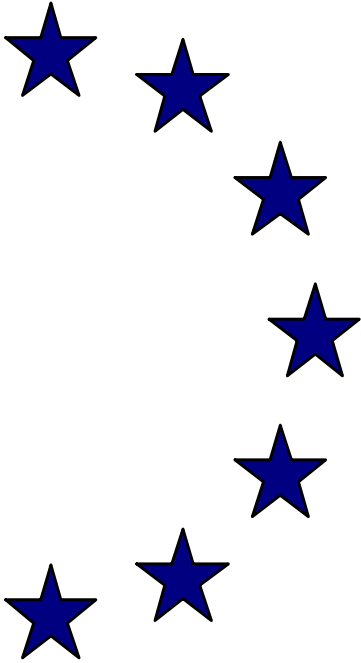


EUROPEAN ECONOMY

EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR ECONOMIC
AND FINANCIAL AFFAIRS

ECONOMIC PAPERS



ISSN 1725-3187

http://europa.eu.int/comm/economy_finance

N° 254

July 2006

**Globalisation: Trends, Issues and Macro
Implications for the EU**

by

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Directorate-General for Economic and Financial Affairs

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European Commission
Directorate-General for Economic and Financial Affairs
Publications
BU1 - -1/13
B - 1049 Brussels, Belgium

ISBN 92-79-01195-2

KC-AI-06-254-EN-C

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Globalisation : Trends, Issues and Macro Implications for the EU

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Acknowledgements : The authors would like to thank K. Havik, F. Ilzkovitz, M. Mc Carthy, K. Pichelmann, R. Veugelers and especially J. Kröger for valuable comments and drafting suggestions regarding earlier drafts of this paper.

Globalisation : Trends, Issues and Macro Implications for the EU

Table of Contents

Executive Overview

1. Introductory Remarks and Conceptual Framework

Globalisation Trends and Issues
--

2. Globalisation trends

2.1 : Longer Run Trends 1820-2000 : What can we learn ?

2.2 : Policy and technology driven acceleration in globalisation from 1990 onwards

3. Globalisation debate : Agreements and disagreements

3.1 : Historical gains from globalisation have been substantial for the EU

3.2 : Greater uncertainties in evaluating the present phase of globalisation

Quantifying the Macro Benefits and Costs of Globalisation for the EU (1990-2050)

4. Indicator based assessment of the benefits and costs of globalisation : 1990-2003

4.1 : Global Relocation : Outsourcing, offshoring and global demand shifts

4.2 : Trade Integration and the threat of China

4.3 : R&D flows : Globalisation of technology production and diffusion

4.4 : Terms of Trade Developments

4.5 : Global productivity and per capita income trends

5. Model based assessment of the macro benefits and costs 1990-2050

5.1 : Main features of globalisation model

5.2 : Quantifying the static and dynamic effects of globalisation

Annexes

Annex 1 : Modelling the globalisation-induced relocation of production processes at a macroeconomic level

Annex 2 : Detailed simulation results

Annex 3 : Trade regressions

EXECUTIVE OVERVIEW

Globalisation, defined as an increasingly integrated world economy, has the potential to generate the largest structural upheaval in economies since the industrial revolution. As in the past, this process is being underpinned by both technological change and by a shift in policies in many countries towards a more open, market based, system of economic governance. These policies reflect the realities of a new world order where knowledge creation and absorption and the flexibility of the regulatory and institutional frameworks will be the key determinants of the economic fortunes of economies.

While the process itself is not new, the present phase of this secular globalisation process has witnessed a significant acceleration over the last 1-2 decades, with the integration of China, India and the former USSR countries into the world economy. This acceleration in integration has resulted in a 50% increase in the world's non-agricultural labour force, with a large proportion of these additional 700 million workers comparing well in human capital terms with the low skilled workers of the "developed" world. This labour supply boost has also coincided with a period rich in technological progress, most notably in the ICT area, with positive effects from the sharp reduction in communication costs being reflected in the growing tradeability of many traditionally sheltered service sectors.

This dramatic intensification of the globalisation process is already transforming the economic structures of the developed and developing worlds, with India emerging as a global power in services, China consolidating its position in manufacturing and with the developed world as a whole searching for an appropriate response.

Many countries in the developed world have recognised the seismic nature of the change and are responding positively by embracing an open-economy, innovation-based, model which emphasises the importance of world class educational establishments; higher levels of, excellence driven and better targeted, R&D; more market based financing systems; and the need for a range of policies aimed at delivering a more dynamic and competitive business environment. Others are responding in an inappropriate manner by attempting to cling to the belief that the EU's present economic problems are temporary and that the magnitude of the changes wrought by globalisation does not justify the need for fundamental reforms.

What are the basic questions to be answered about globalisation : The present study tries to answer the following :

- Firstly, what differentiates the present globalisation phase from previous patterns ?
- Secondly, while the longer term gains from deeper levels of worldwide integration predicted by many commentators are not questioned, could the short term adjustment costs for specific sectors and skill groups (in terms of restructuring costs and real wage changes) be more severe and endure for longer, given the scale and nature of the present globalisation phase ?

- Thirdly, does the empirical evidence regarding globalisation over the period 1990-2003 suggest a positive or negative interpretation regarding the effects of such phenomena as global relocation; the threat of China; changes in international R&D patterns; shifts in terms of trade movements; and divergences in productivity and GDP per capita trends ?
- Fourthly, in terms of quantifying the macro benefits and costs for the EU over the coming decades, what can our globalisation model, on the basis of unchanged policies, tell us about the static and dynamic effects of the post-1990 phase of globalisation and its overall impact on EU living standards up to 2050 ?
- Finally, in terms of policy conclusions, what are the lessons to be drawn in terms of the EU's overall approach to globalisation and why does the present analysis suggest that the Lisbon strategy's emphasis on the knowledge economy must be a critical element in any effective policy response ?

What broad insights does the analysis provide regarding globalisation in general ? : The key points to emerge from the analysis are as follows :

- The post-1990 globalisation phase is characterised by three key interrelated phenomena which differentiate it from previous phases stretching back to the 1850's : firstly, an unprecedented deepening in trade and capital market integration; secondly, a cost-induced and ICT-enabled acceleration in the worldwide relocation of production processes, with an associated boost to trade in intermediate goods and services; and finally, regarding the developing world, higher trade and capital flows coupled with strong human capital endowments are driving a steady process of global income and technological convergence.
- Regarding the short and long term effects of globalisation, even if one holds the consensus view that globalisation will be welfare improving in the long run, one should not ignore the existence of short run, negative effects from globalisation for economically advanced regions such as the EU. Such effects should however be interpreted as transition costs, linked with induced changes in specialisation which inevitably must occur to ensure that globalisation is a mutually enriching experience.
- Whilst inevitable, the transition costs may be relatively severe for individual EU sectors and skill groups given the size of the global supply shock which has occurred; the fact that skill levels for the new entrants to the world's labour force are relatively high; that traditionally protected service sectors are affected; and that the EU's production and trade structures have a substantially higher share of low and medium-low technology products compared with both the US and Japan, with the adjustment costs potentially higher therefore than in the past in terms of shifts in the unemployment rates / compensation levels of lower-skilled workers.
- Despite these valid concerns at the sectoral / skill level, the net effects at the macro level should not be exaggerated. Many commentators erroneously focus on the highly visible localised losses (which are often highly concentrated) rather than the less visible, but real, macroeconomic gains which are dispersed widely and are enjoyed by

the population as a whole¹. In addition, these short-run transition costs should be kept in perspective given firstly, the once-off nature of these costs, compared with the permanent gains from restructuring; secondly, since extra-EU activities constitute a relatively small share of total EU output (i.e. less than 18%²); and finally, the fact that the duration and intensity of the costs will only become problematic in circumstances where policy makers fail to respond appropriately³.

- While it is accepted that there will be winners and losers, this study shows clearly that when all the effects are properly accounted for, that the transition costs are in fact relatively small (less than 0.1 off the growth rate of EU living standards over the period 1991-2003), with offsetting effects on consumers and producers :
 - On the consumption side, the downward pressure on consumer prices from cheaper imports has contributed to a doubling in the growth rate of real consumption wages over the 1990's in the EU (and in the US). This globalisation-linked increase in the consumer surplus has also been bolstered by the gains accruing from a significant increase in product varieties.
 - On the production side, while the EU is holding its own in export markets both in terms of volumes and prices, domestically globalisation is being reflected in higher import penetration rates, increased net FDI outflows and a faster pace of external outsourcing of goods and services, all of which are potentially negative in the short run.
- While an examination of the short run empirical evidence for the period 1991-2003 is elucidating, it is nevertheless only partial in nature, with the paper's most important contribution being its ability to offer a, no-policy change, general equilibrium assessment of the benefits and risks of globalisation over the total period 1991-2050. This is done using an open economy macro model which has been adapted to take account of the post-1990 empirical evidence regarding the various transmission channels. Apart from the income and terms of trade effects linked to shifts in international specialisation, these channels include enhanced levels of competition; increased incentives for investment and innovation; the diffusion of new technologies and organisational practices; scale economies; and greater efficiencies in terms of resource allocation.

¹ According to an article by G. Hufbauer and P. Grieco in the Washington Post in 2005, the adjustment costs are small compared with the gains : "We estimate that the lifetime costs of a year's worth of trade-related job losses (for the US) is roughly \$54 billion, about €240000 per affected worker. This is a huge loss on a personal level but only about 5% of the annual national gains from liberalisation". The authors also stress that while the losses are transitory, the gains from trade liberalisation are permanent. Consequently, there is a strong prima facie case to compensate the losers from liberalisation (eg in the import-competing industries) since the net gains for the economy as a whole are so large.

² One measure of the trade openness of a country is the average of imports and exports (goods and services) at current prices as a % of GDP. Using this definition the extra-EU15 trade-to-GDP ratio was 17.9% in 2003 compared with a figure of 11.9% for the US and 11% for Japan. While the degree of EU openness has increased since the early 1990's, one should keep the overall level in perspective.

³ In addition, as the 2005 OECD Employment Outlook rightly stresses, the size of the labour market challenge should not be exaggerated : "Only a fraction of job losses recorded in OECD countries is likely to be directly attributable to trade and investment liberalisation. To illustrate this, data for 15 OECD countries over the period 1900-2000 show that the high import competition industries within manufacturing only accounted for 4 percent of total employment on average.The most important long run impacts of international trade and investment on labour markets have been to raise average real wages, while inducing shifts in the sectoral and occupational composition of employment. Neither economic policy nor the historical record suggests that the aggregate employment performance has been undermined by increased international economic integration. However, it is likely that growing trade with low-wage countries has played some role in increasing wage inequality in many OECD countries".

- Using this specially constructed globalisation model, the paper quantifies the macro benefits and costs of growing worldwide integration for the EU's economy, with the simulations leading to the following basic conclusions :
 - The results of all the simulation experiments show that the short and long run static effects of globalisation are likely to be small. The emergence of the much larger dynamic benefits will be crucially dependent on policy makers facilitating, not hindering, the difficult process of EU restructuring which must occur. EU industries must learn to adapt to higher levels of global competition and to benefit from the TFP spillover effects of the innovations being generated elsewhere in the world.
 - In terms of quantifying the gains, the simulations show that while the benefits of globalisation have been close to zero for the EU over the period 1990-2003, with effective restructuring the EU has the potential to reap a permanent, annual, income gain of 8% (i.e. €800 billion⁴) or more over the next 50 years.
 - Finally, given the extent of the adjustments to be made, it is hardly surprising that the present debate on globalisation is often tinged with protectionist rhetoric. The simulations suggest that the EU would lose significantly from a lurch towards more insular policies, with an anti-globalisation scenario predicting that long run real wages for EU workers would end up over 20% lower compared with their level in the most optimistic globalisation scenario.

What conclusions are drawn regarding specific globalisation themes ?

- **Global Production Relocation** : Relocation is the general term used in the study to refer to the impact of outsourcing, offshoring and shifts in international demand patterns. On outsourcing, the empirical evidence over the period 1991-2003 is relatively favourable, with the EU increasing its net surplus with the rest of the world in terms of its trade in intermediate goods and services. Regarding offshoring, the picture is less reassuring with a noticeable increase in net outflows of FDI since the mid 1990's. However, the amounts are not large as a share of the EU's overall capital stock and there is evidence to suggest that at least a sizeable part of this net outflow is of a horizontal ("technology-sourcing") nature rather than the vertical, cost-driven, variety (the latter variety is normally deemed problematic by critics of globalisation). In terms of changes to global demand patterns, there is evidence to suggest that a shift in preferences has occurred towards non-EU produced products.
- On the basis of this empirical evidence on outsourcing, offshoring and shifts in demand patterns over the period 1991-2003, the model is calibrated to assess the overall short and long run effects of production relocation on EU living standards in both static and dynamic terms. In static terms (i.e. taking account only of the "first round" effects on consumers and firms) the globalisation model suggests that, even using some of the most pessimistic assumptions regarding production relocation⁵, one

⁴ 2004 prices.

⁵ See Samuelson (2004)

arrives at long run effects on EU living standards of close to zero in both level and growth rate terms. When one also includes the dynamic effects of globalisation (i.e. general equilibrium effects which would be expected to kick into action once shifts in worldwide relocation patterns start to impact on the respective economic structures of countries) the EU gains in the long run from global relocation. These GDP per capita gains reflect the higher productivity growth rates which emerge over time due to a more efficient global division of labour. The size of the EU's share of these worldwide efficiency gains will depend on the speed with which the necessary sectoral reallocation of resources takes place in the EU and, in particular, on the success of governments in facilitating this adjustment process.

- **Trade integration & the threat of China** : On China, the paper shows that the EU has a large and growing trade deficit with this emerging global giant. However, the EU's overall trade balance with the world as a whole has improved over the 1992-2003 period since it has been able to offset losses with China with gains elsewhere, with the result that its overall global trade performance has been much stronger than that of the US or Japan. In addition, the EU enjoys strong complementarities with China in terms of its trade structures, with the EU specialising in medium-high technology and capital goods, compared with China's comparative advantage in low-technology, labour intensive and ICT related products.
- In terms of future developments, while, on the basis of present trends, China is not likely to pose a serious technological threat to the EU, US or Japan over the next 1 to 2 decades⁶, the situation is changing fast, with China's R&D intensity more than doubling over the period 1995-2003 to close to 1 ½ % of GDP. In addition, the EU must realise that part of its present good fortune is linked to the complementarity issue; to the fact that the present catching-up environment favours the EU's specialisation in capital goods production and that it helps in terms of its external pricing power; and that China's trade success so far has generally been in product areas, such as ICT, which are relatively unimportant from Europe's perspective compared with product categories such as cars, pharmaceuticals and chemicals. In this context, the recent revelation that 2005 marked the first year that China recorded a surplus on its trade in motor vehicles suggests that future trading conditions for European companies could become much more demanding.
- In terms of the simulations, the results suggest that the catching-up processes of large emerging economies such as China can be a mutually beneficial process, with strong per capita income gains for both the developed and developing world. Globalisation is most definitely not a zero sum game⁷.

⁶ While China is undoubtedly getting the wage benefits of globalisation, it is not clear how much of the profits it is retaining.

⁷ The notion of "zero sum" is linked with the erroneous belief that what is good for China must be bad for the EU. In fact trade is mutually advantageous as long as each country specialises in products where it has a comparative advantage and this is what appears to be happening at the moment in terms of EU-China trade patterns. According to Wolf (2004), the world should be somewhat relaxed about the threat of China. He tries to answer a number of questions which are typical of the popular debate on China (eg "How can workers in high-income countries compete with Chinese workers ? How can they find jobs when the ones they have go abroad ? How is the world going to avoid a glut of manufacturing capacity, with deflation and mass unemployment ?). He stresses that as long as the labour markets of the developed world can smoothly reallocate the displaced workers (at the moment mainly from manufacturing since it is becoming the new agriculture) then China does not pose a serious threat since : "First, an irresistibly competitive China is a figment of the fevered imagination, since the real cost of labour will tend to remain in line with its productivity. Second, the principal determinants of declining employment in manufacturing in the high-income countries have been sluggish demand and rapidly rising productivity, not trade. Third, even a dramatic impact on the terms of trade of high-income countries, via a huge rise in the relative prices of commodities, would have a modest impact on their real incomes. In short, worries about de-industrialisation and global competition from pauper labour are nonsense".

- **Changes in international R&D patterns** : The last 15 years has witnessed a dramatic upward shift in the internationalisation of R&D flows, as well as in the geographical focus of those flows and in the innovation strategies of transnational corporations. This period has experienced a 40% increase in the share of total R&D spending which is spent abroad, with the traditional intra-Triad nature of this spending giving way to a more truly global pattern, with China and India becoming important locations for planned R&D investments. In addition, the overwhelmingly demand side (i.e. market driven) focus of R&D flows up to the mid-1980's has increasingly given way to a more supply side, technology-seeking, motivation for setting up foreign research laboratories. This strategic shift is working in favour of the US, with the latter having a number of important locational advantages compared with the EU for attracting internationally mobile R&D flows focussed on technology sourcing. These advantages include unrivalled research and teaching institutions as well as a highly integrated innovation system which has a proven track record in nurturing centres of excellence and leading-edge technology clusters. In overall terms, the US has increased its world share of total, internationally mobile, R&D expenditures from 45% in 1995 to nearly 65% by the end of the decade.
- **Shifts in Terms of Trade** : Terms of trade trends directly affect the real income positions of economies and since 1990 these trends tend to confirm the optimistic, mainstream, view of globalisation. If one looks at developments in export and import prices, excluding volatile oil products, the EU and especially the US have been gaining in terms of their pricing power at the expense of countries such as China. The evidence to date underlines the importance of moving up the value added chain, with the US gaining significantly from this strategy, with direct benefits in terms of the income positions of its citizens.
- Since they are such a crucial determinant of the overall gains and losses from globalisation, a range of possible scenarios for the evolution of the terms of trade are assessed in the simulations to 2050. These scenarios evaluate the effects of both a continuation of the present favourable terms of trade trends as well as analysing the implications if China and India directly challenge the US and the EU in their core medium-high to high-technology specialisations. Depending on the assumptions used regarding the degree of the shifts in specialisation, the simulations suggest that globalisation could lead to changes in the EU's terms of trade over the coming decades ranging from zero to positive gains of over 10%.
- **Worldwide Divergences in Productivity and GDP per capita growth rates** : GDP per capita trends have been deteriorating in the EU relative to other OECD economies since the mid-1990's, with any gains from the increases in EU employment rates which occurred over that time being more than offset by negative productivity trends. These developments are quite alarming given that a large number of other areas around the world, both developed and developing, have experienced a strong acceleration or positive turnaround in their productivity / GDP per capita performances, with trends in the latter being the ultimate indicators of the success or failure of their globalisation strategies. While it is difficult to disentangle the different influences, the present paper concludes that the EU's problems on the productivity / GDP per capita side are domestic in origin and consequently should not be attributed to the effects of global production relocation nor to the integration of China into the

world economy. In fact, it is argued that both of these latter developments are in the long run highly positive for EU productivity trends and living standards in general.

What are the Key Messages to be retained by Policy Makers

- Firstly, globalisation has been highly beneficial for the EU in the past and can be equally so in the future. Over the post-war period, it allowed the EU to converge strongly towards US standards of living, with at least 20% of the gains in GDP per capita over this period directly linked to globalisation. Regarding more recent trends, the evidence over the period 1990-2003 suggests that the EU has not benefited from globalisation. Gains on the consumer side have been offset by losses on the production side, although the overall net GDP per capita effects have been relatively small (less than 0.1 off the growth rate of living standards). These modest losses should only be seen however as transition / restructuring effects, with greater levels of competition and TFP spillover effects confidently expected to lead to significant long run gains from globalisation. The simulations suggest the possibility of EU GDP per capita gains similar to those predicted for the EU's Single Market Programme. Exploiting the opportunities offered by the present globalisation phase could bring additional income gains of over €2000 annually, in 2004 prices, for every EU citizen (over €5000 per EU household). In addition, these estimated gains are based only on a "no policy change" assumption and on the effects of existing liberalisation measures. If a successful Doha round can be realised, substantially higher gains can be expected.
- Secondly, with globalisation leading to some questioning of established "stylised facts" in economics, such as the assumed constancy of wage / profit shares over time⁸, policy makers need to remain responsive to the increased complexity. With multinationals doing a growing proportion of their business outside their "home" markets, the historically close correlation between profits and GDP growth (and the important second round effects of higher profitability on domestic investment, wages and employment growth) is fast becoming more problematic. Likewise, access to relatively cheap labour in emerging economies as well as the threat of relocation to such markets are key factors in the globalisation related strengthening of the wage bargaining power of companies. What are EU governments to do in these rapidly changing circumstances ? At a minimum, they need to look at innovative ways of increasing their attractiveness as locations for investment and employment creation; to equip their workers with the requisite skills and flexibility for effective survival and to maximise the consumer gains from globalisation by ensuring highly competitive domestic marketplaces. Policy must be focussed on maximising the domestic share of the global value added generated by internationally mobile companies and not on, ultimately futile, attempts to unfairly tax or restrict the operations of such companies.
- Thirdly, whilst policy making has become more complicated, Europe has no need to fear globalisation. Even though domestic demand developments have been relatively weak over the period since 1995 in a significant number of EU countries, the external side has been relatively encouraging. Unlike the US and Japan, the EU has managed to maintain its dominant world market share position over this period despite the emergence of countries such as China as major trading powers. In terms of production

⁸ With labour more abundant at the world level and capital relatively scarcer, downward pressure has been exerted on wages relative to the return on capital.

relocation patterns, while there is evidence of some negative shifts in demand patterns, the EU has nevertheless been a net gainer from the outsourcing phenomenon and the nature and extent of the FDI outflows have so far not been alarming. In addition, the mainstream, optimistic view of globalisation is supported by the terms of trade gains achieved by the EU over recent years, with the EU retaining relatively strong pricing power in those industries where it has traditionally held a significant global presence, such as chemicals and pharmaceuticals.

- Fourthly, the real source of the EU's present low growth problem is domestic not external in origin. Domestically the EU has a clear structural productivity problem which must be addressed. The fundamental source of this structural problem is the relatively high share of low technology, labour intensive, sectors in the EU's overall output compared with that of the US and Japan and its relative weakness in terms of both the production and use of ICT. To overcome these problems, Member States will need to implement a productivity agenda focussed on the following five key areas, namely action on the level of regulation; the structure of financial markets; product and service market integration; adapting to ageing populations; and progressively moving towards an innovation, as opposed to an imitation, based economic model focussed on both the production and diffusion of knowledge. Without such an agenda, EU GDP per capita growth rates will continue to decline relative to those of other developed countries and the EU will fail to elicit a share of the gains to be generated from the catching-up processes of the emerging economies.
- Fifthly, since the classic efficiency gains from deeper trade and capital market integration depend heavily on the restructuring of the respective economies (specialisation requires restructuring), labour market flexibility is an essential pre-requisite for a mutually beneficial integration process. In the case of the EU, there needs to be a shift of the displaced resources from the low-skilled / labour intensive sectors which are strongly affected by globalisation into those higher skilled activities where the EU continues to hold its comparative advantage. This takes time and needs smooth adjustment mechanisms. At the moment many of the displaced EU workers are ending up in lower-skilled service sectors which of course is contributing to the EU's structural productivity problem. The opposite needs to happen since globalisation is without doubt a race to the top not the bottom, with US terms of trade developments in particular showing the benefits of such a strategy. If the EU wishes to avoid a globalisation-induced "race to the bottom" in low to medium-tech industries, it must increasingly focus on the EU's sources of "deep" comparative advantage⁹ and on creating the framework conditions necessary to convert a reformed EU knowledge production / absorption system into a globally competitive industrial structure.
- Finally, the EU must adapt its economic and social models to the reality that the challenges posed by new, large, global players is not going to go away. If anything, it will intensify as some of these players move up the value added chain and directly compete with us in the more sophisticated product segments. Consequently, while the present catching-up processes of economies, such as China and India, undoubtedly

⁹ Sources of "deep" comparative advantage for a country are activities which are difficult to replicate (not easily substitutable) in a new location (such as R&D) or where there are complementarities between the activities (such as in clusters of excellence dependant on networks of skilled workers).

present risks to the EU's future economic prosperity, this challenge must be accepted as inevitable and one which will help define the backdrop to our policy making over the coming years and decades. Our policies and institutions must be reformed to reflect the reality of greater openness, increased levels of factor mobility and interdependence amongst economies. As the present paper stresses, the EU must in particular learn the basic lessons of the post-war period and move towards a knowledge based, flexible, economic model. This would constitute an optimal EU response to the ongoing internationalisation of production processes. While the Lisbon strategy is a manifestation of this collective desire for change, implementation of the needed reforms will be the litmus test of whether the future will bring a substantial improvement in the EU's gains from globalisation or will confirm the EU's ongoing decline as a global economic power.

KEY MESSAGES

1. GLOBALISATION HAS PRODUCED BIG GAINS FOR THE EU IN THE PAST

(20% of the improvement in EU living standards over the post-war period was due to deeper economic integration at the world level)

(Globalisation is a major source of EU productivity gains through better specialisation, economies of scale, technological content of imports, greater competition and the spur to innovation)

2. GLOBALISATION HAS THE POTENTIAL TO GENERATE LARGE FUTURE GAINS

(The simulations suggest that while the EU has not gained from globalisation over the period 1990-2003, it has the potential to reap significant, permanent, annual gains of 8% (i.e. €800 billion) in the level of GDP per capita over the coming decades. While the static effects of globalisation are shown to be small, the dynamic effects are considerable and are crucially dependent on domestic restructuring - induced by higher competition and TFP spillover effects)

3. EUROPE HAS NO NEED TO FEAR GLOBALISATION

(EU is presently more than holding its own in world export markets and will continue to do so as long as we implement a focussed productivity agenda)

(On production relocation, the results suggest that the negative effects reported in other studies on outsourcing / offshoring are often vastly overestimated and result from using a partial as opposed to a general equilibrium approach. Even using the most pessimistic Samuelson assumptions, one arrives at long run EU effects of close to zero in both level and growth rate terms)

(On China, the results suggest that while its integration into the world economy will be highly disruptive, it is not likely on the basis of present trends to pose a serious technological threat to the EU, US or Japan over the next 1 to 2 decades)

4. EU'S ECONOMIC PROBLEMS ARE DOMESTIC NOT EXTERNAL IN ORIGIN

(The real source of the EU's relatively poor growth outturn in recent years is its structural productivity performance - not globalisation)

5. EU FAILURE TO GAIN FROM POST-1990 UPSURGE IN GLOBALISATION REFLECTS SHORT RUN TRANSITION / RESTRUCTURING COSTS

(It is estimated that these globalisation related transition / restructuring costs amounted to only 25% of the decline in the EU's productivity growth rate over the period 1991-2003. In addition, despite these short run costs, the potential still exists to reap overall GDP per capita gains from globalisation over the coming decades equivalent to those of the EU's Single Market Programme)

6. GLOBALISATION IS A RACE TO THE TOP, NOT THE BOTTOM. WITH SMOOTH ADJUSTMENT MECHANISMS AN ESSENTIAL PRE-REQUISITE FOR A MUTUALLY BENEFICIAL INTEGRATION PROCESS

(A successful response to globalisation is dependent on the implementation of a Lisbon inspired structural reform programme aimed ultimately at moving the EU towards an innovation-based economic model focussed on both the production and diffusion of knowledge. The US has gained significantly from such a strategy both recently and in the postwar period, with the current US terms of trade gains highlighting the pay-off from moving up the value added chain)

7. EU POLICIES MUST ADAPT TO THE NEW GLOBAL REALITY – CHINA AND INDIA ARE SET TO REGAIN THEIR PREVIOUS 19th CENTURY GLOBAL ECONOMIC DOMINANCE BY 2035

(EU policies and institutions need to be reformed to reflect the challenges of greater openness, increased levels of factor mobility and interdependence amongst economies)

Section 1 : Introductory Remarks and Conceptual Framework

Globalisation is neither an inevitable nor indeed an irreversible phenomenon. It is driven by the desire of policy makers to liberalise their economies based on an assessment of the potential economic gains from this process and from the ongoing influence of technological advancements in facilitating an expansion of business opportunities at the worldwide level. Its nature evolves over time to reflect this complex mix of economic, technological and political forces which ultimately shapes the different phases of worldwide integration.

Globalisation is also a much talked about phenomenon, with conflicting signals as regards its short and long run impact. The present paper tries to look at this highly emotive topic with as much detachment as possible, to isolate the key channels via which it impacts on our economies and to quantify its effects in terms of our present and future standards of living.

Whilst globalisation is a process that has been with us for centuries, its breadth and impact has ebbed and flowed over the decades in line with the prevailing liberalisation / protectionist mood of the times. The last 20 years has witnessed an important shift towards the liberalisation camp, with the traditional Triad motor of integration being augmented by the rapid opening up of a number of large, developing world, economies. In total, 700 million new workers have been added to the world's, non-agricultural, labour force since 1995, with an additional 1 ½ billion expected over the period to 2030¹⁰.

But globalisation is much more than a large labour supply shock, with the quality and usage of the released human capital being a much more defining development. The ultimate focus of this paper is on the EU's capacity to adapt to the challenges posed by the higher levels of productivity growth in the developing world; to the sharp expansion in worldwide investment flows to these regions and to the greater volumes of international trade in both intermediate and final goods and services generated by production relocation.

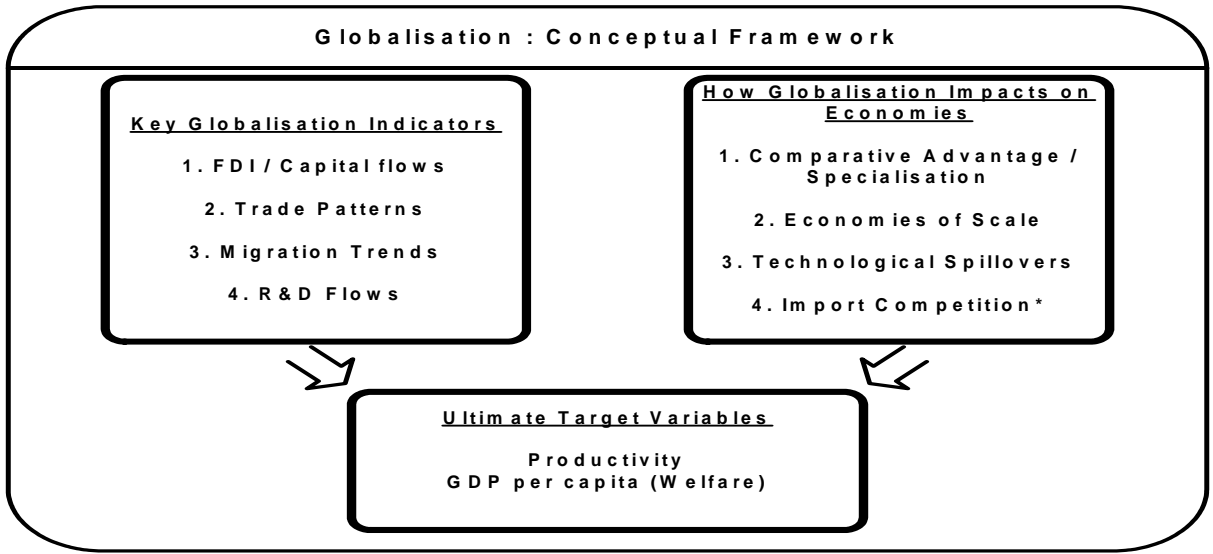
These trends are also leading to a significant increase in worldwide competition levels, with many companies being forced to operate at the global level, and to combine the comparative advantages of different production locations, in order to remain internationally competitive. The use of worldwide production locations provides firms with the potential for significant cost advantages as well as direct access to new and expanding markets, sources of finance and technology.

Conceptualisation of Globalisation : Conceptually we adopt a fairly standard approach to the analysis of globalisation, concentrating our empirical work on a range of indicators such as capital flows, trade patterns, international R&D flows and to a lesser extent migration (see summary diagram 1). On the modelling side we focus on the key transmission channels namely specialisation¹¹; economies of scale; technological spillovers (i.e. diffusion of best technologies / practices) and finally the benefits of import competition in terms of consumer gains from reduced prices and increased varieties and the productivity gains from the

¹⁰ Quote from D. Evans, former US Commerce Secretary : "In May 1945 there were 24 countries as democracies and free-market economies, driven by competition. Sixty years on there are more than 100. It has gone from a couple of hundred million workers to more than 2 billion in free market economies and includes India and China. So we have to prepare ourselves for competing with billions of other workers around the world" (Financial Times, February 2006).

¹¹ Countries should specialise in areas where they have a comparative advantage, with the latter reflecting either different factor intensities (Heckscher-Ohlin models) or relative technology differences (Ricardian models). By exploiting differences in productivity and resources across countries, international trade can ensure a higher level of consumption / welfare compared with a situation where no trade takes place.

reallocation of resources amongst firms (i.e. a shake-out of inefficient producers towards more efficient operators). The ultimate target variable is undoubtedly productivity which in the long run is the key driver of GDP per capita trends.



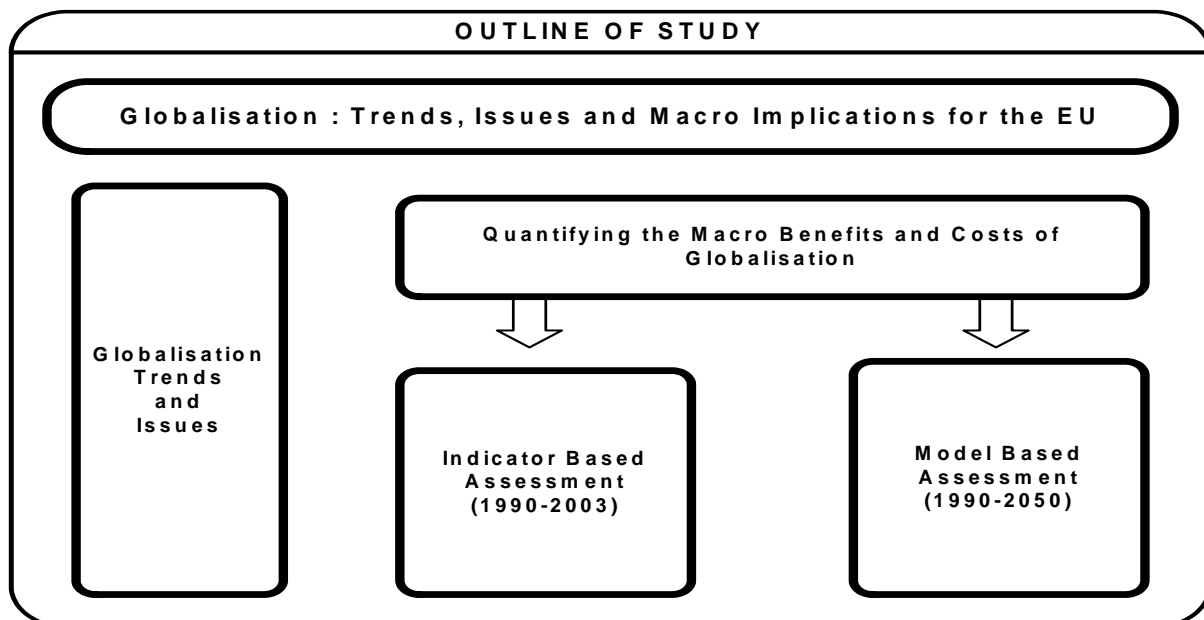
* **Import competition leads to consumer gains (lower prices / mark-ups + larger variety of goods and services) and to domestic productivity gains from the reallocation of resources from low productivity to high productivity firms. In addition, open markets drive innovation / R&D spending due to the heightened foreign competition and the fact that the rewards from innovation are greater because of the larger market size.**

Given the present state of our modelling work and especially the fact that no distinction is made in the globalisation model between skilled and unskilled workers, we do not draw any conclusions regarding the income distribution consequences of globalisation. We do however look at the degree of real wage adjustment which is necessary at the macro level in order to ensure that there is no negative employment effect from globalisation. While the simulations in this paper suggest that the level of real wage adjustment at the macro level is not dramatic, there can be little doubt that for particular skill groups and sectors the adjustment process will be more problematic.

