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Structural Change, Innovation and Growth in the Single EU Market

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Summary: An analysis of structural change along its main dimensions (relative goods and factor prices, shifts in sectoral output and employment shares, and the respective contributions of process and product innovation) is first presented. Next, capital mobility is introduced as well as Sinn's controversial characterization of the large German trade surplus against the backdrop of the increase in international outsourcing. The authors then flesh out the model to show that growth, at least in the medium term, hinges on both demand and supply-side dynamics, with the structure of output and the intensity of trade contributing to growth. Finally, in this exegesis on structural change, innovation, and growth, some dynamic Schumpeterian considerations are offered. The bottom line is that the ability of firms from EU15 countries to rely on imported intermediate products from EU accession countries is the basis for gaining competitiveness in both the global economy and vis-à-vis the United States. It enables them to become more price competitive while restructuring domestic outsourcing in the EU15, making it more focused on producing technologically advanced intermediate products than heretofore. A detailed set of empirical regularities are investigated along two main dimensions: innovation traits and structural change, and Sinn's bazaar effect. International competitiveness is evaluated on the basis of revealed comparative advantage indicators (RCAs) and export unit values (EUVs).

Zusammenfassung: Vorgestellt wird eine Analyse zu den Hauptdimensionen des internationalen Strukturwandels (relative Güterpreise, relative Faktorpreise, Veränderungen in der sektoralen Produktion und der damit verbundenen Beschäftigung und die Beiträge von Prozess- und Produktinnovationen). Zudem wird die Kapitalmobilität berücksichtigt wie auch Sinns umstrittene Beschreibung des großen deutschen Bilanzüberschusses unter Berücksichtigung des starken Zuwachses im internationalen Outsourcing. Die Autoren können mit ihrem Modell zeigen, dass zumindest in der mittleren Frist Wachstum sowohl von Angebots- als auch von Nachfragedynamiken abhängt, wobei die Struktur der Produktion und die Intensität des Handels zum Wachstum beitragen. Im Anschluss an diese Analyse werden einige dynamische Schumpeter´sche Einsichten offenbart. Es lässt sich dann folgern, dass die Fähigkeit von Unternehmen in den EU15 Ländern, auf aus EU Beitrittsländerländern importierte Vorprodukte aufzubauen, die Basis für wachsende Wettbewerbsfähigkeit in einer globalisierten Weltwirtschaft und gegenüber den USA ist. Sie werden wettbewerbsfähiger durch Neuordnung der Struktur des Outsourcings in den EU15 Ländern bei einer Fokussierung auf die Herstellung technologisch anspruchvollerer Vorprodukte als dies vorher möglich war. Mehrere empirische Muster werden an Hand von zwei Dimensionen untersucht: erstens Innovationen und struktureller Wandel und zweitens Sinns Bazareffekt. Internationale Wettbewerbsfähigkeit wird untersucht an Hand von Revealed Comparative Advantage Indicators (RCAs) und Export Unit Values (EUVs).

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1. Introduction

In the 1990s US economic growth exceeded that of both the EU15 and Euro zone. It was only in 2006 that the EU growth – much influenced by Germany's economic recovery – gained speed and in 2007/08 output growth of the Euroarea and the EU27 is expected to exceed US growth. As the EU's growth rate is rising relative to the US one may expect that the US current account deficit-GDP ratio will improve; one should, however, note that the EU's surplus vis-à-vis the US is rather modest, the main surplus countries in a bilateral perspective are Japan and China. With China's exchange rate more or less fixed to the dollar (and similar settings in ASEAN countries), the bilateral exchange rate movements in Asia will hardly help the US to strongly reduce the current account deficit in the medium term. To the extent that the high US current account deficit should continue for many more years to come one might have to cope with a sharp real depreciation of the dollar in the long run. One may argue that the US banking (subprime) crisis and the associated fall of consumption automatically will reduce imports and stimulate – along with a real depreciation of the US dollar of 2004-2007 – exports in the medium term. However, the enormous bilateral trade deficit with China continues to grow strongly, while the net export position vis-à-vis the euro zone will improve only gradually.

As regards EU-US economic relationships the Merkel initiative of 2007 to reinforce transatlantic economic cooperation could help the US to improve its current account position, not least since effective liberalization of services markets on both sides of the Atlantic will generate more trade in services, and the US as the world's No. 1 services exporter stands to benefit from the policy initiative adopted in 2007. The envisaged Transatlantic Trade Council will regularly analyze the progress achieved in major fields, such as financial market services, intellectual property rights, pharmaceutical testing procedures and patenting. Joint initiatives in raising security in international transportation – read: anti-terror activities – also are expected to play a certain role. The field of energy policy is a rather thorny field where one finds joint interests in a strategic perspective but for various reasons will have considerable problems on the way to parallel actions, e.g. in the field of a new Kyoto protocol for the period after 2012. Telecommunications could become a more promising field, not least since internet-based telephony is growing and in new global telecommunications market one may find considerable benefits to be derived from a consistent set of regulatory rules on both sides of the Atlantic.

As regards macroeconomic issues the cooperation between the US and the EU is rather modest, and this problem hardly will be much affected by the Transatlantic Trade Council and the related activities. The phenomenon of a high current account deficit-GDP ratio and the potential for a hard landing of the dollar has not been discussed between the EU and the US, except for multilateral talks at the OECD or the G-8 meetings. On the one hand, US politicians might not be too concerned about large changes in the dollar exchange rate, on the other hand the institutional setting in Brussels is opaque: A US treasury secretary might consider discussing the potential of a sharp change in the dollar exchange rate with the head of DG II (Macroeconomics) or with the head of the Euro group plus the ministers of Finance of the UK – plus the respective ministers in Denmark, Sweden and EU

accession countries. Moreover, the EU which argues that it should have a larger impact on international economic relations due to its increased number of member countries and the increase in population and real income after the EU eastern enlargement is rather weak as it fails to speak with one voice in international issues and in global institutions. The idea that it would be a blessing in each member country were to have a national seat at the IMF is self-deceptive, as the combined weight of national representation at the IMF (and in other international organizations) effectively is likely to be lower than a single EU/Euroland seat; provided that such a single seat also goes along with the creation of an effective Euroland Treasury in Brussels.

As regards the debate about the US current account deficit it obviously is important to consider the price responsiveness of exports and imports of goods and services. Here the empirical analysis is rather unclear if one considers the results of CHIN (2006) who shows that standard modeling of the US export function gives a good empirical fit while the import function is much more difficult from an econometric perspective. Similar problems are also known to play a role in Germany, and these problems underline the potentially important role of international outsourcing and offshoring – the latter involves foreign direct investment and trade in intermediate products with a multinational company. As regards the US current account dynamics one should not only consider outsourcing and offshoring which can affect the price elasticity of imports – for an import demand function with a good empirical fit for the US see IMF (2007) – but also growth dynamics in the EU and the US. The US investment-GDP ratio has increased only modestly after 1993, at the same time the US savings rate has dropped, and this, along with the US budget deficit could also explain the US current account deficit. However, the long-term transatlantic growth differentials also are an important aspect.

In the literature we find considerable evidence that information & communication technology (ICT) plays an important role for the growth differential US vs. EU15: JORGENSON/STIROH (2000), COLECCHIA/SCHREYER (2002), OLINER/SICHEL (2002), STIROH (2003), INKLAR ET AL. (2003) and VAN ARK/PIATKOWSKI (2004) have argued that ICT production and the use of ICT – that is ICT investment – are important drivers of productivity growth. Comparing the periods 1995-2000 to 1979-1995 the INKLAR ET AL. analysis of labor productivity growth in the US and EU-4 finds a rise of 1.25 percentage points in the US and a reduction of 0.27 points in the EU. The growth accounting estimates show that labor quality changes have reduced in both the US and the EU-4 labor productivity. The employment reallocation effect in the US was good for + 0.05 points, but in the EU-4 the figure was -0.06 points. ICT producing industries generated similar impacts on productivity growth in the US and the EU, namely 0.04 and 0.03 percentage points respectively. As regards the impact of ICT using industries the EU did not reach even half the increase of the US which was 0.29 points – the main effect stemming from financial services (0.17 in the US; 0.02 in EU-4). Non-ICT capital deepening contributed to 0.08 points in the US and -.45 points in the EU. Total factor productivity contributed 0.79 points in the US, but only 0.13 points in the EU-4. The impact from ICT producing industries was rather similar on both sides of the Atlantic (.36 in the US vs. .24 in the EU), but in ICT using industries there were much bigger differences, in particular wholesale trade, retail trade and financial services seem to be problem areas for Western Europe. Weak EU-15 productivity increases and slow growth

are all the more unsatisfactory since Germany, France, Italy and Spain suffer from high unemployment rates and since slow growth in 2000-05 seems to indicate that the ambitious goals of the EU Lisbon Agenda – aiming at higher growth and employment by 2010 – will not be achieved. In the 1990s the investment-GDP ratio in the Euro zone was below that of the US and it also seems clear that the degree of factor market flexibility is lower in the Euro zone than in the US. The creation of the Euro zone was expected to contribute to output growth, however, growth has not accelerated; moreover, EU eastern enlargement is expected to stimulate growth in the EU15 and the accession countries, namely through trade creation – and the associated specialization gains – and foreign direct investment creation. EU accession countries have shown economic catching up but Germany and Italy face slow growth; both countries and France have stubborn high unemployment rates.

An EU study on the Lisbon Process (DENIS/McMORROW/RÖGER /VEUGELERS, 2005, p.4) summarizes its findings as follows: "The structural nature of the EU's productivity downturn is confirmed by the analysis…, with the bulk of the deterioration emanating from an outdated and inflexible structure which has been slow to adapt to the intensifying pressures of globalization and rapid technological change. The EU's productivity problems are driven by the combined effect of an excessive focus on low and medium-technology industries (with declining productivity growth rates and a globalization-induced contraction in investment levels); an inability to seriously challenge the US's dominance in large areas of the ICT industry, as reflected in the relatively small size of its ICT in a range of ICT-using industries, although measurement issues severely complicate an assessment of the gains from ICT production and diffusion. The post-1995 differences in EU-US productivity patterns are fundamentally driven by the US's superiority in terms of its capacity to produce and absorb new technologies, most notably in the case of ICT. Healthy knowledge production and absorption processes are mutually supportive elements of any successful long run productivity strategy. Evidence is presented which suggests that the US's overall innovation system is superior to that of the EU's, both in terms of the quality and funding of its knowledge sector and the more favorable framework conditions prevailing. The repeated ability of the US system to direct resources towards the newer, high technology (and often high productivity growth), industries is a reflection of the quality of the interrelationships between the different actors in its innovation system and of an economic and regulatory framework which has the capacity to transform excellence in knowledge creation into globally competitive industrial structure. The systematic inadequacies of the EU's innovation system are highlighted by the experience of the ICT industry, with the history of this industry suggesting that a "national champions" strategy in high technology industries is highly problematic."

