

## Germany in the globalisation process

Over the past 15 years, Germany's increasing participation in the international division of labour has taken place against the backdrop of an especially dynamic globalisation process. Technical progress and the tendency towards decreasing communication and transport costs have encouraged the rapid integration of the world economy. In the early 1990s, globalisation received an additional boost from the integration of formerly non-market-oriented economies into the international division of labour. In addition to the central and east European countries, China is most notably contributing to corresponding changes. German enterprises have used the new opportunities to improve their competitiveness. This is apparent not least from the dynamic growth in German exports. In spite of the emergence of new competitors, German industry has been able, for the most part, to maintain its export market shares over the past few years. In the long term, however, taking advantage of globalisation and limiting the inevitable adjustment costs requires a willingness to make structural change and reforms in Germany. This report analyses different facets of the globalisation process and looks at the factors determining Germany's position in the world market.

## Indicators of Germany's increasing integration into the world economy

*Foreign trade grows faster than gross domestic product*

The internationalisation of economic life, which accompanies the rapidly advancing globalisation process, is reflected in the sharp increase in cross-border activities in the goods and capital markets, among other things. This development can be seen, for example, in the fact that world trade has been growing faster in past decades than worldwide economic output. During the past 20 years, world trade has increased 1½ times as much as global gross domestic product (GDP). In the 1990s, world trade grew at an annual average of 6½%, which was actually twice as fast as real economic output. More and more goods and services are becoming tradable. At the same time, companies and economies have become more involved in foreign trade. Accordingly, the degree of real economic openness of many countries – total exports and imports of goods and services as a ratio of GDP – has increased significantly. This ratio has also noticeably increased in Germany. For instance, the real economic transaction volume with foreign countries increased from just over 60% of GDP in 1990<sup>1</sup> to over 75% last year. This is a high value for a relatively large industrial country in terms of GDP and shows Germany to be a very open economy. The corresponding figure for the USA and for Japan in 2005 was 27% in both cases.

*Trade in services also rises*

Cross-border trade in goods, in particular, is shaping Germany's high degree of real economic openness. About 83% of German foreign trade transactions are determined by trade in goods. Although the cross-border ex-

change of services has markedly increased over the past few years, in line with a worldwide trend it has not increased any more than the trade in goods. Even so, the structure of the German services account reflects changes in international service transactions. Thus, in addition to the traditionally significant travel and transport segments, it is mainly technological services that are gaining ground. In 2005, they accounted for 20% of German revenue and for almost 15% of German expenditure in the services sector. The corresponding shares in 1990 had been 10% and 9%, respectively.<sup>2</sup>

The momentum in foreign trade is also a sign of the internationalisation of production and enterprises. This is accompanied by a worldwide increase in cross-border direct investment stocks. Various studies show that there is a complementary relationship between a country's foreign trade development and its direct investment.<sup>3</sup> The globalisation of enterprises has therefore become a dominant factor in the world's economic integration. At the same time, from an enterprise's point of view, it is often the global perspective that is now of major importance for decisions on development, production and sales. According to UNCTAD figures, worldwide foreign direct investment (FDI) stocks amounted to over

*Internationalisation of enterprises*

<sup>1</sup> Western Germany.

<sup>2</sup> The figures refer to services in the areas of patents and licences, research and development, engineering and other technical services, as well as IT services.

<sup>3</sup> See Deutsche Bundesbank, German foreign direct investment (FDI) relationships: recent trends and macroeconomic effects, Monthly Report, September 2006, pp 43-58, and Task Force of the Monetary Policy Committee of the European System of Central Banks, Competitiveness and the Export Performance of the Euro Area, ECB Occasional Paper No 30/2005.

US\$10 trillion in 2005. About 77,000 transnational enterprises with about 770,000 branches are involved. Their importance for the world economy is significant, and this can be seen not least in the fact that an estimated 62 million people were employed in these branches in 2005. Germany's outward direct investment constituted 9% of worldwide FDI stocks while Germany's inward direct investment constituted 5% of worldwide FDI stocks.<sup>4</sup>

*German enterprises as global players*

Many German enterprises focus on strengthening their competitive position and opening up new markets by means of an investment abroad.<sup>5</sup> For 2004, the Bundesbank's Micro-database Direct investment (MiDi) shows about 22,700 German branches abroad and about 9,000 branches of foreign enterprises in Germany. The cross-border investment both of German enterprises abroad and of foreign enterprises in Germany has increased considerably over the past few years. Since 1990, the statistically recorded direct investment stocks of German enterprises abroad have risen by a multiple of 6½, which is somewhat more than the worldwide increase. In the opposite direction, growth was weaker: the FDI stocks in Germany in 2004 were only four times as great as their value in 1990.<sup>6</sup>

*Growing importance of emerging market economies*

Not only the increase but also the structure of worldwide FDI stocks reflect the globalisation process and the changes in the worldwide division of labour. In 1990, for example, 80% of worldwide FDI stocks were concentrated on industrial countries. In 2005, the corresponding share was 70%. Since the early

1990s, developing countries have been attracting substantial foreign capital. However, this investment has been concentrated on just a few countries, mainly in Asia. China, in particular, has become one of the preferred locations for foreign direct investment in recent years. This seems to be mainly a reflection of the direct investment motives of production cost savings and market access. In recent years, however, Asia has also been gaining increasing importance as a direct investment capital supplier.<sup>7</sup> Apart from Asia, the central and east European countries have been noticeably integrated into the internationalisation of production by means of direct investment since the early 1990s.

With regard to German enterprises' investment abroad, it becomes evident that first and foremost a greater investment in the new central European EU member states as well as in the USA has changed the regional breakdown. In the accession countries, the share of German outward direct investment rose from virtually zero in 1990 to 6% of late while, in the USA, it rose from 23% to 33% in the same period. By contrast, the sharp increase in direct investment (in terms of growth rates) that has also occurred in the

*Changes in structure of German direct investment abroad*

<sup>4</sup> See UNCTAD, World Investment Report 2006. International comparisons of direct investment figures are partly complicated by the fact that country data do not always have the same valuation basis. For example, German data are specified at book value whereas some other countries record stock statistics at market value.

<sup>5</sup> See German Chamber of Industry and Commerce (Deutscher Industrie- und Handelskammertag), Investitionen im Ausland, Ergebnisse einer DIHK-Umfrage bei den Industrie- und Handelskammern, spring 2006.