Research methodology employed : A combination of approaches are used to assess the short and longer term impact of globalisation. We look firstly at the long run empirical evidence regarding the different waves of globalisation over time (i.e. from the 19th century onwards) and we quantify the GDP per capita gains for the EU over the post-war period. Given the focus on the post-1990 wave of globalisation, we look at the data trends over the period 1991-2003 in more detail to see whether the EU would be justified in taking an optimistic or pessimistic view of greater global integration over this period. This empirics driven assessment of globalisation is structured around five key themes and their impact on the EU; the effects of global production relocation; trade integration and the threat of China; shifts in international R&D patterns; non-oil terms of trade developments; and finally global productivity and GDP per capita income trends. Each of these five themes are treated separately using a type of partial equilibrium approach, with the essential insights garnered from this analysis used as the basic inputs for the general equilibrium assessment of the total period from 1991-2050. In addition to the normal trade, investment and price transmission channels of a standard, open economy, model, the one used in this paper has three specific features which try to capture the specificities of the post-1990 globalisation phase :

- Firstly, intermediate inputs are included as an explicit factor of production in the model's production function, thereby enabling an effective analysis of the outsourcing / offshoring issue.
- Secondly, the consumption and investment deflators have been quality adjusted to allow for the welfare effects of a globalisation induced increase in the variety and quality of imports of final consumption / capital goods as well as in intermediate inputs.
- Finally, the model's structure allows for an extensive exploration of the links between technological progress and shifts in global demand patterns.

Structure of Paper : In terms of the layout of the paper, following the present introduction, section 2 looks at the longer run globalisation trends from the 19th century onwards as well as at the specific drivers of the post-1990 period. Section 3 goes on to quantify the historical post-war gains for the EU from globalisation and to provide a brief overview of the present debate on the benefits and costs of integration, with the objective of identifying the important indicators for welfare measurement. Sections 4 and 5 focus on the period 1990-2050, with the former describing the major globalisation related stylised facts since the beginning of the 1990s and the latter providing a model based quantification of the benefits and costs over the period as a whole. More specifically, section 4 looks at the empirical evidence in relation to the five key globalisation themes mentioned earlier and tries to draw some partial equilibrium conclusions regarding their overall impact on the EU. Section 5 then quantifies the short and longer term gains/losses of the globalisation process over the period to 2050.



GLOBALISATION TRENDS AND ISSUES

Section 2. Globalisation Trends

Economic globalisation is not a new phenomenon. Trade, capital and people have been flowing across borders for centuries, with the intensity of these flows growing significantly since the middle of the 19th century. Whilst the process of globalisation has not been smooth, with significant setbacks experienced especially during the interwar period, it is reasonable to conclude that, with the exception of international labour markets, the degree of integration in terms of global trade and capital flows has been on a broadly rising trajectory over time. This long run tendency towards growing worldwide economic ties has been driven by both improvements in transport and communications technologies and by public policy initiatives, although the latter have not always been beneficial to the integration process. These driving factors have acted to significantly reduce the cost and non-cost barriers to transporting goods¹², services and factors of production (labour, capital and knowledge) across national frontiers, with significant benefits for the world economy. In terms of structure, the present section will provide a short overview of the broad, long term, trends for globalisation (2.1)¹³ before focussing in on the key features of the post-1990 acceleration in integration (2.2).

2.1 Longer Run Trends 1820-2000 – What can we learn ?

2.1.1 : Population, GDP and GDP per capita developments : Graphs 1 and 2 give the world population / GDP shares, as well as GDP per capita levels for the OECD countries, for China / India and for the rest of the world over the period 1820-2001. A number of interesting points emerge from these graphs :

- Firstly, the OECD's share of world GDP has always been significantly higher than would have been justified by its share of world population, providing support for the view that policies are much more important than demographics in shaping the economic fortunes of countries.
- Secondly, this economic outperformance of the OECD region has, if anything, tended to grow over time. Part of this outperformance is undoubtedly linked to the fact that the trade and capital market liberalisation which took place from the mid-19th century onwards (at least up until the mid-1980's) was to a large extent a developed world phenomenon.
- Thirdly, in the context of the recent liberalisation policies been pursued by China and India, it is interesting to note that in 1820 both these countries produced nearly 50% of world output, making them the dominant world economic powers at that time. With a present share of world GDP of less than 20%, a world population share of close to 40% and with the pursuit of OECD-inspired economic policies, it is relatively safe to predict a significant rebalancing of world economic power in the coming decades. According to Goldman Sachs (2005), China and India will regain their previous 19th century dominance relatively quickly, with China overtaking the US as the world's

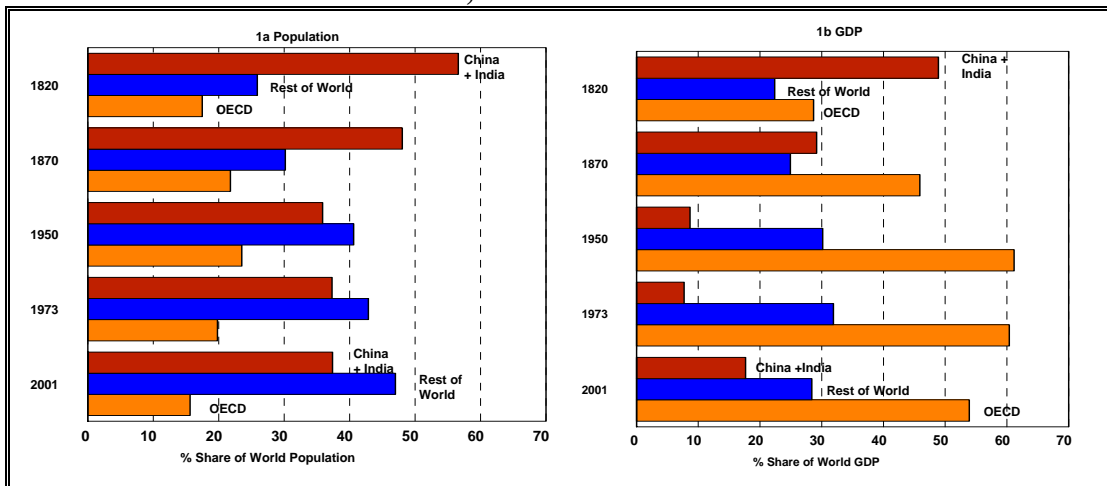
¹² Cline (1999) estimates that roughly half of the increase in trade was due to policy liberalisation (lower tariffs, fewer quotas), with the other half due to technological progress in transport and communications.

¹³ This sub-section looks at global population, GDP and GDP per capita developments since the early 19th century before examining the three key drivers of economic integration over this period namely trade flows, capital market integration and labour / migration patterns.

largest economy in US dollars terms around 2035 and with India the third largest economy by that time.

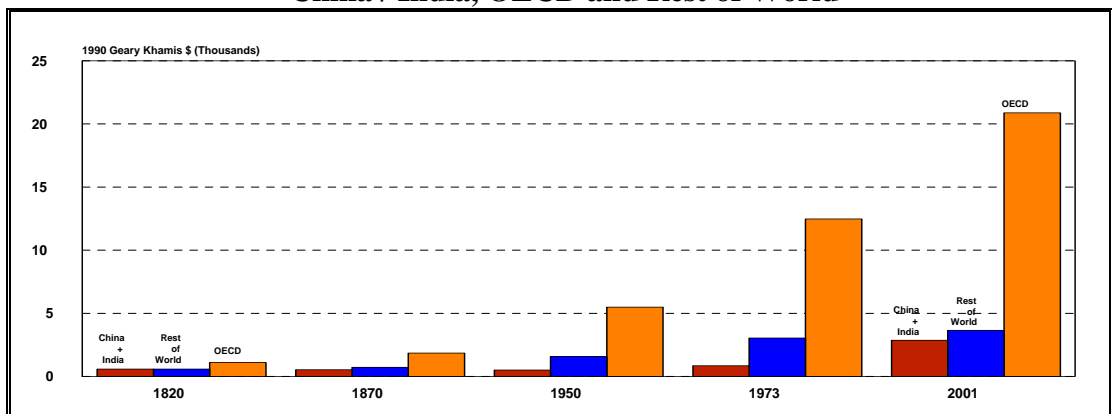
- Finally, the population and GDP developments are combined in Graph 2 to give the GDP per capita trends in levels over time. This graph underlines the outstanding relative economic performance of the OECD grouping of countries over nearly two centuries, with global per capita income differentials tending to grow over time. Standards of living in the OECD have grown in fact from less than twice the levels of the rest of the world in 1820, to a level which was 6 times greater in 2001. The graph also highlights the enormous scope for catching-up for the rest of the world countries, including India and China, over the coming decades, with the ultimate success of such a convergence process dependent on the economic policies pursued at the individual country level and on a further deepening of the present levels of globalisation.

**Graph 1 : % Shares of World Population and GDP (1820-2001)
China / India, OECD and Rest of World**

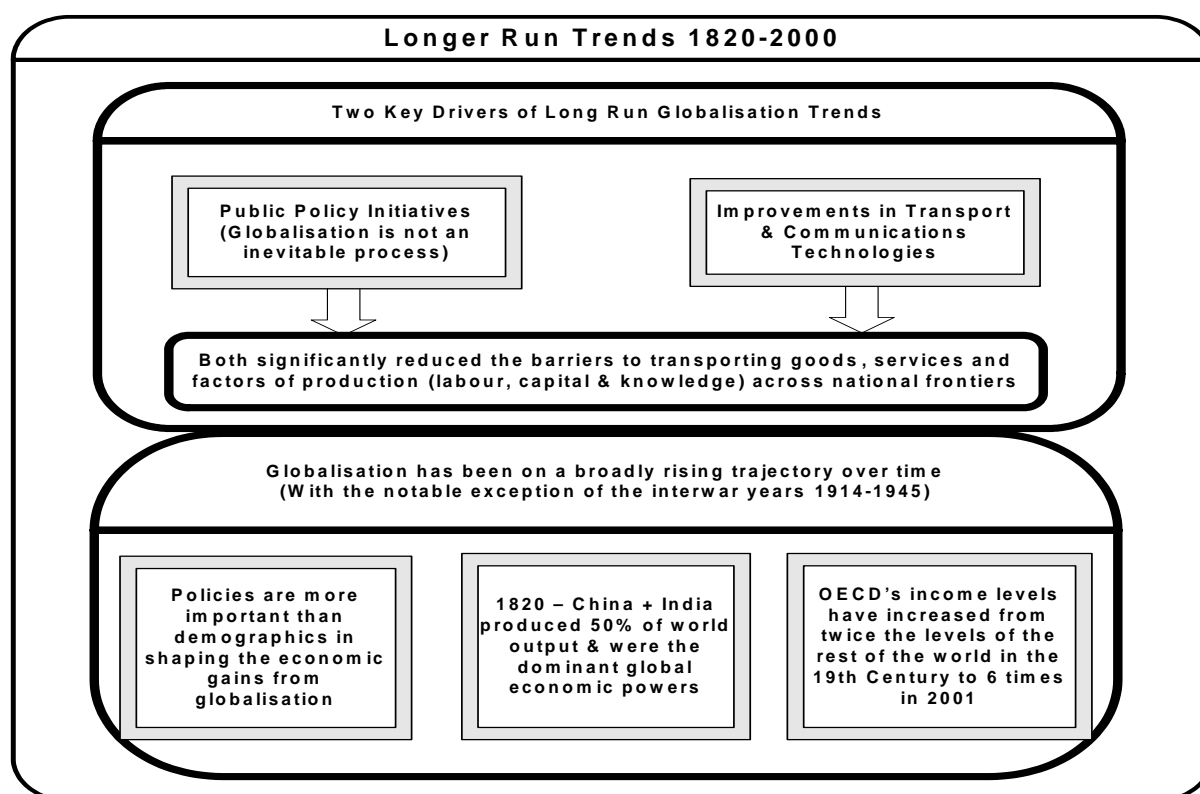


Source : Maddison (2001) and own calculations

**Graph 2 : Levels of GDP per capita (1820-2001)
China / India, OECD and Rest of World**



Source : Maddison (2001) and own calculations



2.1.2 : Trade Integration : Trade flows are a crucial indicator of the degree and pace of worldwide economic integration, with the growth gains of policies aimed at greater trade openness being at the centre of the debate on globalisation¹⁴. Graph 3 gives an overview of the importance of world trade as a percentage of world GDP over time and of the respective shares of world trade by the OECD and non-OECD economies. The most important points to note are as follows :

- Firstly, if one uses world trade flows as a % of GDP as a proxy for the globalisation process as a whole, one can see clearly from Graph 3 that this process is by no means inevitable and is subject to considerable setbacks at the hands of policy makers. While the overall trend since 1870 has been upwards, the interwar years were a timely reminder of the reversibility of the process, with world trade as a % of GDP¹⁵ being cut in half over these years as the tide of protectionism took hold in the major trading powers.
- Secondly, the shift in the post-war WWII period to more open policies ensured that trade integration has been a striking feature of the world economy over recent

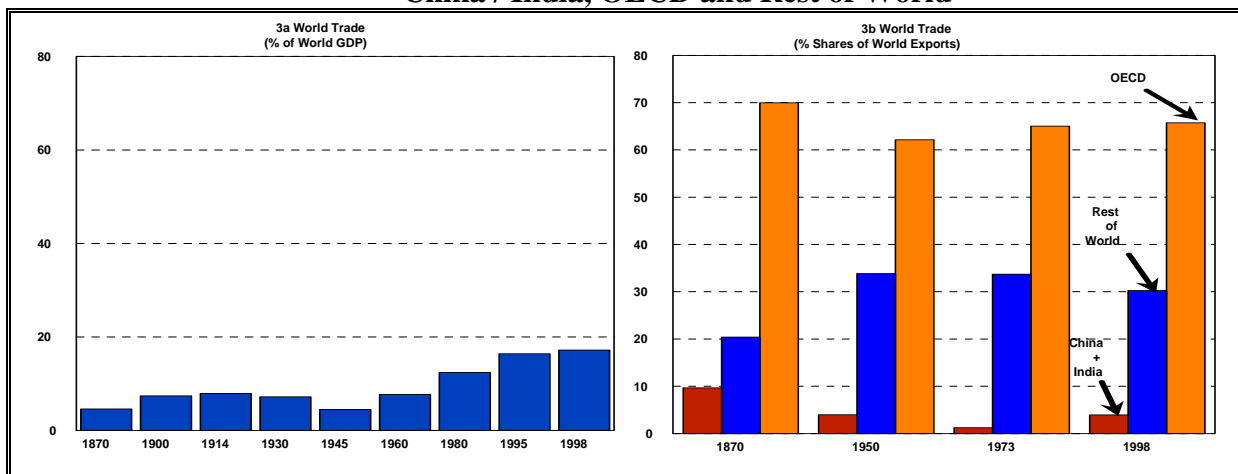
¹⁴ Trade liberalisation on its own will not, of course, generate higher growth. However, combined with good government, macroeconomic stability and high levels of investment in all forms of physical and human capital, it has been demonstrated theoretically and empirically that greater openness is good for growth. Theoretically, a variety of trade-related channels (specialisation according to comparative advantage; higher levels of competition; economies of scale benefits; enhanced product varieties; technological transfers; higher R&D intensities) have been shown to boost productivity and living standards. Empirically, Frankel and Romer (1999) estimated that a rise of 1% point in the ratio of trade to GDP (in a sample of 63 countries) was associated with gains in per capita incomes of between 0.5 and 2%. Other studies (Sachs and Warner, 1995; Edwards, 1998) suggest that more open economies tend to grow faster than less open ones. While there are some dissenting voices to this mainstream view (eg Rodrik and Rodriguez, 2001), these criticisms largely refer to the benefits from trade for less developed countries where some additional institutional reforms may be needed before the potential advantages from trade liberalisation can be realised. Finally, even the critics accept that no country has ever prospered on a sustainable basis by closing itself off to trade. One can conclude therefore that trade is a major source of income / productivity gains for countries, with most studies pointing to a significant positive relationship between openness and productivity growth (i.e. more open economies achieve faster growth).

¹⁵ The ratio of trade to GDP rises as income rises when the income elasticity of demand for imports exceeds unity.

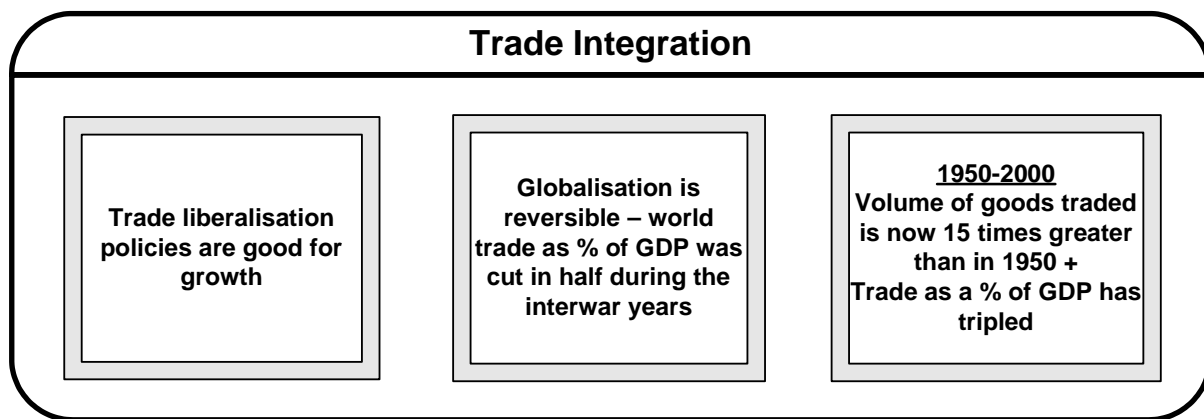
decades, with the volume of goods presently traded being more than 15 times greater than in 1950 and with its share in GDP tripling. While some commentators insist that the present GDP share for merchandise trade is only at pre-World War 1 levels, this analogy takes no account of the growing share of the relatively less tradeable service sector in GDP over the intervening period and consequently of the fact that world trade in goods as a share of world industrial production is now at unprecedented levels.

- Thirdly, the growing integration of national economies into the world’s trading system over the post-war period was driven not only by trade liberalisation but also by falling transportation and communication costs, rising income levels, higher productivity growth rates in tradeables compared with non-tradeables, and more recently by an ICT-enabled acceleration in the international division of labour linked with the development of increasingly global production systems. All these developments have led to a sharp increase in overall trade flows, underpinned by an expansion in both intra-industry flows and in a range of internationally tradeable services.
- Finally, in terms of shares of world trade, graph 3 highlights the dominance of the OECD countries in the global trading system, with the OECD’s world share consistently in the 60-70% range over the whole period 1870 to the late 1990’s. While the rest of the world, most notably China, have been making large gains in terms of their world market shares over the most recent years, the graph underlines the extent of the gap to be made up by these countries over the coming decades.

**Graph 3 : World Trade as % of GDP + % Shares of World Exports (1870-1998)
China / India, OECD and Rest of World**



Source : Crafts (2000), Maddison (2001) and own calculations



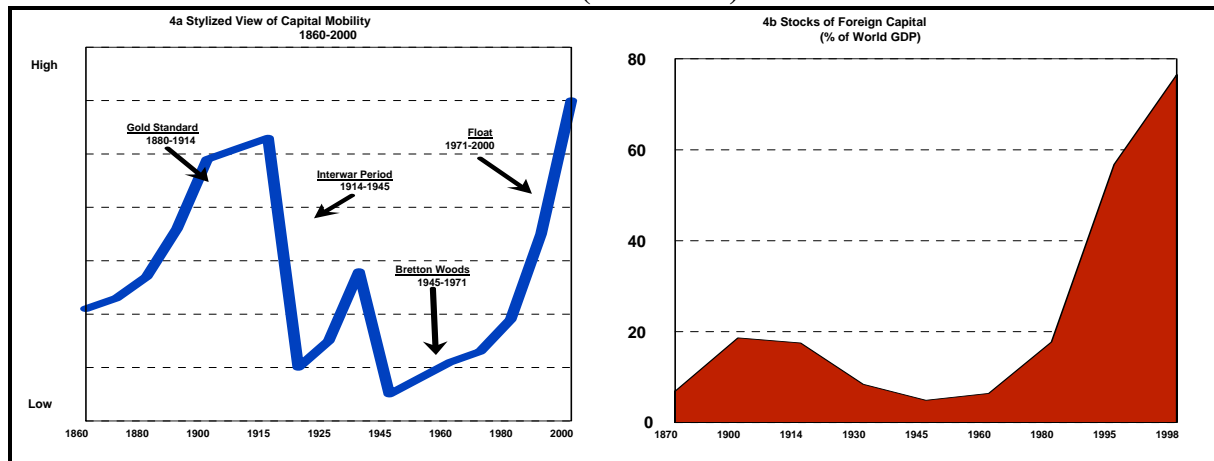
2.1.3 : Capital Market Integration : A heated debate continues to rage regarding the present degree and nature of global capital market integration compared with historical periods. Graphs 4a and 4b include a stylized view of the changes in global capital mobility over the period 1860-2000 as well as an indication of the stock of foreign capital (as a % of world GDP) held over the period 1870-1998. The main points to be retained from the graphs are as follows :

- Regarding capital mobility, according to Obstfeld and Taylor (2002), an analysis of the data is suggestive of a U-shape in the evolution of international capital mobility since the late 19th century, with “a dramatic decline in capital mobility in the interwar period, and a very slow recovery thereafter”.
- This U-shaped pattern of global capital market integration has clearly been influenced to a significant extent by policy makers’ efforts over the century to deal with the classic macroeconomic policy trilemma for open economies whereby countries must relinquish at least one of the “impossible trinity” of an independent monetary policy, a fixed exchange rate or capital account convertibility (i.e. capital mobility).
- As shown in Graph 4a, in the pre-1914 period, the Gold Standard stimulated international capital flows at the expense of foregoing the domestic monetary policy instrument. Following World War II, the Bretton Woods system went for a combination of fixed exchange rates and domestic monetary policy flexibility, with tightly controlled capital movements being an inevitable consequence of this regime choice. Finally, with the broad move to flexible exchange rates and liberalised capital accounts, following the collapse of the Bretton Woods regime, international capital movements have started to grow again. What graph 4a appears to suggest is that global capital mobility has now reached a level which is at its highest for 150 years.
- This view on capital mobility is corroborated by graph 4b which shows that the stock of world external assets was close to 80% of world GDP at the end of the 1990’s. This level of foreign capital holdings was around 4 times greater than those existing at the end of the 19th century.
- While policy changes are clearly hastening the return to a pre-1914 type of global capital market, in the sense of freedom of capital movements, the nature of the financial flows would appear to be very different to those of the Gold Standard days. In particular, the volume of cross border flows is now being driven to a much greater

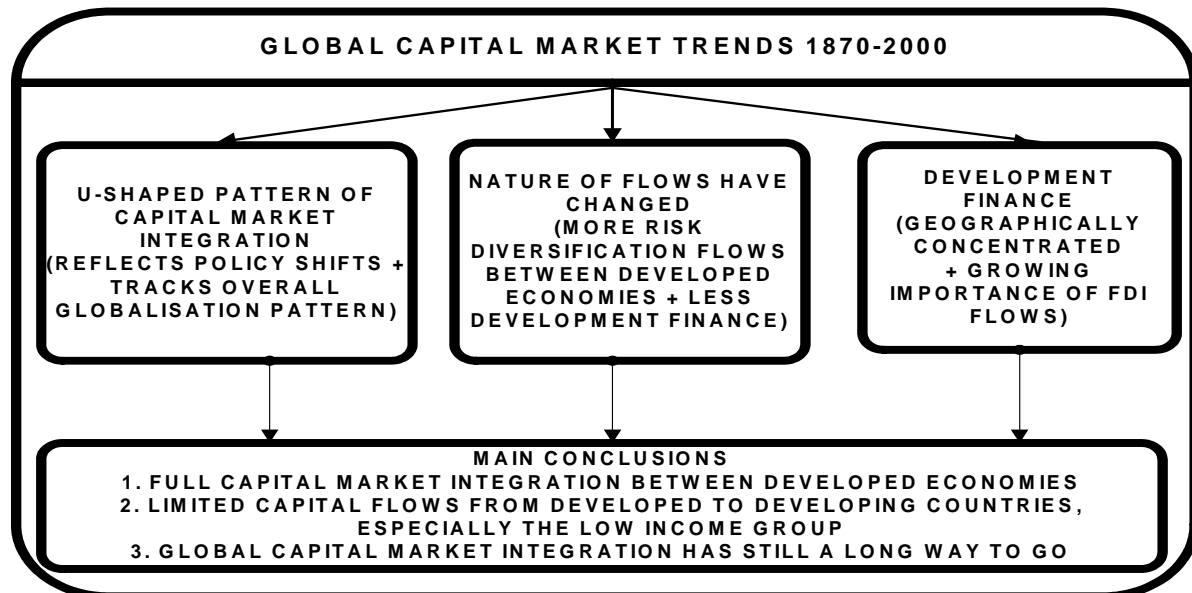
extent by short-term capital flows such as hedging and risk-sharing between developed economies rather than by longer term flows of savings from capital-rich countries to those less developed countries in need of development finance. A second defining feature of the present phase of capital movements is the growing importance of multinationals in terms of FDI flows. Given continuing restrictions on migration and growing labour force shortages in the ageing developed world, this recent spectacular growth in the importance of FDI flows is set to continue and indeed to intensify over the coming decades.

- Perceptions of relative risk are also a factor in explaining why past flows to developing countries have been very geographically concentrated, with a large share going to east Asia and China, and with over 90% of the total flows going to middle income countries, with outward-looking, growth-oriented policy frameworks, capable of offering a pool of relatively skilled labour to potential investors. These latter factors would appear to be more important influences on the investment location decisions of multinational companies, compared with other, often-quoted, issues such as low wage costs.
- These established trends suggest that developing countries, with credible, reform-oriented, policies can in turn reap the benefits of greater and more stable forms of financial flows such as that represented by FDI. In fact, in terms of the composition of total net flows to developing economies, by far the most significant development, especially during the 1990's, has been the increasing importance of FDI and equity flows, with official public assistance to these countries as well as highly volatile syndicated bank lending both declining as a share of the total.
- In overall terms, however, while capital mobility may be at historically high levels, many commentators would suggest that the bulk of the increased flows are essentially still a developed world phenomenon, driven in large part by the increasing integration of the financial markets of the TRIAD grouping. This view still holds despite the evidence for some noteworthy increases in financial flows to specific developing countries in the 1990's (e.g. China) and the trend towards relatively stable forms of financing for these countries such as FDI. Even allowing for these encouraging trends, overall capital movements to developing countries still appear relatively small compared with total global flows and with the supposedly high level of potential returns linked with productivity differentials. In addition, while the volume of gross flows to developing economies may have risen substantially as a share of GDP, overall net long run flows, which are crucial for growth and per capita income convergence, have remained subdued, especially for the low income developing countries where flows have also fluctuated strongly over short periods of time. This evidence would suggest that global capital market integration has still significant room for expansion over the coming decades.

Graph 4 : Capital Mobility + Stocks of Foreign Capital (% of World GDP) (1860-2000)



Source : Obstfeld and Taylor (2002), Crafts (2000), Maddison (2001)



2.1.4 : Labour Market Integration : Over the period 1850-1914, most countries of Western Europe were countries of emigration, with millions of Europeans migrating to the US, Canada and Australia. As with trade and capital market integration, labour market movements were reduced enormously over the “de-globalisation” period from 1914 to the end of the second World War. Immigration restrictions, the “Great Depression” as well as the two world wars put paid to large intercontinental movements of workers (as well as to trade and capital market integration). This dark episode in the history of globalisation gave way to more enlightened policies in the post WWII period, with international migration patterns also been favourably affected. The figures on migration flows for this period are shown in Graph 5, with these trends suggestive of a number of general conclusions :

- Firstly, the countries of Western Europe are no longer countries of emigration, with Graph 5b indicating that the EU15 has become an important destination for international migrants. While the pattern for the net number of migrants has undoubtedly been erratic, the trend over time for the EU15 countries is clearly towards

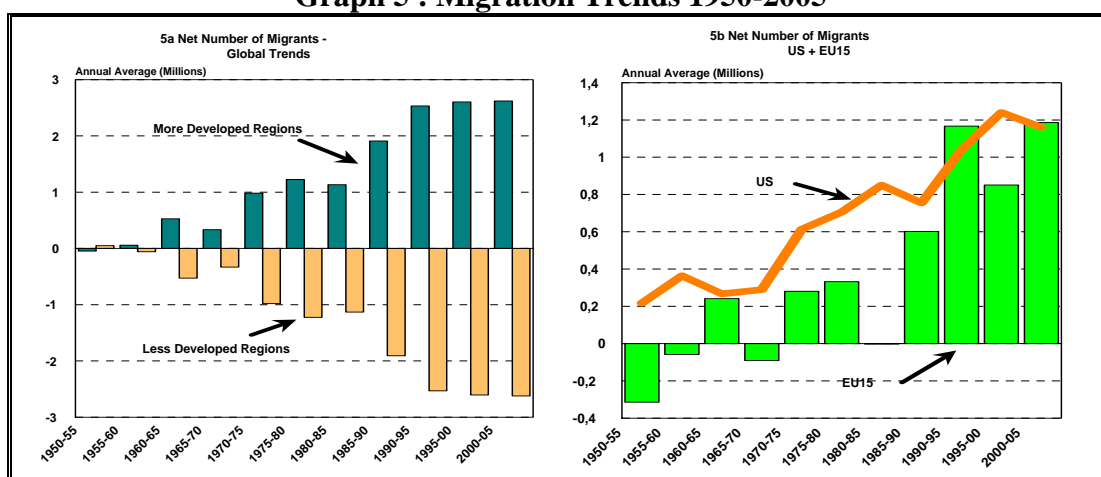
large net inflows of foreigners, with the absolute levels of inflows broadly matching those of the US over the period since the early 1990's.

- Secondly, the worldwide flow of migrants is clearly towards the more developed regions of the world and away from the developing world, with Graph 5a indicating that these flows are currently running at about 2 ½ million on an annual average basis, with a large proportion of these migrants heading towards the EU15 and the US. These flows are being driven mainly by economic considerations, such as sharp divergences in per capita incomes and ongoing reductions in transportation costs for migrants.
- Thirdly, while the present post WWII migration flows may appear large, it is important to put these flows into perspective historically. While annual movements of 1 - 1 ¼ million into the US and Europe may in absolute terms be similar to the inflows of migrants into the US at the beginning of the 20th century, the rate of migration is nevertheless substantially slower. For example, the US immigration rate over the period 1900-1910 (i.e. 11.6 per thousand) was thirty times higher than it is at present¹⁶. Consequently, whilst international migration may have recovered in the post WWII period, the immigration controls imposed after the war have ensured that it has not reached the levels experienced in the 1850-1914 globalisation period.
- Finally, not only is migration at substantially lower rates now than in the past, the nature of those flows has also changed. In the first wave of globalisation, international migration was largely unrestricted, with the new overseas territories offering significant opportunities for both low and high skilled workers in a range of primary extractive industries as well as in emerging industrial sectors. The second wave has seen the imposition of restrictive immigration policies, with the movement of unskilled workers severely curtailed in favour of people with scarce skills and high educational attainment levels. This trend in favour of much higher international mobility for skilled legal migrants is well established, with the international market for skilled labour becoming more highly integrated over recent decades in parallel with the increasing globalisation of capital and goods markets. However, despite the shrinking demand for lower skilled workers in the more technologically advanced economies over this period, it is also clear that efforts to curtail the movement of unskilled labour has been and will continue to be problematic. Large and often growing divergences in the income levels of such workers in different parts of the world has ensured that whilst immigration restrictions may have slowed the pace of integration of the world's low-skilled labour markets, the attraction of illegal movements has remained strong¹⁷.

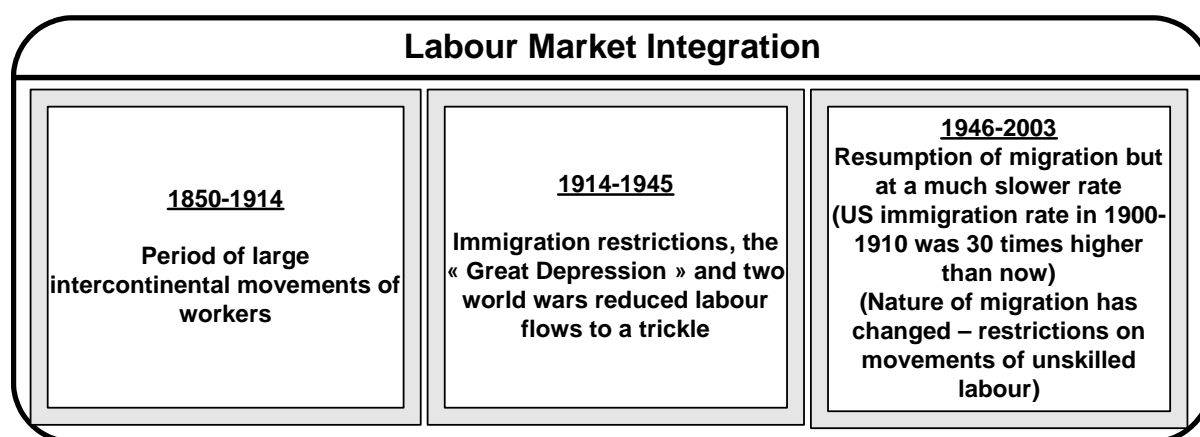
¹⁶ It is interesting to note that these exceptionally high migration rates provoked a backlash in the US at that time due to a slowing in the rate of real wage growth of workers and due to a significant widening in income disparities.

¹⁷ Such movements have the potential to significantly erode North-South income gaps. According to Lindert and Williamson (2001), "all of the real wage convergence before World War 1 was attributable to migration, about two-thirds of the GDP per worker convergence, and perhaps one half of the GDP per capita convergence".

Graph 5 : Migration Trends 1950-2005



Source : UN and own calculations



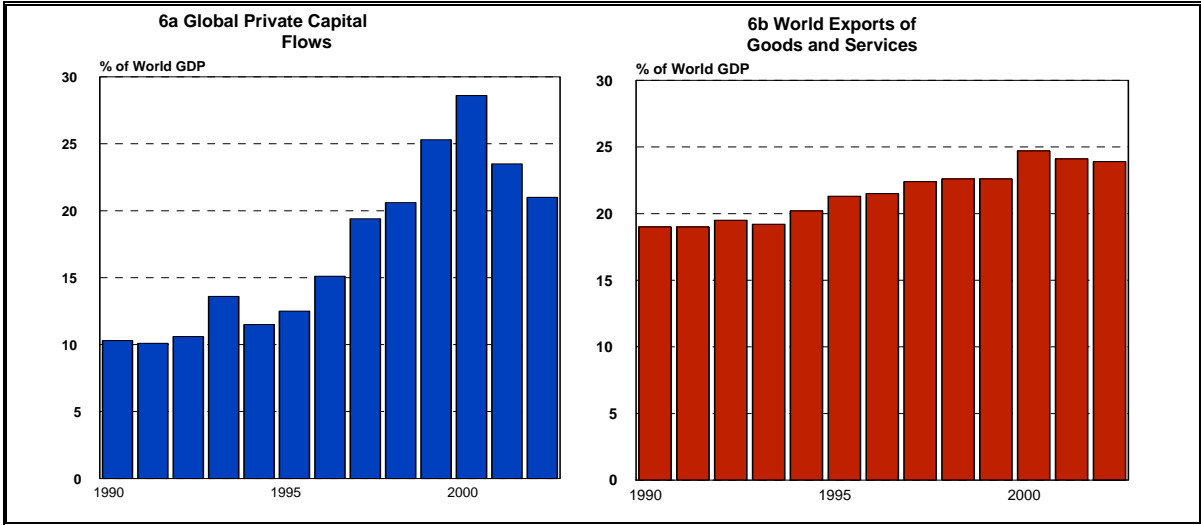
Conclusions on Longer Run Trends : This sub-section has shown that the post-WWII “globalisation” phase differs in a number of important respects compared with that of the late 19th and early 20th centuries. The current trend is characterised by lower rates of labour migration into developed countries, especially of unskilled workers; more trade, especially of the intra-industry type as well as the growing tradeability of the service economy; a greater preponderance towards short-term capital movements and, finally, the growing importance of multinationals in terms of FDI flows. In a way, given the greater political difficulties presently attached to reproducing the large migration flows of the early 20th century, the growth in FDI flows can, at least partially, be seen as a type of substitute for labour flows. Technology, allied to globalisation and capital market liberalisation, has already generated a huge increase in the volume of capital movements in general and FDI flows in particular, with multinationals increasingly important in determining worldwide investment trends. If the pace over the last 20 years is anything to go by, this is likely to be one of the defining structural developments of the 21st century. In addition, in order to capture the extent of the structural shifts, it is important not only to look at FDI but also at other specific investment categories such as R&D, which is now much more internationally mobile compared with previous decades. It is against this backdrop that we examine in 2.2 the specificities of the post-1990 surge in globalisation.