Our analysis will not focus much on the ICT – contributing about 1/3 to US productivity growth in the 1990s – since many ICT issues have been largely explored elsewhere (AUDRETSCH/WELFENS, 2003; BARFIELD/HEIDUK /WELFENS, 2004; WELFENS/ZOCHE/JUNGMITTAG ET AL., 2004). We also will not look into the intra-US differences in productivity growth which are considerable and show that the West – the 12th district of the Federal Reserve System – has recorded a much higher productivity growth in the second half of the 1990s with 3.5% p.a. than the rest (2.6%) of the US (DALY, 2002). Rather we want to focus on problems of and prospects for industrial structural change in EU25: The end of the Soviet Union and the transformation of Eastern

Europe has opened up more than two dozens post-socialist economies for trade and foreign direct investment; eight relatively poor eastern European countries joined the EU on May 1, 2005. Taking into account growth theory and trade theory, it is clear one should expect a medium-term catching-up process and considerable trade creation in the context of EU eastern enlargement. In 2007 Bulgaria and Romania also joined the Community, which will cause further structural adjustment in the enlarged single market with additional options for outsourcing, trade in final products and foreign direct investment. Further expansion plans will be difficult to realize since the negative referenda in France and the Netherlands had largely tilted the scales to the No-side due to strong popular opposition to the Turkish EU enlargement project envisaged by the European Council and the European Commission.

The combination of economic globalization – the rise of trade and FDI (partly related to the opening up of China) in combination with the digitization of the world economy – and EU eastern enlargement have generated considerable pressure for structural change in the EU25. In the eastern European new member countries – post-socialist transition economies – economic opening up, systemic transformation and the rise in real per capita income have brought strong shifts in relative prices and hence structural change. With the Europe Treaties of the early 1990s, opening up the EU15 markets for prospective EU accession countries external impulses overlapped the early transformation process which included restructuring and privatization of firms. Moreover, foreign direct investment inflows have considerably contributed to the modernization of the supply side, technology transfer and growth in most east European countries. In 2004, the year of full EU membership for eight eastern European countries, per capita GDP stood at 45% (at PPP figures) of EU15. Growth rates in those countries have exceeded those in Western Europe in the 15 years after the start of transition in 1990, which was marked by transformational recession; the EU implemented an asymmetric trade liberalization strategy in the 1990s when the so-called Europe Treaties with potential access countries from Eastern Europe offered relatively generous access to the EU market. In the period 1990-2005, there has been some economic catching-up in Eastern Europe where Poland, Hungary, the Czech Republic and the Slovak Republic were rather successful in attracting FDI inflows. The latter came mainly from Western Europe and the US; the sectoral focus was not only on industry but it included the services sector – in particular banking and finance – as well. Restructuring and economic modernization in Eastern Europe's low wage economies (at the beginning of the 20th century, wage rates were about 1/5 of those in EU15) generated growth and stimulated trade with EU15 where many firms realized outsourcing to or off-shoring in accession countries.

The following analysis looks first at the theory of structural change and selected approaches on innovation and growth (section 2) before we take a closer look at empirical aspects of economic dynamics in Europe (section 3); we are interested in describing the dynamics of structural change and the developments of revealed comparative advantages and other trade indicators – this includes aspects of the role of imported intermediates in exports and of exports in imported goods on the one hand, on the other hand the question as to whether negative RCAs of EU15 countries vis-à-vis accession countries are positively correlated with positive RCA positions of EU15 vis-à-vis the US. We also look at some key aspects of the "bazaar effect" which emphasize the problem of hollowing out in the

sense that exports contain an increasing share of imports. The final section suggest on the one hand various policy options for both EU15 and the accession countries, on the other hand we present some conclusions for EU-US economic political relations.

2. Theory of Structural Change, Innovation and Growth

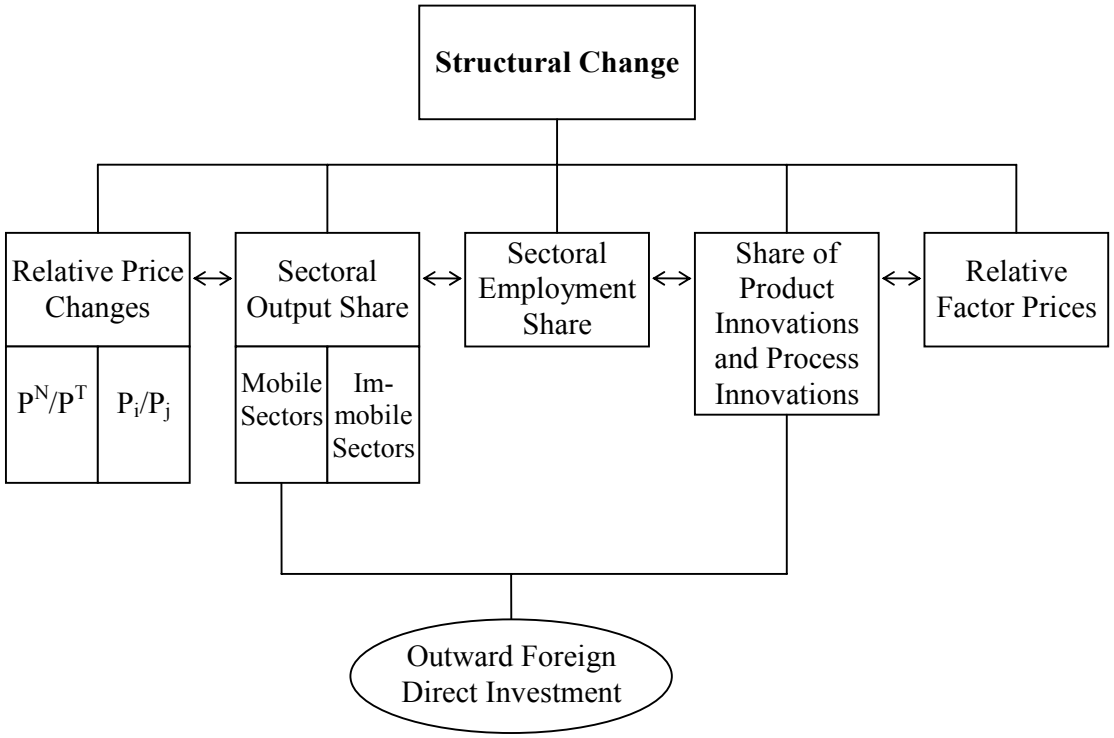
2.1. Basic Dimensions of Structural Change

Economic globalization implies that there will be considerable changes in the relative price of tradables which in turn will cause relative factor price adjustment which – in a neoclassical perspective –should largely follow the logic of the Heckscher-Ohlin Samuelson (HOS) model: Countries which are relatively richly endowed with unskilled labor, skilled labor, capital and technology will specialize in those goods which use the relatively abundant respective input factor intensively. However, in the existing world economy there are some critical deviations from basic assumptions of the HOS model; we have economies of scale, network effects (endogenous growth of demand) in the ICT sector, technology spillovers – hence positive externalities – and foreign direct investment, which are all not in the standard HOS model. Take for instance the Stolper-Samuelson theorem which sees factor immobility and perfect competition in a neoclassical world with free trade,: If the relative price of good i is rising the relative factor reward to that factor will increase which is used relatively intensively in the production of good i. However, with scale economies and network effects a certain modification is necessary: If p_i falls the factor reward of the intensively used factor will rise if there is a dominant network effect or scale effect. Take as an application the following case: At first glance the long-term relative fall of ICT prices imply a relative fall of remuneration of software engineers, but network effects and scale effects bring about a relative rise of the remuneration of such engineers.

With tradable prices adjusting across countries and factor prices reacting to output prices there will be real income effects and effects in factor markets; this can include unemployment to the extent that wages are rigid downwards for workers for which firms' relative demand is falling. As modern globalization includes the opening up and industrialization of China, it is obvious that the relative prices of labor intensive goods will fall which in turn will reduce the relative wage rate of unskilled labor.

Structural change and growth go together since structural change in a competitive economy should relocate resources from low-productivity sectors towards high-productivity sectors on the one hand; and from low stages of value-added (production of simple intermediate products) to more advanced stages (semi-finished goods) and finally to the production of finished goods on the other. An upward move in terms of quality or technological refinement will typically be accompanied with rising – relative – unit export values so that the marginal value product of labor in the respective sector rises. An internationally improving competitiveness in the respective sector can also be measured by the RCA, the revealed comparative advantage.

Figure 1: Structural change and its five dimensions



The main dimensions can be summarized as follows, namely changes in

- relative prices of goods: this concerns in a broad perspective the ratio of nontradables to tradables φ=: $[P^N] / [P^T]$ which is expected to increase in parallel with relative per capita income. This relative price change typically goes along with a real appreciation of the currency (BALASSA-SAMUELSON effect): The ratio P/[eP*] will rise over time as either the nominal exchange rate e – with given price levels at home and abroad P and P*, respectively – will fall or the domestic price level P will rise (at given e and P*, respectively); one should note that the overall price level $P=:[P^N]^a[P^T]^{(1-a)}$.which implies that $P=\varphi^a P^T$ (a is a parameter indicating the share of nontradables in overall consumption). As regards tradables prices one may anticipate that countries catching-up will record a growing share of intra-industrial trade; this holds for eastern European accession countries (BORBELY, 2004; 2005). This change in the composition of trade will go along with a rise in the average export unit value reflecting a shift towards a greater share of high quality goods and other goods fetching a premium in world markets – the latter can include product innovations which allow to get a higher price in the market (WELFENS, 2007).
- relative prices of input factors: the factor used relative intensively in the good whose output is rising will benefit in terms of relative factor rewards (Stolper-Samuelson theorem); e.g. if the production and export of (unskilled) labor intensive goods in China increases, the wage rate of unskilled workers is raised – note that this leaves open the role of the price of nontradables which may be expected to affect the reservation wage rates and international factor price convergence. If

unskilled labor intensive production is increasing in China it is rather unlikely that unskilled labor intensive production in Eastern Europe will also increase unless transportation costs amount to effective regional market demarcations. Thus one may expect that eastern European countries will specialize partly in goods using unskilled labor intensively, but also on goods using skilled labor intensively. By contrast leading EU15 countries – following the logic of Heckscher-Ohlin – will specialize increasingly in goods which are technology intensive or knowledge intensive and thus particularly require skilled labor. This does not rule out some employment of unskilled workers, but it will mainly be in the nontradables sector, in particular in the services sector. From this perspective, it is not surprising that Germany's specific unemployment rate of unskilled workers increased strongly in the 1990s; at the beginning of the 21st century it was twice as high than the average unemployment rate.