<sup>6</sup> See Deutsche Bundesbank, German foreign direct investment (FDI) relationships: recent trends and macroeconomic effects, Monthly Report, September 2006, pp 43-58.

<sup>7</sup> See UNCTAD (2006), loc cit.

emerging markets of South-East Asia<sup>8</sup> and in China over the past 15 years has not caused these countries' share of overall German investment to rise significantly (2% and 1%, respectively).<sup>9</sup>

*Direct investment in services sector increases worldwide*

The change in the worldwide direct investment structure is also revealing when broken down by sector. For example, the importance of direct investment in the services sector has increased in recent years. While this sector accounted for only about one-quarter of worldwide FDI stocks in the early 1970s, the corresponding share in 2002 was some 60%.<sup>10</sup> This may be due not least to the fact that, in the services sector, the opportunities created by technical progress and decreasing costs in the communication sector are of great importance. A policy of market-opening in many countries also played a part. In terms of amount, German direct investment is also focused on the services sector, which recently (2004) was the focus for about 70% of investment. Financial services, in particular, played an important role in this.

*International competition also increases in services sector*

In other words, enterprises are increasingly making use of the opportunities created by the globalisation process by taking the global perspective into consideration when making decisions on production and organisation in the services sector. Just as the goods markets have been subject to increasingly intense international competitive pressure, the services sector in industrial countries is now also facing more and more international competition.

The process of increasing global integration is especially discernible in the financial markets. More and more countries have access to the international capital market. At the same time, there has been a sharp rise in the volume of cross-border securities transactions in recent years. In the case of Germany, for example, the turnover in portfolio investment with non-residents in 2005 was just over 570% of GDP – ten times as much as in 1990. In the USA, the corresponding ratio in 2005 was just under 330%.

*Rapid growth in international capital flows*

Other factors, such as the close coupling of interest rates for long-term bonds or the growing international correlation of share prices, also provide evidence of the rapidly advancing financial market integration.<sup>11</sup> Further evidence is found in the sharp rise in the degree of financial openness of many economies. This degree of openness represents the ratio of the sum of external assets and liabilities to GDP. For Germany, it amounted to just over 340% in 2005, which was three times as high as in 1990. In the USA the corresponding indicator increased in this period by 116 percentage points to just under 200%

*Increasing degree of financial openness*

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<sup>8</sup> Brunei Darussalam, Hong Kong, Indonesia, South Korea, Malaysia, Philippines, Singapore, Taiwan and Thailand. See Deutsche Bundesbank, International capital links, Special Statistical Publication 10, April 2006.

<sup>9</sup> See Deutsche Bundesbank, Germany's external relations with the People's Republic of China, Monthly Report, June 2005, pp 35-50.

<sup>10</sup> A great part of this direct investment is aimed at opening up markets in the field of non-tradable services. See UNCTAD, The shift towards services, World Investment Report 2004.

<sup>11</sup> See Deutsche Bundesbank, International integration of German securities markets, Monthly Report, December 2001, pp 15-28, and Deutsche Bundesbank, Current trends and structural changes in the public bond market, Monthly Report, October 2006, pp 29-44.

and in Japan by some 60 percentage points to 165%.

*Globalisation shapes structural change in industrial countries*

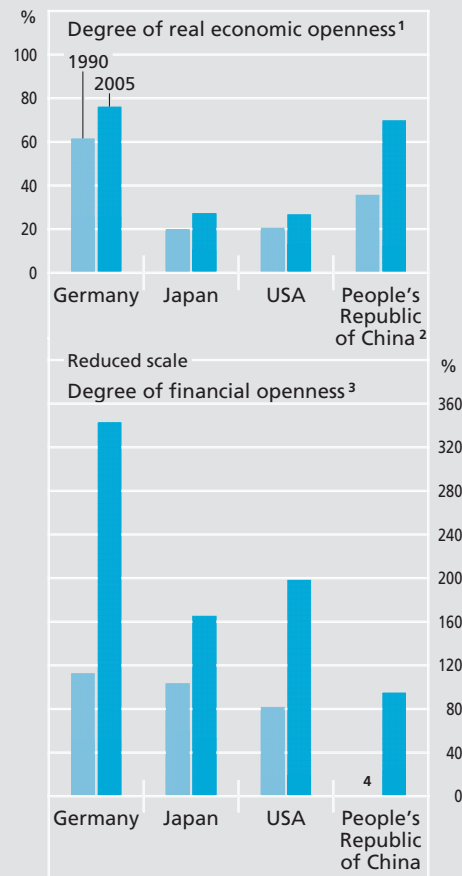
The scope and the pace at which the integration of the goods and capital markets has advanced in recent years were also accompanied by a globalisation change. After the Second World War, the integration of the western industrial countries, in particular, advanced rapidly. In the meantime, the globalisation process also covers most developing countries and emerging market economies, whose degree of openness is often higher than that of the leading industrial countries.<sup>12</sup> This changes the challenges of the growing economic interdependence for an industrial country such as Germany. The degree to which a country can benefit from the opportunities of open markets is mainly determined by domestically influenced factors. In this connection, structural change and accompanying structural reforms play a central role. Not only do they contribute towards strengthening the relative position of an economy in the international economic structure, they also are essential from a domestic perspective, especially for Germany.

### Advantages and challenges of globalisation

*Prosperity gains from exploiting comparative cost advantages ...*

According to foreign trade theory, the international division of labour which exploits comparative cost advantages leads, under competitive conditions, to efficiency gains and increases the average per capita income. Compared with a situation without foreign trade, the economies concerned have greater

### Degree of openness of the economy of selected countries



Sources: IMF and WTO. — 1 Exports plus imports according to the national accounts as a percentage of the respective GDP. — 2 Exports and imports according to customs statistics. — 3 External assets plus external liabilities as a percentage of the respective GDP. — 4 Data for 1990 not available.