2.2 Policy and technology driven acceleration in globalisation from 1990 onwards

While an analysis of the broad trends for globalisation over the last 150 years is enlightening in terms of understanding the basic determinants and fundamental fragility of the process, policy makers are understandably much more interested in the most recent past. For this reason the present section will focus on the post-1990 acceleration in the global integration process. Three key features distinguish this phase - firstly, a further expansion in both trade and capital market integration; secondly, an ICT induced and ICT enabled acceleration in the global relocation of production processes; and finally a worldwide income and technological convergence process which is being driven by the shift from planned to market economies and is being facilitated by the relatively good human capital endowments in the countries concerned. The following paragraphs try to capture the scale and nature of the changes which have occurred in these three areas.

2.2.1 : Further Acceleration in Trade and Capital Market Integration : The fall of the iron curtain in Europe and the opening up of China, India and parts of central and Latin America have led to a further increase in international trade and capital flows. World trade is continuing to grow at rates well in excess of world output and flows of private capital have expanded rapidly. Graph 6a shows that the volume of these capital flows, as a percentage of world GDP, have more than doubled since the early 1990’s, with graph 6b indicating that world exports of goods and services were also growing steadily over this period to reach a share of close to 25% of world output¹⁸.

GRAPH 6 : CAPITAL MARKET AND TRADE INTEGRATION (1990-2002)



Source : World Development Indicators (World Bank)

2.2.2 : Deepening in the global relocation of production processes : The increase in international trade has not been confined to the exchange of finished goods and services since there has also been an expansion in the share of intermediate inputs which are traded internationally. This intermediate trade forms part of the growing trend towards the internationalisation of production. This pattern has been ongoing for decades but has accelerated since the early 1990’s with the growth in the relocation of labour intensive manufacturing and business-related services to lower cost locations around the globe. This is

¹⁸ This compares with an average EU15 figure of 47% in 2003 for exports and imports (18% for extra-EU15 and 29% for intra-EU15).

being driven by multinationals seeking to take advantage of changes in global specialisation patterns and by the need to focus their developed world activities on the higher value added parts of the production process.

Domestic firms are voluntarily relocating a wide range of activities to foreign countries essentially via 2 mechanisms :

- external outsourcing (i.e. contracting out parts of the production process to foreign suppliers) and by
- offshoring (i.e. moving production abroad by setting up foreign subsidiaries).

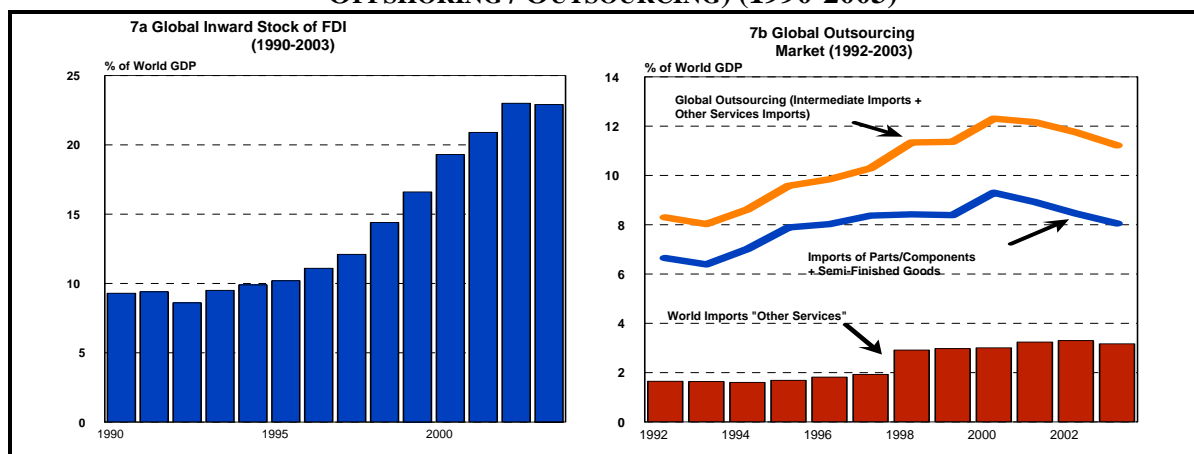
Outsourcing and offshoring¹⁹ are part of the wider process of “global relocation”²⁰ which is the overall term used in the present paper to capture the international trade, FDI and demand implications from the voluntary and involuntary transfer of production and business services abroad (in part or in whole).

While the demand implications of global relocation (i.e. the involuntary aspect) will be discussed later on in the paper, graph 7 provides an indication of the offshoring and outsourcing aspects of this phenomenon. In terms of offshoring, the graph indicates that the global stock of inward FDI has exploded over the 1990’s from less than 10% of GDP in the first half of the decade to well over 20% in the second half. With regard to outsourcing, we measure this phenomenon by taking the total imports of intermediate goods (i.e. parts and components and semi-finished goods) as well as the “other services” category of services imports which includes a range of financial and computing and other business services. Using this definition, the overall global outsourcing market has grown by about 3% points of GDP over the last 10-12 years, from 8 ¼% in 1990 to 11 ¼ % of world GDP in 2003, with roughly 50% of the increase coming from “intermediate” services and 50% from intermediate goods.

¹⁹ Regarding the voluntary aspects, outsourcing refers to the contracting out of a range of economic activities (linked to the intermediate stages of the production process) to external suppliers. These activities include business related services as well as the production of parts and components and semi-finished goods. Outsourcing is measured by the growth rate of both non-oil intermediate goods imports and business-related international services. Offshoring, on the other hand, refers to the process whereby firms retain the ownership of the whole production process but locate parts of their activities abroad by setting up subsidiaries. Offshoring is measured by FDI flows. Outsourcing and offshoring are of course linked in cases where the foreign supplier of the intermediate inputs is owned by the importing company. It is not therefore possible to distinguish between outsourcing / offshoring using data on intermediate imports since the latter could be intra-firm transactions or imports from independent foreign firms.

²⁰ The “global relocation” concept refers to all forms of economic activities (i.e. intermediate and final) and can involve either the closure or scaling down of complete industries or parts of industries in a certain location in favour of another (e.g. textiles) or the emergence of new industries (e.g. ICT). It essentially reflects the changes in domestic business strategies which result from a globalisation-induced heightening in both worldwide competition levels and in the pace of technological change. “Global relocation” is equivalent to the French concept of “delocalisation”.

GRAPH 7 : GLOBAL RELOCATION OF PRODUCTION PROCESSES (VOLUNTARY ASPECTS : OFFSHORING / OUTSOURCING) (1990-2003)



Source : World Development Indicators (World Bank), UN Comtrade and own calculations

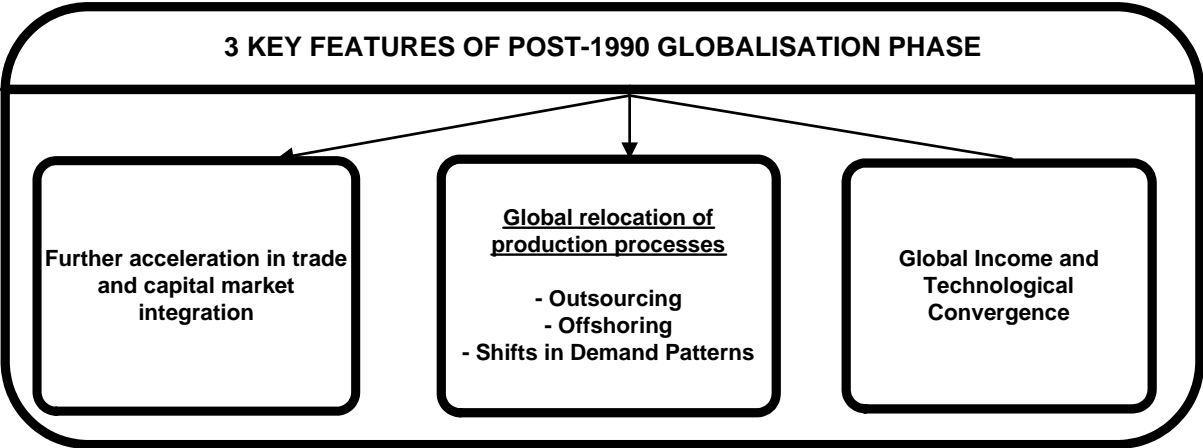
2.2.3 : Global Income and Technological Convergence : In addition to the integration of economies through trade and financial flows, economic globalisation is also being driven by the movement of knowledge (technology) across borders. The emerging economies, especially the EU's new Member States, India, China and other south east Asian countries have exhibited strong productivity growth. On average productivity growth in the rest of the world (world excl. EU15 and US) was about ½ a % point higher than in the EU over the last 10-15 years²¹. This process of income convergence is likely to continue over the coming decades, underpinned by a persistence of the existing TFP growth rate differentials. As indicated by many growth studies, a country's level of long run income per capita is strongly related to human capital. Amongst many of the emerging economies in Europe and Asia, human capital is available in relative abundance.

Definition of Globalisation : All three developments taken together (i.e. trade and capital market integration, production relocation and global convergence trends) is what we use to define globalisation in the rest of the paper. This is a very wide definition. Various authors see globalisation simply as a process enabling the free movement of goods, services, labour and capital. This is what Martin Wolf (2004), for example, defines as 'liberal globalisation'. Especially in recent years, the global "relocation" of production (our second aspect) is often regarded as a typical characteristic of globalisation. It can of course also be seen as one form which the free movement of goods, services and capital can take. Nevertheless "relocation" incorporates other aspects as well. Most likely it depends on some technological developments which have taken place in recent years and which have further reduced the costs of international transactions and communications. In addition, the "relocation" phenomenon is also related to the third element of our definition, technical progress connected to the availability of skilled labour in the developing economies of the world which makes it easier for firms to shift production.

This wide definition of globalisation also encompasses the notion that increased international trade integration and diverging productivity growth rate trends are not mutually independent phenomena. Strong productivity growth in the developing world can be regarded as a driving force for greater trade integration. Obviously, there is also the facilitation of further trade

²¹ The EU's TFP growth rate differentials with some of the more dynamic world regions are in fact much higher. In some cases, they are as high as 2 % points.

integration through the ongoing decrease in transportation costs and trade barriers but this is not what we would regard as the typical characteristic of globalisation as we have experienced it since the beginning of the 1990s. The process of mere trade integration has a long history and goes back at least until the 19th century. What we regard as typical for the 1990s is the economic liberalisation which has taken place in large areas of the world and which enables countries to make full use of their productive potential combined with the increased international mobility of capital, most notably FDI



Section 3 : Globalisation Debate : Agreements and Disagreements

3.1 Historical gains from globalisation have been substantial for the EU²² : In terms of an historical assessment of the gains from globalisation, a number of methods can be used to provide a rough estimate of the EU15's post-war gains from this process. For the analysis we employ two approaches which are widely applied in the literature :

- **Openness** : One approach is to use the long run elasticity of output per capita with respect to openness (measured as exports plus imports as a % of GDP). While a wide range of estimates exist in the literature for this elasticity, the Denis et al (2004) estimate of about 0.3 is reasonably representative of those applied to OECD countries. Applying this elasticity to the increase in openness (extra-EU) achieved by the EU over the period 1950-2002 would suggest that about 20% of the increase in EU15 living standards over this period can be attributed to the EU's growing integration into the world's economy²³. Taking the effects of intra-EU trade flows into account, the benefits would actually be pushed up to an estimated gain of about 30%.
- **International TFP spillovers** : These tentative estimates of the gains from globalisation based on "openness" are corroborated by applying a Helpman and Coe (1995) model for calculating international R&D spillover effects. In their model they allow TFP to be affected by domestic and foreign R&D capital stocks, with foreign R&D being a trade weighted average of the R&D capital of an individual country's trading partners. They arrive at an elasticity estimate for domestic R&D of 0.23 to be applied to all countries and country specific elasticities for the foreign component. The country specific effects arise from 2 sources, firstly from the direct effects from trade and secondly from the indirect effects resulting from the fact that one country's TFP is positively affected by that of its trading partners. According to these estimates, the average elasticity of foreign research on US TFP is about 0.13 which is lower than the average foreign R&D elasticity for EU countries such as Germany, France, Italy and the UK where the elasticity is substantially higher at about 0.22. This difference is explained by the fact that firstly the US (with its large economic weight and with its relatively high R&D intensity) is included as a provider of foreign R&D and secondly EU countries are generally more open than the US and consequently the R&D

²² According to Wolf (2004), based on work from Douglas Irwin ("Free Trade Under Fire" – 2002), trade is an extension across frontiers of the division of labour. It has direct, indirect and intellectual / moral advantages. : " In the first category come the standard static gains from trade – exploitation of economies of scale and comparative advantage. Trade in accordance with comparative advantage is similar to a productivity increase. Instead of making a particular good, an economy can obtain more of it, indirectly, by exporting something else. These gains can be large. A classic example was the opening of Japan in 1858, under American pressure. Before opening, the prices of silk and tea were much higher in the world than in Japan, while the prices of cotton and woollen goods were far lower. After opening, Japan exported silk and tea and imported cotton and woollen goods. This is estimated to have increased Japan's real income by 65 per cent without considering the long-run productivity and growth impact of its joining the world economy. In the second indirect category come the dynamic gains from trade. Trade promotes competition and productivity growth. Companies innovate in response to competitive pressure. Widening the market to include more competitors increases this pressure. Trade is also a conduit for foreign technology, via imports of capital and intermediate goods that embody significant innovations. Professor Irwin observes that even in the United States between a quarter and a half of growth in so called 'total factor productivity', the part of productivity growth not explained by capital accumulation and improved skills, is attributable to new technology embodied in capital equipment. No developing country would have access to the world's advanced technologies without trade". Finally, regarding the intellectual / moral advantages of trade "To the extent that trade facilitates growth, for example, it has made a powerful contribution to the arrival of democracy" all around the world.

²³ For example, a 5 percentage point increase in the EU's ratio of trade to GDP (i.e. from 30% of GDP to 35%) would be roughly equal to a 17 percent increase in the EU15's trade openness. Using a 0.3 coefficient, such an increase in the exposure of the EU to foreign trade competition would be expected to result in a 5 percent increase in the per capita incomes of EU citizens. These income gains from increased trade reflect the benefits of countries specialising according to their respective comparative advantages; from companies being able to spread fixed costs over more output (i.e. economies of scale from having access to bigger markets); from the diffusion of new and better production technologies; and from the many consumer and producer benefits of increased import competition.

spillover effects are greater. As regards the smaller EU Member States, the Helpman and Coe methodology would produce foreign R&D elasticities of 0.25.

These elasticities imply that for the US, the foreign source for TFP growth amounts to about 50% (i.e. $0.13 / 0.23$) of domestic TFP growth. For the larger EU countries the foreign source of TFP growth is about 90% whilst for the smaller EU countries the foreign source of TFP growth would be more than 100%. This means that without international TFP spillovers (generated by trade in Helpman and Coe's regressions), the growth of TFP in the EU would only have been about 50% ($.23 / .45$) of the actual increase in growth, compared with nearly 65% ($.23 / .36$) of the actual growth for the US.

According to the neoclassical growth model, these TFP spillover effects translate directly into labour productivity growth and consequently without openness labour productivity growth in Europe / US would have been about 50% / 65% respectively of the actual growth rate over the post-war period. This productivity estimate also takes into account the fact that TFP affects capital accumulation. However, even if we would assume that there is no link between capital accumulation and TFP, productivity growth in Europe over the period 1950-2000 would still have been about 30% lower without openness. Again if one adjusts for intra-EU effects, the true globalisation effect would be of the order of 20%.

Allowing for intra-EU effects, both approaches (i.e. the long run elasticity of output per capita with respect to openness and estimates of the gains from international R&D spillover effects) would put the post-war extra-EU macroeconomic gains from globalisation at a minimum of 20% of the increase in living standards (with these gains coming through in the form of lower prices, higher real wages and a greater variety / quality of goods and services). The US gains from this second wave of globalisation were also significant (on some measures equivalent to those of the EU) and vindicated its decision to be at the vanguard of efforts to promote liberalisation policies in the difficult post-war period²⁴.

The experience of the US in the post-war catching-up processes of the EU and Japan is in fact a timely reminder of the importance of rejecting the protectionist pressures which are now emerging in many EU member states to the competitive threat of China and India. The US encouraged the process of globalisation after World War II by opening up its markets and by facilitating large scale external capital outflows, especially to Europe, to exploit the new opportunities which were emerging. It also responded positively to the significant competitive challenge posed by Europe and Japan by moving increasingly towards an innovation based economic model²⁵. The US's world class innovation system and the flexibility of its economic and regulatory framework enabled it to flourish in the more competitive world marketplace which emerged, with the restructuring which took place leading to the creation of new, US-dominated, industries, such as ICT²⁶. Due to this positive response, the post-war globalisation phase can be characterised as a "win-win" scenario with sharply rising incomes for all of the participants, with the US averaging GDP per capita growth rates of close to 2 ½ % annually

²⁴ A study by Bradford, Grieco and Hufbauer (2005) showed similar gains in US living standards from globalisation in the post-war period.

²⁵ For example, 75% of the US's productivity growth rate over the period 1950-2003 was based on more knowledge intensive forms of investment i.e. increased spending on R&D and education.

²⁶ The ICT industry was developed in the 1950's and 1960's and now accounts for close to 15% of US manufacturing output. In addition, since ICT is an innovating, general purpose, technology, it has started to facilitate productivity improvements in the rest of the economy by reshaping the activities of a wide range of other manufacturing and service industries.

over the period 1950-2000 compared with 3% in the EU and over 5% in Japan. This generated both a substantial increase in living standards in the US as well as facilitating a significant improvement in the income positions of the EU and Japan relative to the US over this period (from levels of only around 50% and 20% respectively in 1950).

3.2 : Greater uncertainties in evaluating the present phase of globalisation : Three issues will be touched on in this sub-section :

- The general debate about the benefits and costs of globalisation (3.2.1);
- How does outsourcing affect the different interpretations of globalisation (3.2.2); and
- The specific issue of the timing of the effects i.e. differentiating between the short and long run (3.2.3).

3.2.1 : Various viewpoints on the benefits of globalisation : Looking at globalisation in the context of the gains achieved in the overall post-war period, an important question to be addressed is how will the post-1990 international productivity trends, and the changes in the international division of labour implied by them, affect our interpretation of the ongoing gains to be achieved ? There are two extreme positions, an optimistic and a pessimistic one :

- According to the optimistic view (held by many trade economists and which should be regarded as the mainstream position), productivity increases in the developing economies are welfare improving for EU citizens²⁷. The reason is that the goods and services produced in these countries (which are not perfect substitutes for goods and services produced in the EU) tend to be sold at a lower price in order for them to be absorbed by the world market. Thus domestic consumers and investors would benefit from increased productivity in the rest of the world (RoW). Also income growth in these emerging economies leads to higher demand for EU goods and services which increases the price of EU tradeables. Thus industrialised regions benefit both in terms of an increase in their terms of trade and an increase in demand for their products and services. More recently, much attention has been devoted in the literature to a third advantage from an expansion in trade and technical progress in the RoW, namely access for consumers to an increased variety / quality of imported goods. Broda and Weinstein (2005) argue that increased variety rather than pure price effects dominate the welfare gains for consumers resulting from trade liberalisation. They estimate that in the case of the US the value of increased product variety to consumers, derived from trade liberalisation, is equivalent to about 3% of US GDP. This is about 3 times the assumed traditional effect from the gains from trade, as estimated by Feenstra

²⁷ According to the 2005 EU Review : "The widespread popular ambivalence towards globalisation in general and relocation in particular, stands in stark contrast to the sanguine view shared by most economists that trade and investment liberalisation is an important source of rising living standards for the overall population. The broad consensus view holds that the most important long-run impact of international trade and investment has been to raise average real wages without undermining the aggregate employment base, thus providing substantial payoffs to all countries in the aggregate. Indeed, conservatively estimated, about one fifth of the increase in living standards in the EU-15 over the past 50 years is the result of our integration in the world economy – and there is nothing in the historical record to suggest that this has come at the expense of higher levels of unemployment. The rapid global economic change we are now witnessing offers the prospect of further gains in living standards. As in the past, these could come from lower prices for consumers and firms, greater volumes of international trade, higher levels of productivity and real wages, and a wider choice of products. However, in order to realise the potential gains from globalisation, production structures will have to shift into new areas of comparative advantage, and both economic theory and empirical evidence demonstrate that in this process the welfare of some people may be reduced even as aggregate productivity and income improve. There is no shortage of individual case studies and anecdotal evidence indicating significant labour market adjustment costs arising from intensified international competition for certain groups of the workforce, as reflected in higher job displacement rates and the social hardship associated with ensuing long spells of inactivity and unemployment and/or large wage losses once re-employed".

(1992) and Romer (1994)²⁸. Unfortunately the welfare gain from increased variety is hard to measure, since standard national accounts price measures underestimate quality improvements, linked with factors such as variety.

- According to the more pessimistic view as presented, for example, by Samuelson (2004)²⁹ as well as Gomory and Baumol (2000), productivity growth in the developing world will not simply be confined to the production of goods and services in which these countries were specialising in before the productivity take-off. Technological progress in the RoW will enable catching-up countries to increase the range of goods they produce and to enter markets which were previously dominated by industrialised countries. This could make the production of certain goods previously produced in industrialised countries obsolete. In simple terms, technological advancement in the RoW defined in this way is linked with a shift in demand from goods produced in the industrialised regions to goods produced in the catching-up countries. To the extent that increased supply is accompanied by increased demand for the goods supplied by the catching-up countries, the beneficial terms of trade and demand effects described in the optimistic view will be smaller and could even, under certain extreme circumstances, be reversed.

The gains from trade were rarely questioned in the decades prior to the 1990's since over this period most trade was of the intra-industry variety (i.e. within industries) rather than inter-industry (i.e. between industries). With countries essentially specialising in varieties of products or quality ranges within the same industry, there was little danger of countries having to contemplate closing down large sectors of their industrial capacity. In addition, the developed economies did not face any real competition in their core activities which were intensive in the use of skilled labour and leading edge technologies. With the re-organisation of production on a global basis now increasingly driving world trade growth, and with the emergence of new, relatively poor but generally well educated, trading powers such as China, India, Russia, Brazil and Mexico, the above mentioned pre-1990 conditions no longer hold.

While the gains from trade and specialisation are potentially very high when the income levels of the trading partners are very different (i.e. greater efficiency gains in the allocation of resources are possible from specialisation in conditions where there are large differences in the cost structures of countries, with consumers gaining through price reductions), the adjustment costs (i.e. re-skilling of displaced labour and redeployment of capital to new industries) are also very high. These inter-industry adjustment costs are much higher in fact than for trade between countries of similar income levels and, without intervention, can raise significant distributional concerns. In addition, any shift towards intra-industry trade will take time and is to a significant extent dictated by the speed of per capita income convergence. Whilst income differences between trading partners in general hinder the shift to intra-industry trade, there are specific industries, such as ICT and motor vehicles, which have experienced a substantial increase in vertically integrated intra-industry trade.

²⁸ The Feenstra and Romer studies estimated that eliminating protectionism could increase global welfare by an amount equivalent to 1% of GDP. In addition, in studies conducted to evaluate the Internal Market Programme (European Economy, 1996), the trade integration effects for the EU were estimated to be in the range of 0.5 - 0.7% of GDP.

²⁹ Samuelson suggests that technological catch-up in emerging economies such as China could lead to adverse shifts in the terms of trade of the developed economies and to permanent reductions in their per capita incomes.

3.2.2 : How does outsourcing / offshoring affect the various interpretations of globalisation ? The last ten years have been characterised by an increase in the trade of intermediate goods and services, with the international sourcing of intermediate inputs lowering the cost of domestic final production. Increased imports of intermediates, as defined earlier, is also known as outsourcing. This phenomenon does not fundamentally alter the economic assessment since the general arguments for efficiency gains from trade in final goods apply equally to intermediates³⁰. However, there is one important difference. When there is only trade in final goods, the international relocation of production due to changing patterns of comparative advantage may go at a faster pace. In contrast, when domestic firms can outsource some stages of production to foreign suppliers, the larger use of intermediate inputs will often prevent production from moving abroad completely, by allowing firms to make use of a more efficient international division of labour. In other words, outsourcing will not only reduce costs but it can directly increase the marginal product of domestic factors of production (i.e. it can drive up productivity). International sourcing of intermediate inputs (as with final goods and services) improves productivity.

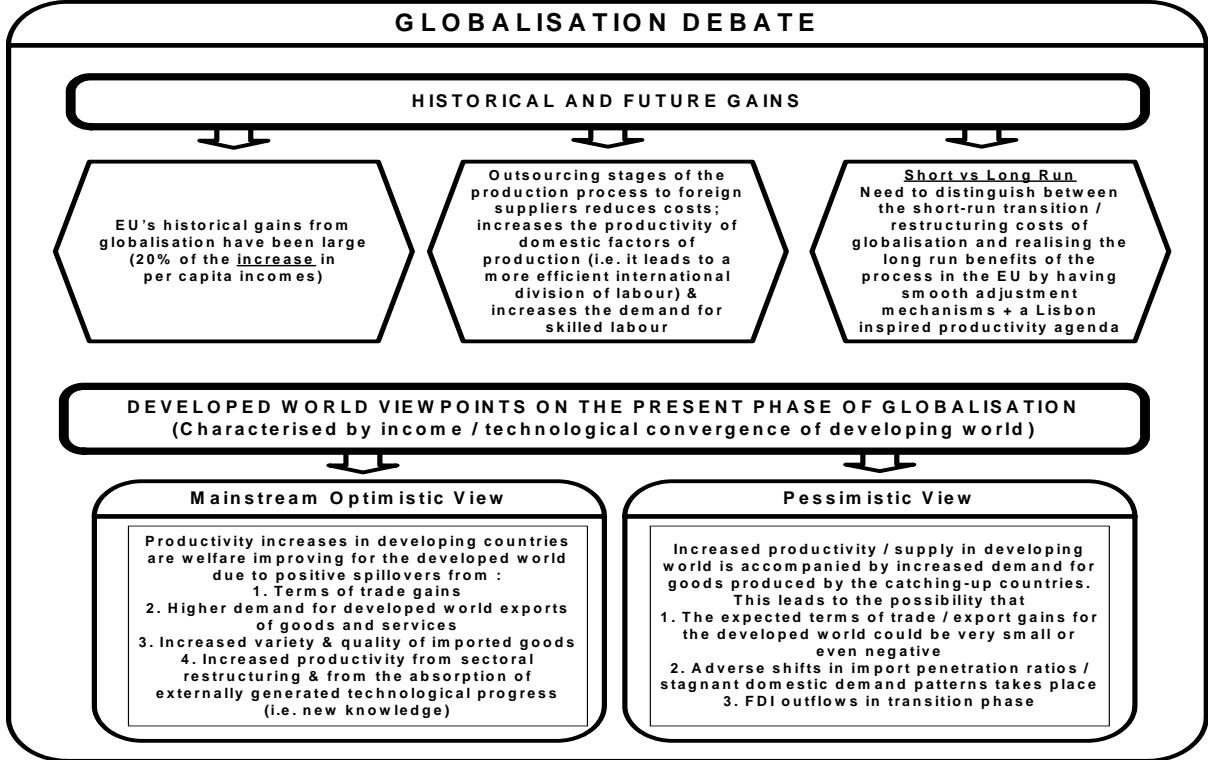
This productivity enhancing effect of outsourcing has been the subject of intensive research in recent years. Egger and Egger (2001) find that international outsourcing of goods has in fact increased the productivity of low skilled workers by over 3% in the EU from 1993 to 1997. Also Amiti and Wei (2004) find that services outsourcing in US manufacturing is positively correlated with labour productivity (but goods outsourcing has insignificant productivity effects). Konings (2004) provides a survey of the employment and productivity effects of outsourcing and tries to assess the quantitative importance of services outsourcing. In a recent paper Amiti and Wei (2006) estimate the effects of goods and services outsourcing on productivity in US manufacturing industries between 1992 and 2000 and find that services offshoring accounted for 11% of productivity growth over this period compared with an effect of 5% for goods imports.

The effects of offshoring will not just be confined to productivity, with income distribution and terms of trade effects also to be expected. A large part of the literature is concerned with the wage premium of high skilled workers. For example, Feenstra and Hanson (1999) attribute between 17 ½ - 40% of the increase in the wage premium of non-production (i.e. "skilled") workers to outsourcing. Given that services outsourcing may on average be more skill intensive than the outsourcing of material inputs the effects of services outsourcing on the wage skill premium could be even greater, with potentially significant effects on the relative wages and / or employment of low-skilled workers. Finally, Mann (2004) argues that international outsourcing in IT production has led to a fall in IT prices of between 10% to 30%.

³⁰ Trade in intermediates (a healthy, mutually beneficial, process of efficiency sharing between countries) complicates an assessment of globalisation but does not fundamentally alter it. Firstly, a distinction has to be made between domestic output and domestic value added / income. The optimistic and pessimistic views extend directly to domestic output in that the effects of both are broadly comparable. However, there can be differences regarding domestic value added (i.e. GDP) due to the efficiency gains which may accrue from the use of intermediate inputs (i.e. in addition to the gains from the traditional factors of production, capital and labour). Any efficiency gains would take the form of an outward shift of the production frontier for final goods, with the increased variety or quality of inputs boosting productivity. If one takes, for example, a terms of trade loss in the developing world (as a consequence of an increase in productivity). This has two opposing effects on developed economies. First there is a negative substitution effect at the expense of domestic factors of production from the outsourcing which occurs. As against this, outsourcing has the potential to enhance the productivity of domestic factors of production i.e. capital and labour. This productivity enhancing effect is however only applicable to intermediate not final goods since if a factory producing final goods closes due to an increase in global competition, this has no offsetting effects in terms of productivity. Finally, there is a third effect to be considered. If capital is mobile, outsourcing is not necessarily combined with an increase in labour productivity since the increase in intermediates is compensated for by a loss of capital. Consequently the overall impact of outsourcing is ambiguous, with the final effect dictated by the relative strength of the above-mentioned factors.

3.2.3 : Short versus long run effects of globalisation³¹ : The discussion so far refers essentially to the long run effects of globalisation i.e. to a situation where a new equilibrium (both external and internal) among the main trading partners has been reached and the terms of trade have been adjusted (i.e. a new equilibrium characterised by increased trade and technological convergence is established at the global level). This is a situation where EU exports would benefit on the demand side from high income in the RoW and both consumers and investors would benefit from gains in the terms of trade. What can be said about the transitional gains or losses and how long will the transition to this new equilibrium last ?

Can one safely assume that there will be a smooth transition from the short to the long run ? Not necessarily, even if one holds the view that globalisation will be welfare improving in the long run, there could still be short run negative effects for economically advanced regions such as the EU15, especially in circumstances where policy makers fail to respond appropriately. There is certainly a positive demand effect because of higher rest of the world imports, especially of EU investment goods which is beneficial in the short run. However, catching up in the developing world also offers higher returns for physical investment in these regions and is likely to direct international investment flows away from the developed to the emerging market economies. This could temporarily lower investment rates at home and productivity growth could suffer temporarily from a decreased rate of capital accumulation, with negative effects on real wage growth. This could have additional negative effects on consumption. Of course these short run negative effects could be significantly attenuated if policy makers were to respond with measures aimed at maintaining the EU’s attractiveness as a place for innovation and investment. More specifically, action is needed to enhance the EU’s capacity to produce and commercialize a flow of world class innovative technologies and to create an investment environment conducive to the imitation and absorption of externally available know-how.



³¹ In general, the short run is characterised by winners, losers and adjustment costs, with the long run gains emerging once the displaced labour and capital resources are productively redeployed.

**QUANTIFYING THE MACRO BENEFITS AND COSTS OF GLOBALISATION FOR THE EU
(1990-2050)**

Section 4. Indicator based assessment of the benefits and costs of globalisation : 1990-2003

Following the broad based nature of the evaluation of globalisation trends and issues in sections 2 and 3, the present section will focus on the specificities of the post-1990 acceleration in globalisation. The big question to be addressed is whether the EU is still gaining from globalisation, as we did in the post-war period, with the trends for a number of key indicators being analysed to make a, partial equilibrium, assessment of the gains and losses. This indicator-based section should be seen as an introduction to the general equilibrium simulations in section 5 where the insights provided from the present section are used to quantify the macroeconomic benefits and costs of globalisation over the 1991-2003 period as well as providing the essential empirical inputs for the longer run simulations to 2050.

What does the empirical evidence suggest regarding the present effects of globalisation. Unfortunately there is no direct way of deciding whether the optimistic or pessimistic view of globalisation laid out in section 3.2 better fits the facts. All we can do is examine whether the evolution of certain macroeconomic variables is more consistent with one view or the other. The earlier theoretical discussion suggested that there are a number of macroeconomic indicators which are important for assessing the benefits and costs of globalisation. The optimists expect positive spillovers from rising terms of trade in the currently industrialised economies, from the additional boost to exports and from the productivity gains induced by sectoral restructuring and from the absorption of externally produced technological progress (i.e. new knowledge). Sceptics would regard adverse shifts in import and domestic demand patterns as alarm signals, with the present EU pattern of increasing import penetration rates and stagnant domestic demand trends being a case in point. In addition, sceptics point to FDI outflows being detrimental (at least over a transition phase) for domestic productivity.

The present section provides information about the basic stylised facts concerning the most relevant macroeconomic indicators, showing both the magnitude of the change in the latter as well as (as far as this is possible) the trend change since the beginning of the 1990s. Careful interpretation is needed given that these indicators are influenced by a wide range of factors, only some of which are related to globalisation. This section presents the trends for most of these variables since the beginning of the 1990s for the EU15, US and a “rest of the world” (RoW) grouping. Focussing only on these 3 areas is useful in establishing a clear understanding of the main transmission channels and it also mirrors the 3-way breakdown used for the model simulations in section 5. However, given the heterogeneity of the RoW grouping, most of the graphs also contain data for specific countries in the RoW grouping, most notably China given the increasingly large role which this country is playing in shaping overall RoW developments. These indicators are discussed under the following headings in sections 4.1 - 4.5 :

- Global Relocation of Production Processes : Outsourcing, offshoring and global demand shifts (4.1)
- Trade Integration and the threat of China (4.2)
- R&D trends : Globalisation of Technology Production and Diffusion (4.3)
- Terms of Trade Developments (4.4)
- Global productivity and per capita income trends (4.5)

4.1 : Global Relocation of Production Processes : Outsourcing, offshoring and global demand shifts

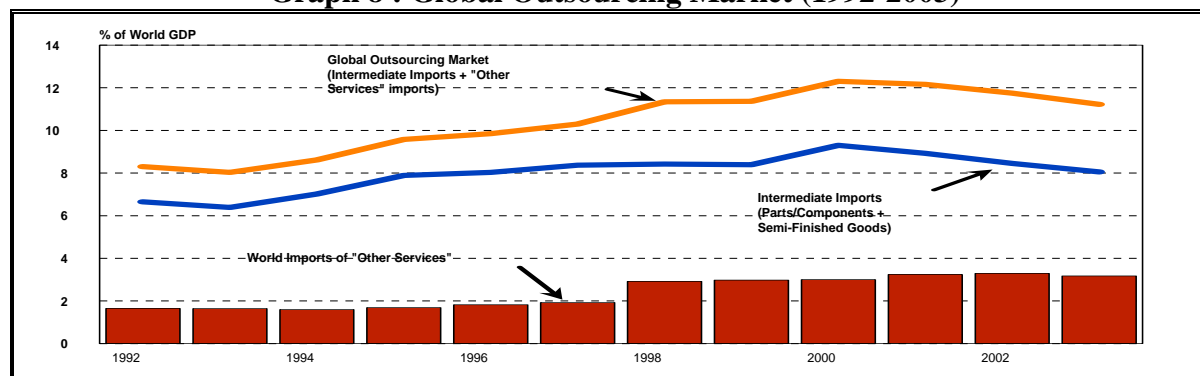
In terms of evaluating the relative merits of the optimistic / pessimistic positions on globalisation, an understanding of global relocation is essential. Here one must be careful with the definition one uses. As explained earlier, we define global relocation as being made up of three distinct elements. The first two elements summarise the voluntary relocation by domestic firms to foreign countries of a wide range of activities via firstly, outsourcing (i.e. the contracting out of parts of the production process to foreign suppliers) and secondly, offshoring which is moving production abroad by setting up foreign subsidiaries. The third element of relocation reflects the involuntary transfer of activities abroad such as the closure or scaling down of complete industries or parts of industries in a certain location in favour of another (e.g. textiles) or the emergence of new industries (e.g. ICT). At the theoretical level, we know that the effects of global relocation are ambiguous, with positive efficiency gains, negative substitution effects and potentially negative effects from capital outflows.