- shifts in sectoral output shares; and this will include shifts in the share of intermediate imports. Leading OECD countries may be expected to specialize not only more on technology and knowledge intensive production, but they also are likely to increasingly outsource production both nationally and internationally; the opening up of Eastern Europe which already started in the early 1990s in the context of the Europe Treaties of the EU has stimulated international outsourcing towards eastern Europe.
- shifts in sectoral employment shares: Following the Stolper-Samuelson theorem the globally increasing relative demand for knowledge-intensive and technology-intensive goods will raise the relative wage of skilled worker which in turn improves opportunities for expansion of the education system and training/retraining activities; countries with a rather flexible supply side in the education system thus stand to particularly gain (e.g., the US, the UK, and the Netherlands).
- share of process innovation vs. product innovations: Given the growing role of software in all sectors and all countries, one may assume that process innovations will dominate in the digital world economy. Moreover, we may assume that modern software development amounts to capital-saving technological progress so that effectively capital is relatively more abundant in the early 21st century than in the 20th century, which could lead to a fall in the relative price of capital and a decline of the capital rental rate relative to the wage index (a composite index for skilled and unskilled labor). The Rybczynski theorem says: An exogenous increase in the endowment of production factor j – given relative goods prices – will lead to higher output of that good which is using the more abundant factor (j) relatively intensively. Therefore we expect a global growth of software intensive – more generally of ICT intensive – goods production; skilled labor which is largely complementary to ICT stands to benefit from this development. Ignoring the early transition period with its many distortions (including variable political risk premium) the Rybczynski theorem might also be applied in the context of FDI flowing to Eastern Europe where the yield on investment should decline relative to the wage ratio. Taking a look at Asia one may apply a similar reasoning to China. However, the Rybczynski theorem overlooks the importance of network effects and

positive regional technology spillovers which obviously are relevant if many multinationals invest in a particular region. Such network effects and positive spillover effects are bound to at least transitorily raise the rate of return of foreign investors.

Given the opening up of China in the 1980s and Eastern Europe and Russia in the 1990s on the one hand and the expansion of ICT – facilitating the international organization of production abroad (e.g., through digital reporting and networked management activities) – on the other, there are new opportunities for foreign direct investment. Moreover, the global innovation race has accelerated as is visible in rising R&D-GDP expenditure ratios in OECD countries so that ownership specific advantages – here technology advantages – of firms play a greater role. Following the OLI approach of DUNNING (1977) who explains FDI in terms of a combination of ownership specific advantages, locational advantages and internationalization advantages (savings on transactions costs through firm-internal transactions), we may expect that FDI growth will exceed that of global output. FDI clearly is a non-neoclassical element in modeling of open economies, and it is unclear whether standard neoclassical theorems hold without modifications. As FDI is often combined with innovation dynamics we also have to consider Schumpeterian dynamics and hence deviations from the neoclassical world of perfect competition. As a macroeconomic implication we should carefully distinguish between GDP and GNP where a simple asymmetric model of an open economy with FDI would have to consider that in the case of identical GDPs (Y in country I which is the host country, Y* in the source country) – produced with a Cobb-Douglas technology according to $Y= K^{ß}L^{1-ß}$ and abroad $Y^*= K^{*ß}L^{*1-ß}$ – the GNP in the domestic host country is Z=Y-ßY (where ßY is profit accruing to foreign investors assumed to own the total capital stock K) while GNP in the source country is Y*+ßY (WELFENS, 1997): If ß=1/3 and population L in both countries is the same, the relative per capita income position y/y* (y=:Y/L) is 2:1 in favor of the source country so that there is no real convergence even with free trade and free capital flows. Both the US and in west European countries witnessed a lively debate about outsourcing and off-shoring in the late 1990s.

2.2. Capital Mobility and Other Non-neoclassical Imperfections

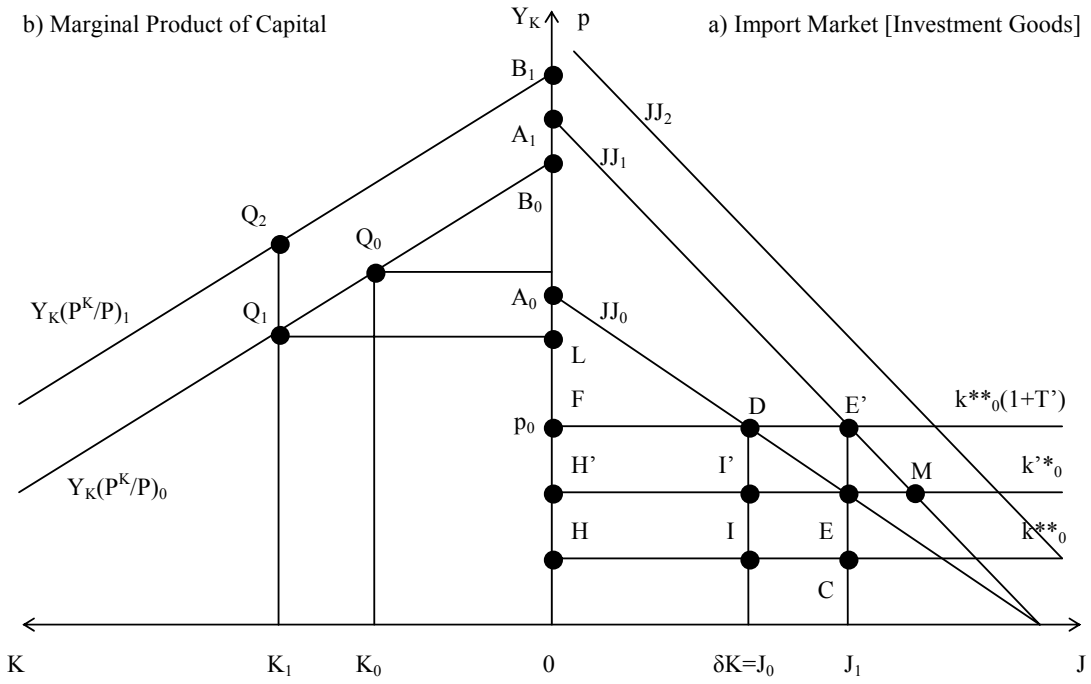
In reality we have a world economy with both trade and factor mobility, in particular mobility of capital (FDI). How is the familiar Vinerian analysis of trade creation and trade diversion affected by the existence of FDI? We assume a three country world in which country A and country B form a customs union. Country C is assumed to have a comparative advantage in the production of the imported good which is a capital good. With a tariff-ridden import price of k'**(1+T) the quantity imported is J_o – coming from country C; J_o is assumed to be identical to depreciations. The creation of a customs union raises imports to J_1 – now coming from country B; but we also have trade diversion in the sense that country C is no longer exporting to country A. There is trade creation as J_1 exceeds Jo; the difference between J_1 and J_o is Greenfield investment. By implication GDP in country A will increase which also implies a rise in GNP and hence a rightward shift of

all demand functions, including the import demand function (JJ). Hence we have an outward shift of the JJ_0 curve to JJ_1. Moreover, the presence of foreign investors will stimulate product innovations and this will bring about an upward rotation of the import demand curve so that JJ_2 is the relevant curve; this implies additional trade creation so that from a theoretical perspective J_{01} (point E_2) is the relevant import quantity. We clearly can see both in the right-hand panel and in the left-hand panel a considerable welfare gain induced by FDI.

As regards mobility of capital one should distinguish between mobile Schumpeter (real: technology-intensive) sectors and immobile Schumpeter industries, where the latter refer to an effective inability to separate research and development (R&D) from the production process (KLODT, 1993); relevant industries are the air and space industry and the special machinery industry so that international wage cost differentials for labor are irrelevant.

One should note that the existence of immobile Schumpeterian industries can impair international factor price equalization. Another impediment – from a theoretical perspective – refers to the existence of nontradables. As regards the role of the latter, the digitalization of the world economy has reduced the share of nontradables in overall output. Both the internet and digital networks have enhanced tradability of many services since it has effectively rendered the supply side or the user more mobile across countries.

Figure 2: Trade creation and FDI-induced product innovation



Source: WELFENS (2005)

Structural dynamics in a digital world economy bring about shifts in the structure of output and can go along with long-term relative factor price changes; changes in goods prices can also play a role. From the perspective of a small open economy in catching-up countries one may assume that the prices of certain goods are subject to an exogenous long-term

decline – as it is observed with ICT goods – or a long-term increase as it is the case with sectors with small process innovation rates plus a global income elasticity of demand exceeding unity.

From a radical macroeconomic point of view one might argue that the composition of output is rather irrelevant; in a pure neoclassical perspective with Harrod-neutral progress the level of the growth path of output per efficiency unit of labor, and hence labor productivity, is determined by the savings rate, the growth rate of the population, the rate of capital depreciation and the exogenous growth rate of technological progress; if production is determined by a Cobb-Douglas production function $Y=K^{ß}(AL)^{1-ß}$ – where A is the level of labor-saving technology – we can additionally state that the parameter ß influences the steady state situation. The growth rate of progress itself is exogenous. In endogenous growth theory one may focus on several ingredients which explain the growth rate of progress, including such factors as:

- human capital accumulation (LUCAS, 1988)
- positive external effects from capital accumulation (ROMER, 1990)
- R&D expenditures (GROSSMAN/HELPMAN, 1991)
- intermediate products which allow for the production of a greater variety of final products which stimulates demand; and this in turn stimulates output growth (ROMER, 1990; GROSSMAN/HELPMAN, 1991; BRETSCHGER, 1998)

A major aspect of structural change is the increase in international outsourcing which leads to the problem of the bazaar economy – to use the term dubbed by SINN (2005). Sinn has argued that Germany's large trade balance surplus is not really impressive, rather Germany's economy would be facing a major problem in international competitiveness as increasingly German exports consist of exported goods containing rising shares of imported intermediates.

2.3. A Demand-Side Perspective of Structural Change

Some aspects and problems of the concept of the bazaar economy hypothesis are easily understood if one takes a look at the equilibrium condition for the goods market in an economy with unemployment: Here the aggregate demand C+I+G+X-J determines output Y (C is consumption, I investment, G government consumption, X exports, J imports).