Deutsche Bundesbank

consumption possibilities. Efficiency gains are also expected from the modern forms of the international division of labour, such as splitting and outsourcing production processes by

<sup>12</sup> In 2005, almost 44% of worldwide exports of goods were from developing countries or emerging market economies although their economic output constituted only about one-quarter of global value added. In 1990, the exports of this group of countries still accounted for less than 30% of world trade. See IBRD, World Development Indicators 2005, and IMF, World Economic Outlook Database, September 2006.

means of offshoring, ie undertaking parts of the production abroad either in an enterprise's own branches or by means of foreign non-affiliated companies.<sup>13</sup> This makes it possible to separate human or fixed-capital-intensive areas, such as administration, research or final assembly, from the often labour-intensive production of individual sub-components. The growing importance of this "fragmentation" can be seen in the fact that not only finished products but increasingly more intermediate goods are traded between countries.<sup>14</sup>

*... greater  
product variety  
and ...*

In contrast to the aforementioned inter-industrial trade in various goods, the intra-industrial trade in goods within a sector does not depend primarily on the exploitation of comparative cost advantages but mainly on the existence of economies of scale, ie the advantages of mass production. Such cost structures are typically due to a large block of fixed costs, owing to the intensive use of fixed capital or technical knowledge. Economies of scope that result from the size of a network and play a great role in telecommunication, for example, have a similar effect. In both cases, foreign trade allows not only falling average production costs but also a greater product variety.<sup>15</sup> Ultimately, both is beneficial to consumers.

*... dynamic  
effects*

The direct advantages of the international division of labour are supplemented by indirect earnings, which often may be difficult to quantify but undoubtedly play an important role in the long term. At enterprise level, the dynamic effects of intensified competition and of an accelerated dissemination of tech-

nical knowledge are particularly worth mentioning. Moreover, economic policy makers see themselves exposed to greater competition between the systems and are driven to stricter fiscal discipline, for example.

According to estimates by the European Commission, one-fifth of the rise in the standard of living in the EU countries over the past 50 years is due to the greater openness of the world economy.<sup>16</sup> However, globalisation also increases the individual economic need for adjustment and accelerates macro-economic structural change. Individual sections of the population and economic sectors may be affected quite differently by this. Necessary adjustments are signalled by shifts in the relative prices of goods and in relative income. For example, an additional supply of production factors, goods or services at first generally signifies an intensification of competition and a deterioration in the income situation of the existing providers whereas additional foreign demand tends to have positive effects on income. The changes due to the in-

*Globalisation  
increases need  
for adjust-  
ment ...*

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<sup>13</sup> See J Bhagwati et al (2004), The muddles over outsourcing, *Journal of Economic Perspectives*, Vol 18, pp 93-114.

<sup>14</sup> See J Kleinert (2003), Growing trade in intermediate goods: outsourcing, global sourcing, or increasing importance of MNE networks?, *Review of International Economics*, Vol 11, pp 464-482.

<sup>15</sup> See C Broda und D Weinstein (2004), Globalization and the gains from variety, *Federal Reserve Bank of New York, Staff Report No 180*.

<sup>16</sup> See European Commission, *Rising International Economic Integration – Opportunities and Challenges*, The EU Economy 2005 Review. Various empirical studies have examined the positive income effects of foreign trade for different countries. See J A Frankel and D Romer (1999), *Does trade cause growth?*, The American Economic Review, Vol 89, pp 379-399; A Bassanini and S Scarpetta (2001), *The driving forces of economic growth: panel data evidence for the OECD countries*, OECD Economic Studies No 33, pp 9-56; M Nogueur and M Siscart (2005), *Trade raises income: a precise and robust result*, *Journal of International Economics*, Vol 65, pp 447-460.

tensified trade links between Germany and China are a case in point: the low prices for textiles from the Far East increased the competitive pressure on producers in Germany (and in other European countries). From 2000 to 2005 alone, German imports of textiles and clothing from China increased by 90%, and the production in Germany dropped by almost 25%. By contrast, German mechanical engineering enterprises almost tripled their sales in China in the same period.

### Globalisation and labour market

*... also in labour markets*

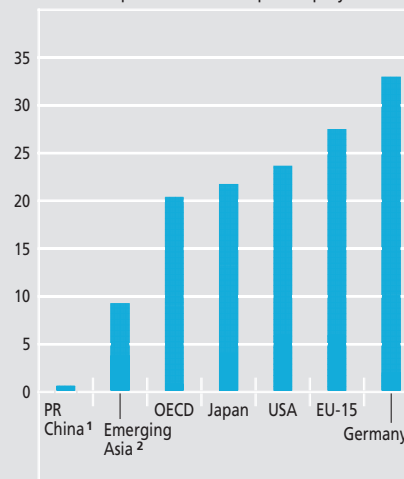
The adjustments in the labour markets which are linked to globalisation are an especially sensitive issue in social politics. In industrial countries such as Germany, which is considered a "high-wage country" by international standards, the globalisation process and the associated need for adjustment are often seen as a threat to jobs, wages and working conditions.

*Additional supply of labour abroad ...*

It is true that the conditions in the international labour market have changed very dramatically and very rapidly over the past few years. China and India alone each boast a population of over 1 billion. In the meantime, the factor labour has become much more available to enterprises operating worldwide than 20 years ago. The wage differences on the global labour market are considerable. However, this reflects not only differences in factor endowments, productivity and "quality", in the sense of training and performance, but also significant differences in living standards and in social welfare. Wage differences alone, however, say nothing

### Labour costs in the manufacturing sector of selected countries and regions in 2005

US dollars per hour worked per employee



Source: US Department of Labor, Bureau of Labor Statistics. — 1 Data for 2004. — 2 Hong Kong, South Korea, Singapore and Taiwan.

Deutsche Bundesbank

ing about the advantages of individual locations. For an industrial country such as Germany, the question still remains as to which adjustments and challenges accompany the globalisation process.

Real foreign trade theory makes it possible to describe potential effects of a change in international factor endowments – as observed in recent years – on the structural change and labour markets in the industrial countries. To a certain extent, the worldwide growth in the supply of low-priced and comparatively labour-intensive goods and services foreshadows a structural change in industrial countries at the expense of the sectors competing with imports, especially since capital movements in the form of direct investment, for example, also contribute to this.