In empirical terms, global relocation can be roughly measured by firstly looking at trade data i.e. changes in intermediate goods and services imports (which can be used as a proxy for outsourcing), secondly, by examining shifts in the FDI component of capital flows (for the offshoring part of relocation) and by looking at import penetration ratios / growth rate differentials to assess changes in the demand for domestic and foreign produced goods and services, which is what we use to measure the third, involuntary, element of this phenomenon.

Outsourcing : In terms of outsourcing, on the basis of our definition, graph 8 reiterates the point made earlier in section 2.2.2 that the overall world outsourcing market was equivalent to 11 ¼ % of world GDP in 2003, an increase of roughly 3% points since the early 1990's. In terms of the EU's outsourcing market, graph 9a shows that while the total EU outsourcing market is significantly larger than for the world as a whole (i.e. 14 ¾% vs. 11 ¼% of GDP in 2003), the increase of 3 percentage points since 1992 was identical. Consequently the EU and world economies have both experienced relatively large increases in outsourcing over the period, with this growth reflecting both increased trade in intermediate goods and in intermediate (essentially business) services.

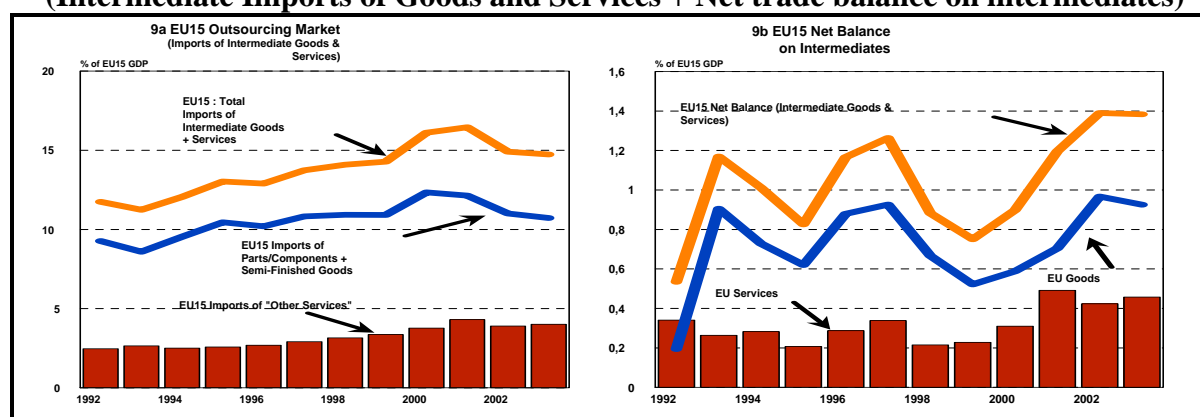
In terms of assessing the overall gains and losses for the EU from outsourcing, graph 9b gives the trends for the net balance on intermediate goods and services (i.e. after allowing for both export and import developments). This graph shows that while our imports of intermediates has clearly been rising, we have also been exporting a lot of these goods and services. In net terms, the EU has had a consistent surplus on intermediate goods and services trade over the period 1992 to 2003, with this surplus in fact rising over time from 0.5% of GDP in 1992 to 1.4% in 2003. This growing surplus is also broadly based with the EU enjoying positive trade balances in terms of both intermediate goods and intermediate services. This data is at least one indication that the EU has been gaining in relative terms with regard to outsourcing.

Graph 8 : Global Outsourcing Market (1992-2003)



Source : World Development Indicators (World Bank), UN Comtrade and own calculations

Graph 9 : EU15 Outsourcing Market (Intermediate Imports of Goods and Services + Net trade balance on intermediates)



Source : UN Comtrade and own calculations

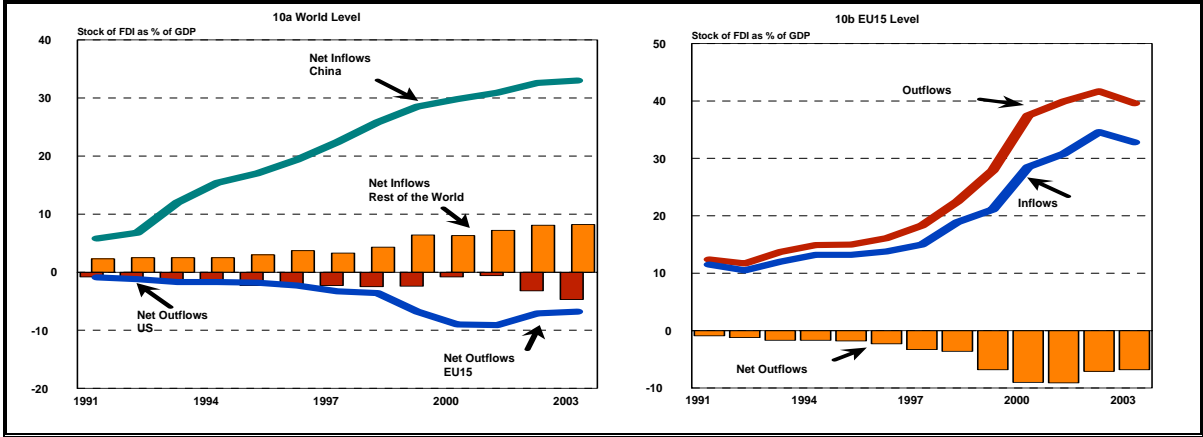
Offshoring : A knowledge of capital flows, especially the net position in terms of FDI, is important to assess the domestic investment implications of globalisation. Stocks of foreign capital as a share of world GDP have increased dramatically since the early 1980's, with the pace accelerating even more in the 1990's. FDI constitutes a big part of these flows over the last 10-15 years, with the inward stock of FDI rising from around 9% of world GDP in 1990 to close to 23% in 2003. This FDI trend for the 1990's marks a big change relative to the 1980's where the increase was much more subdued (i.e. from 6 ½% to 9% of world GDP). While the EU, US and the ROW all experienced sharp increases in the share of inward FDI as a percentage of GDP since the early 1990's, the net positions tell a very different story. As can be seen from Graph 10a, the net positions for the EU and the US deteriorated significantly over this period. From a position of broad balance in the early part of the 1990's, net FDI outflows from the EU reached over 9% of EU GDP in 2001 before falling back somewhat in 2002 and 2003³². This trend marks a significant break with the 1980's where the EU was in either broad balance or slight deficit (i.e. of the order of 1 to 1 ½ % of GDP). For the US, the deterioration in its net stock position was less severe compared with the EU. In addition, its net deficits of 3-4 % of GDP in the 1990's were not totally out of line with its experiences in the 1980's, at least in the early part of that decade. Finally, regarding the ROW, graph 10a shows that the net inward stock of FDI has increased significantly over the 1990's and has continued to grow in the early years of the present century to reach a level of over 8% of GDP. A significant part of the increase over this period has been due to the opening up of

³² The vast majority of EU15 FDI outflows are to other developed economies, most notably the US.

China, where the net stock of FDI has grown from around 5% of GDP in the early 1990's to over 30% in recent years.

Regarding the EU15's net outflows, graph 10b shows the EU outflows and inflows as well as the net position. While the net outward stock has reached over 9% of GDP (i.e. well over €800 billion), it is important to stress that this is firstly only a very small fraction of the EU's total capital stock of around 300% of GDP and secondly at least part of this gap reflects horizontal FDI outflows which aim to absorb and acquire new technologies abroad rather than "vertical FDI" which is often directed at exploiting low labour costs through the internationalisation of production.

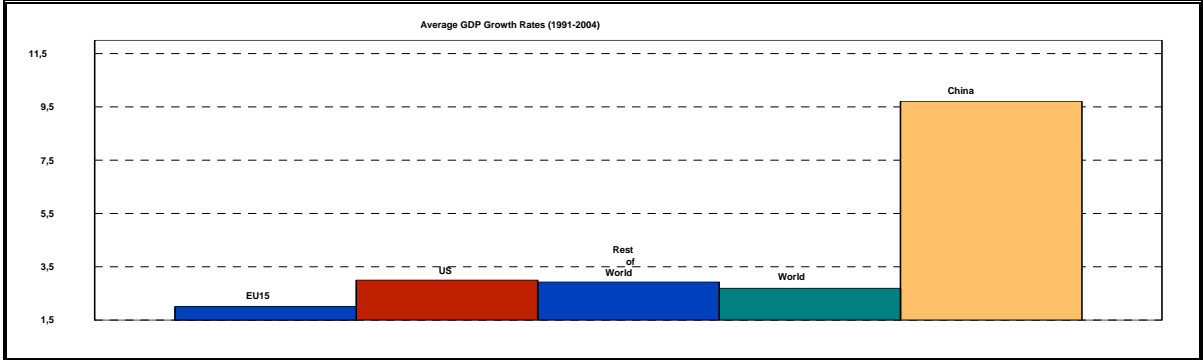
Graph 10 : Net Stocks of FDI for the EU, US and Rest of World (1991-2003) + Inflows, Outflows and Net Stocks for EU15 (1991-2003)



Note : China is also part of "Rest of World" grouping
 Source : OECD and own calculations

Global Demand Shifts : Regarding the third element of relocation, an analysis of overall GDP growth rate differentials (graph 11) and of world import demand patterns (graph 12) would suggest that import penetration ratios for goods and services have increased more strongly for the EU³³, compared with the rest of the world. A notable exception to the latter generalisation (within the rest of the world grouping) is China which has experienced a large increase in its import penetration ratio relative to the world average, reflecting the high import content of many of its successful export industries.

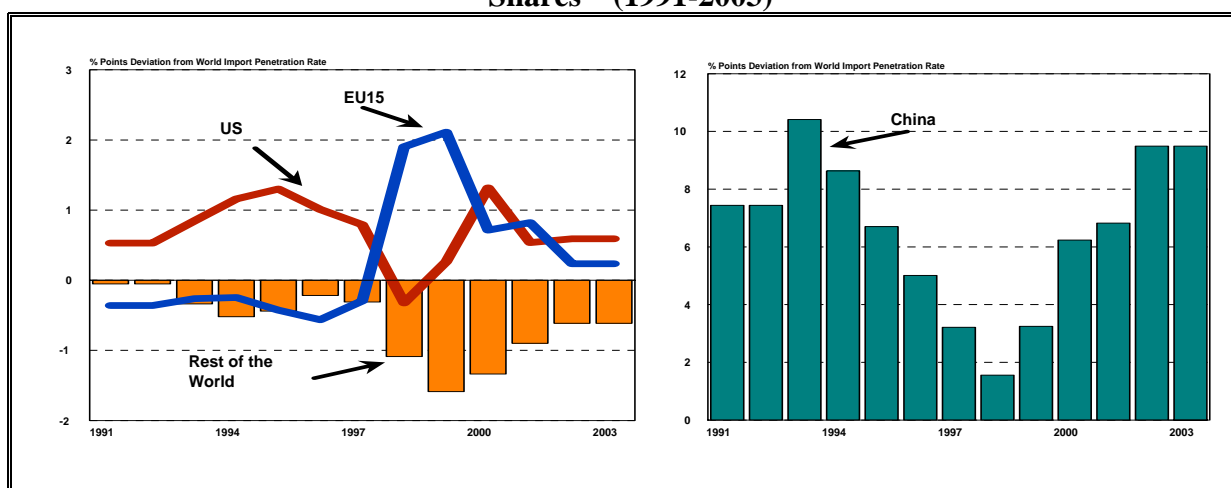
Graph 11 : Demand Shifts : GDP Growth Rate Differentials



Note : China is also part of "Rest of World" grouping
 Source : WDI and Ameco

³³ This increase should not be dismissed as totally negative since it is generally accepted in economics that the real gains from trade are to be found in importing not exporting.

Graph 12 : Demand Shifts - Import Penetration Ratios : Non-Oil Import Market Shares* (1991-2003)



* Refers to external trade between the 3 areas and is measured as imports as a share of domestic demand (EU15 = Extra EU15)

Source : World Bank (World Development Indicators) and own calculations

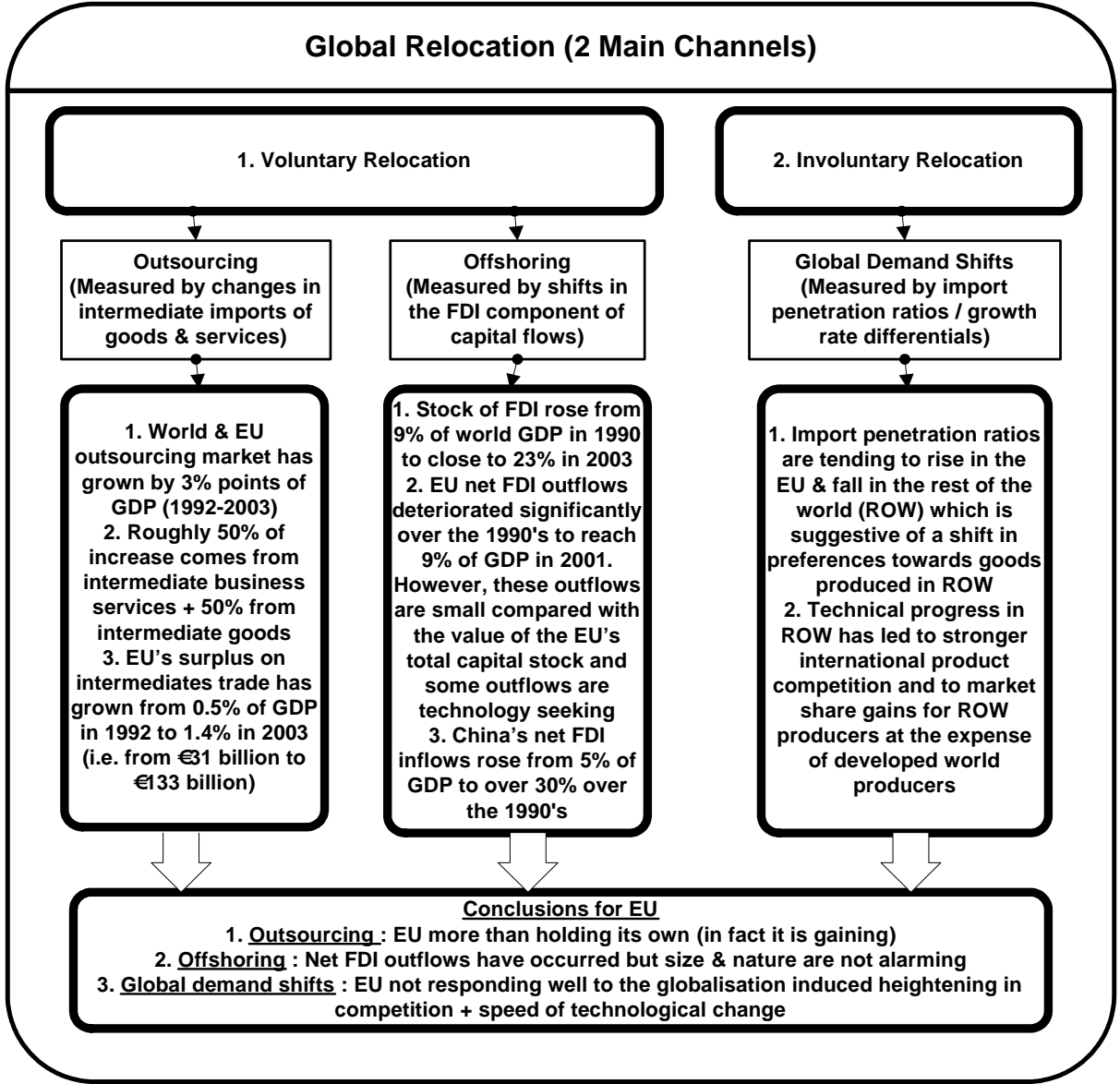
Potential Shifts in Preferences towards Foreign Goods and Services : Is the optimistic or pessimistic view of globalisation supported by looking at the development of import penetration ratios ? The import penetration ratios presented in Graph 12 are suggestive of a shift in preferences towards goods produced in the rest of the world. The evolution of import shares in fact provide a direct estimate of import demand shifts in the three regions under the assumption that the price elasticity of imports is equal to one. Empirical estimates for this elasticity suggest values larger than one³⁴. Given, as we will see later in this section, that the terms of trade has improved for the EU (i.e. the price elasticity of imports is not equal to one), the actual shift of preferences for foreign goods is larger than indicated by the change in the import share (i.e. the demand shift in favour of imports is being underestimated by the evolution of the import share). This view is supported by the empirical evidence from the trade regressions in Annex 3 which show that the imports of country 1 from country 2 depend positively on growth in country 2. As noted by Krugman (1988), there is a systematic link between international growth rate differentials and demand elasticities for imports. Recently Gagnon (2004) has shown that this is consistent with models of technical change where increases in TFP are positively linked to product innovations (i.e. ROW produces goods which are increasingly demanded in the developed world). This enables ROW countries to offer products on the world market which so far have been exclusively supplied by the more developed economies.

Thus the development of import market shares over the last 10-15 years are not inconsistent with the view that technical progress in the rest of the world has led to stronger international product competition and to market share gains for the rest of the world in markets previously dominated by the EU and the US. In terms of longer term patterns, while import penetration rates have increased, the most discernible shift is in the composition of trade, with imports of capital and intermediate goods (most notably parts and components) and of high technology products now constituting a higher share of overall imports. Consequently, the 1990's have experienced not only an acceleration in international economic integration but also a change

³⁴ For an elasticity larger than one, the import share underestimates the true demand shift in a specific country if its terms of trade are increasing and vice versa.

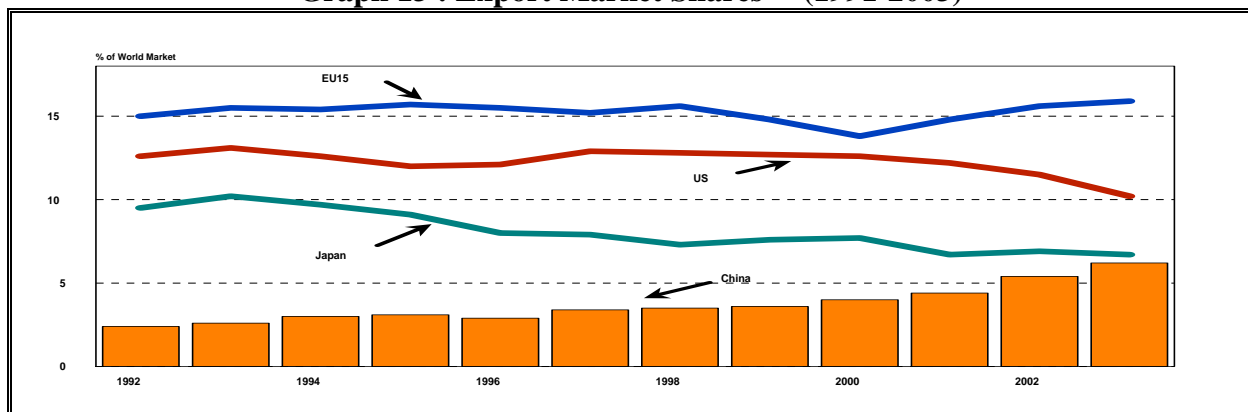
in the nature of integration towards the globalisation of production processes, most notably in the ICT and car industries.

Conclusion on Global Relocation : It is not possible to draw definitive conclusions from the outsourcing, offshoring and demand shift graphs in the present section regarding the overall macroeconomic significance of the production relocation phenomenon. Such an assessment will be made later on, using model simulations, in section 5. However, graphs 8-12 do provide a type of partial equilibrium analysis which acts as a useful complement to the general equilibrium assessment which will be made using the simulations. The overall impression created by the graphical analysis is of the EU more than holding its own in terms of outsourcing; of the EU's net FDI position being negative but the size and nature of the outflows are not alarming; and finally, in terms of global demand shifts that the EU is not responding well to the globalisation induced heightening in competition levels and in the accelerated pace of technological change.



Higher export volumes constitute one of the most visible indicators of the gains from globalisation and the evidence is that the EU is generally holding its own in extra-EU15 world markets. As graph 13 shows, the EU is the world's number one trading power, with changes to its overall market share performance since the early 1990's comparing favourably with that of the US and Japan. This global domination, to a large extent, reflects the fact that the EU is the market leader in a wide range of medium technology and capital intensive goods industries. Despite this, there are a number of areas of concern regarding the medium to long run trends for the EU. In terms of new competitors, as we will see in more detail later on in this section, China and the Asia region in general pose a considerable competitive threat to the EU. Over the 1990's, the EU has experienced large and rising deficits with Asia in its overall trade and has experienced sharp turnarounds in its trading performance in a number of product areas which have traditionally been EU strongholds. In terms of a skills-based breakdown of product groupings, while the EU has a strong specialisation in the medium-high technology area, it is exceptionally weak in a large number of high technology export markets, especially in the ICT area. In overall terms, the speed of the changes in certain product categories and the EU's inexplicably large gap in specific high technology areas suggest that complacency based on the relatively good 1990's performance would be a serious mistake.

Graph 13 : Export Market Shares* (1991-2003)



* EU15's world market share excludes intra-EU15 trade

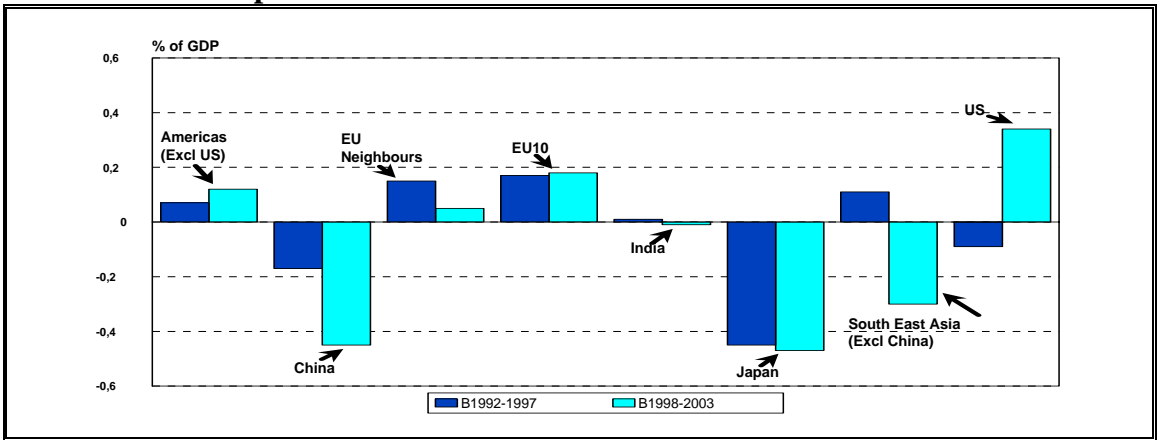
Source : UN Comtrade and own calculations

"Threat" to EU from the integration of China into the World Economy : Graph 13 confirms the emergence of China as a significant player in global markets. While this process of integration into the world's trading system will undoubtedly be disruptive, from an economic point of view the issue is whether this disruption is potentially beneficial or not. To examine this question, from the EU's perspective, the text below looks in more detail at changes in global trade patterns, examining shifts in the EU's and China's comparative advantage over the last 10-15 years and the evidence as to whether China is rapidly moving up the value added chain.

³⁵ China's influence on the global economy reflects not only the fact that it is large and growing fast but also that it is one of the most open, large, economies in the world in terms of inward foreign investment and trade as a % of GDP, with the degree of openness accelerating sharply over the 1990's. For example, China's ratio of trade to GDP in 2003 was over 30% compared with 18% for extra-EU15 and 12% for the US. In terms of foreign investment, China's net inflows of FDI in 2003 as a % of GDP were nearly 10 times greater than those of the US. While the short run adjustment costs of greater openness can be significant for particular sectors, regions and skill groups, the long run, economy-wide, productivity gains from company restructuring / reskilling of workers to keep pace with global competition is already resulting in dramatic gains in Chinese real wages and per capita incomes.

As stressed earlier, the rise of China in world export markets has not, as yet, occurred at the expense of the EU, with the US and Japan appearing to be more strongly affected over the period 1991-2003. However, while the EU has not experienced large shifts in its overall export market share or indeed in its total trade balance position since the early 1990's, there have nevertheless been large changes in terms of the geographical focus of its trade and consequently in its market position vis-à-vis its main trading partners. Since 1992, the US, the EU's new Member States (i.e. EU10) and China have become increasingly important export markets for the EU15. Changes to the EU15's overall trade balances shown in graph 14 indicate large and rising deficits with Asia (including China) compensated by surpluses with most other areas of the world. All 3 areas of Asia shown in the graph have opened up significant trade gaps with the EU, with the Chinese trade deficit of nearly ½% of GDP at similar levels to that of Japan, with whom we have had a persistently large deficit since the early 1990's.

Graph 14 : EU15 Trade Balances with Rest of World



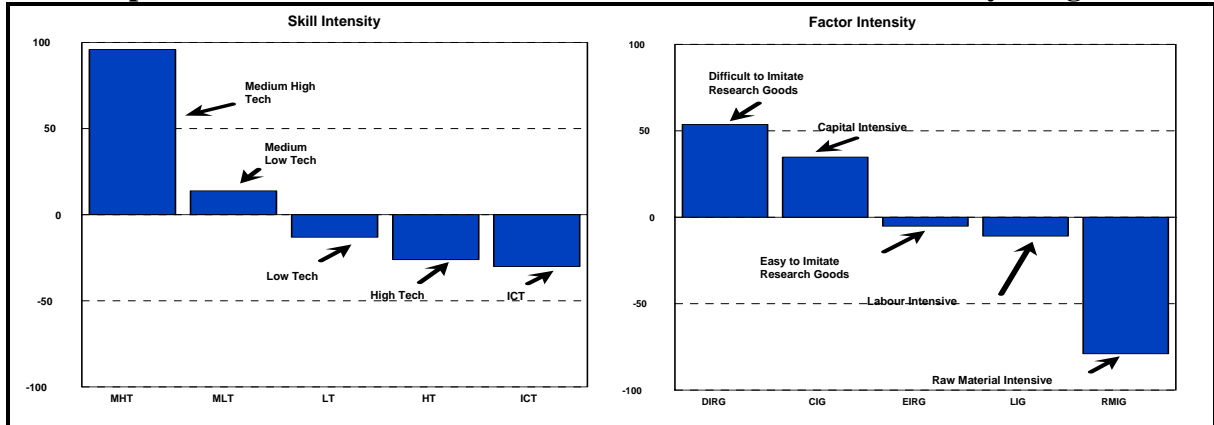
Source : UN Comtrade and own calculations

Comparative Advantage Indicators : Regarding the rising EU trade deficit with China, it is important to shed some light on both the nature of the goods which are driving this deficit and on the underlying specialisation patterns. In this context, part of the analysis for the present section is based on work done for a companion paper on global trade integration (see Havik and Mc Morrow 2006 – forthcoming), including the calculation of revealed comparative advantages (RCA's) for all the regions of the world, including China and EU15.

Two basic classifications were used for the RCA calculations, one skill based which breaks trade in manufactured goods down into the five categories of "high tech", "ICT", "medium high tech", "medium low tech", and "low tech". The second classification covers total trade and is based on the intensity with which individual products use the different factors of production. Here there is a five way breakdown into "difficult to imitate research goods", "easy to imitate research goods", "capital intensive goods", "labour intensive goods" and "raw material intensive goods".

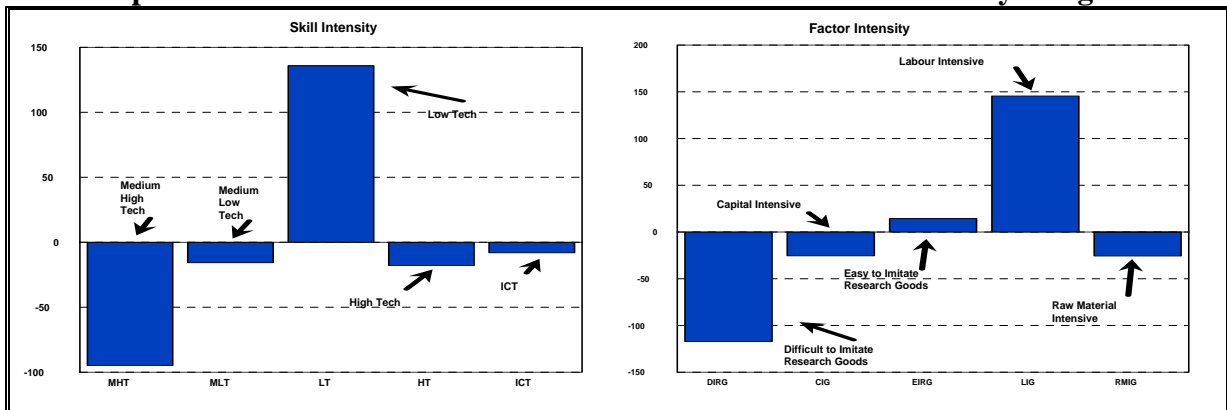
What do both breakdowns reveal about the respective comparative advantages of the EU and the US. Graphs 15a and 15b clearly indicate that there is a large degree of complementarity in the trading structures of both areas, with the EU strong in "medium high technology", "difficult to imitate research goods" and "capital goods" and with China relatively weak in those specific categories. Likewise in areas where China is strong, such as "low tech" and "labour intensive goods", the EU is relatively weak.

Graph 15a : RCA's* for EU15 for different skill and factor intensity categories



Source : UN Comtrade, CEPII and own calculations
 * Revealed Comparative Advantage

Graph 15b : RCA's* for China for different skill and factor intensity categories



Source : UN Comtrade, CEPII and own calculations
 * Revealed Comparative Advantage

EU-China trade at the product level : While RCA breakdowns of trade into specific skill or factor intensity groupings are enlightening, it is important to supplement this with an overview at the product level. Given that the 3 digit "Standard International Trade Classification" (SITC) includes a total of 266 products, the analysis in Havik and Mc Morrow (2006) focuses only on the top 20 contributors to the growth of global trade (see Table 1). As the table shows, calculating the top 20 products at the world level involved taking the export growth rate for each product and multiplying it with its overall share in total non-fuel exports to calculate its respective contribution. Table 1 shows the top 20 products derived from this exercise. This list of the most dynamic export products represents nearly 40% of total non-fuel world trade and over 50% of the growth rate in non-fuel exports over the 1994-2003 period. These 20 products are heavily concentrated in the "medium high tech", "high tech" and "research intensive" goods categories, indicating that there is a clear shift in world demand towards these high skill intensive products over the last decade. If one examines the world market shares for the EU, US and China for the top 6 products (graphs 16a-16c), two important conclusions emerge :

- Firstly, that while the EU is broadly holding its own in many of these markets, its share of ICT related product markets (i.e. semiconductors; computers; and parts and accessories for computers) is often relatively small; and

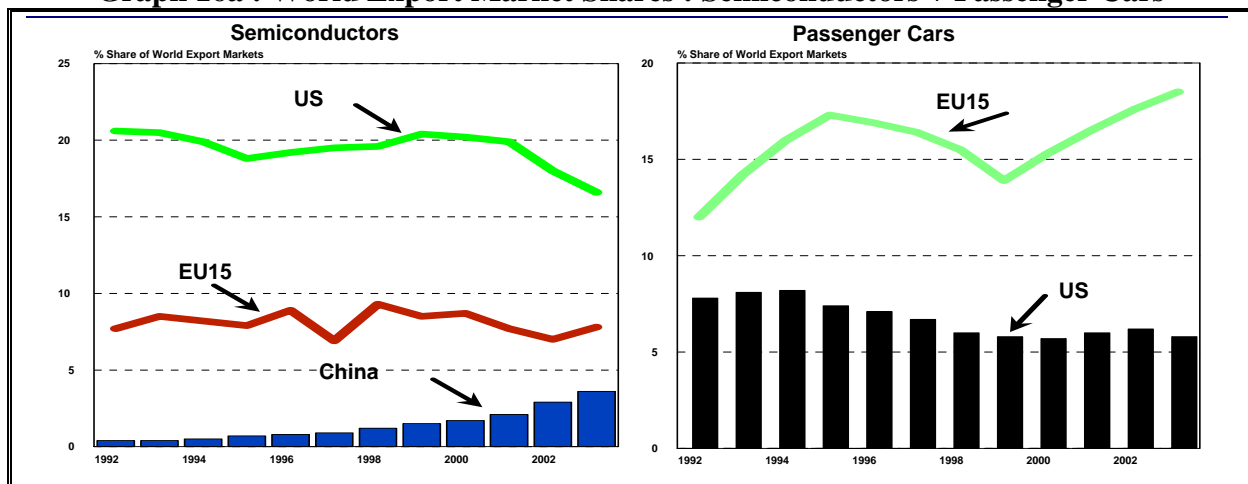
- Secondly, that China is largely absent from the passenger cars and pharmaceuticals markets, areas where the EU is very strong. China would appear to be more of a competitor to the US in many of the ICT related areas where the US has traditionally held a strong comparative advantage. One exception however is telecommunications where China is gaining market share from both the US and the EU.