(1) $Y = C+I+G+X-q^*J$

As we assume that $C=cY$, $I=b'Y$ and $G= \gamma Y$, $X=x(q^*,Y^*)Y$; $J=j(q^*)Y$ we can write in growth rates (denoting $x=X/Y$; $j=J/Y$, $q^*=eP^*/P$ where e is the nominal exchange rate and P the price level; * stands for foreign variables, g for growth rates):

(2) $g_Y = cgv + bgv + \gamma gv + xg_X - jg_J$

For simplicity we have set q* equal to unity. The growth contribution of exports ix xg_X which suggests for the case of $x=0.3$ and $g_X =0.10$ that the contribution from exports is 0.3 percentage points. However, imported intermediates stand for 1/3 of value-added in

exports the true growth contribution of exports is $x'g_X$ = 0.2 times 0.10 = 0.2 percentage points. From this perspective it is clear that a rising share of intermediate exports reduces the growth impact of a given export growth. However, the expression "given export growth" is a problem here since a profitable dynamic international division of labor which leads to a rising share of intermediate exports should raise the growth rates of exports; this indeed is the case if we assume an export function

(3) $X=x(q^*,Y^*)Ye'^{\lambda v}$

where e' is the Euler number and v the share of differentiated products in exports and λ a positive parameter. Hence we have assumed that with a rising share of intermediate imports – leading to a rising share of product varieties – the growth rate of exports will increase. Moreover, we might even assume that a rise in v will cause a real appreciation, and the net effect on X of this rise in v could still be positive. Moreover, if there is trade in intermediate products we should focus on the net bazaar effect: In country I's imports from country II one will find intermediate products which country II had imported from country I (country I's exported intermediate products). Hence the negative growth impact of imports is smaller than a look at jg_J suggests as the true j' – representing value-added abroad in country II relative to GDP in country I – is smaller than j. Finally, one may point out that in the case that the macroeconomic production function does not only include factor inputs K and L but also the degree of high-technology specialization (JUNGMITTAG, 2004) a rising share of intermediate imports in exports – more generally more traded intermediate inputs in global output – implies a positive growth effect if trade in intermediate products stimulates high technology specialization. Such specialization effects is likely to be highly asymmetric, namely in favor of countries with a high ratio of R&D expenditures relative to GDP and a particular focus on high technology as proxied by the share of high-tech patents in overall patents.

2.4. A Demand-Side and Supply-Side Growth Perspective

While short term analysis might argue that aggregate demand determines output, long run growth analysis typically argues that the production function – and the respective factor inputs – determines output growth. However, in a medium term perspective one may argue that both the demand side and the supply side determine output growth (WELFENS, 2005). One may argue that a meaningful medium-term policy perspective comes up with rather different results which point to considerable needs for more empirical analysis. The approach suggested also allows one to take into account both demand side impulses (Y^d is aggregate demand: the sum of planned consumption and investment plus exogenous government demand plus net exports) and long run supply side effects (the production potential Y^{pot} as proxied by a simple production function). The analytical description can be found in the annex.

Medium term output growth thus not only depends positively on the growth rate of capital accumulation g_K, the growth rate of labor input g_L, the rate of (Harrod-neutral) technological progress g_A, and the growth rate of foreign output g_{Y^*} (the foreign growth

rate will affect g_Y the more, the higher foreign output Y* relative to Y is), but also on the import-GDP ratio j and the export-GDP ratio; this is in line with many empirical studies finding a significant impact of trade intensity on growth. Moreover, growth depends negatively on the term s'; this being said does not, of course, rule out that the savings rate s=1-c has a positive impact on the level of the long run growth path which is in accordance with long run growth theory. One should note that from a theoretical perspective the growth rate of labor saving technological progress might depend on the trade intensity x+j (or any suitable index reflecting the relative intensity of exports and imports); a more refined view might introduce specific weights for the impact of low, medium and high-technology trade intensity; one also should note in this context the empirical findings of JUNGMITTAG (2004) who finds that the degree of high-technology specialization Ω' has a significant positive impact on economic growth of EU15 countries. If we assume that the growth rate of technological progress depends on the trend innovation input ratio (r'), namely weighted past R&D-expenditures relative to Y, and on the trend degree of high technology specialization (Ω') we can – using positive parameters f' and f'', respectively - replace g_A by f'r'+f''Ω'. In an economy with FDI inflows one would have to make additional modifications; in particular one may assume that g_A =f'r'+f''Ω' + f'''F where F is the share of the capital stock owned by foreign investors.

The approach presented suggests that both the supply-side dynamics and the demand side dynamics are important for medium term growth. Moreover, the structure of output and the intensity of trade can contribute to output growth.

2.5. Dynamic Schumpeterian Perspectives

If one assumes that Schumpeterian rents are a positive function of technology intensity and also rise with the degree of outsourcing – the highest profit rate being in the production of finished goods since at that stage of production the firm has a high leverage over suppliers – a promising strategy for economic catching up is to combine technological upgrading and a long-term focus on the expansion of finished goods.

This perspective is not an argument for naïve industrial policy but foremost for a reasonable policy strategy:

- strong emphasis on competition and free trade policies
- clear focus on human capital formation and training
- adequate emphasis on inward FDI promotion where over time policymakers could try to encourage production of finished products and high value-added services
- adequate R&D support by government

Figure 3: Structure of production and profit rate R („Schumpeter Ladder")

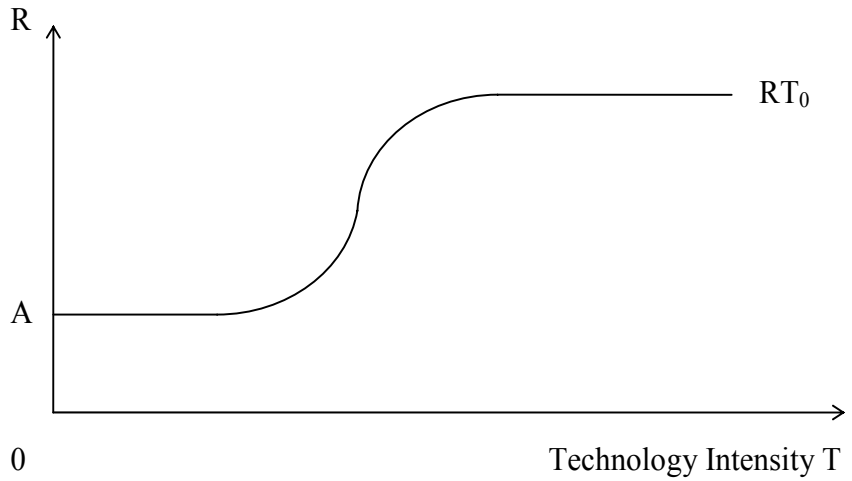
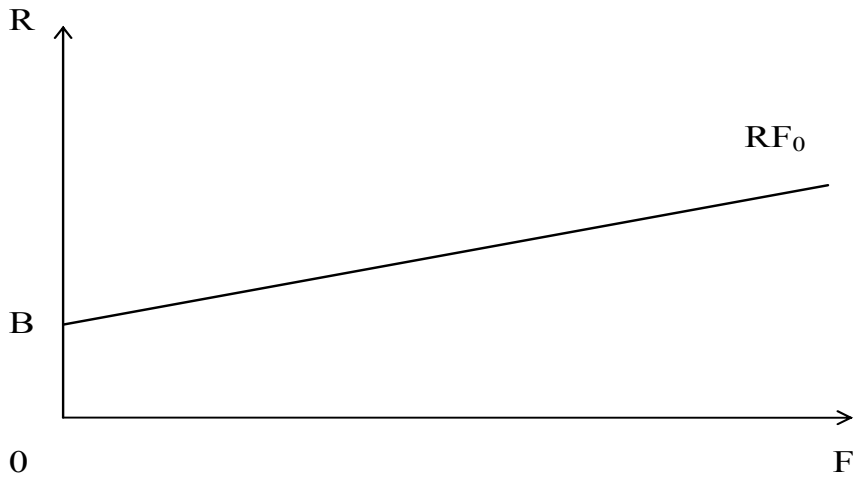


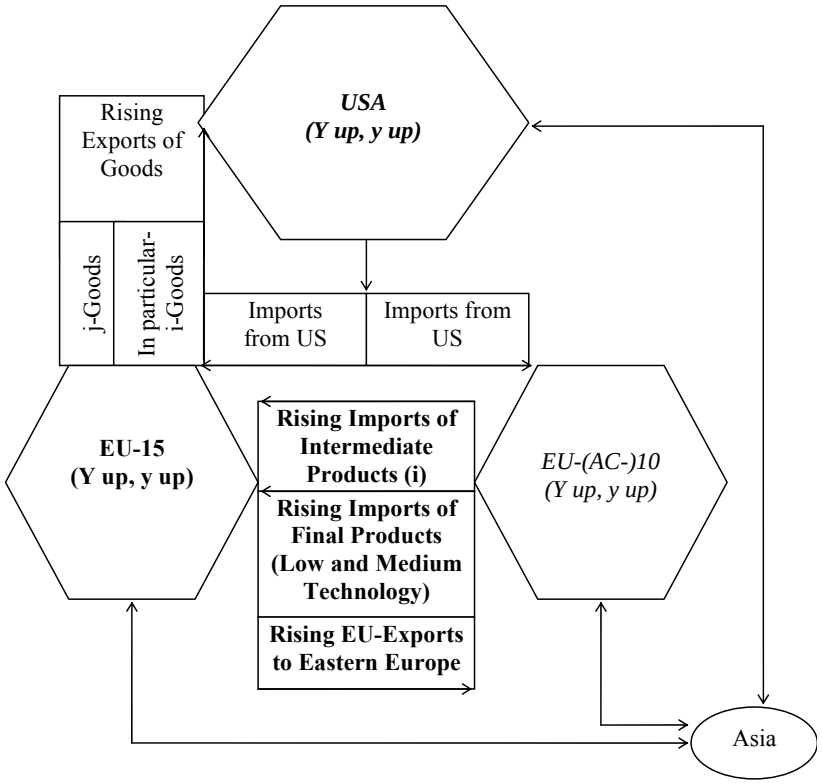
Figure 4: Position in Chain of Value-Added and Profit Rate R; (F =: Final Assembly)



It is unclear whether economic and technological catching-up really could rely on leap-frogging. Typically, firms in a given sector will have to achieve a certain technological graduation over time. In an early stage of development and economic catching up, diffusion of new technologies will be more important than innovation; only after a certain per capita income and a critical level of R&D-GDP expenditures have been reached may one expect there to be strong and sustained innovation dynamics – and only in the long run can high technology dynamics play a considerable role in OECD countries which have achieved a high per capita income. From this perspective EU accession countries will gradually climb up the technology ladder where those able to attract high FDI inflows relative to GDP should have particularly favorable perspectives of economic and technological catching-up. As accession countries move up the technology ladder the EU15 countries will have to increasingly specialize on high technology goods and high technology services which implies enormous challenges for the education system. In a long run perspective this also holds for accession countries since catching-up in terms of per

capita income will raise the relative price of nontradables which in turn is likely to stimulate demands for higher real wage increase such that firms in the tradable sector will increasingly be able to survive only if they start more comprehensive outsourcing to other countries which still have low wages, e.g. the Ukraine or Russia or many Asian countries.

Figure 5: Triangular perspective on trade, structural change and efficiency gains



A more complex perspective is obtained in a three country perspective. We may state the following hypothesis: In a triangular perspective of international specialization one may expect that EU15 countries positive RCA in exports vis-à-vis the US be positively correlated with those import fields in which EU15 has a negative RCA vis-à-vis Eastern Europe. This means that the new international division of labor after EU eastern enlargement is such that at least part of the EU15 sectoral import structure within EU25 is reinforcing external competitiveness as measured by the relative sectoral net export position in the USA. Similarly, Japan's net export position in the US could benefit from its import structure vis-à-vis Asian trading partners.