*... influences structural change in Germany*

*Domestic  
factors  
dominate*

The increasing availability of low-paid work can contribute to rising wage differences in the industrial countries.<sup>17</sup> However, unemployment may also arise in countries where wages do not react flexibly enough.<sup>18</sup> Especially in the case of poorly qualified workers in industrial countries, there is the danger that the wages paid exceed their productivity and that a downward wage adjustment is prevented by explicit or implicit minimum wages. These jobs then cannot withstand the competition. A comparison of unemployment among poorly qualified persons in OECD countries indicates, for example, that Germany has been less successful than some other countries in integrating persons with only low qualifications into the work process. In Germany, the corresponding unemployment rate in 2004 was 20.5%, which was just over 7 percentage points higher than ten years earlier. In the OECD average and in the EU average, however, it remained virtually constant during the same period; in 2004, it was 10.4% and 12.9%, respectively.<sup>19</sup> However, various studies show that other factors, such as technical progress and corresponding changes in qualification requirements, dominate employment in the industrial countries more than the effects of the international division of labour.<sup>20</sup>

*Contrasting  
adjustment  
effects*

The empirical evidence for the effects of globalisation on the labour markets of industrial countries is not conclusive. In view of the partly contrasting effects over different horizons, this finding is not surprising. Thus, negative consequences for individual sectors and groups of persons may well be expected in the short and medium term. However,

these costs in the transition phase are set against the advantages arising in the long term. First, jobs that are lost tend to be replaced by higher-grade jobs with better income prospects. Second, less productive jobs can also benefit in the long term from a generally rising income level. A current study by the European Commission is simulating these effects for the EU countries and concludes that the costs of the adjustment period are relatively low compared with the possible long-term gains.<sup>21</sup> The simulation also shows that protectionist measures would result in a substantial long-term downturn in the income level in the EU. By contrast, economic policy reforms can facilitate the adjustment processes. They make it possible to exploit potential advantages of globalisation more effectively and would significantly improve the EU countries' income prospects. In this context, the institutional framework in the labour market also plays a central role in influencing the effects of the structural change on employment and unemployment.<sup>22</sup>

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<sup>17</sup> See R C Feenstra and G H Hanson (2003), Global production sharing and rising inequality: a survey of trade and wages, in K Choi and J Harrigan (eds), *Handbook of International Trade*, Oxford, pp 146-185.

<sup>18</sup> See OECD, *Employment Outlook 1997*, Paris; B Hoekman and L A Winters (2005), *Trade and employment: stylized facts and research findings*, World Bank Policy Research Working Paper 3676.

<sup>19</sup> See OECD, *Education at a Glance 2006*, Paris. For the general context, see H-W Sinn (2005), *Die Basar-Ökonomie*, Berlin.

<sup>20</sup> See OECD, *Employment Outlook 2005*, Paris.

<sup>21</sup> See C Denis et al (2006), *Globalisation: trends, issues and macro implications for the EU*, *European Economy, Economic Papers* No 254.

<sup>22</sup> See OECD (2005), loc cit; European Commission (2005), loc cit; M P Moore and P Ranjan (2005), *Globalisation vs. skill-biased technological change: implications for unemployment and wage inequality*, *Economic Journal*, Vol 115, pp 391-422.





*Flexible labour markets as important adjustment determinant ...*

In Germany, too, the flexibility of wages or of the wage structure is an important determinant of the labour market effects which stem from the growing international division of labour and the necessary adjustment to the changes of the worldwide factor endowments. Against this background, the partial flexibilisation in the German labour market which has been introduced over the past few years at least points in the right direction. The manufacturing sector, in particular, has been subject to major restructurings over the past ten years, which have ultimately also had the effect of raising labour productivity and lowering unit labour costs. In terms of these unit labour costs, the international competitiveness of German enterprises has substantially improved over the past few years. Vis-à-vis that of enterprises in 19 industrial coun-

tries, it is now almost 19% more favourable than in 1995, when it reached a low. Compared with the other euro-area countries, Germany's competitive position improved by 20% in this period.

The general cost discipline in terms of wages, the flexibility of working hours, the broader range of forms of employment and more efficient production processes contributed to this improvement. However, the rise in labour productivity partly also involved the shedding of labour and the associated social adjustment costs. Nevertheless, the labour market reforms facilitate the reintegration of these workers, since the reservation wage is not as rigid as previously. However, the most recent discussions about the extension of minimum wage regulations to various sectors point in



the opposite direction. Given the worldwide factor endowment, however, it is also not forward-looking to think that the wage costs component alone would enable the retention of large-scale labour-intensive production, which is in direct competition with imports from suppliers from countries with very low wages.

Consequently, a major determinant of the German labour market's standing in the global environment will always be the provision of market-related in-service training for the workforce. In this context, it will become increasingly important to continuously adjust higher education and further training to new challenges. An empirical study with German data at corporate level shows that innovations are the driving force behind German

exports.<sup>23</sup> When Germany's future economic viability is being considered, this assigns a central role to an efficient education system. It is an important determinant of the locational quality and forms the key to the efficient use of the advantages that globalisation offers to advanced economies.

### Foreign trade, world market shares and structural change

Over the past few years, German exporters have made an important contribution to overall economic growth in Germany.<sup>24</sup> For example, while real GDP has expanded by 14% since 1995, exports have more than doubled in this period. At the same time, however, there has been a marked increase in the import content of German exports (from 31% in 1995 to 41½% in 2005). This reflects the closer cross-border ties and the growing fragmentation of producing goods for export in the global environment. The determinants that have shaped Germany's relative position on the world markets in the globalisation process are examined below. This involves relative price fluctuations, the patterns of specialisation that have developed over the years as well as exogenous changes and corresponding adjustment reactions.

*Changing pattern of specialisation*

<sup>23</sup> See S Lachenmaier and L Wößmann (2006), Does innovation cause exports? Evidence from exogenous innovation impulses and obstacles using German micro data, Oxford Economic Papers, Vol 58, pp 317-350.

<sup>24</sup> According to the figures of the Federal Statistical Office's input-output calculation, the share of the export-induced domestic gross value added rose from 13.7% in 1995 to about 20% in 2005. See Federal Statistical Office, Konjunkturmotor Export, Materialienband zum Pressegespräch am 30. Mai 2006 in Frankfurt am Main.

*... must be supplemented by qualification measures*

*German terms of trade moved sideways in recent years*

The price ratio of the German export and import goods on the world market (terms of trade) has fluctuated sharply since the early 1970s. After showing a clear downward trend from the start of the first oil crisis to the end of the second oil crisis, the price ratio rose sharply in the mid-1980s owing to the emerging fall in prices for crude oil and has since been moving mainly sideways, with an interim peak before the turn of the millennium.