Table 1 : 20 Largest Contributors to World Non-Fuel Export Growth 1994-2003*

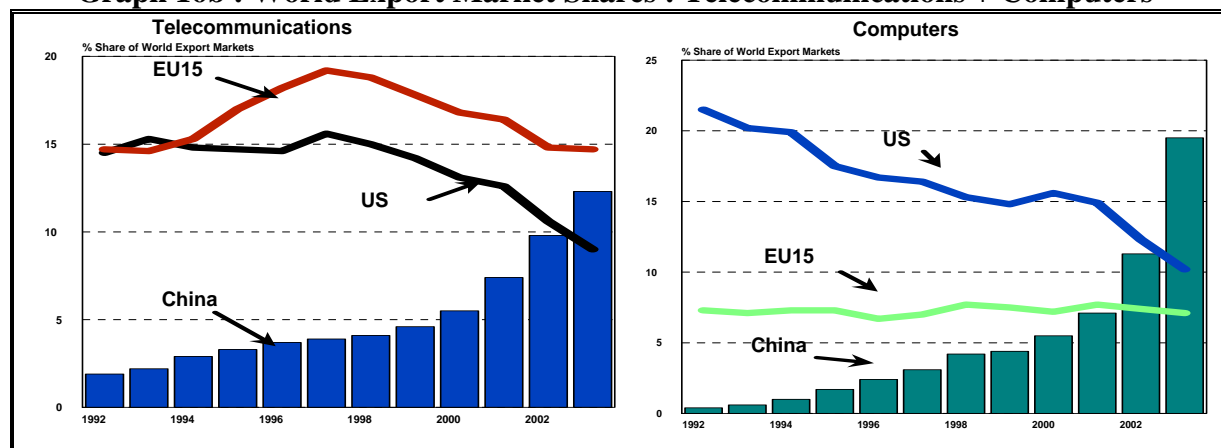
Rank	Product Group	1994-2003		
		Non-Fuel Export Growth Rate	Share in Non-Fuel World Exports	% Contribution to Non-Fuel Export Growth
1	Semiconductors	13.6	4.4	7.8
2	Passenger Cars	8.4	5.6	6.0
3	Telecommunications Equipment	12.5	3.3	5.4
4	Computers	10.0	3.3	4.3
5	Parts and Accessories for Computers	10.8	2.5	3.5
6	Pharmaceuticals	17.6	1.5	3.4
7	Parts and Accessories for Motor Vehicles	7.7	2.6	2.6
8	Electrical Circuits	10.0	1.5	2.0
9	Electrical Machinery	8.9	1.7	1.9
10	Aircraft	6.6	1.9	1.7
11	Measuring Equipment	8.5	1.2	1.4
12	Chemicals	12.9	0.8	1.3
13	Furniture	9.3	1.1	1.3
14	Piston Engines	8.1	1.2	1.3
15	Paper and Paperboard	6.9	1.3	1.2
16	Specialised Equipment	7.3	1.2	1.1
17	Clothing	7.9	1.1	1.1
18	Base Metal Manufactures	8.8	1.0	1.1
19	Plastics	8.7	1.0	1.1
20	Engines and Motors	10.0	0.8	1.0
	Total of Top 20	9.6	39.1	50.4
	Total World Non-Fuel Exports	7.7	100	100

Source : UN Comtrade and own calculations

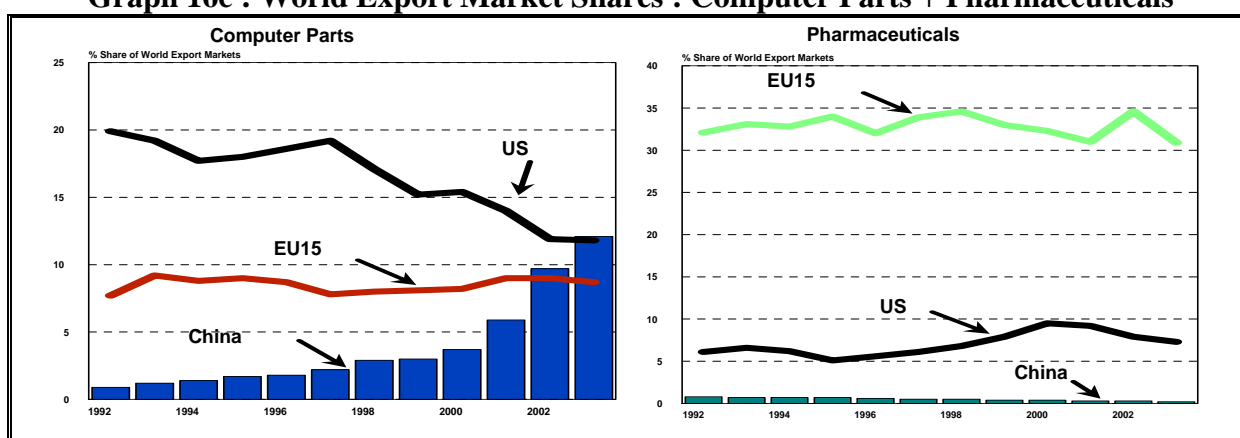
Graph 16a : World Export Market Shares : Semiconductors + Passenger Cars



Graph 16b : World Export Market Shares : Telecommunications + Computers



Graph 16c : World Export Market Shares : Computer Parts + Pharmaceuticals



Source : UN Comtrade and own calculations

Is China advancing rapidly in terms of technology ? : A key question for EU policy makers is whether China is rapidly moving up the value added chain ? We have seen already that the RCA's for China show a strong focus on low-skilled and labour intensive sectors. This however seems inconsistent with the analysis of the top 6 industries showing China with a growing world share in a range of ICT related industries, many of which are classified as high technology. This apparent inconsistency is why one needs to go beyond simple market shares to assess the real threat from China. In fact a number of factors suggest that the RCA analysis rather than trends in export market shares provides a more accurate reflection of the extent of technological progress in China. The following factors would point strongly to the conclusion that while China may be exporting high technology products, it is nevertheless focussed on the labour intensive stages of the production of such goods³⁶ :

- Firstly, China is only able to export huge volumes of ICT products because it imports almost all of the high value added parts and components that go into these products. China is just an assembler of such goods (i.e. not a manufacturer in the traditional sense), with the domestic value added of these products only representing 15% of the export value, the rest is import content. To put this 15% into context, the ECB has estimated that in 2000 the Euro Area domestic value added figure was over 55%.

³⁶ The following four bullet points draw heavily on the work of N. Lardy (2005)

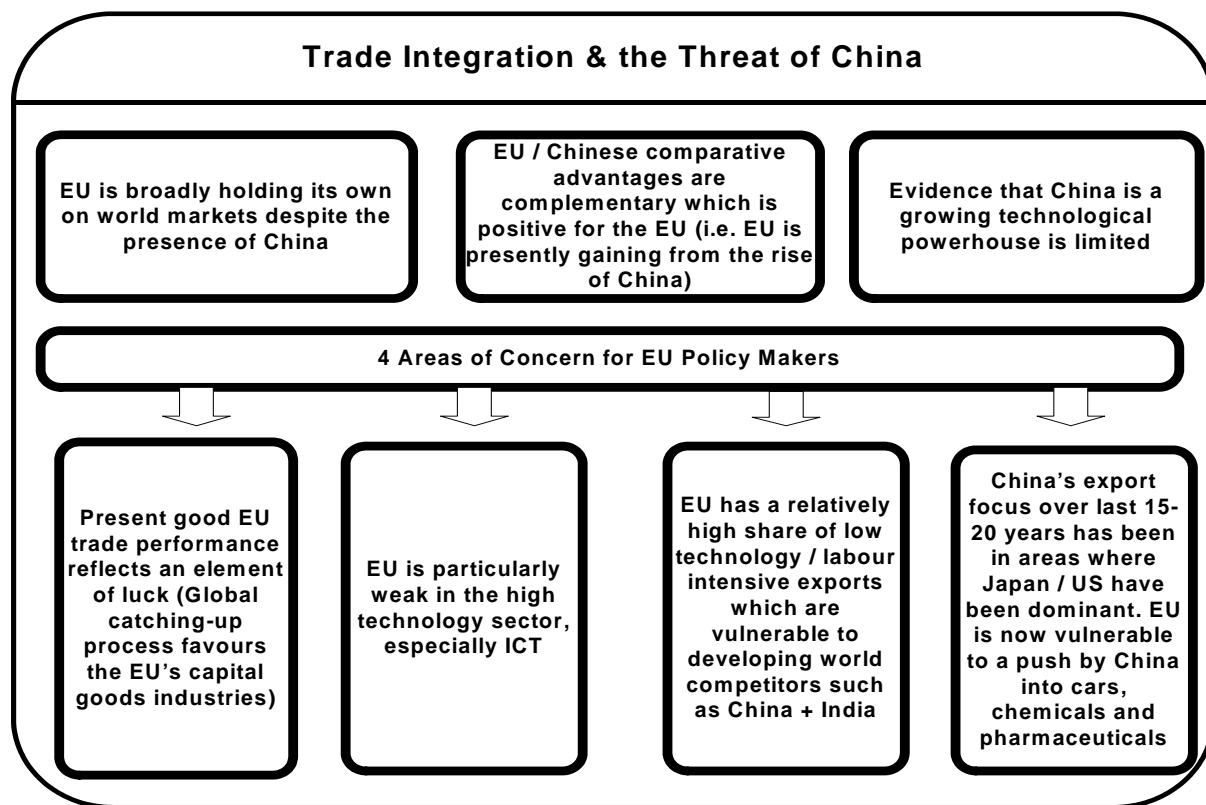
- Secondly, most of the ICT products which China produces (DVD players, notebook computers, mobile telephones) cannot be considered high tech. If one looks at the huge export volumes and low unit prices of these products, these should not be included in the high technology category.
- Thirdly, most exports of ICT products are assembled not by Chinese-owned firms but by foreign firms (especially Taiwanese) that are using China as an export platform.
- Fourthly, these foreign firms tend to protect their technology from Chinese competitors thereby limiting the diffusion of technology to indigenous Chinese firms. These latter indigenous firms also appear to spend very little on R&D to develop new technologies on their own.

Concluding Remarks : In overall terms, section 4.2 has shown that the EU is broadly holding its own on world markets despite the growing presence of China. It has also underlined the strong complementarities in the structure of Chinese / EU trade (as reflected in the comparative advantage indicators) as well as the very little evidence which exists, at the present time at least, to support the view that China is a growing technological powerhouse. However, despite this relatively reassuring assessment, there are a number of potential risks for the EU.

- Firstly, while the EU has done reasonably well over the last 10-15 years in maintaining its leading role in world trade, this performance may reflect a certain element of good fortune given that the initial, investment intensive, phase of the global catching-up process tends to benefit those capital goods industries where the EU is relatively strong.
- Secondly, the EU's exceptionally poor performance in the high technology sector, and ICT in particular, is a major source of concern especially given the evidence that China is anxious to rapidly move up the value added chain (and is investing heavily in R&D and education to hasten this process).
- Thirdly, given the estimates of over 100 million low skilled agricultural workers in China needing to move into the manufacturing sector over the coming decades, it appears that China's comparative advantage is likely to remain in labour intensive products for many years. Given that the EU has a relatively high share of its exports in the low technology / labour intensive categories compared with the US or Japan, it is particularly vulnerable to the almost inevitable world domination by China (or other low cost producers) in these industries.
- Finally, unlike the last 10-15 years when China tended to focus its export strategy on ICT related products³⁷ as well as textiles / clothing, it is very likely that in future phases of their development that they may well target some of the industries where the EU is presently dominant, such as cars, chemicals or pharmaceuticals³⁸.

³⁷ Globalisation has helped to stimulate the consumer uptake of ICT products such as computers and mobile phones. Cheap assembly plants in a number of emerging Asian countries, using expensive high technology components from the US and Europe, have both combined to keep the price of these products affordable.

³⁸ This is already starting to happen and it is perhaps ominous to note that 2005 was the first year that China recorded a surplus on its motor vehicle trade.



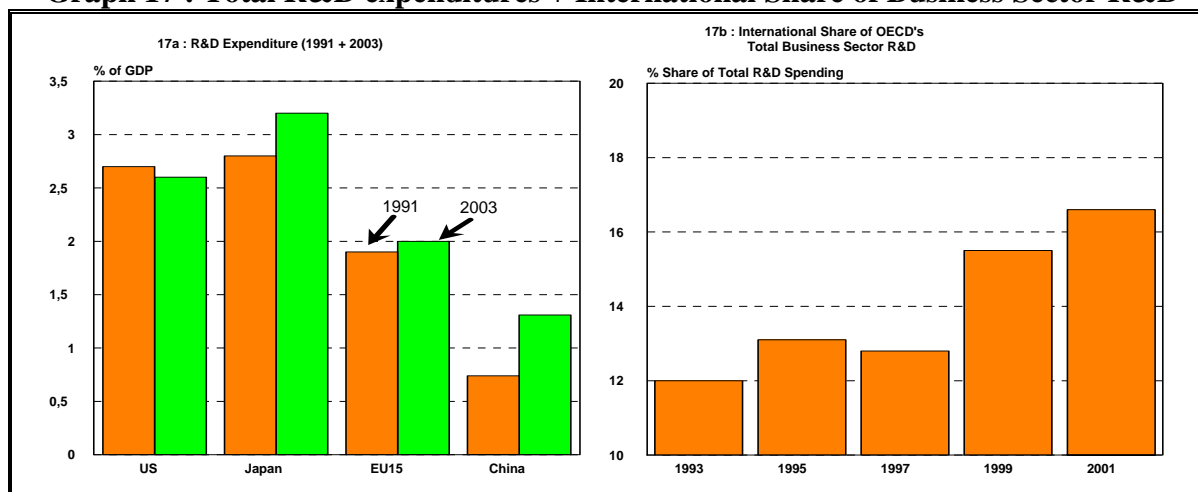
4.3 : R&D Flows : Globalisation of Technology Production and Diffusion

As with trade and capital flows, the 1990's has also experienced a substantial increase in the flow of technology across borders. This flow is made up of two essential elements, the internationalisation of R&D activities (4.3.1) and the global diffusion of "ready-to-use" technologies from "inventor" countries to "applicant" countries in the form of patents and licensing agreements (4.3.2).

4.3.1 : Internationalisation of Technology Production : Graph 17a indicates that while the overall R&D intensities of economies did not change dramatically over the period 1991-2003 (with perhaps the notable exceptions of Japan and China³⁹), there was a definite shift in terms of the domestic / international split of research expenditures. Although the largest proportion of R&D is still done at home, the internationalisation of R&D activities is developing rapidly and is mainly carried out by large, technology-intensive, multinational firms. According to the OECD's "Globalisation Indicators", R&D performed abroad by OECD companies amounted to over 16 ½% of total business sector R&D in 2001. As graph 17b indicates, this represents almost a 40% increase compared with the equivalent share in 1993. This growth shows that the progressive international relocation of R&D facilities is fast becoming a key element in the overall process of economic globalisation.

³⁹ High R&D spending in China is however very different from the development of commercially viable innovative products as recognised by G. De Jonquieres (Financial Times July 2006) "Although Chinese science is developing rapidly, as reflected in growing numbers of patent filings, the country's efforts to translate ideas into commercially successful innovations have so far been disappointing. Many structural barriers stand in the way. They include an ivory tower approach to engineering education; weak links between universities and business; academic corruption; ineffective intellectual property protection; state-owned industries' domination of large markets and scarcity of venture capital funding. Many of these handicaps are deep-seated and will require bold action to dislodge".

Graph 17 : Total R&D expenditures + International Share of Business Sector R&D



Source : OECD

Who are the key players ? : R&D internationalisation has traditionally been an intra-TRIAD phenomenon, with the EU, but especially the US, being major locations for foreign R&D. However, more recently, this phenomenon has become more truly global, with many emerging economies becoming important locations for internationally mobile R&D facilities. A 2004 survey by the Economist Intelligence Unit showed, for example, that the favourite locations for planned R&D investments were China, followed by the US and India.

This more global focus for R&D spending can be seen in the increasing diversification of the US's own outward R&D investments. US firms are targeting all major regions of the globe and especially Asia, with the result that the EU15's share in total US outward R&D has been declining since the late 1990's. These trends are expected to persist as the new global market players continue to build up their science and technology infrastructures and to open up their markets to foreign entrants.

Why is R&D increasingly flowing across borders ? : The growing internationalisation of the R&D function is being driven by both demand and supply side factors :

- Firstly, on the demand side, by the establishment of R&D laboratories by multinational firms outside their home countries to serve and support their overseas production units and marketing activities – relocation of R&D facilities is therefore closely linked with the relocation of production, both of which have progressed steadily since the early 1990's.
- Secondly, on the supply side, there is an acceleration in the setting up of international R&D networks and alliances between firms and various public sector research bodies, including universities and government research institutes.

The empirical evidence on the respective importance of these different drivers suggests that the technology sourcing, supply-side, motives have over the last 20 years become a major impulse for firms locating R&D abroad, especially amongst more developed economies. Demand side motives (e.g. closeness to local markets) continue however to be an important driver, most notably towards the emerging economies.

This shift in the international innovation strategies of firms towards technology sourcing is of course linked to, and nurtured by, the broader process of globalisation. Up until the mid-1980's, as explained earlier, the R&D strategies of transnational corporations were essentially demand driven i.e. as firms increasingly located their production closer to their customers and suppliers, they needed R&D laboratories in those markets to adapt the technologies and products developed at home to local conditions. After the mid-1980's, spurred on by the increase in competition unleashed by the new phase of globalisation, more supply related motives were starting to influence multinationals in establishing foreign R&D facilities. These motives included the need to effectively tap into foreign sources of knowledge and technology in centres of scientific excellence located worldwide. This was expected to both increase the efficiency of the firm's own R&D processes and to provide channels for the absorption of technological spillovers from the local public knowledge base. Spillovers were expected to include information from other R&D firms / institutions and access to trained personnel and to leading edge universities or government institutions. These supply-driven R&D facilities tended to be more focussed on the long-term basic research of the firms involved, with collaboration with researchers / institutes in similar fields of research a key objective of the internationalisation process.

This shift in the innovation strategies of multinationals is already starting to reflect itself in the relative attractiveness of individual countries as locations for the different forms of research facilities. Technology-oriented research activities (the "R" part of R&D) tend to be located in those countries with relatively high scientific and technological skills and where there are world class research institutes and universities and opportunities for public-private partnerships. Market-oriented / more development types of R&D activities (i.e. the "D" part of R&D) are attracted to countries offering strategic market access.

Given this shift in strategies, it is perhaps not surprising to find that since the mid-1990's the US has become a more attractive location for internationally mobile R&D operations. As table 2 indicates, the US has a rapidly expanding share of total internationally mobile R&D expenditures, with the latter increasing at between 10-15 percent on an annual average basis. The US has many of the key locational determinants needed to attract such mobile R&D flows, especially of the technology seeking variety, including a globally-envied third level education system and a proven innovation capacity. It is perhaps interesting to note that a large part of the US's expanding global share of mobile R&D spending is due to the activities of EU multinationals having research-focussed affiliates on US territory.

Table 2 : Shares of Mobile World Research Expenditures

	1987	1995	1997	1999
FRANCE	4	6	5	4
GERMANY	10	10	8	7
UK	7	5	4	4
JAPAN	32	34	27	21
US	47	45	56	64
TOTAL	100	100	100	100
GROWTH RATES IN GLOBAL R&D EXPENDITURES				
COMPOUND ANNUAL GROWTH RATE	1987-1995	1995-1997	1997-1999	
	2%	16%	12%	

Source : Conference Board, OECD Science and Technology Database.

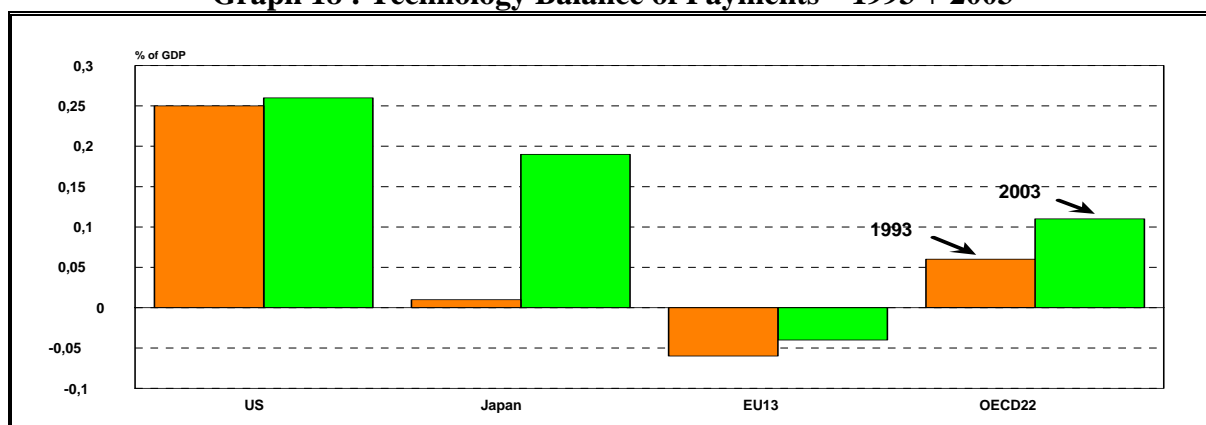
4.3.2 : International Diffusion of Knowledge : In line with the general trend towards the internationalisation of the research activities of firms, an increasing share of the technology produced in countries, in the form of patents etc, is owned or co-owned by foreign residents / firms. The OECD estimates foreign ownership of domestic inventions to be around 15% of the total in most countries.

Furthermore, firms are not only developing innovations internationally, they are also exploiting their innovations on world markets, through licensing their technologies or selling their innovations to foreign purchasers. Directly buying or selling technology on international markets is reflected in the balance of payments statistics, with intra-firm technology transfers (i.e. between parent companies and their international affiliates) dominating the transactions.

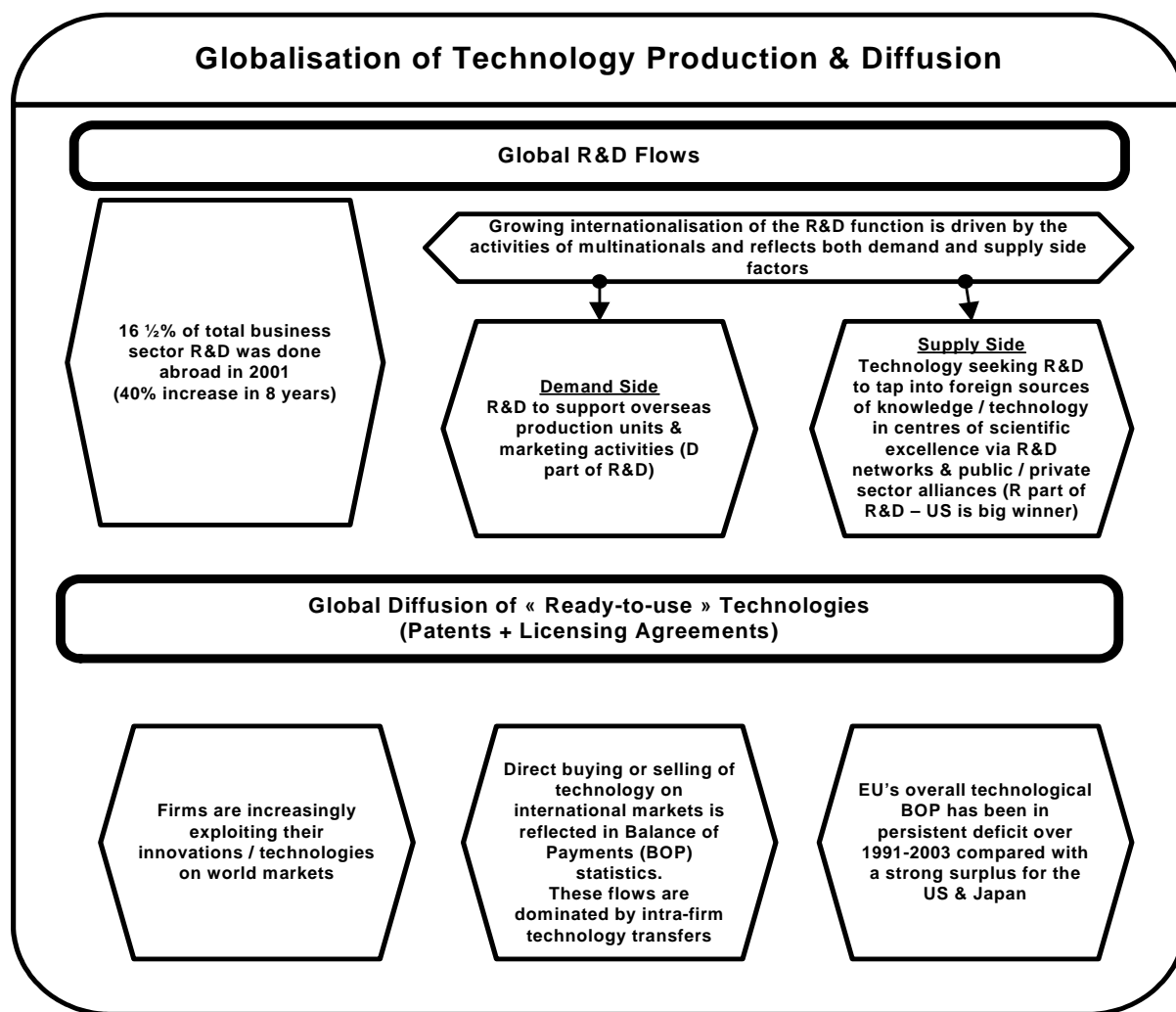
As an indicator, the technology balance of payments reflects a country's ability to sell its disembodied technology abroad and the extent to which it makes use of foreign technologies. Deficits / surpluses need therefore to be carefully interpreted since they can reflect a wide range of factors including a country's degree of technological autonomy, its ability / inability to assimilate foreign technologies or its high / low levels of technology imports / exports. Ultimately, a country's technological development reflects the choice between domestic production of technology / inventions (via a high national R&D effort) or foreign absorption (via the acquisition of foreign technologies and the payment of licensing fees and royalties).

These balance of payments statistics are indicating that in parallel with the increasing cross-border ownership of technology, a sharp upward movement has occurred in the amount of technological receipts and payments made by countries over the 1990's in the form of licence fees and royalties (i.e. payments for production-ready technologies, not R&D). For example, average EU receipts and payments linked with international technology transfers rose from less than ½% of EU GDP in 1991 to over ¾ of a % in 2003. However, as graph 18 shows, the EU's overall technological balance of payments was in persistent deficit throughout the period, unlike the situation for the US, Japan and the OECD area as a whole which remained net technology exporters to the rest of the world.

Graph 18 : Technology Balance of Payments – 1993 + 2003



Source : OECD



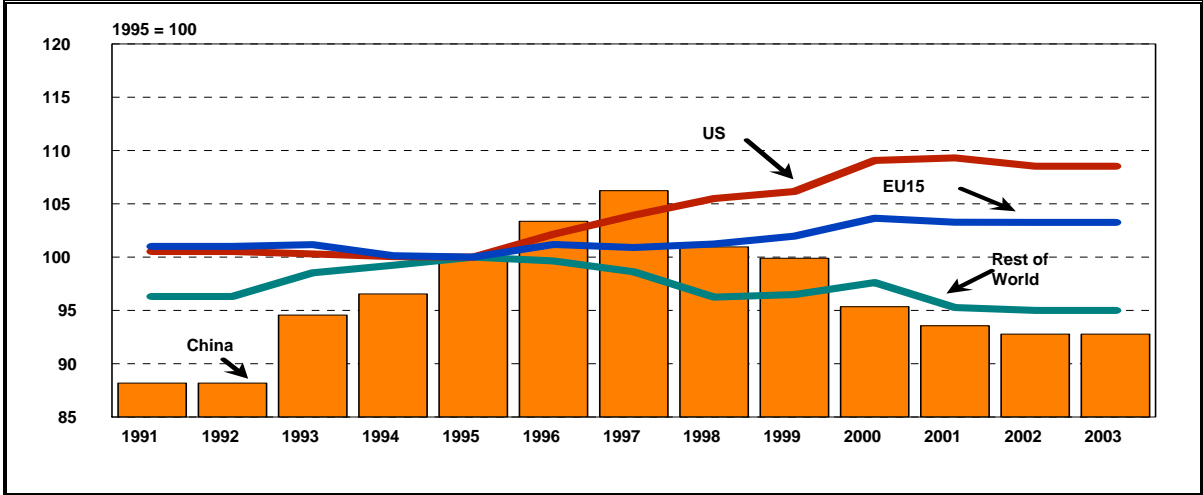
4.4 : Terms of Trade Developments

Terms of trade⁴⁰ : The welfare effects of globalisation, measured in terms of consumption trends, both for the converging and developed regions, are critically dependent on the evolution of the terms of trade. Looking at the terms of trade trends in graph 19 (i.e. the relative price of exports compared to imports for non-oil goods and services), they seem to support the optimistic view of globalisation. In other words, despite the observed productivity growth differentials, there has been no demand shift to the ROW, with the technology (i.e. supply side) improvements in this region simply leading to lower prices. Both the EU and the US show terms of trade gains (when changes in oil prices are excluded) since the mid-1990's, while the rest of the world and China show terms of trade losses. This aggregate level pattern is consistent with the view that the relatively advanced economies are more specialised in the

⁴⁰ An important question for the simulations in section 5 will be how well the various globalisation scenarios can account for the aggregate level movements in the terms of trade and for the role played by the underlying technology and demand shocks. In particular, could greater changes in the terms of trade have been expected given the relative size of the shocks which occurred ? Since the terms of trade gains suggest that the exports of the EU and the US are becoming relatively more valuable on world markets (i.e. we have to export less to receive a given quantity of imports), this implies that the EU and the US, in one sense, have become more, not less, competitive on world markets since the early 1990's. A gain in competitiveness is defined here to mean that EU and US citizens have the capacity for a sustainable increase in their real incomes / standards of living due to globalisation. However, while we are getting richer on average, the problem is that the relative incomes of high skilled workers / owners of capital is often rising compared with those of the unskilled (i.e. there is a potential problem in terms of the distribution of the gains from globalisation).

medium to high tech product areas. This specialisation pattern not surprisingly has given them more pricing power compared with the emerging economies which have tended to focus on low skilled products / basic commodities or in the labour intensive stages of the production of high tech goods (many of which are controlled by foreign multinationals). Graph 19 also shows that the EU and even more so the US are gaining strongly relative to China with respect to terms of trade developments. These developments tend to support the view, discussed earlier, which questions the speed with which China is catching up technologically⁴¹.

Graph 19 : Terms of Trade Developments for Non-Oil Goods and Services : 1991-2003

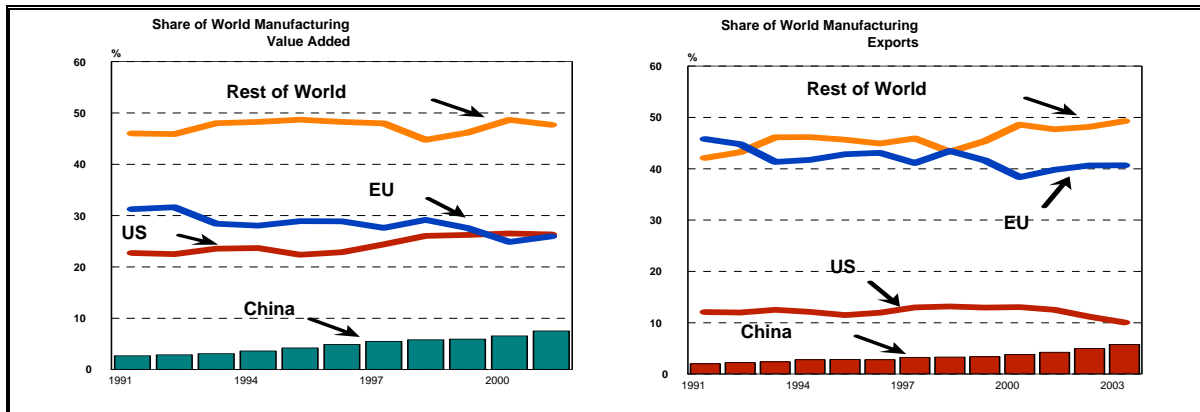


Note : China is also part of "Rest of World" grouping
 Source : World Bank (World Development Indicators) and own calculations

EU vs US Terms of Trade Developments : While terms of trade trends between the developed and developing world can be rationalised in terms of the relative skill content of trade, an interesting additional question is whether the same rationale applies to the growing, post-1995, terms of trade differential between the US and EU15. This observation holds even when one takes account of exchange rate changes, as the terms of trade indicator itself is not sensitive to the currency used for the calculations although the components (i.e. export and import prices) are⁴². At the aggregate level, the greater US gains reflect the fact that import prices have fallen more than export prices compared with the situation in the EU. In addition, in dollar terms, US export prices have fallen substantially less than those of the EU. While there is undoubtedly an exchange rate element to this export price trend, it may to some extent reflect greater US pricing power given its strong comparative advantage in high technology, manufactured, goods and in specialised research goods such as semiconductors. Such an explanation would also be consistent with the fact that although the US’s global share of manufactured goods exports is clearly on the decline, its share of global manufacturing value added has risen (graph 20). These contrasting trends for exports and value added are suggestive that the US is more advanced than the EU in transferring the low value added parts of its manufacturing industries to emerging markets (either via outsourcing or offshoring) whilst retaining those parts of the value added chain which have the greatest pricing power.

⁴¹ The Chinese need to sell several hundred million of their T-shirts into Europe to be able to buy one Airbus from us.
⁴² For example, when export and import prices are expressed in US dollars, the general price evolution for all regions clearly points to price declines for the 1995-2002 period.

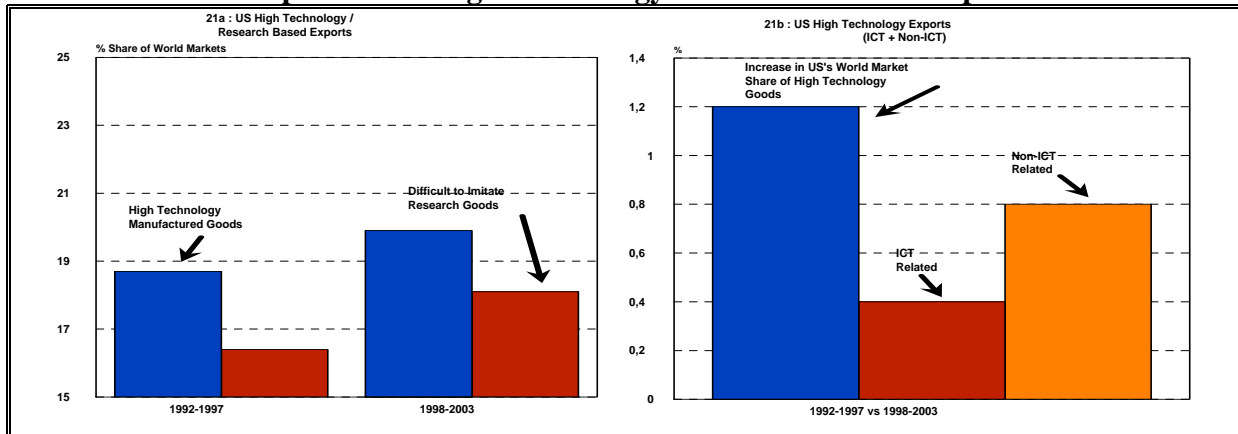
Graph 20 : Shares of global manufacturing value added and manufacturing exports 1991-2003



Note : China is also part of "Rest of World" grouping
Source : WDI and own calculations

Graph 21 goes on to show that the increase in the US's high technology export market share at the world level was mainly driven by non-ICT products which underlines the diversity within the US high technology sector. This growing US focus on high technology segments of the market, whilst outsourcing the labour intensive stages of the production of these goods to Mexico, Brazil and China, is paying rich dividends for the US. This good terms of trade performance for the US shows that one must interpret losses in US export market shares very carefully. These losses may reflect both a highly successful outsourcing strategy by US firms as well as the proven capacity of the US's innovation system to not only produce new ideas but to commercialise a flow of innovative technologies over the longer term.

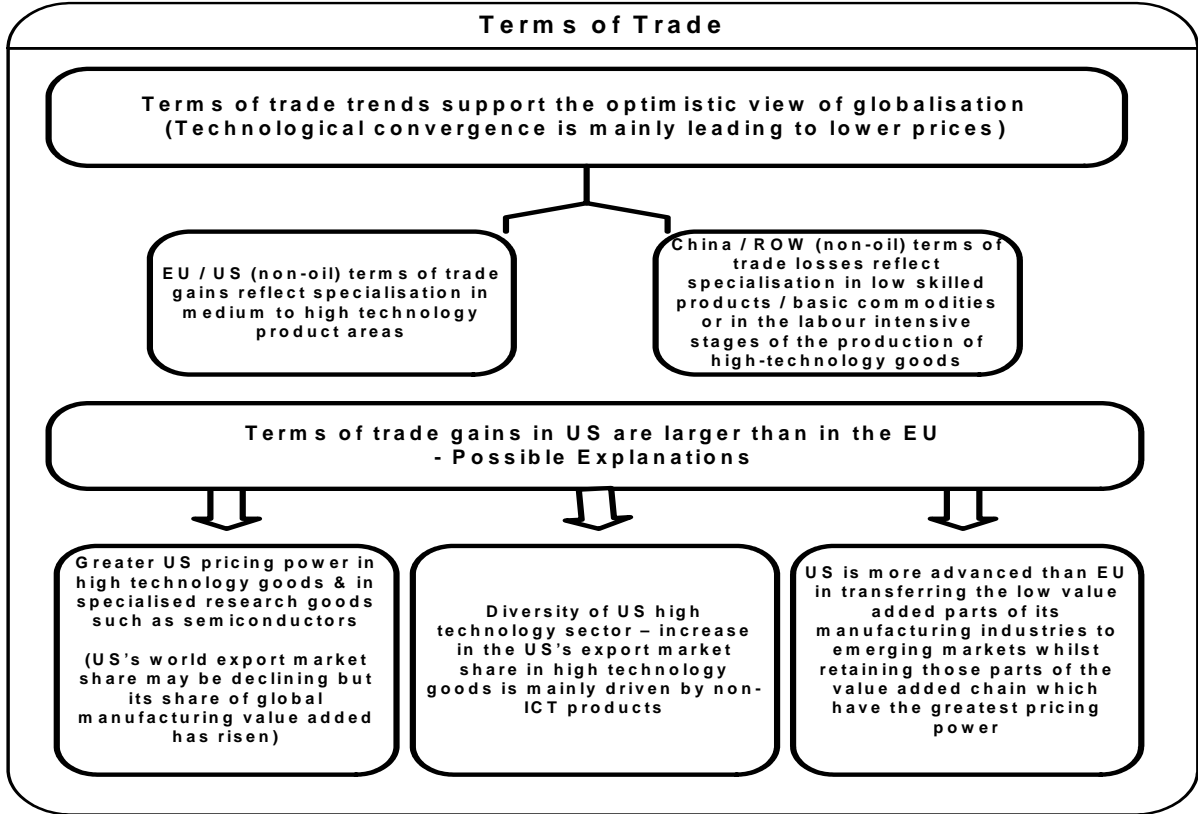
Graph 21 : US High Technology + Research Based Exports



Source : UN Comtrade and own calculations

Industry Level Terms of Trade : Can industry-specific terms of trade trends help us to explain these differences in the post-1995 evolution in the US and the EU ? An analysis of the top 20 export product groupings (shown previously in Table 1), using price data supplied by CEPII, neither supports nor rejects this thesis, with conflicting results depending on whether one measures the terms of trade using world price indices or unit values. The world price index data suggests that the EU experienced higher terms of trade gains for the top 20 product groupings compared with the US. The EU retained relatively strong pricing power in those industries where it has traditionally held a significant global presence, such as in chemicals

and pharmaceuticals where prices have remained relatively stable compared with the declines experienced elsewhere. In addition, the EU has done well in a number of the capital goods industries, the products of which are in strong demand in the initial stages of the catching-up processes of the rest of the world. Unfortunately, however, these higher EU gains do not hold when world prices are replaced by the specific terms of trade indicators based on unit-values. Consequently, this industry level price data gives conflicting signals regarding the direction of the aggregate economy-wide trends. This is perhaps not that surprising given that the pricing data for sectoral trade categories tends to be very volatile, with specific segments of individual categories displaying very different pricing patterns and with individual countries specialising in different quality ranges. In addition, it should be stressed that these 20 groupings represent less than half of all trade in goods and unfortunately no price data exists for the service sectors.