In this triangular perspective the ability of firms from EU15 countries to rely on imported intermediate products from EU accession countries is the basis for gaining competitiveness in both the global economy and the US. EU15 firms' outsourcing to Eastern Europe not only allows them to gain in terms of price competitiveness as cheaper imported intermediate products replace domestic intermediate products (or there is even true new outsourcing with cost advantages). It also is attractive to increase outsourcing to eastern Europe as a means to restructure domestic outsourcing in EU15, namely in a way that domestic outsourcing is more focused on producing technologically advanced intermediate

products than previously. Following ROMER (1990), GROSSMAN/HELPMAN (1991, chapter 3) and BRETSCHGER (1998, chapter 7), one may argue that a complex "high-technology" product Y^h is produced according to the following CES function using intermediate products x_i (i=1,2…n).

(I) $Y^h = [\sum(x_i)^{ß'}]^{1/ß'}$

If all intermediate products have the same cost structure we will have identical quantities of each intermediate product produced such that x1=x2=…xn. Thus we get the typically symmetrical equilibrium

(II) $Y^h = xn^{1/ß}$

Assuming – to make sure that positive profit rates exist – that $0<ß'<1$ we finally get (with X denoting the sum of all inputs)

(III) $Y^h/X = n^{(1-ß')/ß'}$

Hence factor productivity is a positive function of the number of intermediate products. To the extent that economic opening up and regional integration lead to an increase in n, we can expect a positive productivity effect. This should translate into a higher level of the growth path.

Given slow development in EU societies, it would be wise for Europe to stimulate technological progress, productivity growth and output growth. Accelerated productivity growth and stronger innovation dynamics would be all the more important for EU countries since in the long run Europe faces problems from its ageing societies. The simulations of McMORROW/ROEGER (2004) suggest that long run growth will reduce in the EU15 countries where the ageing phenomenon in the first half of the 21st century will be stronger than in the US.

Facing many theoretical issues in the context of structural change, innovativeness and growth, it is quite important to take a closer look at empirical analysis.

3. Empirical Analysis

The following section will concentrate on the analysis of selected innovation traits, structural change and the bazaar effect mainly through descriptive statistics. We will focus on selected EU-15 countries as well as some new EU member states and partially the USA as well.

3.1. Selected Innovation Traits and Structural Change

Product innovations allow for the increase in product prices in world markets and hence the earning of high incomes (wages and profit). Process innovations are equivalent to cost reductions and allow firms to fetch higher market shares and high incomes, in particular if

price elasticity is larger than unity or if increased market share also allows for the exploitation of dynamic scale economies (e.g., learning by doing effects). Innovation dynamics can be assessed in different ways:

- Innovation expenditures, usually scaled by sales ("R&D intensity"); this in an R&D input indicator
- Patents per capita (R&D output indicator)
- Product innovation rate (new products to the market in % of sales, survey data, innovation output indicator)
- Diffusion rate (new-to-the-firm products, figures are from surveys)

Taking a closer look at selected EU countries, one finds that Sweden, Germany and Finland were leading in R&D intensity in manufacturing (6.4, 4.7 and 3.9, respectively, in 2003; EU average 3.45; see Tab. 1). France and the Netherlands achieved 3.1, the UK 3.0. Germany's R&D intensity in the services sector was much weaker, namely 1.6 compared to the EU average of 1.8. Sweden was a clear leader in this field. France and the UK recorded 1.6 and 1.4, respectively. It is interesting to observe that in the field of product innovations in manufacturing, Germany was below the EU average despite its leading position in R&D intensity. Finland, Sweden and France were leading countries in the field of product innovations. This suggests that the German innovation system might have considerable efficiency problems. A similar picture is found in production innovation in the services market. As regards diffusion indicators, Germany is a leading EU country. Moreover, Sweden and Germany recorded a high ratio of New-to-firm to New-to-market in the manufacturing industry, which points to relatively fast diffusion (this could reflect strong competition).

Table 1: European Innovation Scoreboard, 2003

European Innovation Scoreboard 2003 – Selected Member States

	EU 15	DE	FR	NL	AT	FI	SE	UK
Innov exp manuf	3.45	4.71	3.08	3.07	2.83	3.91	6.42	2.96
Innov exp serv	1.83	1.64	1.57	0.79	0.92	0.96	19.11	1.39
New-to-mark prods manuf	10.5	7.1	9.5	-	8.4	27.2	3.5	9.5
New-to-mark prods serv	7.4	3.7	5.5	-	4.3	12.2	9.3	-
New-to-firm prods manuf	28.6	40.3	17.5	23.8	23.1	31.1	32.1	-
New-to-firm prods serv	18.8	16.4	17.1	13.9	12.8	18.8	23.7	-
New-to-firm/New-to-mark prods manuf	2.7	5.7	1.8	-	2.8	1.1	9.2	-
New-to-firm/New-to mark prods serv	2.5	4.4	3.1	-	3.0	1.5	2.5	-

Source: EUROPEAN COMMISSION (2003), Staff Working Papers, European Innovation Scoreboard 2003, page 27, Brussels and own calculations.

Against such apparent innovation weakness, one might consider it surprising that Germany has such a high current account surplus, e.g. 5% of GDP in 2002. However, 90 billion net exports recorded in 2002 would quickly melt away if full employment could be restored; investment would increase by about 10% or by about Euro 20 bill., consumption also by

about 5% or 60 bill., which would leave net exports down at Euro 10 bill. The assumption here is that consumption is a positive function of disposable income and a negative function of the expected unemployment rate. Investment is assumed to depend negatively on the real interest rate and the expected unemployment rate. To put it differently, a high net export position of a country with a high unemployment rate cannot simply be considered an indicator of high international competitiveness. Rather, it largely reflects weak domestic demand. The reduction of net exports in the case of rising employment and hence a falling expected and actual unemployment rate will hold even if one takes into account the expansionary impact of higher employment on the supply side. This perspective is, of course, not to deny that in a situation of high net exports (and also in the case of net imports: see the US in the 1990s), certain sectors are positively successfully-specialized in production and export of technology intensive or innovative products.

International competitiveness in specific sectors can be assessed on the basis of revealed comparative advantage indicators (RCA: sectoral relative export share in country *i* as compared to the same industries relative export share on the EU15 single market, with an indicator above unity indicating a sectoral competitive advantage) or with respect to export unit values. A sectoral increase in the weighted export unit value indicates an improved competitiveness in the EU single market as higher prices can be fetched in a very competitive market. (There might, however, be cases for which changes in market power or government intervention also affect the export unit value).

According to the Heckscher-Ohlin theory, the RCA should depend on relative factor endowments. Higher RCAs and higher export unit values in certain sectors are likely to contribute quite strongly to output growth in the long run. Scale intensive sectors and science intensive sectors are obviously two potentially relevant sectors. In a high wage economy, emphasis on science-based products can strengthen competitiveness through product innovations which will temporarily lead to rising export unit values and hence higher profitability. This is a Schumpeterian perspective which leads away from perfect competition. Scale intensive products also imply that the perfect competition model does not hold. In some cases, scale intensive products exhibit both static and dynamic scale economies so that high production volumes could be combined with first mover advantages.

Interestingly, the US has achieved a higher export unit value in all fields where it has enjoyed a positive comparative advantage This suggests a positive feedback mechanism in the sense that a higher export unit value goes along with increased profitability, which in turn reinforces investment and hence should contribute to an improving RCA.

The US has achieved a strong increase in the GDP weighted export unit value in NACE 30, 32, 33 and 35, respectively: manufacture of office machinery and computers; manufacture of radio, television and communication equipment and apparatus; manufacture of medical, precision and optical instruments, watches and clocks; manufacture of other transport equipment (e.g. airplanes). US companies apparently are well positioned to fetch higher prices in those sectors which represent a relatively large share of the economy. In the fields of NACE 32 and 35, the improvements in export unit values also represent a large share of US exports. The rise in the export unit value was quite impressive in NACE 32 and NACE 35, for which the respective value doubled and nearly quadrupled, respectively. In NACE 35 the US export value is five times as high as

in the case of Germany, ten times as high as in the case of Italy and about fifty times as high as in the case of Hungary.

Table 2: USA – RCA, EUV, EUV weighted with the sectoral export shares of manufacturing and of GDP

NACE rev.1 (2-digit)	RCA 2000/01	EUV 2001	EUV 1993	EUV 2001 weighted (export share)	EUV 1993 weighted (export share)	dEUV weighted (export share)	EUV 2001 Weighted (GDP share)	EUV 1993 Weighted (GDP share)	dEUV Weighted (GDP share)
15	0,24	0,40	0,26	0,01	0,01	0,00	0,16	0,11	0,06
16	0,07	2,04	1,64	0,00	0,00	0,00	0,02	0,01	0,00
17	0,28	6,85	5,28	0,04	0,06	-0,02	0,95	0,67	0,28
18	0,11	28,16	17,75	0,06	0,11	-0,05	1,25	1,23	0,02
19	0,16	9,17	11,17	0,02	0,04	-0,03	0,39	0,48	-0,09
20	0,79	1,37	0,82	0,01	0,01	0,00	0,21	0,14	0,08
21	0,50	0,84	0,50	0,01	0,01	0,00	0,29	0,12	0,16
22	**1,10**	**14,21**	**9,48**	**0,14**	**0,11**	**0,03**	**3,07**	**1,20**	**1,87**
23	0,29	0,11	0,09	0,00	0,00	0,00	0,02	0,01	0,00
24	**0,91**	**3,95**	**2,25**	**0,52**	**0,32**	**0,20**	**11,56**	**3,50**	**8,06**
25	0,57	8,00	6,13	0,14	0,13	0,00	3,09	1,49	1,61
26	0,49	3,91	2,66	0,03	0,02	0,01	0,65	0,24	0,41
27	0,53	7,35	4,33	0,21	0,14	0,07	4,75	1,54	3,21
28	0,56	12,57	8,64	0,18	0,13	0,05	3,90	1,43	2,48
29	**1,24**	**20,61**	**14,22**	**2,16**	**1,57**	**0,59**	**48,12**	**17,43**	**30,70**
30	**1,40**	**144,84**	**117,88**	**22,11**	**20,29**	**1,82**	**492,25**	**225,17**	**267,08**
31	**1,31**	**35,90**	**25,52**	**1,60**	**1,01**	**0,58**	**35,52**	**11,22**	**24,29**
32	**1,93**	**252,79**	**125,42**	**27,94**	**8,35**	**19,59**	**622,02**	**92,67**	**529,35**
33	**3,64**	**150,75**	**84,41**	**13,41**	**7,53**	**5,88**	**298,58**	**83,58**	**214,99**
34	0,20	9,73	6,96	0,32	0,22	0,10	7,06	2,43	4,63
35	**4,73**	**299,91**	**76,10**	**53,81**	**10,36**	**43,45**	**1197,95**	**114,99**	**1082,96**
36	0,97	22,27	12,45	0,44	0,23	0,22	9,89	2,50	7,39

Note: Fields of positive RCAs are bold typed; strong improvement in GDP-weighted export unit value is underlined; fields of declining export unit value are in Italics.