*Slight increase in real world market shares*

The real world market shares of German exports rose to over 10% between 1970 and 1985,<sup>25</sup> only to fall again owing to the influence of growing competition from Europe and Asia and later also to German reunification to barely more than 8% and therefore actually below the 1970 level. Since the mid-1990s, there has been another slight upward trend, with the result that Germany's export shares reached almost 9% in 2005. All in all, the German terms of trade and the real world market shares have mostly been moving in opposite directions since the early 1970s. An important link between the two variables is the relationship between the terms of trade and the real exchange rate, which symbolises a country's price competitiveness.

*Terms of trade and real exchange rate*

While the terms of trade describe the price ratio between export and import goods, the real exchange rate converts the domestic price level to foreign currency and sets it in relation to the foreign price level.<sup>26</sup> Accordingly, the relationship between the terms of trade and the real exchange rate is all the closer, the more the law of one price is applied in the world markets and the more pronounced

the correlation between the price development for export goods and the price index that is used for the calculation of the real exchange rate is.<sup>27</sup>

Price competitiveness, for its part, is a central determinant of the development of a country's shares of world exports. Together with non-price factors, it has a significant influence on how an economy fares under the conditions of globalisation. Moreover, the world market shares are influenced by the regional and sectoral composition of exports. This "structural effect" can be separated from the actual competition effect by means of an analysis of constant market shares.<sup>28</sup>

The structural effect illustrates the changes in world market share that result from the re-

*Determinants of real world market shares*

*Structural effect for Germany consists of ...*

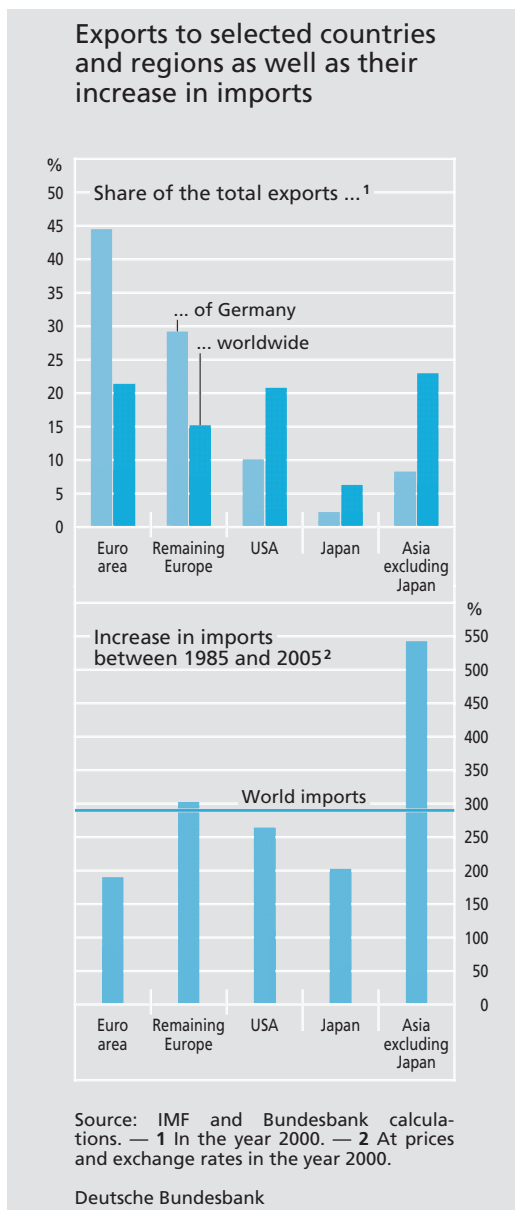
<sup>25</sup> At prices and exchange rates in the year 2000. For a calculation of real world market shares, see also Deutsche Bundesbank, Germany's world market shares, Monthly Report, November 2002, p 40.

<sup>26</sup> If the price level is compared with the weighted average of the price indices of the most important trading partners, this is called the real effective exchange rate. See Deutsche Bundesbank, New calculation of the indicators of the price competitiveness of the German economy, Monthly Report, November 2001, pp 50-53.

<sup>27</sup> 
$$e = TOT \cdot \frac{E \cdot P_X^*}{P_M^*} \cdot \frac{P_X}{P_X^*} \cdot \frac{P_X^*}{P^*}$$

where  $e$  = real exchange rate;  $TOT$  = terms of trade;  $E$  = nominal exchange rate;  $X$  = index for export goods;  $M$  = index for import goods; \* = index for foreign countries. For Germany, the correlation coefficient between the terms of trade and price competitiveness on the basis of the price deflator of total sales was 0.46 for the period from 1985 to 2005. Since the existence of European monetary union, it has actually risen to 0.87.

<sup>28</sup> For the analysis of constant market shares, see C Milana (1988), Constant market share analysis and index number theory, European Journal of Political Economy, Vol 18, pp 603-617; A H Q M Merckies and T Van der Meer (1988), A theoretical foundation for constant market share analysis, Empirical Economics, Vol 13, pp 65-80, and J Fagerberg and G Sollie (1987), The method of constant market shares analysis reconsidered, Applied Economics, Vol 19, pp 1571-1583. See also Task Force of the Monetary Policy Committee of the European System of Central Banks (2005), loc cit, as well as European Central Bank, Competitiveness and the export performance of the euro area, Monthly Bulletin, July 2006, pp 69-79.



gional specialisation (market effect) and the sectoral specialisation (product effect) of an economy.<sup>29</sup> For example, if German exports are more (less) closely oriented to the rapidly growing regional or sectoral markets than other countries, the German share of world exports rises (falls). The structural effect is positive (negative). The following calculations are based on prices, exchange rates and export shares in the year 2000.<sup>30</sup>

Between 1985 and 2005, the benefit which German exports had from the strong growth in world exports to Asia was below average. German exports are not as strongly represented in these markets as those of its international competitors whereas they show a high degree of specialisation in the comparatively slow-growing euro-area markets (see chart on this page).<sup>31</sup> From the mid-1990s, German exporters benefited from their presence in central and east European transition countries, whose import growth recently was also well above the growth in world trade. All in all, however, the regional focus of German exports has hampered the development of the export shares.

*... negative market effect and ...*

The sectoral perspective shows a specialisation of German exports in mechanical engineering and the manufacture of transport equipment, while the local enterprises in the hi-tech sector of electrical (including computers) and optical equipment are under-represented.<sup>32</sup> In the context of structural

*... neutral product effect*

<sup>29</sup> For a breakdown of the changes in world market shares into the structural and competition effect, see annex.