4.5 : Global Productivity and Per Capita Income Trends

This last sub-section provides an assessment of global productivity trends which should be regarded as the most important indicator for evaluating the overall success or failure of the globalisation process for individual countries given its effects on the living standards of the developed world and on the income convergence ambitions of emerging economies. Globalisation-induced changes in specialisation patterns require sectoral adjustments in both the developed and emerging economies to ensure a mutually beneficial process. The success of this restructuring is ultimately reflected in productivity / real wage developments and consequently trends in the latter provide a summary indication of how the respective economies are responding / adjusting to globalisation.

Table 3 shows that long run changes in per capita incomes are essentially driven by productivity trends. One can also see that the EU's own catching-up process with the US over

the period since 1960 was driven by an annual average productivity growth rate differential of close to 1% point. Likewise, the EU must now expect a faster pace of efficiency gains in the rest of the world over the coming decades, as these countries restructure and upgrade their economies in their drive to converge towards the income levels of the developed world. Globalisation is an essential vehicle for this catching-up process to occur, with trade and capital market integration driving productivity growth via increases in capital accumulation and the diffusion of technological progress. Of course, for the EU to fully benefit from this process, it must also adapt to the changes in specialisation / comparative advantage being driven by this deepening in the integration process. In this context, increased global competition is potentially a powerful driver of productivity growth, acting as an incentive for firms to continuously enhance their underlying efficiency performances via process or product innovations (thereby differentiating themselves from their competitors in the global marketplace).

TABLE 3 : AVERAGE ANNUAL GROWTH RATES (%) -1960-2003*

	EMPLOYMENT	PRODUCTIVITY	GDP	POPULATION	GDP PER CAPITA
EU15	0.5	2.5	2.9	0.4	2.5
US	1.7	1.6	3.4	1.1	2.2
REST OF WORLD*	2.0	2.1	4.2	1.8	2.3
WORLD*	1.9	1.8	3.7	1.7	2.0
	PRODUCTIVITY (PER PERSON EMPLOYED)		GDP PER CAPITA		
	1960-1990	1991-2003	1960-1990	1991-2003	
EU15	2.9	1.4	2.9	1.6	
US	1.5	1.8	2.4	1.8	
REST OF WORLD*	2.2	2.0	2.4	2.2	
(CHINA)		(6.1)		(6.6)	
(INDIA)		(3.9)		(3.9)	
WORLD*	1.9	1.6	2.1	1.8	

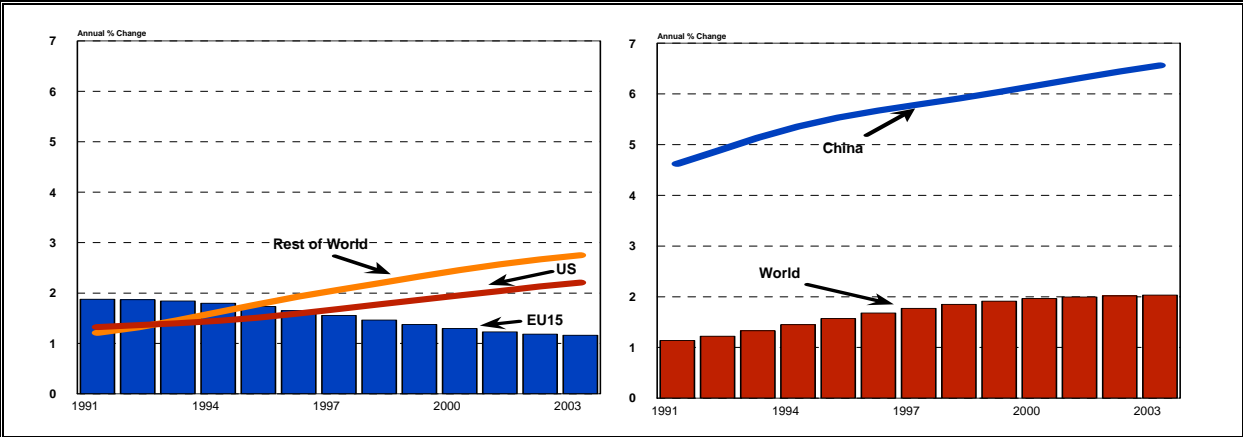
*For the "rest of the world" and world aggregates, only those countries where data is available for the whole period 1960-2003 are included. Source : GGDC Total Economy Database, UN, own estimates.

On the basis of productivity trends over the 1990's, how well has the EU been coping with this deepening of the global integration process and with the income and technological catching-up of the rest of the world ? As can be seen from table 3 and graph 22, productivity growth rates in the rest of the world have been on average about ½ a % point higher compared to the EU over the period 1991-2003. While catching-up would suggest that such a differential is to be expected, graph 22 worryingly indicates that the differential has been growing rapidly over the 1990's, with the gap in 2003 at around 1 ½ % points. The US on the other hand has managed to boost its productivity growth rate over this period and to restrict the gap to less than ½ a % point, even over recent years. These trend labour productivity differences suggest that the EU is not responding effectively to the catching-up of the rest of the world, especially when one compares its performance with that of the US.

As a recent paper by Denis et al. (2005) showed, part of the downturn in the EU's productivity growth rate over this period reflects an outdated and inflexible EU industrial structure which has been slow to adapt to the intensifying pressures of globalisation and the

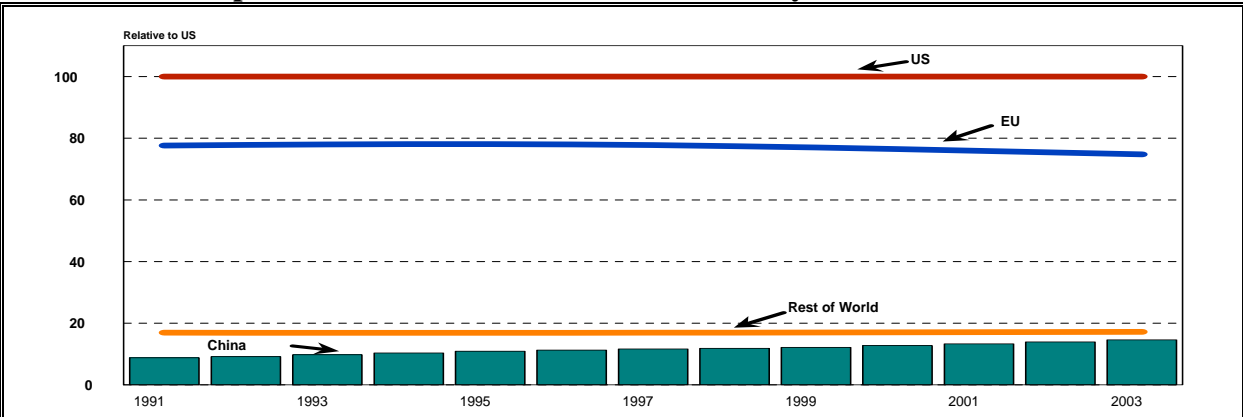
associated acceleration in technological progress. In addition, this latter paper stressed that while the US has also witnessed big negative effects from globalisation in a range of its traditional manufacturing sectors, it has nevertheless managed to turn around its productivity performance by focussing on the newer, leading edge, manufacturing sectors such as ICT and on a further development of a number of its service sectors. What is particularly disturbing about the EU's post-1990 performance is that it has now, for the first time in the post-war period, a trend productivity growth rate which is lower than that of the US. This has occurred despite the fact that the EU's productivity levels are still less than 80% of those of the US (Graph 23). The EU is manifestly suffering from a premature halting, and indeed reversal, of its own secular convergence trend.

Graph 22 : World Trend Labour Productivity Growth Rates : 1991-2003



Note : China is also part of "Rest of World" grouping
 Source : World Bank (World Development Indicators) and own calculations

Graph 23 : World Trend Labour Productivity Levels : 1991-2003



Note : China is also part of "Rest of World" grouping
 Source : World Bank (World Development Indicators) and own calculations

With regard to the emerging economies (i.e. the "rest of world" grouping), according to Graph 22, these countries are making big strides in terms of productivity growth rates, although of course in levels (graph 23) it is clear that the present positive growth rate differentials will need to persist for decades if incomes in these countries are to converge over time to those in the EU and the US. It can of course be argued that productivity trends in the ROW by themselves are not the result of technological convergence but are instead the outcome of higher investment rates. A big issue therefore is to get a clearer idea of the nature and extent of the technology shocks in the rest of the world in order to understand the present and expected future shifts in global production patterns. A knowledge of TFP developments is

crucial for identifying these region-specific technology shocks and for assessing the quantitative magnitude of worldwide technological convergence.

Graphs 24-25 give a decomposition of labour productivity into its capital deepening and total factor productivity (TFP) components and indicate that the upward trend in productivity in the ROW is being driven by both of these factors but with TFP the most significant driver. Of the 1 ½ % points increase in the rest of the world's trend labour productivity growth rate over the period 1991-2003, 80% of it came from an acceleration in TFP growth. In the case of the EU, the greatest share (over 70%) of the downward movement in labour productivity over the same period is due to a decline in TFP growth rates. This is a very important conclusion since TFP is widely regarded as the structural component of productivity growth⁴³, with significant divergences emerging between the efficiency performance of the EU and the rest of the world, especially since the mid-1990's⁴⁴. It is also interesting to compare the performance of China with that of the RoW grouping as a whole. While China has also witnessed a sharp acceleration in its labour productivity growth rate, with the latter rising by 2 percentage points (from 4.6% to 6.6%) over the period 1991-2003, unlike the overall RoW grouping this acceleration is totally due to increased rates of capital deepening. While TFP growth rates are relatively high in China, they have been stable over the period at around 3%, with this trend again questioning the belief that China's recent productivity acceleration reflects domestically generated technological progress⁴⁵.

Graphs 24-25 therefore tell us quite a bit about the nature of the productivity changes in the ROW. Whilst the efficiency gains in the grouping as a whole may reflect more than simply the absorption of technical progress from the developed world in the form of capital accumulation, this appears to be the sole factor explaining the 1991-2003 trend acceleration in China. In addition, while the RoW as a group may be producing new knowledge (i.e. new process or product innovations) which the whole world can gain from⁴⁶, it is not however possible to judge at this stage the extent to which this new knowledge is being derived from their own domestic R&D and human capital endowments or whether it mainly reflects the activities of foreign multinationals. If the ROW trends were simply an absorption story, the implications for the developed world would be less significant compared with a scenario where these countries are producing new knowledge via their own domestic innovation systems and converting this knowledge into a globally competitive industrial structure. The implications for the EU of different interpretations of these TFP trends in the ROW are explored in the simulations in section 5, in particular regarding their effects on terms of trade and production relocation patterns.

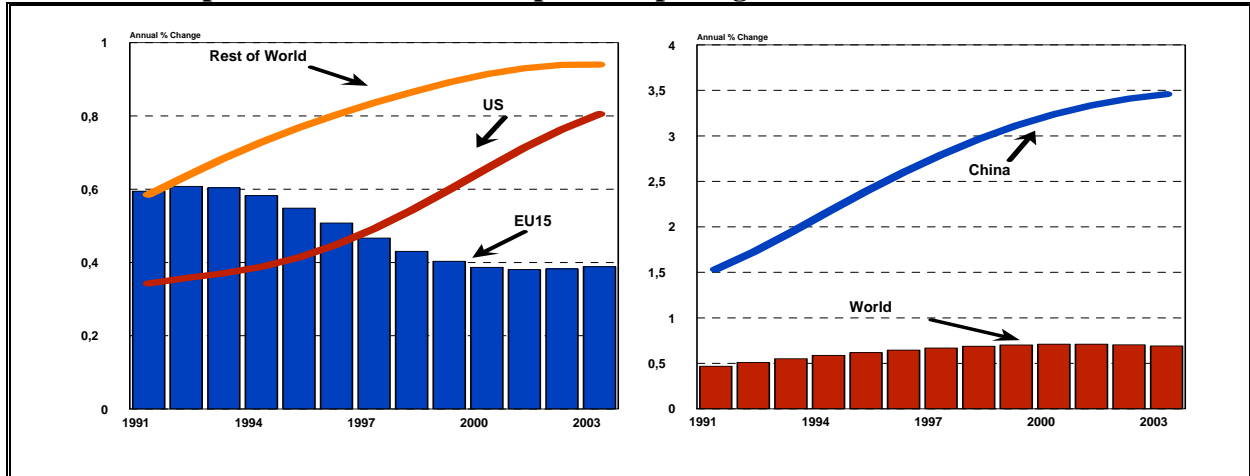
⁴³ Long run labour productivity grows broadly in line with labour augmenting technical progress i.e. TFP.

⁴⁴ As well as the short-term uncertainties related to the strength of consumer demand, the sluggishness of the investment recovery in the EU over recent years is partly related to this longer run structural deceleration in the pace of technical progress, with faster capital accumulation over the coming years dependant on trend improvements in TFP / employment growth.

⁴⁵ China's recent labour productivity growth appears to emanate from a massive accumulation of capital resources rather than from increasing efficiency.

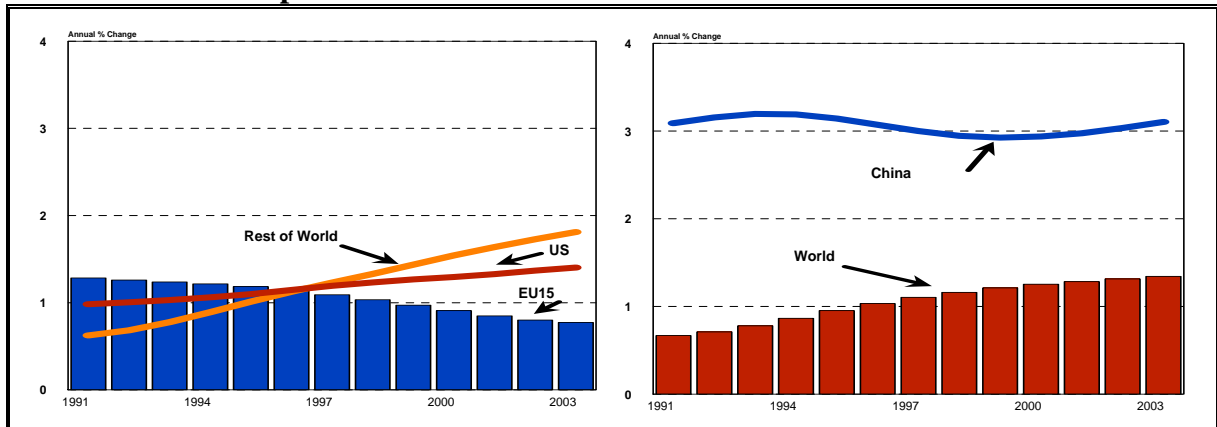
⁴⁶ An example from the 1970's and 1980's would be the just-in-time technology introduced by Japanese manufacturers.

Graph 24 : World Trend Capital Deepening Growth Rates : 1991-2003

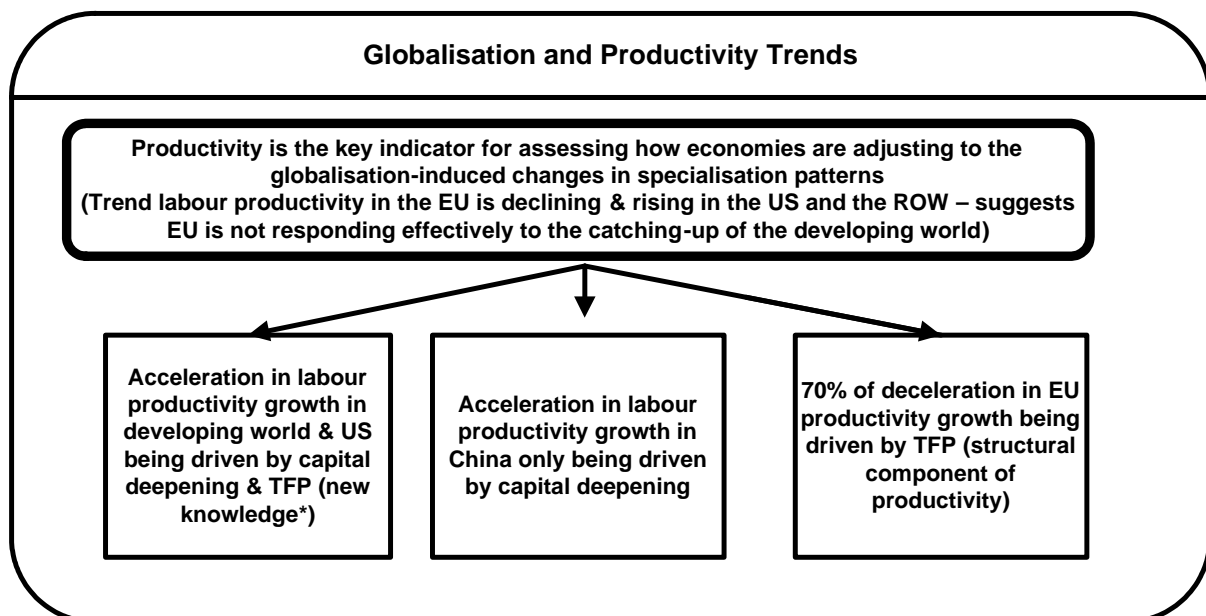


Note : China is also part of "Rest of World" grouping
 Source : World Bank (World Development Indicators) and own calculations

Graph 25 : World Trend TFP Growth Rates : 1991-2003



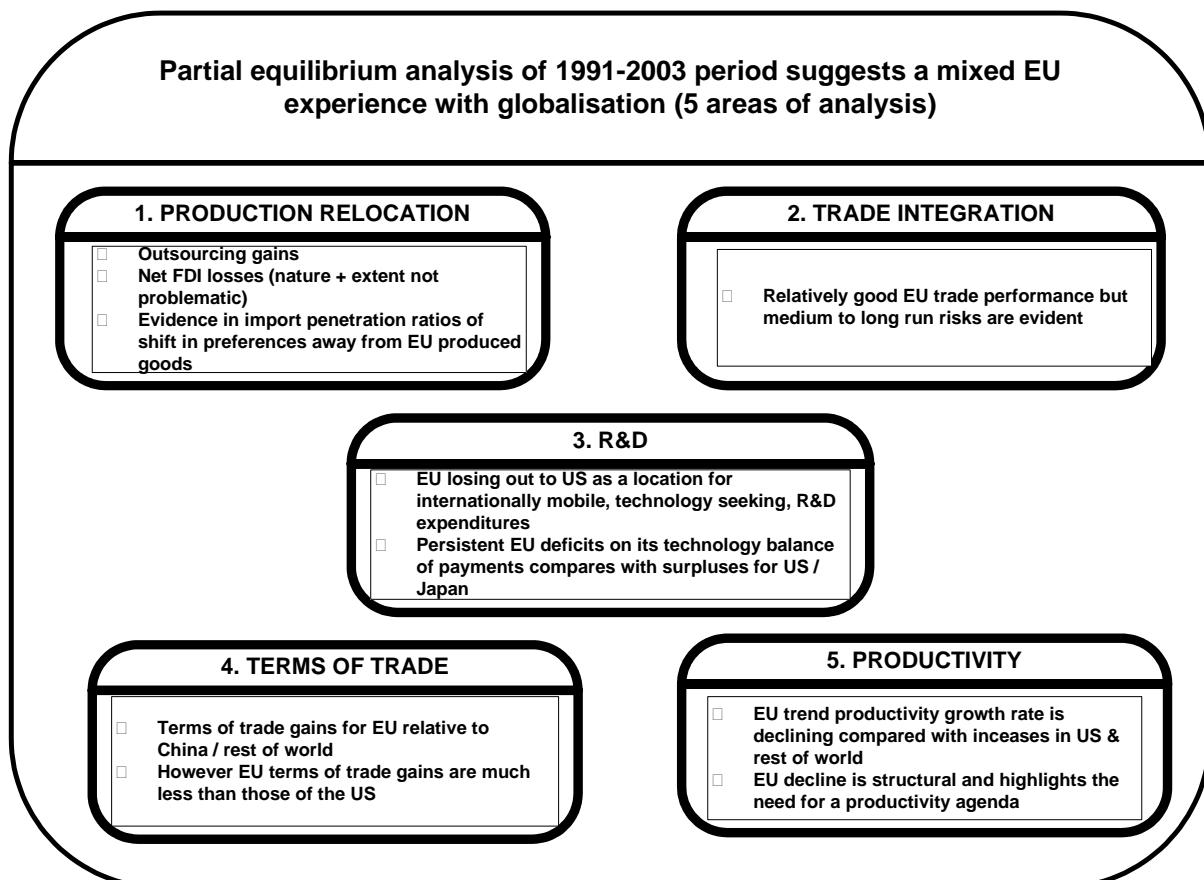
Note : China is also part of "Rest of World" grouping
 Source : World Bank (World Development Indicators) and own calculations



* It is not possible to judge whether the "new knowledge" is being derived from the developing world's own domestic R&D / human capital endowments or from the activities of foreign multinationals

Concluding Remarks

To summarise, the evidence presented in section 4 does not permit a definitive conclusion regarding the overall benefits or costs of globalisation for the EU economy over the last 10-15 years, with a final assessment only being possible on the basis of the general equilibrium simulations to be presented in section 5. Despite this uncertainty, it is fair to suggest that from the partial-equilibrium analysis in the present section that the overall trend for globalisation-related EU indicators has been somewhat negative. This is particularly true for productivity, where TFP trends are pointing to a structural productivity problem in the EU. This TFP conclusion has clear implications for all of the other indicators covered, although lagged effects, and the particular nature of the catching-up process in the ROW, is perhaps clouding the outcome in certain areas, most notably regarding the EU's relatively favourable terms of trade and export performances. On the assumption that the EU continues to be significantly underrepresented in the high technology export sectors (unlike the US and Japan) and that Asia progressively moves into areas of traditional comparative advantage for the EU in the medium-high technology segment of the market, it is reasonable to predict a medium to long run deterioration in both the EU's overall pricing power and in its external trading position. The deteriorating TFP performance in the EU and the associated poor investment environment is also adding to the relatively high level of capital outflows and to the increasing evidence that our import penetration ratios are rising, with particularly high ratios for a number of important ICT products.



Section 5 : Model based assessment of the macro benefits and costs of globalisation

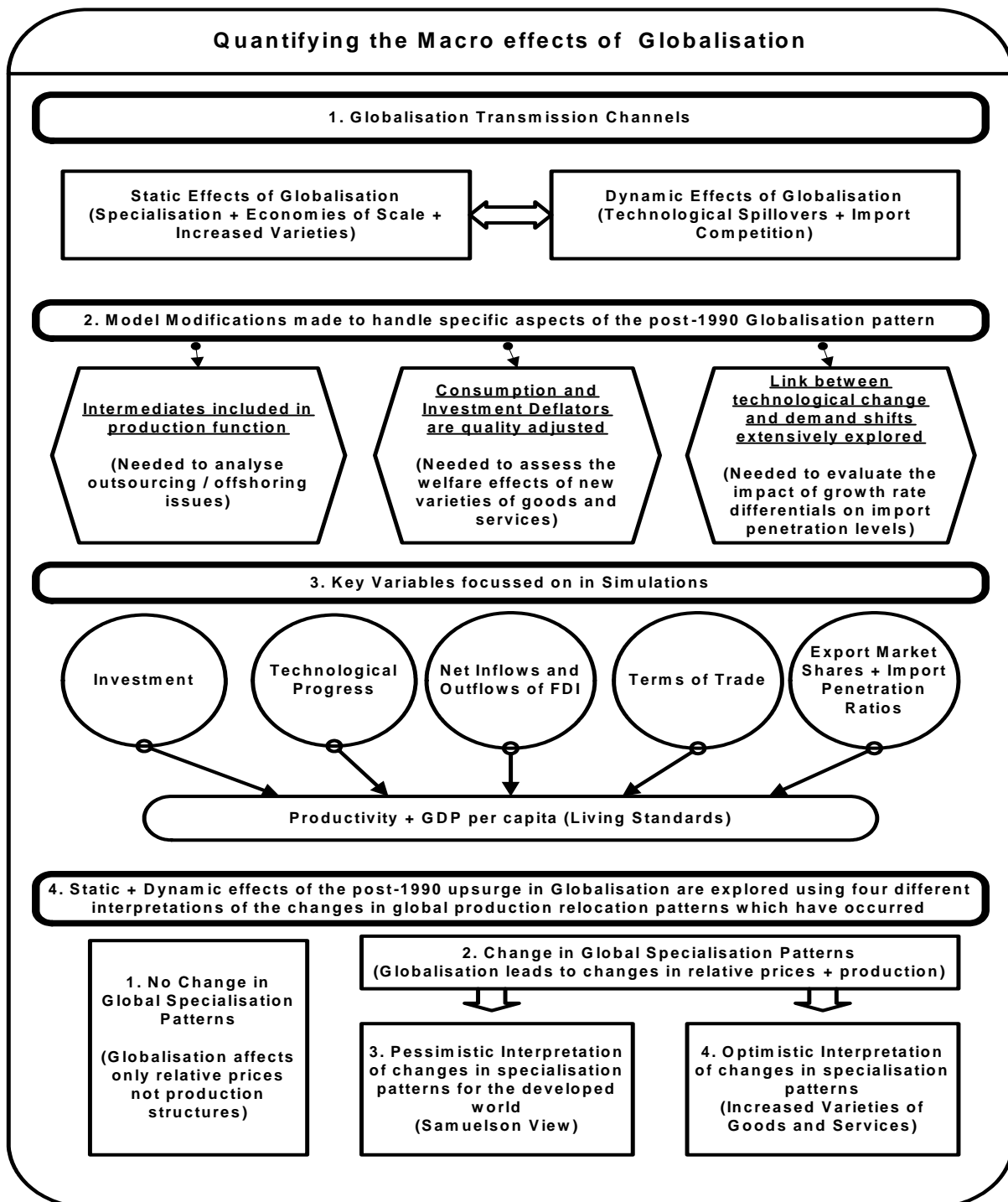
A successful globalisation strategy is predicated on allowing a reallocation of resources to take place within the respective economies. Many countries in Europe are presently placing, excessively heavy, restrictions on this process and consequently the indicator based evidence presented in section 4 has shown that the 1990's have been characterised by, at best, small gains from globalisation and, at worst, small losses. With the public debate overwhelmingly focussing on the short run, potentially negative, aspects of globalisation, such as production relocation and the associated lower domestic investment levels, the positive medium to long run benefits of globalisation are in danger of being ignored or at least underestimated. Against this background, the present section will quantify, in a realistic manner, both the short run adjustment costs of globalisation as well as the longer run potential benefits in terms of higher productivity and GDP per capita growth rates. By doing so it will demonstrate that the present policy response to globalisation in many EU countries is not working, with this inappropriate policy reaction compromising the longer run health of their economies as well as that of the EU as a whole.

5.1 : Main features of globalisation model

Analysing the quantitative impact of globalisation is carried out using a variant of ECFIN's international macro model (QUEST) and using the insights provided by section 4. The summary chart on the next page provides an overview of the modelling approach used to quantify the macroeconomic effects :

- **Transmission Channels** : The model has the capacity to assess both the static (i.e. shifts in comparative advantage / specialisation patterns of countries; gains in terms of economies of scale; and in the availability of new varieties of goods and services) and the dynamic (benefits in terms of increased import competition and from the dissemination of global technological advances) effects of globalisation.
- **Modelling the specific features of the post-1990 globalisation phase** : The model has been adapted in various ways in order to better capture the specific features of the post-1990 phase of globalisation. Firstly, an important feature which has been added is the consideration of imported intermediate inputs in domestic production. This is essential to better reflect the outsourcing phenomenon. Trade in final and intermediate goods and services is explicitly modelled via a CES preference and production structure which allows us to specify the varying degrees to which goods and services produced in different world regions are substitutable. Secondly, a consistent definition of price indices allows us to interpret changes in real consumption in welfare theoretic terms. Finally, based on recent empirical results in international trade, an attempt has also been made to model the link between technological change and demand shifts.
- **Key target variables** : The summary chart indicates that a large range of variables are focussed on in the simulations (investment, technological progress, FDI, terms of trade and export / import market share developments), with the most emphasis being placed on the effects of globalisation on productivity / standards of living.
- **Simulations allow for the testing of different theories regarding the effects of the post-1990 globalisation phase** : Given the conflicting views regarding globalisation, with credible arguments being put forward in both the optimistic and pessimistic

strands of the literature, it is important to evaluate the relative merits of the different hypotheses. This is done in the simulations, where 4 different views on the costs / benefits of globalisation are assessed before drawing any overall conclusions.



It is worth stressing at the outset that quantifying the effects of globalisation at the macroeconomic level is a difficult task and that there are certainly limitations to a purely macroeconomic view of the globalisation phenomenon. The process of globalisation does not affect the economy in a uniform manner. It affects sectors and occupations to varying degrees. Not being able to identify the critical sectors and their interactions with the rest of the economy in a detailed way is a weakness of any macro analysis. Nevertheless a macro

approach offers many advantages. Sectoral studies are by definition partial in nature and they miss important economic feedback mechanisms. In contrast, international macro models such as QUEST allow for the consistent modelling of international trade and financial flows by considering equilibrating mechanisms, operating via adjustments in the terms of trade, which establish long run internal and external balance. In fact the quantitative analysis conducted in this section emphasises international capital flows, by looking at how they respond to globalisation related shocks and by further analysing repercussions on other important macro aggregates such as consumption, investment and productivity.

5.2 : Quantifying the static and dynamic effects of globalisation

5.2.1 : Simulations allow for 4 different interpretations of the macroeconomic effects of the post-1990 globalisation phase

In order to conduct a meaningful analysis of globalisation it is important to first define what globalisation means in terms of quantifiable shocks hitting the world economy. Here we go back to our earlier definition of globalisation where we stated that the major impulse for the current globalisation phenomenon is a process of technological convergence in a number of emerging economies, mostly located in central and Eastern Europe, Asia and parts of central and Latin America. As discussed earlier, technical progress, defined as the growth rate of TFP, has been about $\frac{1}{2}$ a percentage point higher in the RoW compared to the EU15 over the last decade, with the trend in recent years pointing to gaps of 1% or more. It is assumed in the simulations that the average 1991-2003 growth rate differential of $\frac{1}{2}\%$ is likely to persist over the next 50 years and to gradually decline thereafter⁴⁷.

As indicated earlier in the paper, one important element for assessing the spillover of technical progress from the RoW to the industrialised economies is the degree to which increased technological capacity in the RoW leads to changes in global production patterns. More specifically, to what extent will worldwide income and technological convergence lead to the relocation of production from one country to another for a range of goods and services. Consistent with the estimates of Gagnon (2004), bilateral imports of country *i* from country *j* are positively affected by the growth rate differentials between the two countries⁴⁸. The available estimates suggest that a growth rate differential between the catching-up country and world GDP growth of 1% shifts its imports by about $\frac{1}{2}$ a percentage point (i.e. every 1 percentage point growth differential is associated with a 0.5 percentage point shift in that country's demand for intermediate and final imports). An important question remains however : how does this affect the number / variety of goods and services produced in the

⁴⁷ What is happening after 50 years is highly uncertain. However, whatever assumptions we make for the period after 2050 will not affect the results for the first 25 years very strongly.

⁴⁸ The available estimates suggest that the import demand shift in bilateral import equations can be represented as a function of the TFP growth rate differential between the exporting country *j* and the rest of the world. The derived parameter value gives the magnitude in which productivity changes in country *j* translate into import demand shifts in country *i*. In this context, most of the literature on empirical trade regressions refers to import demand in terms of final goods. Final goods refer to the demand for imported investment and consumption goods. There is however a second demand shift which the present analysis also considers, namely the demand for imported intermediates as inputs into the production processes of domestic industries. Like in the case of the demand for final goods, two aspects of intermediates must be distinguished. An increase in technology in the rest of the world increases the demand for intermediates, simply because this demand is price elastic. However a second effect could also be playing a role, especially since the early 1990's. Over these years, technological and other developments (improved global communication systems; reductions in transport costs and tariffs; a larger share of goods being traded which have low transportation and handling costs, for example ICT goods and services) could have been biasing overall trade towards imported intermediates. These efficiency improvements in international production (in a wider sense) are also linked to TFP improvements in the rest of the world. Increasing trade integration drives these efficiency gains through the increased competition which the wider market generates and via the international division of labour (i.e. the specialisation by people and economies on what they do best).

industrialised economies ? From the perspective of the EU, at least four alternative global production relocation patterns can be distinguished :

- ***Global relocation pattern 1 (no change in specialisation)*** : Under this scenario, catching-up in the rest of the world does not fundamentally change the structure of traded goods and services. Rapid technical progress enables emerging economies to produce the goods they traditionally supplied to the world market at a lower cost. In this scenario, “relocation” only therefore takes the form of changes in relative prices whilst the pattern of international specialisation remains unchanged.
- ***Global relocation pattern 2 (change in specialisation)*** : For this second scenario, it is assumed that technological progress in the rest of the world enables emerging market economies to produce goods and services which were formerly only produced in the more advanced countries. This causes firms in the industrialised economies, such as the EU, to exit the market or to move production abroad. Certain types of goods formerly produced domestically in the EU are replaced by imports. Consequently, technological convergence leads to shifts in relative demand. This process is modelled via a positive shift in the import demand equation for the EU and a negative shift in the demand for domestically produced goods. However, while there is a shift in the pattern of specialisation, the number of varieties of goods and services is not changed globally.
- ***Global relocation pattern 3 (pessimistic assessment of a change in specialisation : "Samuelson View")*** : This scenario is a variant of pattern 2, with the only difference being that technical progress in the RoW is assumed not only to lead to the production of goods and services which directly compete with those of industrialised countries in world markets but in addition it leads to the substitution of imports in the RoW by domestic production. There is therefore a negative shift of import demand in the RoW associated with the positive demand shift towards domestically produced goods. This scenario is manifestly more negative for the EU compared with scenario 2, with import substitution in the ROW leading to reduced exports for the EU and to less favourable terms of trade effects.
- ***Global relocation pattern 4 (optimistic assessment of a change in specialisation)*** : This is also a variant of scenario 2 but this time the outcome is more favourable for the EU. The important difference with the earlier scenario is that the introduction of new goods and services by the RoW does not lead to a displacement of domestically produced EU goods and services. This scenario is an attempt to capture the gains for EU consumers and investors from an increased variety of intermediate and final goods and services⁴⁹. In this case the upward shift in the EU’s import demand equation is not accompanied by a downward shift for domestically produced EU goods and services.

The overview of the simulation results presented in 5.2.2 explores the impact of globalisation under these four alternative scenarios. Obviously the “truth” will be found in a combination of all four patterns. Nevertheless it is useful to look at these extreme simple cases in order to see the range of possible outcomes. The simulations describe the main static and dynamic effects of globalisation on the EU and the rest of the world. The results have been presented as a

⁴⁹ Scenario 4 admits that there is a shift in the demand for goods produced in the ROW. However these goods are not regarded as competing with goods produced in the EU/US but the ROW is adding new varieties which induces consumer benefits.

range of possible outcomes. This approach was adopted to reflect the high degree of uncertainty attaching to the long run evolution of a number of key GDP per capita determinants, such as import propensities; terms of trade; the investment climate in the EU; and the effects of higher levels of competition, restructuring and technological spillovers.