As regards export unit values and the change of export unit values over time, one should also take a look at weighted export unit values so that the relative economic significance of certain sectors can be understood. As regards Germany, it is well-known that the country has a positive RCA – read RCA above unity – in both the automotive industry and in other transport equipment (NACE 34 and 35). Taking a closer look at German industry, one can see that specialization in terms of RCA changed slightly in the decade after 1993. Germany has one important loser industry (see by contrast Italy), namely NACE 19 which not only represents a negative RCA but also signifies declining export unit values: tanning and dressing of leather, manufacture of luggage, handbags, saddlery, harness and footwear; NACE 17 and 18 – they are classified as labor intensive sectors – also show weak international competitiveness (RCA<1); sectors 28 and 36 which also are labor-intensive show at least an improvement of export unit values. There is a high RCA in the manufacturing of fabricated metal products (NACE 28, not including machinery and equipment). It is also noteworthy that the export unit value has increased over time for this product group. In the field of office machinery and computers (NACE 30) – a sector which (together with NACE 32: telecommunications equipment) is considered highly relevant for productivity growth –, Germany has a negative RCA. Worse yet, the export unit value in this sector has declined. NACE 32 has improved over time. The overall picture with respect to the long-term development of export unit values in German industrial export

reveals that export unit values – average revenue per quantity unit (e.g., kilogram of steel, etc.) – showed few changes over the period from 1993 to 2001. Which sectors are most important for economic dynamics: In a narrow sense those sectors which show a positive RCA and a high weighted export unit export value; this at least is the concept presented here. As regards the economic significance of export unit values, it is indeed useful to take a closer look at weighted unit values where sectoral shares in overall manufacturing exports are taken as weights: considering only weighted indicators reaching at least 0.75 (hence export unit value must be high or the share of the respective sector in overall export of manufacturing) – see the bold figures in the respective tables – we see that 29, 30, 32, 33, 34 and 35 are crucial sectors for Germany.

Note that the change in the weighted export unit value of 32, 33 and 34 was positive in Germany over the period 1992-2001; and this should translate into relatively increasing wages for skilled workers as we may assume that these sectors are using skilled labor intensively. As regards Germany, 29, 33, 34 and 35 reveal an economically significant positive RCA; as regards Hungary we find 18, 30, 31, 32, 34 as positive RCA: 34 is an overlap with Germany. The fact that Hungary could improve the weighted export unit value strongly in 34, the automotive sector, points to a strong catching-up process in the Hungarian automotive sector. To the extent that this finding is representative of accession countries in Eastern Europe, Germany's automotive firms acting in the lower quality segments of the market might face profitability problems in their German plants. The new international division of labor in Europe suggests that mass production of standard cars will be largely relocated to Eastern Europe's low wage countries. Hence the respective regions will face serious labor reallocation challenges in the early 21st century.

Figure 6: Germany – RCA and Export Unit Values

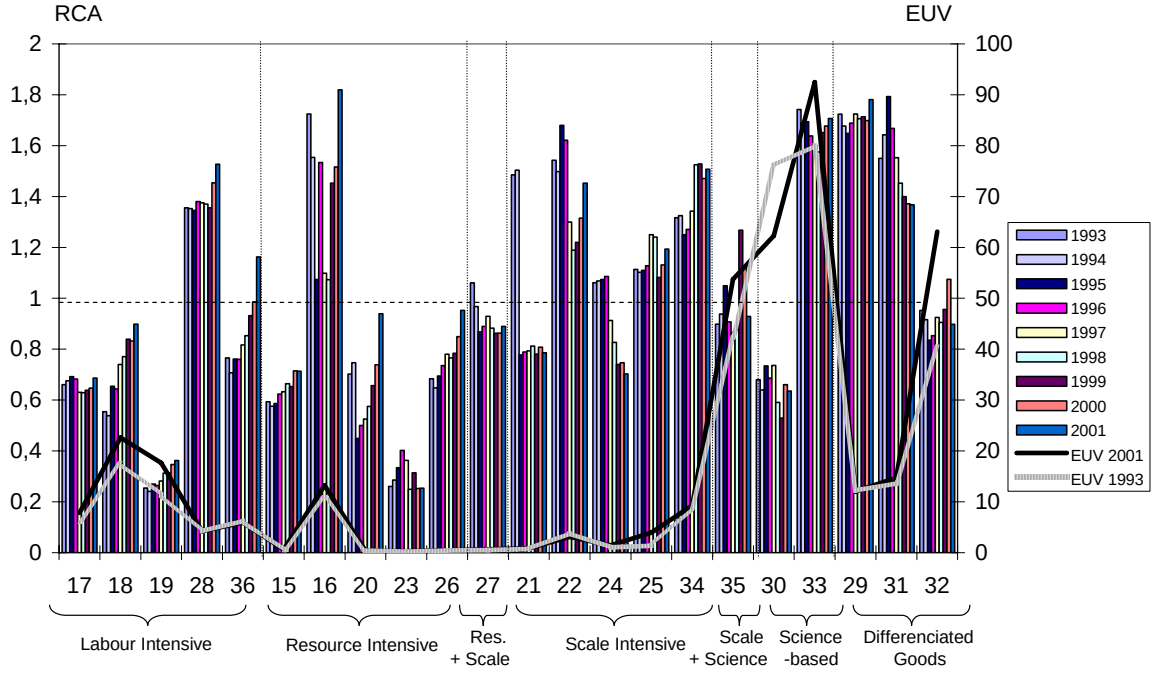


Table 3: Germany – RCA, EUV, EUV weighted with the sectoral export shares of manufacturing

NACE rev.1 (2-digit)	RCA			EUV 2001	EUV 1993	dEUV	EUV 2001	EUV 1993	dEUV
	2000/01	EUV 2001	EUV 1993	weighted (export share)	weighted (export share)	weighted (export share)	weighted (GDP share)	weighted (GDP share)	Weighted (GDP share)
15	0.71	0.62	0.52	0.03	0.03	0.01	8,55	2,93	5,62
16	1,67	13,25	10,82	0.07	0.05	0.01	8,37	4,00	4,37
17	0.67	7,82	6.12	0.13	0.10	0.03	20,67	11,22	9,44
18	0.86	22.60	17.51	0.33	0.26	0.07	25,94	13,86	12,08
19	0.35	17.65	11,39	0.08	0.05	0.03	0,89	4,96	-4,07
20	0.84	0.38	0.40	0.00	0.00	0.00	0,43	0,15	0,28
21	0.80	0.85	0.73	0.02	0.02	0.00	3,58	1,56	2,02
22	1,38	3.11	3,83	0.03	0.04	-0.01	5,21	2,81	2,40
23	0.25	0.26	0.18	0.00	0.00	0.00	0,64	0,10	0,55
24	0.72	1,43	1.01	0.16	0.11	0.05	28,49	11,78	16,71
25	1,16	3,92	1,38	0.13	0.05	0.09	21,49	9,50	12,00
26	0.90	0.43	0.44	0.01	0.01	0.00	1,17	0,60	0,57
27	0.88	0.66	0.51	0.04	0.03	0.01	6,50	2,10	4,40
28	1,49	4,22	4,18	0.14	0.14	0.00	21,27	9,46	11,81
29	1,74	12.02	12,20	1,50	1,52	-0.02	197,64	96,45	101,19
30	0.65	62.26	76.05	4,29	5,24	-0.95	799,70	208,07	591,63
31	1,37	14.70	13.64	0.69	0.64	0.05	101,16	35,49	65,68
32	0.99	63.06	40.44	3,54	2,27	1,27	561,74	113,08	448,66
33	1,69	92.49	80.01	3,16	2,73	0.43	217,73	114,93	102,80
34	1,49	9,27	8,80	1,94	1,84	0.10	307,56	107,29	200,27
35	1.03	53.74	42.32	2,53	2.00	0.54	341,70	163,22	178,48
36	1.07	5,92	6,28	0.12	0.12	-0.01	19,83	8,25	11,58

NACE 30, 31 and 32 indicate successful Hungarian specialization. However, note that 31 and 32 - differentiated goods (this also includes 29) – illustrate relative footloose industries: the manufacturing of office machinery and computers (30) and of electrical machinery and apparatus n.e.c. (31) could internationally be relocated relatively quickly.

One should point out that RCAs typically follow relative sectoral patent positions. A rising share in global patents in the respective sector translates into an improved sectoral RCA with a time lag of 3-4 years. Hence expenditures on research & development and innovation policies are important.

Compared to the apparently stable German industrial specialization pattern, Hungary has launched a rather impressive catching-up process since reinforcing the RCAs in some technology intensive sectors and was also able to fetch higher export unit values – a proxy for its ability to extract high prices in competitive EU market – in EU-15 markets. Hungary has many fields which have shown a rise in the export unit value.

