capital goods industry is far worse hit than had been assumed. The causes are the protectionist steps that are beginning to take effect and halt the export recovery that began in the third quarter. Exports fall to below 220 billion euros by the end of 2009. Overall economic output declines by 7% in 2009 and again in 2010. Unemployment rises to seven million people by the end of 2010. Social unrest rocks Germany and Europe.

Recovery is very slow. Unemployment persists at around six million for a long time. No palpable improvement is seen until after 2015.

Climate policy measures are shelved indefinitely as a result of the recession. Emissions do, however, fall as a result of lower economic output. Isolationist trade policies necessitate increased use of domestic coal. There is no investment in new power stations. In about 2015, greenhouse gas emissions start to rise again, reaching their 2005 level by 2020.

B.5.4 Key features of the strategy

The basic measures are implemented on an intensified scale. The 2010 deficit is increased to 12% of GDP, a decision is taken against prolonging short-time working, expenditure for energy-efficiency improvements to buildings is doubled, as is spending on consumption

vouchers and European cooperation. These measures make it possible to achieve comprehensive European cooperation in responding to the worsening crisis.

B.5.5 Impact of the strategy

In 2010, economic output falls by “only” 4%; unemployment soars to six million by the end of 2010. Comparisons are drawn between the combined challenge presented by the economic and ecological crisis and the challenge of reconstruction after the Second World War. Stronger social solidarity can be seen in many areas – ranging from neighbourhood help through to a rapid reform of the health system.

The German economy stabilises around a growth model in which inventiveness and valuing of perfection visibly improve the quality of life, with towns and cities becoming both more energy-efficient and liveable.

In a similar way to the stagflation scenario, the short-term decline in greenhouse gas emissions continues as a result of the long-term expansion of efficiency technologies and renewable energies. In 2020, emissions are 50% below their 1990 level.

B.6 Massive surprises

In cases where the scenario technique is used, it is usually assumed that the scenarios set the parameters for possible developments, so that the actual development is intuitively felt to be somewhere “between” the different scenarios. In the current financial and economic crisis, an assumption of this kind would be dangerous because it would compromise the ability to identify surprising developments at an early stage and respond with practical measures. It was this very ability that was lacking when the current crisis began.

Due to the very nature of surprises, it is impossible to say in advance how the strategy to boost sustainable investment could best be implemented if we really were faced with massive surprises. Nevertheless, it would probably have the advantage of being more robust than other options, particularly in this case. Because without this kind of strategy it is likely that structurally conservative approaches would prevail in German policymaking. That, however, would reduce the ability to deal with massive surprises. By contrast, a strategy of this kind would improve it because it would involve Germany in a learning process that has been part of a public discussion and political decision-making process.

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