In addition to technological convergence, another important globalisation feature which is emphasised in the simulations is the substantial liberalisation of international capital and trade flows since the beginning of the 1990s. Of course trade barriers due to distance (transportation costs) remain but these are largely symmetric.

Finally, regarding the employment effects, it is assumed for all the simulations that wages adjust to keep the level of employment constant. While this is undoubtedly a simplification, it has the advantage of summarising the effects of globalisation on the labour market by a single indicator, namely real wages⁵⁰. With a standard wage equation in place in the model, the impact would have been split into wage and employment effects. Another way of looking at this convention is that it provides information on how much wages will have to adjust in order to keep employment constant. In most cases while real wages may need to adjust downwards in the short run, this is not the case over the longer run where gains are evident from the improvement in the terms of trade. This overall effect does not however make a distinction between skilled and unskilled workers and consequently no conclusions can be drawn in terms of the income distribution consequences of globalisation⁵¹. Future modifications to the model will hopefully make such an analysis possible.

5.2.2 : Overview of Simulation Results (see annex 2 for the detailed results)

Three essential issues are addressed in the simulations :

- Firstly, from a backward looking perspective, we are interested in the extent to which the evolution of the main macroeconomic aggregates over the last 15 years have been influenced by the globalisation process and whether the EU has gained or lost from this process. The conflicting interpretations of recent globalisation trends reflects the fact that the catching-up process is driving big shifts in international production patterns and it is difficult to estimate the gains / losses from this process for the developed world. The key issue is whether the globalisation induced shifts in international production patterns are positive or not for the EU i.e. has the increase in outsourcing, offshoring and shifts in international demand patterns added to EU living standards or not. In effect the simulations are trying to quantify the trends discussed earlier in section 4;

⁵⁰ What is the degree of real wage adjustment which is necessary at the macro level in order to ensure that there is no negative employment effect from globalisation.

⁵¹ While not quantified, many studies suggest that a significant real wage adjustment will result for particular skill groups and sectors. If there is a decline in the demand for unskilled workers, this will manifest itself in either higher levels of structural unemployment / lower employment rates (in countries with inflexible labour markets) or in a decline in the relative wages of unskilled workers / increasing income differentials (in countries with more flexible labour markets). Trade liberalisation has in fact a similar economic effect to technological progress – it allows economies to consume more without any increase in their available resources by exporting what they don't want and importing what they do. Also, like technological progress, trade liberalisation creates winners and losers but the evidence suggests that technological change is much more important in explaining income inequalities in a country since technology is stronger than trade in driving the demand for skilled labour. W. Cline (1999) estimated that technological progress was close to 5 times more powerful than trade integration in widening the ratio of skilled to unskilled wages in the US over the period 1973-1993. Technological change is clearly skill-biased.

- Secondly, from a forward looking perspective, the simulations attempt to establish how the European economy will be affected, on a no-policy-change basis, by a continuation of current globalisation patterns both in static and dynamic terms; and
- Finally, given the rise in protectionist sentiments in many developed economies, the globalisation model is used to look at the effects of an anti-globalisation scenario which is characterised by increased trade tariffs and a reduction in capital mobility.

The model is used to examine these 3 issues and it does this by providing upper and lower bounds of globalisation-induced spillover effects for the EU economy, both in the short and long run. The simulations isolate the key transmission channels from globalisation to productivity and GDP per capita trends. The static effects of various hypotheses regarding import penetration and terms of trade movements have been underlined, as well as the beneficial effects of globalisation from greater product varieties and from the dynamic influences discussed earlier. These more dynamic effects would be expected to result in gains for the EU in terms of product upgradings (i.e. higher value added goods and services) and a recovery in TFP growth rates. Graph 26 and Table 4 give a summary of the range of outcomes which are possible from the different interpretations of the implications of present globalisation patterns. The results are presented in terms of the outturn for the EU's GDP per capita performance. The main points to be highlighted are as follows :

- **Overall assessment of the static effects of globalisation on the EU** : In purely static terms (i.e. simply allowing for first round effects), graph 26 shows that the post-1990 globalisation phase, and the associated production relocation from EU15 countries to emerging market economies, has only had marginal effects over the period 1991-2003 on the growth rate of EU living standards. If one assumes that the conventional trade and growth view holds (i.e. no change has occurred in the pattern of worldwide comparative advantage), then the growth rate effect over this period has been essentially zero (not shown in Graph 26 since the effects are so consistently close to the zero line). If, on the other hand, one assumes that globalisation has led to shifts in international specialisation patterns, the maximum negative effect would still only be of the order of 0.1 of a percentage point off the growth rate of EU living standards over the period 1991-2003. Even this negative impact is shown to be a short run adjustment effect, with the long run static impact of globalisation over the complete period 1991-2050 being roughly zero. In addition, the present relatively negative EU effects from the post-1990 globalisation patterns should be compared with the much more positive US experience with the catching-up processes of the EU and Japan in the post-WW2 period. A similar policy response to the catching-up processes of countries such as China and India could bring equivalently large gains to a number of EU member states.
- **Has the EU lost or gained from global production relocation ?** : Regarding the phenomenon of global production relocation, the present study shows that its macroeconomic effects are in fact relatively small. In the worst case scenario (i.e. the Samuelson view), the maximum negative effect would be -1.3% in 2015 on the level of EU GDP per capita which is equivalent to .05 off the EU's annual average growth rate over this period. In addition, the effect in 2050 would be close to zero in growth rate terms. This is not of course in contradiction with the widespread popular view that production relocation is having significant sectoral and regional effects. It just stresses that the net effect of globalisation-induced changes in international production patterns

is extremely small for the EU as a whole, with any localised losses in specific sectors being offset by gains elsewhere in the EU's economy.

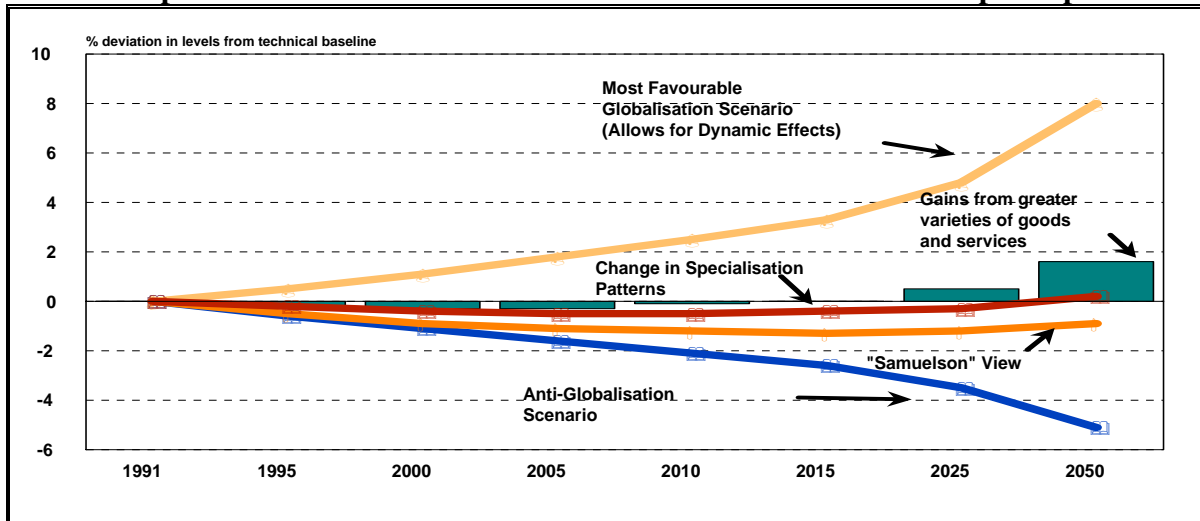
- **How does the interpretation of globalisation change if dynamic effects are taken into account in the simulations ?** : If one allows for the possibility of more dynamic effects from globalisation in terms of restructuring from heightened competition levels and from technological spillovers from the rest of the world, the EU has the potential to achieve significant efficiency gains from the ongoing global convergence process and from the associated reallocation of productive resources. On the basis of the most optimistic scenario, the level of EU GDP per capita would increase by about 8% over the next 4-5 decades which is roughly equivalent to 0.2 on the annual average per capita income growth rate over this period. This is broadly equivalent to the expected impact from the EU's single market programme. Such a scenario would also result in a 30% gain in income levels for the rest of the world, thereby ensuring a strong degree of catching-up for the emerging economies and a successful integration process for both developed and developing countries⁵². Given that extra EU goods and services trade amounts to less than 18% of EU GDP, an annual growth rate effect of 0.2 constitutes a significant gain, especially since the competitive environment in the EU is relatively intense due to the high degree of integration which has already been achieved. In absolute terms an 8% increase in per capita income levels amounts to a permanent annual gain in living standards of about €2000 in 2004 prices for every EU citizen (over €5000 per EU household)⁵³.
- **Would a "fortress Europe" policy be a good option to pursue ?** : Regarding the effects of actions to slow down or even reverse the trend towards greater global integration, the results of the simulations are unambiguously negative. All 3 anti-globalisation scenarios described in Annex 2 show negative effects for the EU and the rest of the world, with the most pessimistic scenario suggesting that the level of living standards in the EU could be up to 5% lower. Consequently, while the protectionist route may appear initially alluring to politicians relative to the alternative of global competition, in the long run it is a policy which will be highly negative for EU citizens in terms of efficiency levels and overall welfare⁵⁴. Outward-oriented policies are manifestly essential for dynamism and greater prosperity.

⁵² Immense productivity gains (and consequently real wage / income gains) are possible as a result of the increasing international division of labour. Globalisation is therefore good for global economic prosperity. The EU must introduce policies which ensure that we take our fair share of the gains to be distributed from integration.

⁵³ These gains can be enjoyed annually since trade and investment liberalisation and the lowering of transport and communication costs via technological progress permanently increase the national income level of countries. In addition, if the dynamic effects of heightened competition / R&D spillovers on innovation / reskilling of workers are taken into account greater global integration can permanently (i.e. for 30-40 years) increase the rate of per capita income growth (i.e. a key idea of endogenous growth theory).

⁵⁴ Quote from A. Johnson, UK Trade and Industry Secretary, "The paradox of protectionism is that it destroys what it seeks to protect" (Financial Times, February 2006). Resorting to protectionism and trying to shield jobs and industries from international competition only reduces economic efficiency, income and employment opportunities in the long run. An anti-globalisation stance is therefore not tenable. The only credible way to react to the emergence of the developing world is to keep EU markets open and exposed to global competition (this is essential to force adjustment on companies / countries), whilst investing additional resources in skills and technology (which is essential to move up the value added chain).

Graph 26 : Overview of simulation results : Effects on EU GDP per capita



Source : Own calculations

KEY SIMULATION RESULTS

Static -first round- effects of globalisation are small
(Not surprising given firstly the offsetting influences described in section 4 & secondly the fact that extra-EU markets account for less than 18% of EU GDP)*

Real gains from globalisation are dynamic in nature
(The restructuring / innovation induced by the increase in competition / technology spillover effects / skill transfers could provide permanent productivity / GDP per capita gains for EU citizens of 8%)

Transition costs of globalisation are small & once-off.
Long run gains of globalisation are large & permanent

Fortress Europe policy would economically be highly damaging both for the EU and developing economies

* Furthermore, future static gains for the EU and the US from shifting resources to take account of comparative advantages and to exploit economies of scale are modest given relatively similar technologies, factor endowments and consumer preferences in both geographical areas. Since the EU and the US are both close to the technology frontier, the most important long-term effect from a more integrated global market economy are the potential dynamic gains from the boost to innovation from heightened levels of competition and from access to new technologies. Greater levels of innovation leading to the development of productivity enhancing technologies has the potential to boost the long run growth rates of both economies.

Table 4 : Overview of Simulations

	Assumption Regarding Globalisation (all simulations assume productivity convergence in the developing world)	Key Implications of Assumptions underlying the Simulations	Main Outcome – GDP per capita level effect		Consistency with empirical evidence 1990-2003
			2005	2050	
Static (“First Round”) effects					
1	No change in specialisation	<ul style="list-style-type: none"> • Relative Price Effects : Catching-up of developing countries does not change the structure of traded goods and services (intermediates + final) – only leads to changes in relative prices 	-0.2	0.6	Terms of trade developments over 1990-2003 seem to support this view
2	Change in specialisation	<ul style="list-style-type: none"> • Relative Demand Effects : Developing countries start to produce intermediate and final goods previously only produced by the developed economies such as the EU and the US. • EU firms exit the market or move production abroad which leads to increases in import penetration levels 	-0.5	0.2	View supported by import penetration levels
2 a	Pessimistic assessment of change in specialisation (Samuelson View)	<ul style="list-style-type: none"> • Import Substitution in Developing World : In addition to the production of goods and services which directly compete with EU and US products, developing countries start to substitute imports with domestic production • Result : Lower exports from EU / US to these countries (i.e. reduced output) + less favourable terms of trade developments 	-1.1	-0.9	Little evidence over last 10-15 years to support this view
2 b	Optimistic assessment of change in specialisation (Varieties)	<ul style="list-style-type: none"> • New varieties : Introduction of new goods and services does not lead to a displacement of domestically produced goods and services 	-0.3	1.6	Gains here are difficult to measure (Problem : quality adjusted deflators)
Dynamic Effects					
3	Benefits of globalisation go beyond the initial “first round” effects on consumers and firms, emanating from lower prices and a greater range of goods and services	<ul style="list-style-type: none"> • Competition : Globalisation has an impact on competition levels and therefore on price / cost mark-ups • TFP Spillovers : Potential for higher levels of technological (i.e. TFP) diffusion • Scenario assumes change in specialisation and is directly comparable with No 2 above 	1.8	8.0	Evidence is limited for these dynamic effects over 1990-2003 period (Productivity trend in EU is declining sharply as is the TFP trend)

ANNEXES

Annex 1 : Modelling the globalisation-induced relocation of production processes at a macroeconomic level

Annex 2 : Detailed simulation results

Annex 3 : Trade regressions

Annex 1 : Modelling the globalisation-induced relocation of production processes at a macroeconomic level

There is substantial empirical evidence that technical progress occurring in a certain region goes along with changes in the structure of international production. Countries with above average rates of technical progress are expanding the menu of goods and services that they offer on the world market. In particular a technological innovation in an emerging economy can be such that an industrialised country can lose its comparative advantage for the production of certain goods, with the consequence that production moves from one country to another. The international switch of production locations is what we call “global relocation”. Notice, this is a more general concept than outsourcing or offshoring, since it applies to finished and intermediate goods. This annex shows how this process is modelled in the globalisation variant of the QUEST model which is used for the simulations in the present paper.

QUEST, like any standard macro model uses a system of import demand equations that are a function of the aggregate demand for consumption, investment by households, firms and the government and the relative price of imports. This is the so called elasticities approach. A key assumption of the elasticities approach is that each country produces an aggregate commodity which is an imperfect substitute for goods (aggregates) produced in other countries. This assumption is often referred to as the Armington (1969) assumption. The one good assumption hides the fact that the aggregate itself is undergoing substantial structural changes, among them changing patterns of comparative advantage. This process can be modelled at an aggregate level if one properly defines the aggregate from an underlying structure of preferences over domestic and foreign varieties. Krugman (1979) was the first to start from a more disaggregated approach to modelling macro trade relationships. The CES utility function introduced by Dixit and Stiglitz (1977) has become the standard vehicle for representing preferences. Let

$$X_r = \left[\sum_{i=1}^{N_D} X_{r,i}^D \frac{\sigma-1}{\sigma} + \sum_{i=1}^{N_F} AX_{r,i}^F \frac{\sigma-1}{\sigma} \right]^{\frac{\sigma}{\sigma-1}}, \quad \sigma > 1, \quad A \leq 1, \quad X = (C, I), \quad r = (Dom, For)$$

be a utility function for the domestic economy (region r) defined over N^D domestic and N^F foreign varieties. The parameter σ denotes the elasticity of substitution between the individual varieties⁵⁵. The parameter A denotes the home bias. Utility maximisation subject to a budget constraint allows us to derive aggregate demand functions for imports and for domestically produced goods :

⁵⁵ The actual structure of preferences is slightly more complicated, especially if it allows for different elasticities of substitution (eos) between domestic and foreign goods.

$$X_r^D = s_r(N^D) \left(\frac{P_r^D}{P_r} \right)^{-\sigma} X_r$$

$$X_r^F = s_r(N^F) \left(\frac{P_r^F}{P_r} \right)^{-\sigma} X_r$$

Aggregate demand for goods produced domestically (X^D) and for imports (X^F) are a function of aggregate demand, relative prices and product variety. By starting from individual commodities it can be seen that in contrast to the standard Armington specification, there is a third important factor, namely changes in the number of varieties which can explain variations in import demand and the demand for domestically produced goods. Assume that the world economy initially produces N goods. The subsets N^D and N^F are produced domestically and abroad. Now suppose that technical progress enables the foreign economy to also produce some of the N^D goods at a lower world market price, then the production location for these goods will change, N^F increases and N^D declines. At the aggregate level this leads to an upward shift in the import demand equation and a downward shift in the demand function for domestically produced goods.

In the conventional view, changes in demand only occur as a response to relative price changes. The modern trade theory view allows for additional structural shifts due to the introduction of new goods in one region and thus allows for an additional globalisation channel, besides the relative price channel. Notice, shifts in the demand functions for domestic and imported goods will in general be associated with relative price changes. The new view allows us, however, to distinguish between the sources for price changes. In particular it distinguishes between cost changes across regions which are due to product innovations and cost changes due to other sources. For example, if the change in relative costs is due to relative shifts in labour supply but does not affect technological capacities, then only the conventional price channel would be operative. If relative costs are changing due to the introduction of new products then in general both the price channel and the variety channel would be operating simultaneously.

This view on aggregate trade equations thus offers more possibilities to model the link between technical progress in individual regions and shifts in domestic and foreign demand components and thereby obtain a better macroeconomic representation of globalisation. There is indeed substantial factual evidence that empirically estimated shifts in import equations are related to product innovations in the exporting region. Shifts in import demand can be explained by growth differentials between the exporting and the importing region (see Annex 3 and the literature cited there). In the empirical trade equations used in the QUEST model, the ‘shift terms’ are modelled as follows :

$$s_r(N^i(TFP_r^D, TFP_r^F)) = \left(\frac{TFP_r^i}{TFP_r^D + TFP_r^F} \right)^{\psi_r(i)} \quad \text{with } i = (D, F) \text{ and } \psi(i) \in [0, 1]$$

thereby establishing a link between changes in relative TFP and product innovations. In the scenarios presented in this paper, four production relocation patterns between the rest of the world (RoW) and the EU are distinguished.

Relocation pattern 1 : Catching up in the RoW does not fundamentally change the structure of traded goods and services. Rapid technical progress essentially enables emerging economies to produce the goods they traditionally supply to the world market at lower cost. “Relocation” only occurs via relative price effects but the pattern of international specialisation remains unchanged. This is modelled by setting $\psi_r(D) = \psi_r(F) = 0$, $r = RoW, EU$ 15.

Relocation pattern 2 : Technological progress in the rest of the world enables emerging market economies to produce goods which were formerly only produced in the current industrialised countries. This causes firms in the industrialised economies to exit the market. Certain types of goods formerly produced domestically are replaced by imports. This process is modelled via a positive shift in the import demand equation and a negative shift in the demand for domestically produced goods. There is a change in the pattern of specialisation. However, the number of varieties is not changed globally. This is modelled by setting $\psi_{EU}(D) = 1, \psi_{EU}(F) = 1$, and $\psi_{RoW}(D) = 0, \psi_{RoW}(F) = 0$.

Relocation pattern 3 : The same as pattern 2 concerning the EU but in addition it is taken into account that technical progress in the RoW leads to import substitution by domestic production. There is a negative shift of import demand in the RoW associated with a positive shift in the demand for domestically produced goods.

$$\psi_{EU}(D) = 1, \psi_{EU}(F) = 1, \text{ and } \psi_{RoW}(D) = 1, \psi_{RoW}(F) = 1.$$

Relocation pattern 4 : This is similar to pattern 2, with the difference being that the introduction of new goods by the RoW does not lead to a displacement of domestically produced goods in the EU because the RoW introduces new goods. In this case the upward shift in the import demand equation is not accompanied by a downward shift in the demand for domestically produced EU goods and services. The parameter values characterising this pattern are given by $\psi_{EU}(D) = 0, \psi_{EU}(F) = 1$, and $\psi_{RoW}(D) = 1, \psi_{RoW}(F) = 0$.

The introduction of new goods to the world market adds an additional welfare gain, since preferences are characterised by a love of variety ($\sigma > 1$). The quality change due to new goods is measured by a quality adjusted price index which is derived from the utility function. In the QUEST model, a consumption based price index P is defined consistently with the underlying CES preferences as the minimum expenditure for goods X_i^D and X_i^F such that $X(X_i^D, X_i^F) = 1$, given relative prices. The consumer price

index measures the least expenditure for X_i^D and X_i^F that buys a unit of the consumption index. How does the introduction of new goods change this index ? The price index is defined as follows :

$$P = \left[N^D P^D (1-\sigma) + N^F P^F (1-\sigma) \right]^{\frac{1}{1-\sigma}} .$$

Under the assumption that consumers value the introduction of new goods ($\sigma > 1$), an increase in the number of foreign goods ($\Delta N^F > 1$) lowers the price index, thus indicating a rise in the value of real consumption.

Annex 2 : Detailed simulation results⁵⁶

The simulations try to provide answers to 3 key questions –

- What are the static effects of globalisation ?
- Does allowing for dynamic effects alter the fundamental conclusions concerning globalisation ? and
- Would the EU benefit from a shift towards anti-globalisation policies ?

1. Static Analysis of Globalisation

Static Analysis of Globalisation : What are the longer run implications for the EU of a persistence of the 1991-2003 trends ? : Looking back at the last 10-15 years, the question can be posed whether the relatively strong growth in the RoW over this period has in total been rather beneficial or harmful for the EU's economy. A priori a clear answer to this question cannot be given. On the one hand, it can be argued that growth in the RoW generated additional demand for EU exports. But this must be compared to the potentially increased levels of import penetration in the EU and the possibly detrimental effects from capital outflows. Could capital outflows in the last decade have contributed to lower EU15 investment rates and consequently could they have been a factor behind the slowdown in EU productivity growth ? Furthermore, can the observed growth divergences possibly explain the magnitude of the change in the terms of trade and import shares and how do these effects translate into the growth of consumption, investment and GDP as well as to changes in the trade balance ? Section 1.1 below assesses whether the first 2 "relocation" patterns described in Section 5 of the main text are compatible with the stylised facts of the post-1990 period, with 1.2. looking at pessimistic and optimistic variants of the second pattern (i.e. that a change has occurred in global specialisation patterns).

⁵⁶ Static V Dynamic Gains : The specialisation inherent in the principle of comparative advantage has a positive effect on productivity via two channels :

- Firstly, static - level - effects (i.e. one-off efficiency improvements from the reallocation of domestic factors of production to their most productive uses) and
- Secondly, dynamic – growth rate – effects (i.e. on-going efficiency gains from two of the key drivers of productivity growth - namely competition and innovation – as well as from a more rapid access to, and diffusion of, new technologies). Trade and investment liberalisation stimulates the imitation and adoption of foreign technologies and the search for new, domestically generated, technologies via the innovation process.

While relatively easy to define, in practice it is often difficult to differentiate between static and dynamic gains since the one-off gains from the re-allocation of resources do not appear instantaneously. In general, however, it is fair to conclude that the growth rate effects (i.e. via increased competition and innovation) are potentially more important than the efficiency / allocation effects.

1.1 : Are present globalisation trends leading to changes in international specialisation patterns or not – a review of the different viewpoints

Simulation 1 : No change in specialisation patterns - the conventional trade and growth view (“relocation” pattern 1 – see description in Section 5 of main text): This first scenario is close to the conventional trade and growth view, based on the notion of comparative advantage / specialisation. According to this view of globalisation, growth in the ROW does not lead to a change in the pattern of international specialisation. In other words TFP growth in the ROW does not lead to a shift in demand in favour of this region, beyond the effect generated by the change in the terms of trade. Without a shift in preferences, the welfare effects (measured by private consumption) of an increase in foreign TFP are significantly larger. With a TFP growth rate differential of roughly 0.5%, Table 1 and Graph 1 show that after 50 years the level of output in the rest of the world has grown by nearly 30% relative to a technical baseline which assumes that no catching-up occurs. Relative to the EU’s GDP per capita level, this would imply an increase from about 25% of the EU average at present to 55% in 2050.

Concerning the EU itself, the long run output effect is slightly positive. However, there is an adjustment process, characterised by a period of investment falling below baseline levels, linked with the relocation of capital to the faster growing regions. The negative investment response peaks between 5 and 10 years after the initial shock where at its maximum its level is down by about 1%, i.e. the annual average growth rate of investment is reduced by about 0.1%. The real consumption wage recovers relatively quickly because of the terms of trade gains⁵⁷ and turns positive after 10 years despite the fact that productivity levels remain below baseline for much longer. Also consistent with recent economic developments in the EU, the relocation of capital to the rest of the world (ROW) has been associated with a positive trade balance effect over the 1990-2005 period. Globalisation is associated with an increase in the import share for both final and intermediate goods (due to cheaper existing products) and with a small loss in the EU’s world export market share. Compared to the actual increase in the EU’s import share over this period, the model generated increase is on the low side and consequently the results may be on the optimistic side.

In overall terms, under this scenario, the negative short run effects for the EU from production “relocation” slightly dominate the positive effects from increased world demand and from the improvement in the EU’s terms of trade. However, EU households benefit in the medium to long run in terms of improved terms of trade and from the higher interest income from abroad (from the earlier capital outflows). The increase in the terms of trade derives from the fact that the acceleration in productivity in the ROW, and the associated price declines, dominates the positive effects on prices from the shift in import demand towards goods produced in the ROW. As explained in the main text, this pattern is not inconsistent with the terms of trade developments as observed over the last 15 years (see graph 19 in section 4).

⁵⁷ The model uses quality adjusted price indices. Standard consumer deflators underestimate the degree of price declines due to increased import variety.

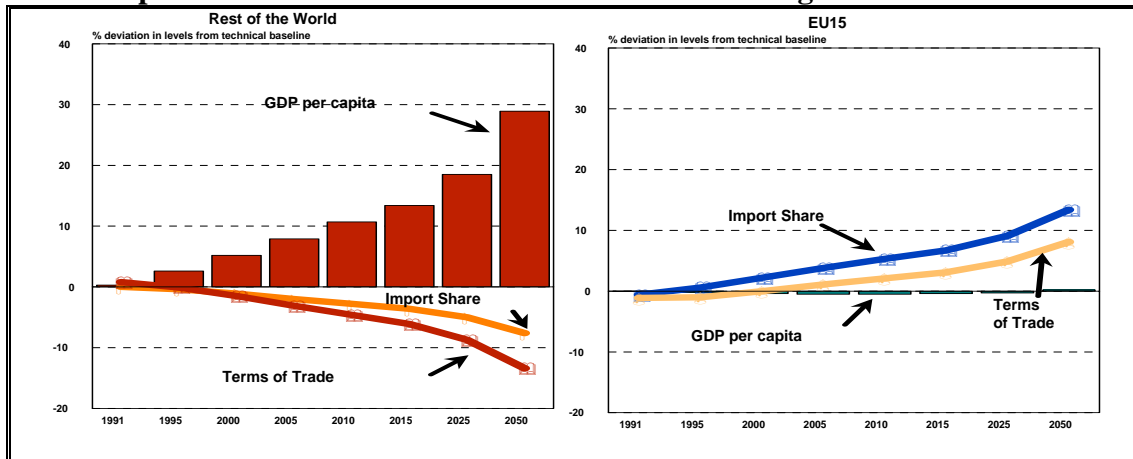
Table 1 : Simulation 1 – No shifts in international specialisation patterns (conventional trade and growth view)

Effects on Rest of World				
	1991	2005	2025	2050
GDP per capita	0.3	7.9	18.5	28.9
Terms of Trade	0.8	-3.1	-8.7	-13.4
Import Shares (Final Goods and Services)	0.0	-2.0	-5.0	-7.6
Effects on EU				
	1991	2005	2025	2050
GDP per capita	0.0	-0.2	0.0	0.6
Terms of Trade	-0.5	2.5	7.1	11.1
Import Shares (Final Goods and Services)	0.0	1.5	4.0	6.1
Import Shares (Intermediate Goods and Services)	0.0	1.5	3.7	5.6
Investment	-0.7	-0.5	1.1	2.5
Consumption	-0.2	0.3	1.8	3.5
Real Consumption Wages	-0.1	0.2	1.1	2.3
Export Market Share	0.2	0.1	-0.4	-0.7
Trade Balance	0.2	0.1	-0.3	-0.6

Note : All variables are expressed as % deviations from a baseline with a common technology trend

Source : Own calculations

Graph 1 : Effects of a continuation of the 1991-2003 globalisation trends



Source : Own calculations

Simulation 2 : A shift occurs in international specialisation patterns (“relocation” pattern 2) : In this scenario emerging market economies are expanding varieties and enter markets previously dominated by the EU. This scenario addresses fears that there may be an insufficient response from the EU to the challenge posed by emerging market economies by not moving strongly enough into the development and production of new products. These fears are fuelled by the apparent weakness of the EU economy to enter new high tech markets such as ICT for example. Can this scenario better characterise the last 15 years and if yes what would be the long run consequences for Europe ?

This scenario attributes more of the observed decline in GDP, consumption and investment in the EU over the period 1990-2005 to globalisation. This adjustment pattern

to the ‘globalisation shock’ generated by the model is not inconsistent with the stylised facts on consumption, investment and the trade balance in the EU over the period 1991-2003. The prospect of less capital deepening and consequently lower productivity growth has negative effects on labour income expectations and therefore on private consumption, which frontloads this effect. However, despite the more negative results from simulation 2, it must be stressed that globalisation as such does not entirely explain the relative decline in the EU's GDP per capita growth rate over this period, with the annual growth rate being reduced by about .05% in the first 10 years, which is equivalent to less than 25% of the actual relative decline.

Concerning the terms of trade, whilst this scenario is broadly consistent with the observed developments since the early 1990s, the nature and extent of the gains are different to those of simulation 1. In simulation 1 it was assumed that the products in which the ROW holds a comparative advantage (e.g. production of ICT-related goods, consumer electronics and textiles⁵⁸) are sold at a lower price (i.e. the TFP gains in the ROW are reflected in cheaper products only). In simulation 2 it is assumed that the TFP gains are reflected in both cheaper products and in the introduction of new products by the ROW which are increasingly demanded by the developed world. A comparison of the results in tables 1 and 2 reflects these differences in the underlying assumptions, with a larger terms of trade gain in the pure TFP scenario (i.e. simulation 1) and an increase in the nominal import share which is significantly smaller than that of the present simulation.

Table 2 : Simulation 2 – Shifts in international specialisation patterns

Effects on Rest of World				
	1991	2005	2025	2050
GDP per capita	0.3	8.1	18.8	29.2
Terms of Trade	1.8	-1.2	-6.2	-10.2
Import Shares (Final Goods and Services)	1.0	-0.5	-3.3	-5.6
Effects on EU				
	1991	2005	2025	2050
GDP per capita	0.0	-0.5*	-0.3	0.2
Terms of Trade	-1.1	1.1*	4.9	8.1
Import Shares (Final Goods and Services)	-0.6	3.8	9.1	13.4
Import Shares (Intermediate Goods and Services)	0.0	4.2	9.0	13.0
Investment	-1.5	-1.5	0.2	1.6
Consumption	-0.6	-0.1	1.6	3.4
Real Consumption Wages	-0.2	-0.3	0.5	1.6
Export Market Share	0.4	0.0	-0.7	-1.2
Trade Balance	0.4	0.1	-0.5	-0.9

* The GDP per capita loss is greater than the terms of trade gain – consumers are gaining (higher consumer surplus) but EU production is being hit by higher import penetration rates and by negative effects on domestic investment. The expected redirection of investment towards the new sectors (services etc) and the knock-on employment effects are not yet evident for the EU and the question is why.

Note : All variables are expressed as % deviations from a baseline with a common technology trend.

Source : Own calculations

⁵⁸ For the ICT-related goods and consumer electronics, the comparative advantage of the ROW is in the labour intensive, final assembly, stages of production, with many of these operations controlled by foreign multinationals.

In overall terms, given that we are replicating developments for only the last 15 years, the results from simulations 1 and 2 unfortunately do not allow us to make a clear discrimination in favour of one view or the other. Both are broadly consistent with the stylised facts. However, even under the second scenario, it is clear that the EU economy could benefit from higher growth in the RoW, though to a smaller extent than under the traditional trade and growth view. Given the uncertainties involved, 1.2. goes on to look at two variants of simulation 2, with the objective of establishing the likely range of the overall effects.

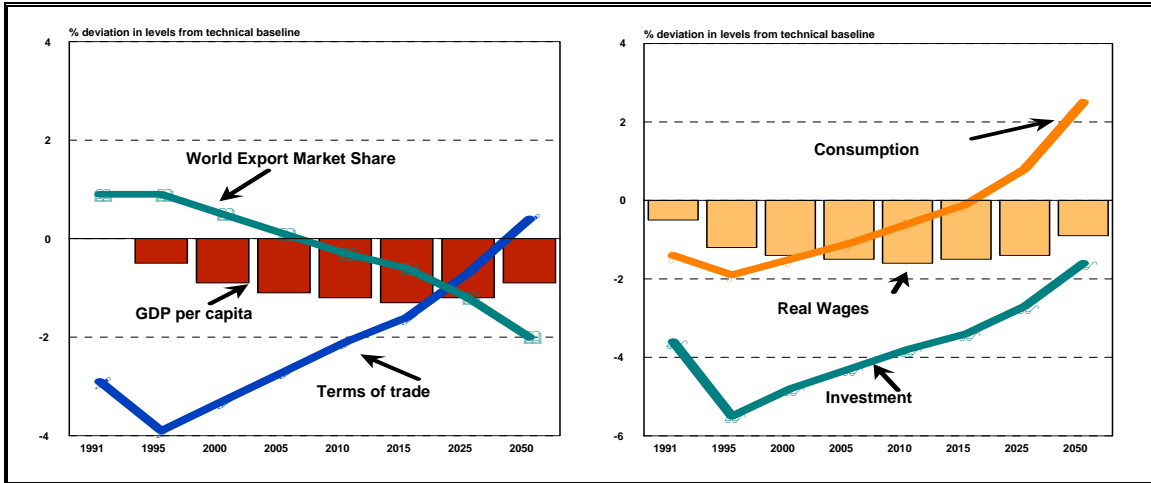
1.2 : Changes in international specialisation patterns – a pessimistic and optimistic interpretation for the EU

Simulation 3 – A more pessimistic production relocation scenario (pattern 3) : One of the consistently positive features of scenarios 1 and 2 is that the EU continues to reap important benefits from an increase in its terms of trade. Though these two scenarios capture the movements of the terms of trade over the last decade quite well, their long run prediction (a permanent terms of trade improvement for the EU) is somewhat at odds with empirical evidence on the long term link between growth and the terms of trade for faster growing regions.

The stylised facts over the last four decades in fact point in the direction that there is no systematic negative association between faster growth in a region and a loss of its terms of trade. This suggests that the “relocation” assumptions made in the first and second scenario could in fact be too optimistic. Therefore, in this scenario we adopt “relocation” pattern 3 (see section 5 of main text for details) where we allow for import substitution in the RoW. This scenario yields no long run improvement in the EU’s terms of trade. The negative EU investment impact is now much more persistent and the real wage outcome is much more negative reflecting the downward pressure on productivity. Despite this, the extent of the negativity should not be exaggerated. After 50 years GDP per capita is down by 1% in levels, with most of the reduction concentrated in the first 10-15 years. Even in this scenario the long run welfare effects (i.e. in terms of consumption) represented by an increase in per capita consumption is positive for the EU economy. This is because households benefit from increased interest income from their investments abroad. The most important conclusion to be drawn from this simulation is that relocation (defined as offshoring plus outsourcing⁵⁹ plus shifts in relative demand) is a relatively minor phenomenon, at least at the level of the EU’s macro economy.