Figure 7: Hungary – RCA and Export Unit Values

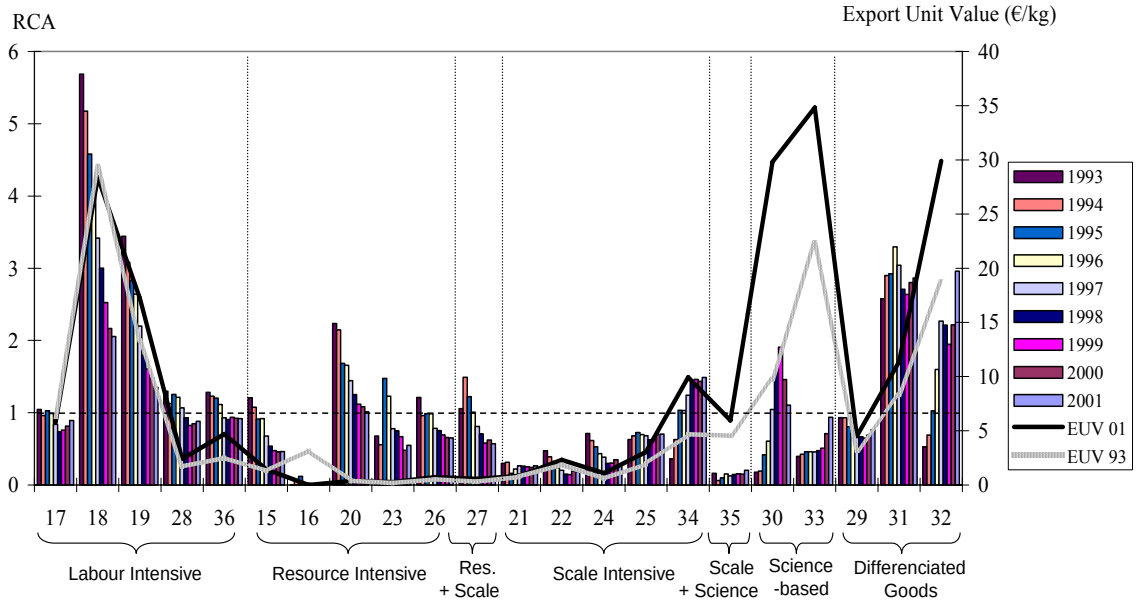
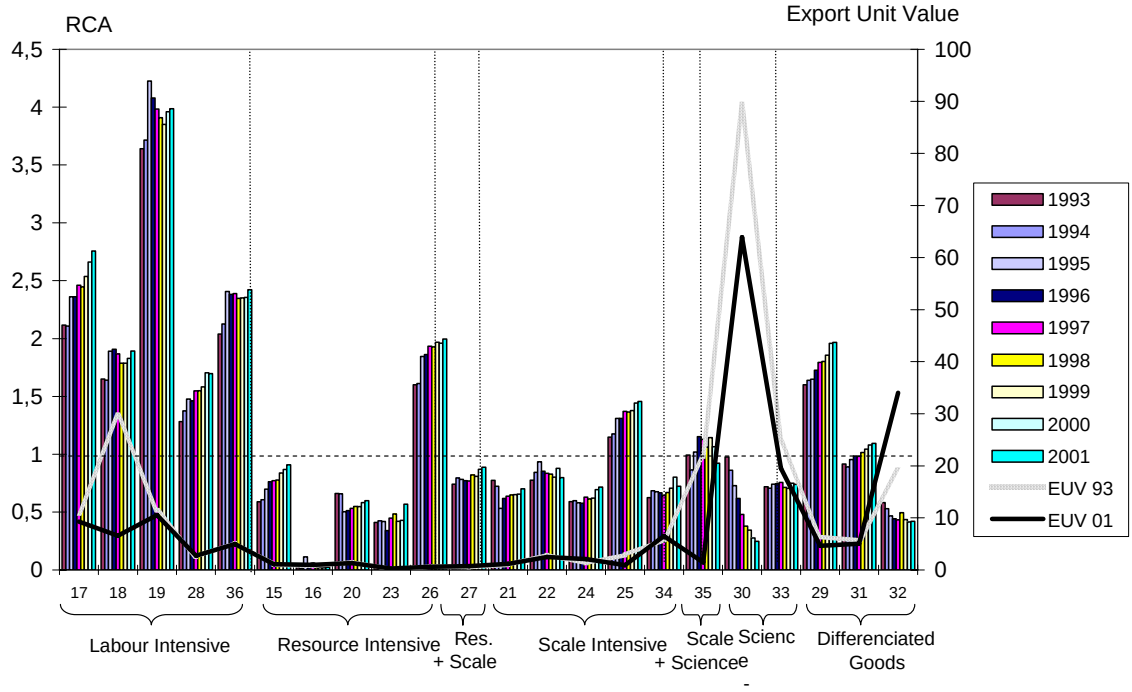


Table 4: Hungary – RCA, EUV, EUV weighted with the sectoral export shares of manufacturing or respective sectoral shares in GDP

NACE rev.1 (2-digit)	RCA			EUV 2001	EUV 1993	dEUV	EUV 2001	EUV 1993	dEUV
	2000/01	EUV 2001	EUV 1993	weighted (export share)	weighted (export share)	weighted (export share)	weighted (GDP share)	weighted (GDP share)	Weighted (GDP share)
15	0,46	1,45	1,27	0,05	0,04	0,01	19,29	16,37	2,92
16	0,00	0,00	3,19	0,00	0,00	0,00	0,00	0,00	0,00
17	0,85	5,72	6,29	0,11	0,12	-0,01	48,85	26,15	22,70
18	2,11	28,39	29,41	1,05	1,09	-0,04	494,83	438,19	56,65
19	1,42	17,21	13,31	0,28	0,21	0,06	118,38	70,66	47,72
20	1,05	0,37	0,38	0,00	0,00	0,00	1,62	0,63	0,99
21	0,25	0,84	0,75	0,01	0,01	0,00	2,72	0,50	2,22
22	0,19	2,32	1,89	0,00	0,00	0,00	1,69	0,83	0,87
23	0,51	0,27	0,18	0,00	0,00	0,00	1,59	0,29	1,30
24	0,31	1,09	0,56	0,04	0,02	0,02	22,93	5,09	17,85
25	0,70	3,04	1,93	0,07	0,04	0,02	27,75	4,43	23,32
26	0,65	0,73	0,53	0,01	0,01	0,00	2,89	1,46	1,44
27	0,60	0,56	0,29	0,02	0,01	0,01	8,56	1,76	6,80
28	0,87	2,40	1,69	0,05	0,04	0,02	21,86	6,41	15,45
29	0,73	4,51	3,16	0,29	0,20	0,09	113,75	26,54	87,21
30	1,28	29,81	9,74	3,59	1,17	2,42	2503,98	9,06	2494,92
31	2,83	11,36	8,32	1,10	0,81	0,29	489,95	74,79	415,16
32	2,59	29,91	18,76	5,06	3,17	1,89	1624,24	35,17	1589,07
33	0,82	34,83	22,37	0,80	0,51	0,29	198,11	20,40	177,71
34	1,46	9,93	4,68	2,35	1,11	1,24	941,11	20,94	920,17
35	0,18	5,96	4,54	0,05	0,03	0,01	6,85	2,63	4,23
36	0,92	4,69	2,50	0,09	0,05	0,04	37,21	8,30	28,91

Germany's industry shows some clear fields of comparative advantage as does Hungary, an interesting case of new economic dynamics in an EU accession country. It is quite noteworthy that Hungary achieved higher export unit values in several sectors. The table shows that weighted improvements of export unit values were strong in 30, 32 and 34, essentially electronic products which represent scale-intensive goods, science-based goods and differentiated goods.

Figure 8: Italy: RCA (Revealed Comparative Advantage) and Export Unit Value



Italy has suffered in a traditional field of comparative advantage from a fall in the export unit value, namely in NACE 18 (manufacture of wearing apparel; dressing and dyeing of fur) which indicates stronger global price competition for an important sector of the Italian economy. There also was a strong fall in the export unit value in NACE 30 which is the crucial manufacturing of office machinery and computers, but in this group Italy also demonstrates a revealed comparative weakness as the RCA (Revealed Comparative Advantage) is much below unity. More encouraging news can be seen which respect to 35, which is close to an RCA exceeding unity and where the export unit value has improved. Very encouraging is also NACE 19 – with a high RCA and improved export unit value – which is a traditional strength of the Italian economy: tanning and dressing of leather, manufacture of luggage, handbags, saddlery, harness and footwear. A successful adjustment is also found in NACE 28 and 29, respectively: Manufacture of fabricated metal products, except machinery and equipment (28) and manufacture of machinery and equipment n.e.c. (29). From this perspective Italy could benefit considerably from EU eastern enlargement both through rising exports of sophisticated consumption goods and of industrial goods.

Table 5: Italy – RCA, EUV, EUV weighted with the sectoral export shares of manufacturing and of GDP

NACE rev.1 (2-digit)	RCA			EUV 2001	EUV 1993	dEUV	EUV 2001	EUV 1993	dEUV
	2000/01	EUV 2001	EUV 1993	Weighted (export share)	weighted (export share)	Weighted (export share)	Weighted (GDP share)	weighted (GDP share)	Weighted (GDP share)
15	0,84	1,07	1,04	0,07	0,07	0,00	7,93	4,70	3,23
16	0,01	0,70	0,75	0,00	0,00	0,00	0,01	0,00	0,00
17	2,79	9,53	10,83	0,59	0,96	-0,37	69,33	65,67	3,67
18	1,85	15,80	29,77	0,52	1,36	-0,83	61,52	92,67	-31,14
19	3,76	17,62	11,43	0,78	0,68	0,11	92,16	46,23	45,93
20	0,62	1,30	1,49	0,01	0,01	0,00	0,84	0,53	0,31
21	0,68	1,12	0,99	0,02	0,02	0,01	2,72	1,24	1,48
22	0,89	2,69	2,88	0,02	0,02	0,00	2,51	1,48	1,02
23	0,49	0,28	0,15	0,00	0,00	0,00	0,36	0,11	0,25
24	0,65	1,79	1,30	0,17	0,10	0,07	19,81	7,00	12,82
25	1,46	2,95	2,90	0,13	0,13	0,00	15,50	8,73	6,77
26	2,00	0,59	0,65	0,02	0,02	-0,01	2,10	1,70	0,39
27	0,92	0,71	0,57	0,04	0,02	0,01	4,23	1,71	2,52
28	1,72	2,58	2,57	0,11	0,10	0,01	13,07	6,92	6,14
29	1,99	6,19	6,35	1,04	0,96	0,08	122,32	65,92	56,40
30	0,29	56,58	89,47	1,81	4,88	-3,06	212,81	333,21	-120,39
31	1,10	6,54	5,67	0,24	0,19	0,05	28,73	13,04	15,69
32	0,45	24,50	19,24	0,63	0,42	0,21	73,63	28,80	44,83
33	0,72	20,28	24,72	0,36	0,43	-0,08	41,91	29,62	12,29
34	0,77	6,32	5,81	0,78	0,48	0,30	91,19	32,51	58,68
35	0,95	24,99	21,79	0,90	0,82	0,09	105,96	55,71	50,25
36	2,39	3,89	5,20	0,19	0,29	-0,10	22,38	19,76	2,62

So far we have analyzed the relative export position of selected countries as suppliers on the EU-15 market. However, having a flourishing export market does not necessarily mean that a country is competitive and is dealing well with the challenges of structural change. What counts is the ratio of domestic to foreign value added in production, as well as the ratio of domestic to foreign intermediated inputs in production. This will have an impact on how well factor markets can cope with structural change. Thus we will now turn to the analysis of the importance of intermediate imports, which brings us to the so-called bazaar effect.

3.2. The Bazaar-Effect

The Bazaar-Effect according to SINN (2005) states that the share of domestic value added in total output of an industry *i* falls to the benefit of foreign countries. This means that a declining part of the final product's value added is generated domestically. There is a tendency toward outsourcing and offshoring, while the first implies the purchase of intermediate products from external firms and the latter indicates that a (mostly labor intensive) part of the value added production chain is relocated to a foreign country. In the

extreme case, the economy would merely buy and sell products, just like on a bazaar. The question of outsourcing and offshoring is especially brigand within an EU25 perspective, since many western European companies offshore production to eastern Europe and also buy eastern European intermediate inputs.