<sup>30</sup> In order to calculate the market effect, the imports of the individual countries or groups of countries were deflated by the national import prices. The calculation of the product effect is based on the sectoral exports of 26 OECD countries. They were adjusted by the national price deflator of the manufacturing sector and then aggregated. For non-OECD countries, not all of the required sectoral data were available.

<sup>31</sup> For example, German exports to Asia (excluding Japan) accounted for less than 10% of German exports in the base year 2000, while the share of worldwide exports to Asia (excluding Japan) was over 20%. By contrast, the other euro-area member countries absorbed some 45% of German exports but only just over one-fifth of global exports.

<sup>32</sup> The shares of the mechanical engineering sector and of the manufacturers of transport equipment in German exports in the base year 2000 were 15% and 24%, respectively, and thus well above the OECD average. By comparison, electrical and optical equipment accounted for almost one-quarter of the exports of all OECD countries. In Germany, it accounted for only 19%.

changes that affected the composition of exports from industrial countries, these hi-tech sectors and – to a lesser degree – the manufacture of transport equipment have grown very rapidly, while the other sectors have become less important. All in all, the sectoral specialisation of German enterprises – with respect to the group of countries considered here – had a mostly neutral effect on their export development over the past few years.

*Competition effect ...*

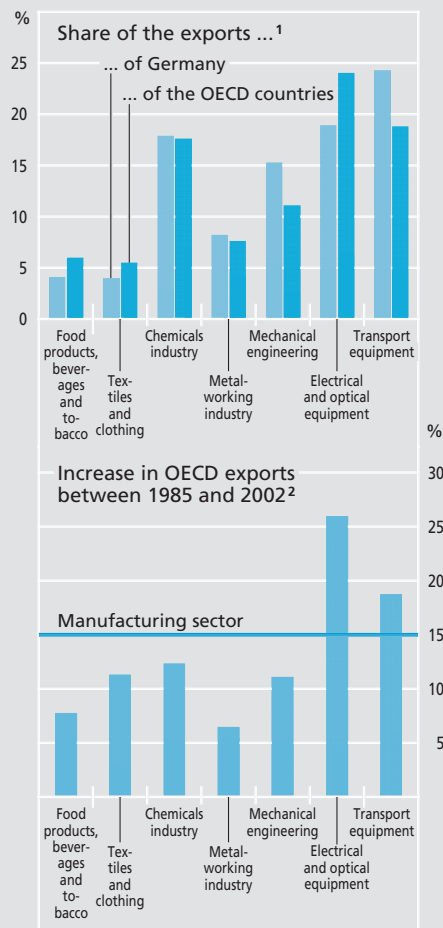
The competition effect reflects the aggregated development of the market shares within the respective sectors and regional areas. In mathematical terms, it represents the residual of the changes in the world market shares after adjustment for the structural effect. It can be determined by indicators for both price and non-price competitiveness. A suitable measure of price competitiveness is the corresponding indicator of the Bundesbank based on the deflator of total sales. On the other hand, Germany's inward and outward direct investment, together with other factors, influence the non-price competitiveness of German exporters (see the explanatory notes on page 30).

*... also negative*

The slight loss of real world market shares over the past 20 years was due not only to the aforementioned unfavourable structural effect but also to a negative competition effect. Over the whole period, price competitiveness has slightly deteriorated, while non-price competitiveness experienced only minor changes.

Given the course of German shares in world exports between 1985 and 2005, however, it

### Exports of selected industries in the manufacturing sector



Sources: IMF, OECD and Bundesbank calculations. — <sup>1</sup> In the year 2000. — <sup>2</sup> At prices and exchange rates in the year 2000.

Deutsche Bundesbank

seems reasonable to make a distinction between the first decade, which was shaped by a marked decline, and the last ten years, in which German exports regained world market shares. The losses in export shares between 1985 and 1995 were accompanied by a deterioration in all the aforementioned determinants. The negative market effect and a

*Deterioration in competitiveness between 1985 and 1995 ...*

## Determinants of Germany's real world market shares

Changes in a national economy's share of real exports may be broken down into a *structural effect* and a *competition effect*.<sup>1</sup> The structural effect stems from the regional and structural specialisation of exports. The competition effect reflects changes in the export shares within each of the sectors and export markets. To illustrate this, the present study employs indicators for both price and non-price competitiveness. A suitable measure of price competitiveness is the real exchange rate based on the deflator of total sales.<sup>2</sup> However, Germany's inward and outward direct investment, together with other factors, influence the non-price competitiveness of German exporters. The period studied runs from 1981 to 2005. Estimates of the influences on the competition effect are based on the following equation:

$$(1) WE_t = \alpha_0 + \alpha_1 PWF_t + \alpha_2 FDI_{t-1}^a + \alpha_3 FDI_{t-1}^i + \epsilon_t$$

where *WE* is the competition effect (calculated as the real world market share less market and product effects); *PWF* is the indicator of price competitiveness based on the price deflator of total sales;<sup>3</sup> *FDI<sup>a</sup>* is the level of German direct investment abroad expressed as a percentage of global direct investment stocks; *FDI<sup>i</sup>* is foreign direct investment in Germany expressed as a percentage of global direct investment stocks; and *t* is the time index. The data are the logarithms of real variables at prices and exchange rates in the year 2000.<sup>4</sup>

All variables in the equation are integrated of order 1.<sup>5</sup> According to the error correction estimates, the variables illustrating non-price competitiveness (*FDI<sup>a</sup>* and *FDI<sup>i</sup>*) are cointegrated. In addition, a second cointegration relationship exists between the competition effect and price and non-price competitiveness.

### Real world market shares and price and non-price competitiveness

#### First cointegration relationship

$$FDI_{t-2}^a + 1.375 \cdot FDI_{t-2}^i - 4.439 = 0$$

(8.52)

<sup>1</sup> See Annex, p 33. — <sup>2</sup> The number of new patents registered by German firms in comparison with that of the rest of the world was not significant in statistical terms; for this reason it was not employed as a measure of non-price competitiveness in the results presented here. — <sup>3</sup> An increase in the *PWF* variable implies a deterioration in price competitiveness. — <sup>4</sup> Direct investment is price-adjusted in the local currency using the national GDP deflator. Global stocks of direct investment were approximated by the fig-

#### Second cointegration relationship

$$WE_{t-1} + 1.021 \cdot PWF_{t-1} - 0.400 \cdot FDI_{t-2}^a - 6.680 = 0$$

(6.94)                      (-5.59)

Error correction	<i>D(WE<sub>t</sub>)</i>	<i>D(PWF<sub>t</sub>)</i>	<i>D(FDI<sub>t-1</sub><sup>a</sup>)</i>	<i>D(FDI<sub>t-1</sub><sup>i</sup>)</i>
First cointegration relationship	-	-	-0.232 (-2.05)	-1.671 (-5.87)
Second cointegration relationship	-0.174 (-2.03)	-	-	-1.746 (-3.92)

t-values in parentheses.