⁵⁹ **Higher levels of outsourcing / offshoring :** An additional simulation was carried out just to look at the international outsourcing / offshoring part of the overall production relocation effect (i.e. the “voluntary” part of relocation). This simulation looked at the impact of assuming that outsourcing / offshoring turns out to be a much bigger phenomenon than presently predicted. For this scenario, we assumed that it is twice as large as is simulation 2 (i.e. extra-EU intermediate imports of parts and components and of semi-finished goods increase their share of EU GDP by 3% points rather than the 1 ½% points assumed in simulation 3). The main results of this simulation relative to simulation 2 is that the negative investment impact is much more persistent and the real wage outcome is more negative. Although this type of production relocation has positive output effects, when one allows for the initial capital outflows and for the fact that a lot of the output is produced using imported inputs, the overall impact on living standards is negative. Despite this, the extent of the negativity is not alarming. In terms of GDP per capita, a doubling in the levels of outsourcing compared with the earlier simulation is associated with a negative level effect of -0.2 in 2050 which if translated into growth rate terms is effectively zero. While this compares with a slightly positive effect of 0.2 in simulation 2, given that we are talking about levels over 50 years, a negative turnaround of 0.4 should not be considered significant.

Graph 2 : Macroeconomic Effects of a more pessimistic production relocation scenario for the EU



Source : Own calculations

Table 3 : More pessimistic relocation scenario (no terms of trade gains for the EU and smaller demand effects)

Effects on EU				
	1991	2005	2025	2050
GDP per capita	0.0	-1.1	-1.2	-0.9
Terms of Trade	-2.9	-2.7	-0.7	0.4
Import Shares (Intermediate Goods and Services)	0.0	3.2	7.0	9.8
Trade balance	1.0	0.2	-1.1	-1.8
Investment	-3.6	-4.3	-2.7	-1.6
Consumption	-1.4	-1.1	0.8	2.5
Real Wages	-0.5	-1.5	-1.4	-0.9

Note : All variables are expressed as % deviations from a baseline with a common technology trend

Source : Own calculations

Simulation 4 : A more optimistic production relocation scenario (pattern 4) : This scenario shows that the introduction of new goods from the ROW has the potential to significantly increase the long run welfare gains in the EU. This aspect, as we learned earlier, has been emphasised in the recent trade literature, where a lot of attention has been devoted to the two welfare consequences of increased trade for consumers, namely the fall in the price of existing goods and services and the introduction of new imported varieties of goods / services. As can be seen in table 4, when one allows for these types of variety effects, globalisation takes on a much more positive aspect. While the results with regard to the terms of trade and import share developments are broadly similar to simulation 2, there is a much more positive outturn in terms of investment and consumption. The positive consumption effect is more than double that of simulation 2, with the result that overall GDP per capita in 2050 is more clearly positive compared with the earlier results. Why are the results so positive in the long run ? The deflators for consumption and investment are quality (variety) adjusted, i.e. they fully take into

account the consumer and investor benefits from having increased choice. Traditional price indices would not properly take this effect into account (see Annex 1 for additional details).

Table 4 : Potential effects from the introduction of new varieties of goods

	Effects on EU			
	1991	2005	2025	2050
GDP per capita	0.0	-0.3	0.5	1.6
Terms of Trade	-1.1	0.9	4.3	7.1
Import Shares (Final Goods and Services)	0.0	4.8	10.2	14.7
Investment	-1.6	0.2	3.5	6.1
Consumption	-0.4	1.1	4.2	7.5
Real Wages	-0.2	0.9	3.1	5.5

Note : All variables are expressed as % deviations from a baseline with a common technology trend

Source : Own calculations

Overview of Simulations 1-4 : The above simulations stress the uncertainties regarding a static interpretation of globalisation patterns, with both interpretation 1 (no change in specialisation) and interpretation 2 (change in specialisation) both been consistent with the stylised facts of the post-1990 period. In addition, depending on what happens with regard to the terms of trade and import demand patterns, the income position of the EU could be more negative or positive. However, while this is undoubtedly true, simulations 1 to 4 do provide a useful range against which to assess the different hypotheses, with the most negative scenario pointing to losses of about 1% in GDP per capita levels in 2050 (i.e. 0.02 off the annual average growth rate over the coming decades) and with the most optimistic scenario pointing to permanent gains of 1.6% in levels (i.e. a gain of 0.03 in terms of growth rates).

2 : Dynamic effects of globalisation

In addition to the type of static effects discussed in the first section, many commentators rightly stress that the benefits of globalisation go far beyond these initial “first round” effects on consumers and firms, emanating from lower prices and a greater range of goods and services. Globalisation also offers the realistic prospect of higher levels of productivity and growth due to the restructuring induced by greater levels of competition and from the faster pace of worldwide technological change.

Simulation 5 : Effect of globalisation in terms of competition : The effect of globalisation in terms of the emergence of new competitors or from the introduction of new products is likely to have an impact on competition levels and could therefore reduce price / cost mark-ups. Various economists have tested this hypothesis in recent years. Kee and Hoekman (2003), using international sectoral data, find that an increase of 10% in the ratio of imports to production lowers the mark-up by around 1 ½ percentage points (i.e. the mark-up falls from an average of 12% to 10 ½%). Chen, Imbs and Scott (2004) find similar results for Europe based on Eurostat data and the BACH database. Boulhol (2005) estimates the import penetration effect, directly on the Lerner index (a measure of the

profitability of firms), using data from the OECD’s STAN sectoral database. He also finds similar results and estimates the reduction in mark-ups to be in the range of 3 to 4 percentage points⁶⁰. The scenario presented in table 5 is run under the assumption that increased trade will increase competition and cause a decline in the mark up of 4 percentage points. Concerning production relocation, a change in specialisation patterns is assumed and consequently the results can best be compared to those of the earlier simulation 2. The increase in competition lowers prices and increases the demand for labour and capital. This has especially beneficial effects for the real income of workers both directly and indirectly via higher investment.

Table 5 : Potential effects from increased competition levels

	Effects on EU			
	1991	2005	2025	2050
GDP per capita	0.0	0.1	1.1	2.5
Terms of Trade	-1.1	1.1	4.9	8.2
Import Shares (Final Goods and Services)	-0.6	3.8	9.1	13.4
Investment	-1.0	1.7	6.0	8.3
Consumption	-0.7	-0.4	1.8	4.6
Real Wages	-0.2	1.6	5.2	8.6

Note : All variables are expressed as % deviations from a baseline with a common technology trend

Source : Own calculations

Simulation 6 : Potential for higher levels of technological diffusion : In addition to the competition effect, the last simulation in this section also allows for the potential benefits accruing from technological (i.e. TFP) spillovers from the rest of the world. A recent review of the literature on international technology diffusion (Keller, 2004) concluded that for “most countries, foreign sources of technology are of dominant importance (90 percent or more) for productivity growth” and that substantial technology spillovers are associated with it (i.e. the use of foreign investment goods has productivity benefits over and above the direct capital deepening or absorption effect).

For the purposes of the present simulation, it is assumed that about 25% of the technological advancement in the RoW spills over into the EU in terms of higher TFP growth. These spillover effects for the EU take the form of higher levels of innovation and positive reorganisation effects. Table 6 shows that when one correctly allows for the dynamic effects of increased openness both in terms of dynamically induced gains from technological diffusion and from the enhanced levels of competition described earlier in simulation 5, the long run welfare effects of globalisation are not only much larger but the short term losses are smaller and are of a shorter duration. Graph 3 also makes the important point that the developing world and the EU are both big winners from globalisation under this scenario. In terms of GDP per capita, the level of income in the developing world rises by over 30% compared with a gain of 8% for the EU. In growth

⁶⁰ An increase in the import penetration ratio (i.e. measured as imports as a share of domestic demand) by 10 percentage points lowers the Lerner index by 3-4 percentage points.

rate terms, an 8% level effect translates into an annual average gain in EU living standards of roughly 0.2 each year up to 2050.

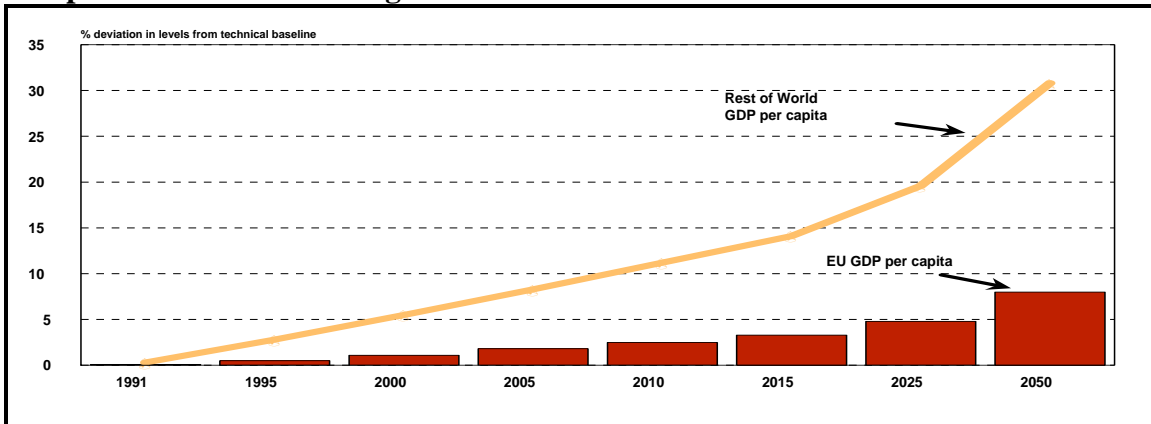
Table 6 : Potential dynamic effects (increased competition and technological diffusion)

Effects on EU				
	1991	2005	2025	2050
GDP per capita	0.1	1.8	4.8	8.0
Terms of Trade	-0.9	0.8	3.7	6.0
Import Shares (Final Goods and Services)	0.0	3.4	7.3	10.5
Investment	-1.1	3.1	8.5	12.2
Consumption	-0.3	1.5	5.4	9.7
Real Wages	-0.1	2.6	7.1	11.5

Note : All variables are expressed as % deviations from a baseline with a common technology trend

Source : Own calculations

Graph 3 : Most favourable globalisation scenario : Gains for EU and Rest of World



Source : Own calculations

3 : Anti-globalisation scenarios (Static and dynamic effects)

Despite the fact that the benefits of globalisation are widely accepted, the extent and nature of the present phase is understandably causing concern amongst politicians and policy makers regarding its ultimate impact on developed economies. While the simulations described in the first and second sections would suggest that at the macro level these concerns are groundless, the regional and sectoral impacts could nevertheless be considerable as countries strive to restructure their economies in response to the intensification in global competition levels. Given this charged political environment it was felt appropriate to look at the possibility of not only slowing down the process of globalisation but in fact of reversing it via the imposition of increased levels of tariffs and the re-introduction of capital controls. In the three simulations described below the static and dynamic effects of reversals to the present integration trend are analysed, with the first simulation looking at the purely “first round” effects; the second simulation

examining the implications in terms of reduced levels of competition; and the final simulation assessing the additional impact in terms of technology spillovers.

Simulation 7 : Static effects of anti-globalisation policy measures : For this simulation, a 10 percentage points increase in tariff levels is imposed which essentially brings us back to the average tariff levels pertaining in the 1960's (see Williamson 2004). In addition, it is assumed that FDI as a share of world GDP is reduced to half its present levels. The pure trade effects of the tariff increases are in fact relatively small. They can be compared to the Krugman (1990) estimate of a 50% reduction in international trade yielding a loss in worldwide per capita income of 2.5%. These effects are offset in the developed economies by the reduction in capital outflows, with the overall GDP per capita effect in the EU being less than 1% in terms of levels (consistent with a contraction in world trade of about 20%).

Table 7 : Anti-Globalisation Scenario - Static Effects

Effects on Rest of World				
	1991	2005	2025	2050
GDP per capita	0.0	-0.3	-0.4	-0.5
Effects on EU				
	1991	2005	2025	2050
GDP per capita	0.0	-0.6	-0.8	-0.9
Investment	-1.2	-2.5	-2.4	-2.4
Consumption	0.3	0.1	-0.3	-0.4
Real Wages	-1.5	-2.0	-2.3	-2.5

Note : All variables are expressed as % deviations from a baseline with a common technology trend
Source : Own calculations

Simulation 8 : Effects due to reduced product market competition associated with less trade : As discussed earlier, the link between trade intensity and goods market competition is an actively researched relationship. Applying the estimates quoted earlier (Kee and Hoekman etc) to the reduction in trade intensity implied by increased tariffs, yields a reduction in GDP per capita of about 3 ¼% in 2050.

Table 8 : Anti-Globalisation Scenario – Impact of static effects + reduced competition

Effects on EU				
	1991	2005	2025	2050
GDP per capita	0.0	-1.1	-2.3	-3.3
Investment	-1.7	-5.8	-8.0	-8.8
Consumption	0.5	0.3	-0.6	-1.6
Real Wages	-1.5	-3.9	-6.8	-9.0

Note : All variables are expressed as % deviations from a baseline with a common technology trend
Source : Own calculations

Simulation 9 : Static + Competition + Technology Diffusion Effects : The final simulation takes into account the main potential channels via which increased tariffs and reductions in FDI flows can impact the EU and world economies. Regarding the effects of technology diffusion, as explained earlier, international technology trends play an important role in the economic development of countries. Various studies (e.g. Helpman and Coe (1995); Keller (2004)) conclude that for larger countries, about a quarter of domestic TFP growth is imported from abroad, with much higher levels for smaller economies. Using this estimate, a reduction in trade could lead to a significant slowdown in technical progress around the world. Applying the same technology diffusion effects as in simulation 6 implies that a 10% reduction in trade would lead to a reduction in worldwide TFP (i.e. knowledge) of about 3%. If one combines the technology, competition and initial static effects, table 9 and graph 4 show a substantial negative impact on living standards in the EU and the ROW, of the order of 5% in levels, roughly 0.1 in growth rate terms. These simulations confirm that the EU's present standard of living depends to a significant extent on the efficiency gains achieved via the global trading system.

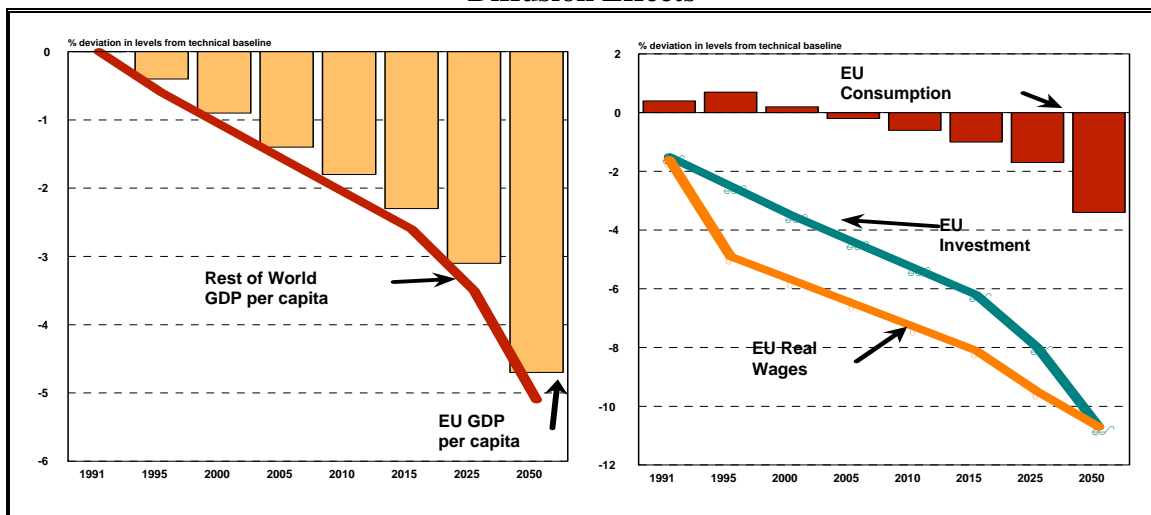
Table 9 : Anti-Globalisation Scenario – Static + Competition + Diffusion Effects

Effects on EU				
	1991	2005	2025	2050
GDP per capita	0.0	-1.6	-3.5	-5.1
Investment	-1.6	-6.5	-9.5	-10.7
Consumption	0.4	-0.2	-1.7	-3.4
Real Wages	-1.5	-4.4	-8.0	-10.7

Note : All variables are expressed as % deviations from a baseline with a common technology trend

Source : Own calculations

Graph 4 : Anti-globalisation scenario : Incorporation of Static + Competition + Diffusion Effects



Source : Own calculations

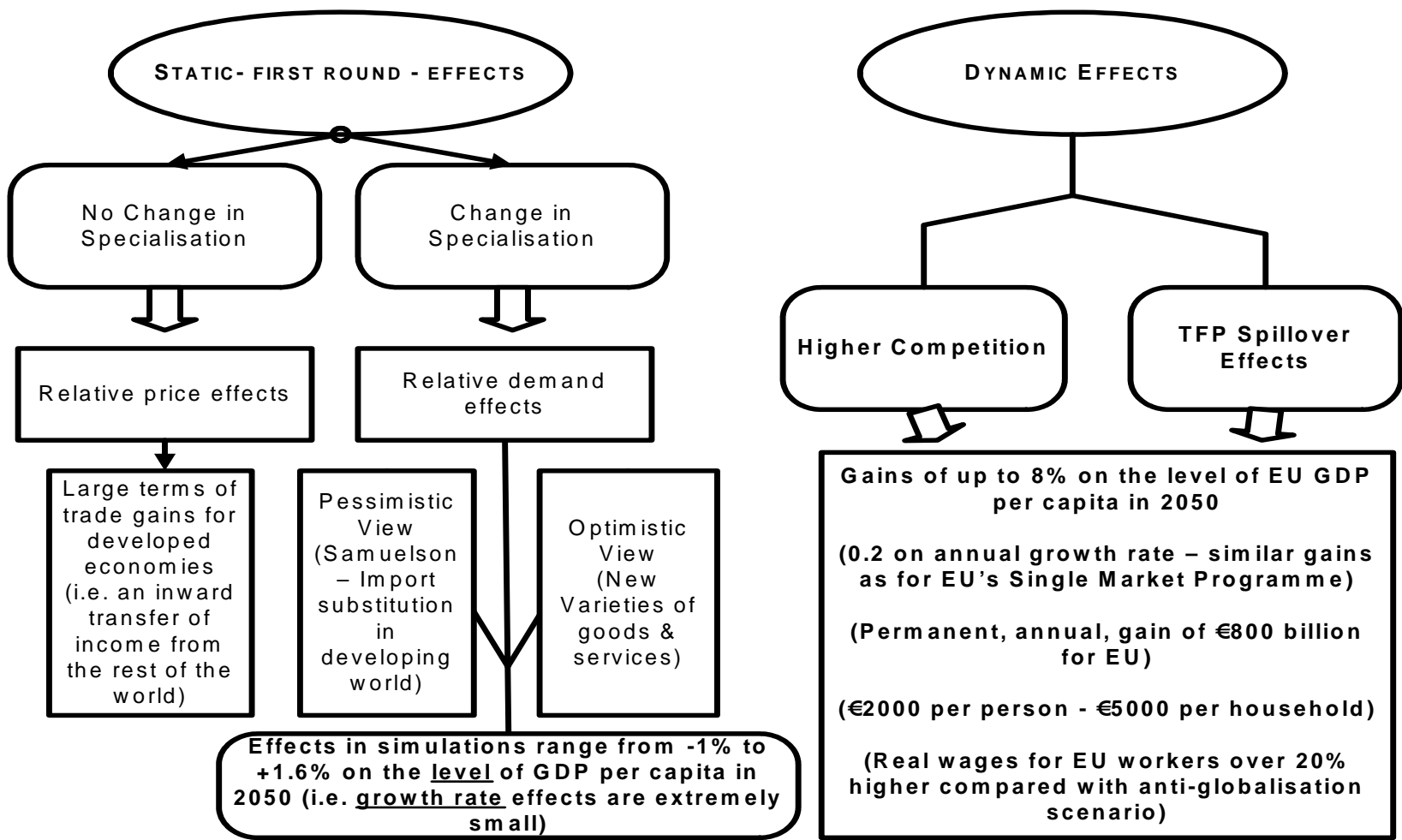
Overview of Simulation Results : The overall conclusion of the above simulations is that the EU is presently not reaping the potential benefits from globalisation. Our productivity growth rates are declining as the inadequacies of our production structures are increasingly exposed. Some policy makers are wrongly attributing the EU's problems to global relocation forces (i.e. outsourcing, offshoring and shifts in worldwide demand patterns). This belief is not supported by the simulations in the present paper which conclude that for the most pessimistic relocation assumption, that when all the static effects are taken into account, the effect on the long run growth rate of EU living standards is essentially zero. In addition, these are essentially transition costs. When the dynamic benefits of relocation are taken into account, the EU could see per capita growth rates boosted by up to 0.2% points annually over the coming decades.

Table 10 : Overview of Simulation Results : Effects on EU GDP per capita; Terms of Trade; Import Shares; Export Shares; Investment; Consumption and Real Wages

	GDP PER CAPITA		TERMS OF TRADE		IMPORT SHARES		EXPORT SHARES		INVESTMENT		CONSUMPTION		REAL WAGES	
	2005	2050	2005	2050	2005	2050	2005	2050	2005	2050	2005	2050	2005	2050
STATIC EFFECTS OF GLOBALISATION														
1. NO CHANGE IN SPECIALISATION	-0.2	0.6	2.5	11.1	1.5	6.1	0.1	-0.7	-0.5	2.5	0.3	3.5	0.2	2.3
2. CHANGE IN SPECIALISATION	-0.5	0.2	1.1	8.1	3.8	13.4	0.0	-1.2	-1.5	1.6	-0.1	3.4	-0.3	1.6
2A : PESSIMISTIC VARIANT (SAMUELSON)	-1.1	-0.9	-2.7	0.4	1.8	9.8	0.1	-2.0	-4.3	-1.6	-1.1	2.5	-1.5	-0.9
2B : OPTIMISTIC VARIANT	-0.3	1.6	0.9	7.1	4.8	14.7	0.0	-1.2	0.2	6.1	1.1	7.5	0.9	5.5
DYNAMIC EFFECTS OF GLOBALISATION														
3. INCREASE IN COMPETITION + TECHNOLOGICAL SPILLOVERS	1.8	8.0	0.8	6.0	3.4	10.5	0.0	-0.9	3.1	12.2	1.5	9.7	2.6	11.5
ANTI-GLOBALISATION SCENARIO														
4. STATIC + DYNAMIC EFFECTS	-1.6	-5.1	-8.1	-1.2	0.2	0.4	0.0	-0.1	-6.5	-10.7	-0.2	-3.4	-4.4	-10.7

Source : Own calculations

Simulation Results



Trade amongst countries has further intensified over the last 10-15 years. Of course increased trade integration is not a new phenomenon - it has been observed for decades. However the period since 1990 is generally seen as a new era, both politically (fall of the iron curtain), economically (rapid convergence of several regions in the world, increased international capital mobility, outsourcing) and technologically (reduction in transport and communication costs, emergence of new goods and services, such as ICT, which can be traded more easily). How are individual regions performing in this new era ? Can these developments explain shifts in import and export equations ? Or should we rather regard trade integration as a fairly uniform process affecting all regions about equally ? In the EU context an important trade related question is the following : how does international trade transmit higher growth in the RoW to the EU economy. Are trade relations such that higher growth abroad is transmitted positively to the EU or is the opposite the case ?

In order to analyse this question we set up a system of bilateral trade equations defined over 10 regions of the world (EU15, EU10, EU-Neighbours⁶¹, China, South East Asia⁶², Japan, India, US, Rest of Americas⁶³, Rest of World). International trade can best be characterised by a system of bilateral import demand equations (exports of region j can be derived by aggregating the bilateral imports of regions i with j). Standard trade theory derives imports from CES preferences defined over goods produced in different regions. In other words, it is assumed that goods produced in individual regions are imperfect substitutes. The degree of substitutability can be measured by the price elasticity of imports (σ). It is usually assumed that there is a unit income elasticity for imports. Under these assumptions the nominal share of imports of country i from country j ($simy_{jit}$) can be written as a function of the terms of trade

$$(1) \quad simy_{jit} = \frac{PM_{jit} IM_{jit}}{P_{it} Y_{it}} = s_{jit} \left(\frac{P_{jt}}{P_{it}} \right)^{-(\sigma-1)}$$

This is also known as the Armington (1969) equation. The variable s_{jit} is regarded as largely determined by exogenous factors, especially trade costs (transportation costs approximated by distance, tariffs etc). Therefore the above model is sometimes denoted as the gravity model.

Is this model, which represents the standard view on trade, sufficient to explain international trade since the beginning of the 1990s? If it were, one could possibly draw far reaching conclusions concerning the welfare implications of fast growing regions for slow growing regions. The most important implication of the conventional trade model is that fast growing countries can experience rapid export growth only to the extent that they accept declining terms of trade. This is the most important mechanism through which fast growth in foreign regions generate welfare gains for domestic (e.g. EU) households. However, it is often argued that the observed relationship between the terms of trade declines of the exporter and export growth is weaker than implied by the standard trade model. The question therefore arises

⁶¹ Includes North Africa, the Middle East, non-EU central and eastern Europe, Turkey, countries of the ex-USSR, Switzerland, Norway and Iceland.

⁶² All of South East Asia (excl. China) plus Australia and New Zealand.

⁶³ All of North and South America and the Caribbean (excl. the US).

whether other factors besides the terms of trade could possibly explain movements in trade shares.

Krugman (1988) provided the most prominent challenge to the standard model. In theoretical models pioneered by Helpman and Krugman (1985) a more refined link between growth/technical progress of the exporter and export performance (import demand shifts for imports from the exporter) has been established. They allow for quality changes of exportables. This is an important aspect that has been added. Conventional trade models, such as the Armington model, present essentially a static view of the theory of comparative advantage, where individual countries specialize in certain product categories. Technical progress only leads to a further refinement in the production of these goods. In other words, technical progress in country j does not threaten country i , since it stays within its traditional product line. However, this is not the only direction technical progress can take. It can very well be the case that technical progress is enabling country j to produce goods where country i used to have a comparative advantage. For example, China starting to produce cars could be a case, not adequately captured by the traditional trade model. Recently Gagnon (2004) has shown how the Armington model can be modified in order to incorporate product innovations of the exporting region. Essentially he suggests to add the relative GDP growth rate between the exporter and importer to the standard import determinants and he finds strong evidence for the significance of this variable.

This aspect is especially important for the EU15 which suffered from a relatively weak growth performance in recent years. The question would be, has faster growth in the RoW acted as a locomotive for Europe, i.e. would growth in the EU have been even worse without faster growth abroad or has faster growth in the RoW made things worse via increased pressure on imports.

Another important globalisation phenomenon has been the rising importance of FDI. This could itself have been an important factor shifting bilateral import shares. Various hypotheses can be formulated:

- Hypothesis 1 : FDI outflows serve to better supply the destination country with domestic goods (and to a lesser extent services), e.g. by setting up a distribution network. In this case one would expect that FDI inflows increase imports, i.e. FDI inflows into country i lead to an increase in imports into the same region.
- Hypothesis 2: FDI outflows are a substitute for exports, i.e. production is moved to the importing region. In this case one would expect that FDI inflows into region i lower imports of that region from country j .
- Hypothesis 3: FDI outflows are a substitute for domestic production (outsourcing) and they are not predominantly used for supplying the foreign market directly. In this case one would expect FDI outflows of country i to country j to be positively related to an increase in the import share of country j in imports of country i .

Using a complete set of bilateral import equations for the 10 regions, covering the whole world economy and using annual data over the period 1992 to 2002, we test both the Krugman-Gagnon hypothesis as well as the link between FDI and trade. Our empirical model is given by the following equation

$$\ln(\text{simy}_{jit}) = c_1 \text{DIST}_{ij}^2 + c_2 \ln\left(\frac{P_{jt}}{PM_{it}}\right) + c_3 \ln(\text{POP}_{it}) + c_4 \ln(Y_{jt}/Y_{it}) + c_5 \text{FDI}_{jit} + c_6 \text{FDI}_{ijt} + u_{jit}$$

It includes the basic variables from the gravity model (the geographical closeness of countries is still an important explanatory factor for trade flows). The trade intensity between region i and j is inversely proportional to the square of the distance between regional centres ($DIST_{ijt}^2$) which serves as a proxy for trade costs and other remoteness factors. Another important factor for the magnitude of the import share is the size of the importing region, with smaller economies typically showing larger openness. The size of the population of the importing region (POP_{it}) controls for the size effect. The relative price term (P_{jt}/PM_{it}), defined as the GDP deflator of the exporting economy to the average import price in the importing economy represents the terms of trade effect. Note that a zero coefficient for the terms of trade would indicate a price elasticity of imports equal to one⁶⁴. As additional explanatory variables we include the relative growth between the exporting and the importing region in order to test the Krugman-Gagnon hypothesis and we include two FDI indicators, namely the stock of FDI capital of country j in country i (FDI_{jit}) and the stock of FDI capital of country i in country j (FDI_{ijt}) in order to shed some light on the link between FDI and trade across regions.

Table 1 : Bilateral Trade Regressions Results

	Gravity Model	Krugman-Gagnon Model	FDI and Trade
Geographical Distance ² (ij)	-1.0 (***)	-1.0 (***)	-1.0 (***)
Terms of Trade (ij) (σ) (Relative Prices)	-1.41 (ns)	-1.32 (ns)	-1.28 (ns)
Population Size (i)	-2.8 (*)	-3.1 (*)	-2.1 (*)
Growth Rate Differential Y(j)/Y(i) (Relative Demand)		1.9 (**)	1.4 (*)
Low Tech - Share(j)		-0.18 (ns)	-0.10 (ns)
High Tech - Share(j)		0.24***	0.091*
Foreign Direct Investment Stock (j,i)			(ns)
Foreign Direct Investment Stock (i,j)			EU10, EU-Neighbours, Rest of Asia, China (***) India (*)
	R ² = 83.9% 784 obs.	R ² = 84.9% 784 obs.	R ² = 88.5% 784 obs.

(***),(**),(*): significant at the 1%, 5%, 10% level, (ns): not significant

Source : Own calculations

As shown in Table 1, the following results emerge from these regressions :

- Firstly, the conventional determinants of trade flows, namely relative prices and trade costs (here approximated by distance between trading partners) still play an important role in shaping international trade. The price elasticity is larger than one.
- Secondly, the Krugman hypothesis which warns about the overwhelmingly positive effect which faster growing regions can have on slow growing regions (e.g. China on Japan) finds some support in the data. Furthermore, countries with a large share of high tech industries seem to have a better export performance.
- Finally, concerning the link between FDI and trade we find some evidence that the stock of FDI from the importing country i to the exporting country j increases imports from j . This holds especially for $j =$ EU10, Rest of America, China and India. This provides some evidence for the outsourcing phenomenon (hypothesis 3).

⁶⁴ In all regressions country dummies as well as a linear time trend are included.

References

- Amiti, M. and S. Wei (2004), "Fear of service outsourcing – is it justified?", *Economic Policy* (April).
- Amiti, M. and S. Wei (2006), "Services Offshoring, Productivity and Employment : Evidence from the US", CEPR Discussion Paper No. 5475.
- Armington, P. (1969), "A theory of demand for products distinguished by place of production", IMF Staff Papers.
- Bergsten, C. (2005), "The United States and the World Economy", Institute for International Economics.
- Bradford, S., P. Grieco and G. Hufbauer (2005), "The Payoff to America from Global Integration", Institute for International Economics.
- Broda, C. and D. Weinstein (2005), "Are we underestimating the gains from globalisation for the United States", Federal Reserve Bank of New York.
- Boulhol, H. (2005), "The convergence of price-cost margins", Cahiers de la MSE, Série blanche.
- Chen, N., J. Imbs and A. Scott (2004), "Competition, globalization and the decline of inflation", CEPR Discussion Paper.
- Cline, W. (1999), "Trade and Income Distribution : The Debate and New Evidence", Institute for International Economics.
- Cline, W. (2004), "Trade policy and global poverty", Center for Global Development, Institute for International Economics.
- Dixit, A. and J. Stiglitz (1977), "Monopolistic competition and optimal product diversity", *American Economic Review*.
- DTI 2004, "Liberalisation and globalisation: maximising the benefits of international trade and investment", *DTI Economics Paper*, No 10.
- ECB (2005), "Competitiveness and the export performance of the Euro area", Task force of the monetary policy committee, *Occasional Paper Series*, No 30.
- Edwards, S. (1998), "Openness, productivity and growth: What do we really know", *Economic Journal*, Vol. 108.

Egger, H. and P. Egger (2001), "International outsourcing and the productivity of low-skilled labour in the EU", WIFO Working Paper, No.152.

European Commission (1996), "Economic evaluation of the internal market", European Economy, Reports and Studies, No.4.

European Commission (2002), "Responses to the challenges of globalisation", *DG ECFIN's European Economy series, Special report*, No 1.

European Commission (2002), "The internal market – ten years without frontiers".

European Commission (2004), "European Competitiveness Report 2004".

European Commission (2005), "EU Economy 2005 Review : Rising International Economic Integration – Opportunities and Challenges".

Feenstra, R. (1992), "How costly is protectionism ?", *Journal of Economic Perspectives*, Summer 1992.

Feenstra, R and G. Hanson (1999), "The impact of outsourcing and high-technology capital on wages : estimates for the United States", *Quarterly Journal of Economics*.

Fontagné, L. et al (2004), "European industry's place in the international division of labour: situation and prospects", CEPII-CIREM.

Frankel, J.A. and D. Romer (1999), "Does trade cause growth?", *American Economic Review*, Vol. 89.

Gagnon, J. (2004), "Productive capacity, product varieties, and the elasticities approach to the trade balance", *International Finance Discussion Papers*, Board of Governors of the Federal Reserve System.

Gomory, R. and W. Baumol (2000), "Trade and conflicting national interests", Cambridge : MIT Press.

Goldman Sachs (2005), "China's GDP Revision Boosts BRICs Projections", *Global Viewpoint Issue No : 05 / 38* (December).

Helpman, E. and D. Coe (1995), "International R&D Spillovers", *European Economic Review*, No 39.

H.M. Treasury (2005), "Long-term global economic challenges and opportunities for Europe", *March*.

Kee, H. and B. Hoekman (2003), "Imports, entry and competition law as market disciplines", CEPR discussion papers.

Keller, W. (2004), "International Technology Diffusion", *Journal of Economic Literature*, (September).

Konings, J. (2005), "Trade liberalization, intermediate inputs and productivity", CEPR Discussion Papers.

Krugman, (1988), "International Economics: Theory and Policy", Scott Foresman/Little Brown.

Krugman, (1990), "Rethinking International Trade", MIT Press.

Lardy, N. (2005), "China : The Great New Economic Challenge" published in "The United States and the World Economy", Institute for International Economics.

Lindert, P. and J. Williamson (2001), "Globalization and Inequality : A Long History", Annual Bank Conference on Development Economics, Barcelona (June).

Mann, C. (2004), "Globalization of IT services and white collar jobs : the next wave of productivity growth", International Economics Policy Briefs.

Nicoletti G. et al (2003), "Policies and international integration: influences on trade and foreign direct investment", *OECD Working Paper No 359*.

Obstfeld, M and A. M. Taylor (2002), "Globalization and capital markets", NBER Working Paper 8846.

Richardson, P. (1997), "Globalisation and linkages : Macro-structural challenges and opportunities", *OECD working Paper No 181*.

Rodrik, D. (1998), "Symposium on globalisation in perspective : an introduction", *Journal of Economic Perspectives*.

Rodrik, D. and F. Rodriguez (2001), "Trade policy and economic growth : a sceptic's guide to cross national evidence", *Macroeconomics Annual 2000*, NBER.

Romer, P. (1994), "New goods, old theory and the welfare costs of trade restrictions", *Journal of Development Economics*, February 1994.

Sachs, J. and A. Warner (1995), "Economic reform and the process of global integration", *Brookings Papers on Economic Activity*.

Samuelson, P (2004), "Where Ricardo and Mill rebut and confirm arguments of mainstream economists supporting globalization", *Journal of Economic Perspectives*.

UNCTAD (2004), "Development and globalization – Facts and Figures".

Williamson, J. (2004), “The tariff response to world market integration in the periphery before the modern era”, paper presented to the “*Market Integration Workshop*”, *European University Institute, Italy*.

Wolf, M. (2004), “Why globalisation works : the case for the global market economy”, *Yale University Press*.

World Bank (2005), “2005 World Development Indicators”.