German inward and outward direct investment are in competition with each other (first cointegration relationship).<sup>6</sup> This interplay presumably reflects international competition among investment locations where the home country of an enterprise is becoming increasingly irrelevant. It is also connected with the increasing integration of emerging economies in Asia and in central and eastern Europe; these countries have become significantly more attractive targets for direct investment. German enterprises are relatively strong performers in direct investment, not only in Europe, but also in China and India. However, Germany seems to have lost some ground as a host country for inward direct investment.

The second cointegration relationship shows the connection between the competition effect and price and non-price competitiveness. As expected, improvements in price competitiveness are associated with above-average increases in German exports on an international comparison. Concurrently, changes in the German share of global direct investment stocks entail the export shares being adjusted in the same direction. This suggests that German enterprises enhance their international competitiveness by shifting parts of the production process abroad. Furthermore, access to foreign expertise or improved access to export markets could also play a role here.

ures for 27 OECD countries as well as China, Hong Kong, India and Russia. More than 94% of global stocks were captured in this manner in 2005. — <sup>5</sup> The Augmented Dickey-Fuller test (ADF), Phillips-Perron test (PPT) and the Kwiatkowski-Phillips-Schmidt-Shin test were carried out. — <sup>6</sup> When interpreting the data, it is important to note that this study defines the stocks of direct investment as ratios to global stocks.

marked decline in price competitiveness had the greatest impact in this period.<sup>33</sup>

*... due partly to German reunification*

German reunification was also a special factor in the first half of the 1990s and seems to have had a direct effect both on price and non-price competitiveness. Owing to the heavy demand from the new federal states, goods and probably also investible funds, which would otherwise have gone abroad, were increasingly directed from the federal territory as formerly defined to eastern Germany. At the same time, German imports increased. Moreover, the favourable economic developments in Germany following reunification resulted in significant wage increases, which had a detrimental effect on price competitiveness.

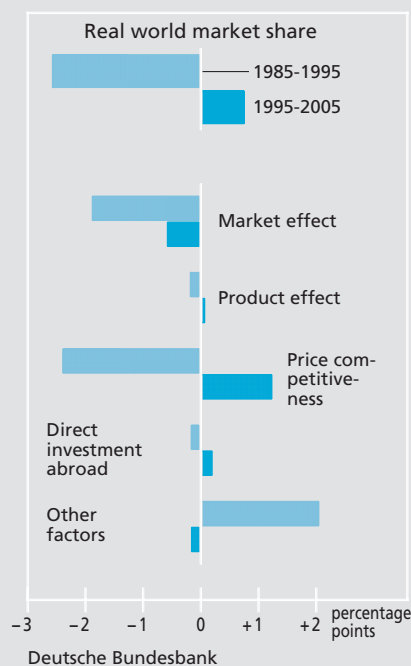
*Subsequent improvement in price and non-price competitiveness*

Since 1995, by contrast, both price and non-price competitiveness, so far as the latter is measured in terms of German direct investment abroad, have developed favourably. At the same time, the negative contribution of the market effect has markedly declined. In this case, it seems that the special position of German enterprises in the central and east European growth markets has had a positive effect. Overall, however, the dominance of trade with other EU member states, combined with a below-average presence in the faster growing Asian markets, has slowed German export developments up to now.

*So far Germany holds ground against new competitors ...*

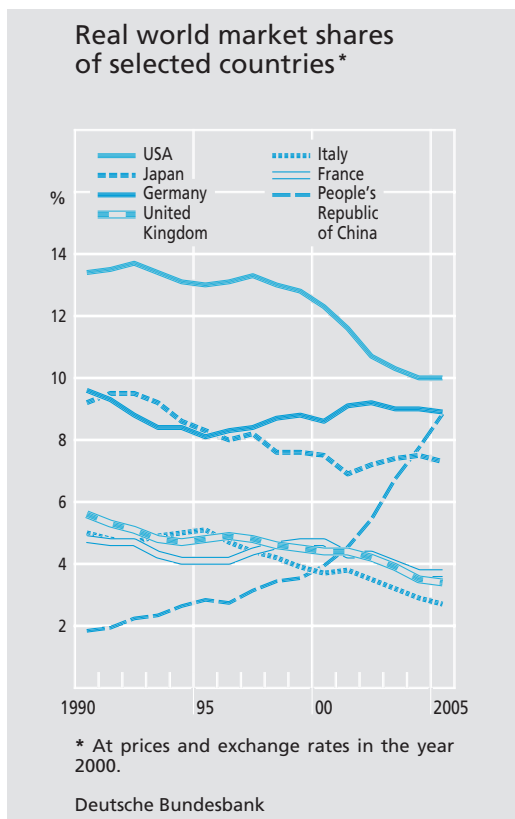
As expected, following the catching-up process of the emerging market economies, the share of the industrial countries in world trade tended to decrease. Compared with suppliers from the other industrial countries, however, German exporters have so far held

### Contributions to changes in Germany's real world market shares



their ground against the increasing competition by the emerging economies. By contrast, the real shares of the USA and Japan in world exports have further declined over the past ten years, during which Germany made good some of its previous losses, and were 3 percentage points and 1 percentage point, respectively, below the corresponding values of 1995. Within the EU, the United Kingdom, France and Italy also suffered losses. Conversely, the real world market shares of the Asian economies excluding Japan rose in this period by 9 percentage points to 27%.

<sup>33</sup> See also D Simonis (2000), Belgium's export performance – a constant market share analysis, Federal Planning Bureau, Working Paper No 2, Brussels, which analyses the period from 1991 to 1997 and concludes that the negative competition effect was the driving force behind the German loss of export market shares in this period.



In 2005, the People's Republic of China accounted for about one-third of this.

*... by means of complementary goods supply and ...*

German enterprises benefited from the fact that the range of goods offered by the new competitors is rather more complementary than substitutionary to German exports. Furthermore, German enterprises have made use of the cost advantages of foreign locations and – as described above – have increased their own competitiveness by relocating production processes.

*... use of international division of labour*

This interpretation is consistent with the finding that German direct investment abroad has a positive influence on the export business of domestic enterprises. Moreover, empirical studies show that, in the long term, German direct investment abroad can be ex-

pected to have a favourable influence on domestic investment activity. This means that the employment effect is also more likely to be positive.<sup>34</sup> This argues against concerns that regard the intensive direct investment of domestic enterprises as a threat to employment in Germany.

However, the challenges for the German economy are not expected to decline in future if the structural change that can be seen especially in China and India continues and these countries become increasingly competitive in areas where the advanced economies still see their comparative advantages.<sup>35</sup> Against this background, the ability of enterprises to react quickly to a changed environment will be a decisive competitive factor in the future.

*Ability to adjust to a changed environment*

## Summary and conclusions

The globalisation of the world economy has undoubtedly changed the framework for the individual economies. In general, however, industrial countries, emerging market economies and developing countries can benefit from the extended opportunities provided by the international division of labour. Nevertheless, this requires the disposition and ability to

<sup>34</sup> See Deutsche Bundesbank, German foreign direct investment (FDI) relationships: recent trends and macroeconomic effects, Monthly Report, September 2006, pp 43-58. However, it should be remembered that not every transaction that is recorded in the external stock statistics or the balance of payments as direct investment is linked to a creation of jobs. These data often describe a simple transfer of cross-border capital in the context of mergers.

<sup>35</sup> See P A Samuelson (2004), Where Ricardo and Mill rebut and confirm arguments of mainstream economists supporting globalization, Journal of Economic Perspectives, Vol 18, pp 135-146.



enter into competition with other countries. While German enterprises have mainly reacted very successfully to the new challenges, the economic policy makers must still act to create an environment that facilitates adjustment processes and thus makes it possible to fully exploit the advantages arising from globalisation. This applies especially to the labour market. Here, the structural change requires a high degree of flexibility in order to facilitate

the move to new employment in the case of job losses. This also involves an appropriate education policy in order to strengthen innovative capacities and future economic viability. Only in this way can the adjustment burdens accompanying structural change be kept as low as possible in an industrial country such as Germany. Resorting to protectionist measures, by contrast, does not hold out any prospect of success.

## Annex

### Analysis of constant market shares: breakdown of the changes in export shares into a structural effect and a competition effect

The percentage change in German world market shares corresponds to the difference between the growth rates of German exports and world exports.

$$(1) \frac{d(X^D/X^W)}{X^D/X^W} = \frac{dX^D}{X^D} - \frac{dX^W}{X^W} \\ = \sum_i \sum_j \frac{X_{ij}^D}{X^D} \frac{dX_{ij}^D}{X_{ij}^D} - \sum_i \sum_j \frac{X_{ij}^W}{X^W} \frac{dX_{ij}^W}{X_{ij}^W}$$

$X_{i,j}^D$  = German exports from industry j to country i;  
 $X_{i,j}^W$  = world exports from industry j to country i;  
 $X^D$  = total German exports;  $X^W$  = total world exports.

By adding

$$+ \sum_i \sum_j \frac{X_{ij}^D}{X^D} \frac{dX_{ij}^W}{X_{ij}^W} - \sum_i \sum_j \frac{X_{ij}^D}{X^D} \frac{dX_{ij}^W}{X_{ij}^W}$$

the equation can be reformulated as follows:

$$(2) \frac{d(X^D/X^W)}{X^D/X^W} = \underbrace{\sum_i \sum_j \left( \frac{X_{ij}^D}{X^D} - \frac{X_{ij}^W}{X^W} \right) \frac{dX_{ij}^W}{X_{ij}^W}}_{\text{structural effect}}$$

$$+ \underbrace{\sum_i \sum_j \frac{X_{ij}^D}{X^D} \left( \frac{dX_{ij}^D}{X_{ij}^D} - \frac{dX_{ij}^W}{X_{ij}^W} \right)}_{\text{competition effect}}$$

The structural effect reflects the changes in the world market shares owing to the sectoral and regional specialisation in connection with structural shifts in the composition of world trade. The competition effect represents the aggregated development of the market shares within the respective sectors and regional areas.

The structural effect can be further broken down into the following effects:

- Market effect  $\sum_i \left( \frac{X_i^D}{X^D} - \frac{X_i^W}{X^W} \right) \frac{dX_i^W}{X_i^W}$
- Product effect  $\sum_j \left( \frac{X_j^D}{X^D} - \frac{X_j^W}{X^W} \right) \frac{dX_j^W}{X_j^W}$
- Mixed effect  $\sum_i \sum_j \left[ \left( \frac{X_{ij}^D}{X^D} - \frac{X_{ij}^W}{X^W} \right) - \left( \frac{X_i^D}{X^D} - \frac{X_i^W}{X^W} \right) \frac{X_{ij}^W}{X_i^W} / \frac{X^W}{X^D} - \left( \frac{X_j^D}{X^D} - \frac{X_j^W}{X^W} \right) \frac{X_{ij}^W}{X_j^W} / \frac{X^W}{X^D} \right] \frac{dX_{ij}^W}{X_{ij}^W}$

The mixed effect arises from differences in the geographical orientation between the individual sectors.

The competition effect (CE) results from the changes in world market shares minus the structural effect (equation 2). Disregarding the mixed effect results in the following:

$$\begin{aligned}
 (3) \quad CE &\approx \frac{d(X^D/X^W)}{X^D/X^W} \\
 &\quad - \underbrace{\sum_i \left( \frac{X_i^D}{X^D} - \frac{X_i^W}{X^W} \right) \frac{dX_i^W}{X_i^W}}_{\text{market effect}} \\
 &\quad - \underbrace{\sum_j \left( \frac{X_j^D}{X^D} - \frac{X_j^W}{X^W} \right) \frac{dX_j^W}{X_j^W}}_{\text{product effect}}
 \end{aligned}$$

The estimation equation on page 30 is based on the logarithmic stock variables. In order to convert the growth rates into logarithms, the shares

$$X_i^D/X^D, \quad X_i^W/X^W, \quad X_j^D/X^D \text{ and } X_j^W/X^W$$

were kept constant at the values of the base year 2000. Furthermore, prices and exchange rates were also based on the year 2000.