Indeed, one can show that the share of domestic value added in production is declining in Germany, as well as in some other European countries. However, this does not necessarily imply a problem for the domestic economy. As long as the sum of domestic value added share plus domestic intermediate inputs' share to total production does not decline, there should not be a negative effect to the domestic factor markets. If, for instance, domestic value added in production declines by 2 percentage points, but at the same time the share of domestic intermediates in production rises by 2 percentage points, the share of domestic participation in production remains the same, causing no harm to the domestic economy. This is merely a relocation of economic activity among domestic industrial sectors. For total manufacturing one can observe a decline in the share of value added plus the share of domestic intermediate inputs since the second half of the 1990s; this, however, is not valid for all industries. Therefore we will now turn the attention to the six most economically important German industries.

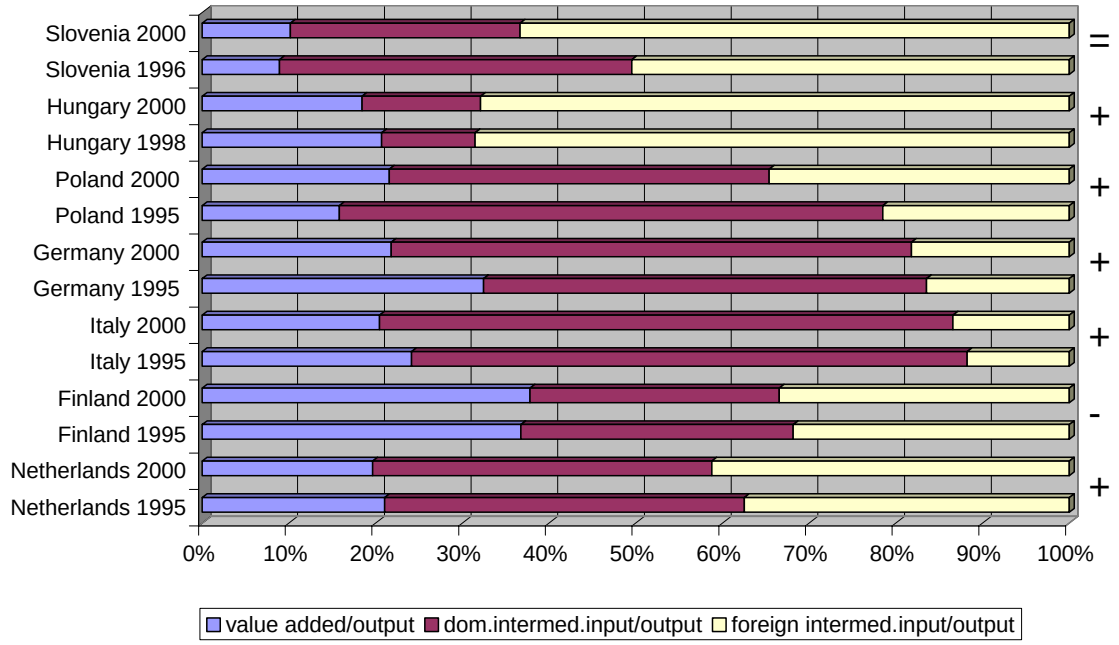
These are motor vehicles, machinery, chemicals, radio/TV/communication equipment, textiles/ wearing apparel, and office machinery. These six industries make up to roughly 62% of German exports and 52% of German imports in the year 2004. The share of these six industries in the foreign trade position of the other countries considered in the analysis is also rather high (e.g., 60% of Hungarian exports, and 59% of Hungarian imports in 2002). We will analyze the extent of the bazaar effect for these six industries.

Motor Vehicles

The following figure shows the share of domestic value added, of domestic intermediate inputs and of foreign intermediate inputs in the total output of the motor vehicles industry in selected countries. These include three new EU member states, Slovenia, Hungary and Poland. Furthermore it includes Italy and Germany as the "sick men" in Europe; the Netherlands as a small open economy; and especially concerning the telecommunications industry, Finland has been included into the analysis.

The Bazaar-effect as described by SINN (2005) refers to a decline in the share of domestic value added in total output. Indeed this is the case for motor vehicles in Germany, where the share of value added falls from 32.5% in 1995 to 21.8% in 2000. At the same time, however, the share of domestic intermediates rises from 51.1% to 60%. The total share of domestic formation of output therefore only slightly declines from 83.6% to 81.8%. This corresponds to relocation to foreign countries in the production of motor vehicles to the extent of 1.8 percent of output. However, still 81.8% of output is produced in the home country, either as value added in the motor vehicles industry or as intermediate production in other domestic industries. Thus the bazaar-effect is rather small in the German motor vehicles industry.

Figure 9: Motor vehicles – Bazaar effect



A similar rise in the share of foreign intermediates can be observed in the Netherlands, Finland and Italy, and to a greater extent in Poland and Slovenia. The Netherlands, Hungary and Slovenia, as being small open economies, are expected to have a higher overall share of foreign intermediates, which is shown in the figure. However, the share of foreign intermediates is considerably higher for the small new EU economies than for the Netherlands.

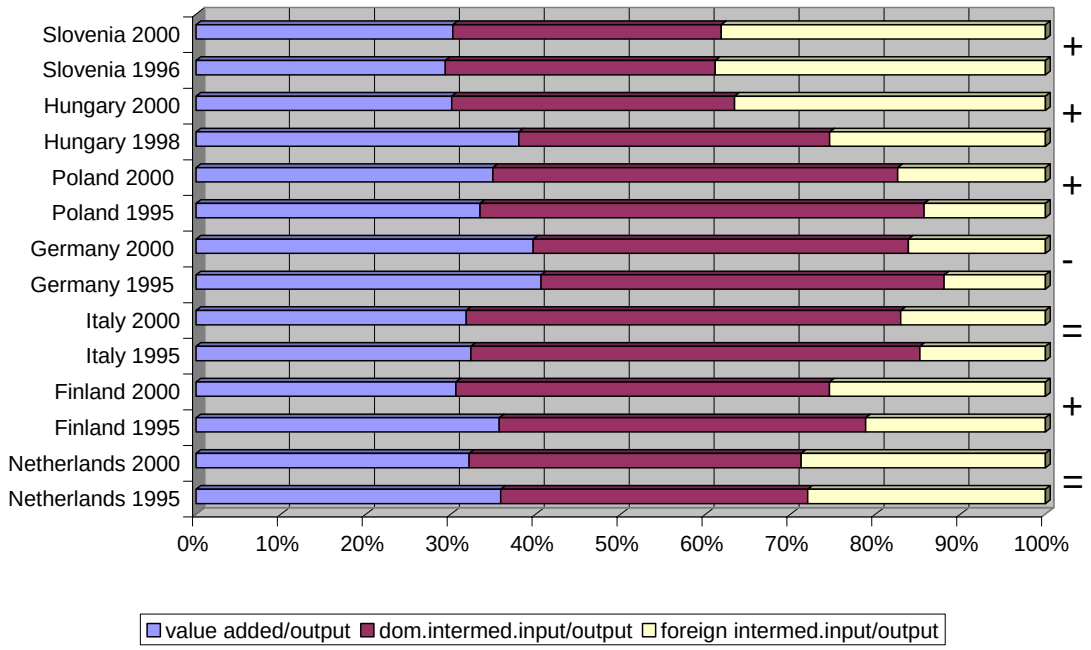
The values (+ or -) at the end of the rows indicate the tendency of Export Unit Values (EUV) since 1993. It seems that a problem might occur if a strong decline of the domestic share of production is accompanied by declining tendency of Export Unit Values. In the motor vehicles industry, only Finland shows a decline in EUVs; at the same time, however, that share of value added has increased.

Machinery and Equipment

Most countries show a considerably high share of domestic production in this area. The sum of the share of value added and domestic intermediates exceeds 70% in most cases. Only in some new EU member states can one find a little higher share of foreign intermediates: Slovenia and Hungary.

Except for Slovenia the share of foreign intermediate inputs has risen in the time period considered. A relatively strong rise occurred in Hungary with 11%, followed by Finland and Germany with roughly 4%. Although there is a negative tendency in the development of the EUVs in Germany, the situation is not alarming, since the share of foreign intermediates is still very low (16%). In most of the countries the EUVs tend to increase, except for Italy and the Netherlands, where they stagnate instead.

Figure 10: Machinery and equipment – Bazaar effect

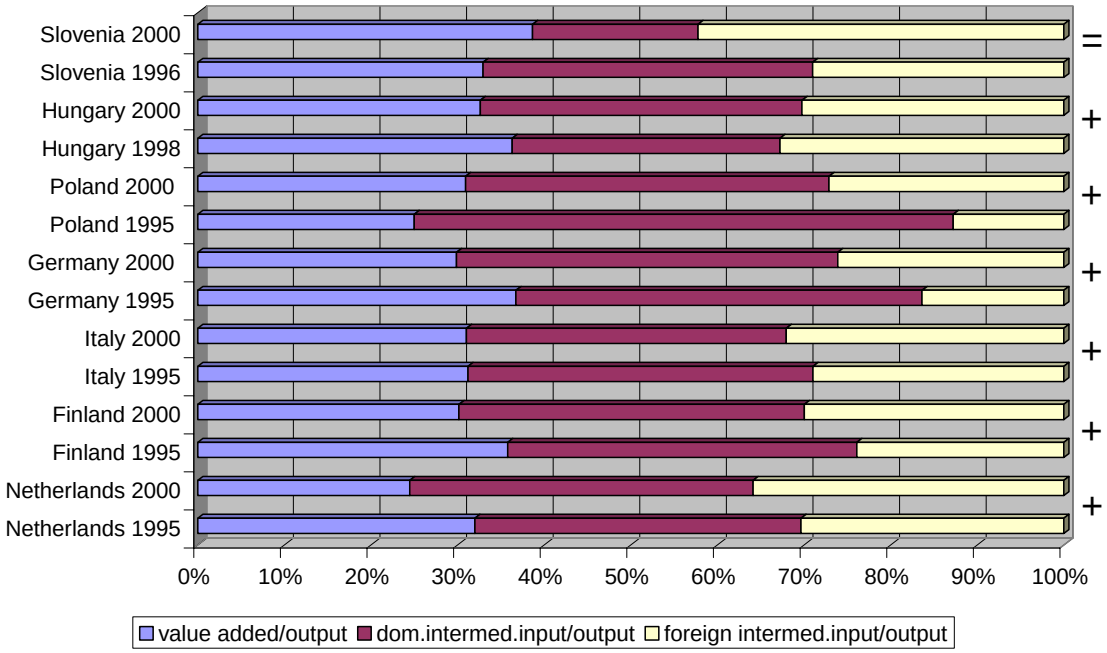


All in all, the picture in the machinery industry is rather homogenous with a relatively high percentage of domestic activity in production.

Chemical Products

Homogeneity is also given in the chemicals production. In most countries the share of domestic value added makes up to 25-35% of the industry output. Except for Italy, for which the share has remained constant, domestic value added in production is declining in western European counties, giving rise to the bazaar-effect. This is also the case for Hungary. However, both in Slovenia and in Poland the share is increasing considerably. At the same time, this rise cannot compensate for the loss in the share of domestic intermediates, thus the share of foreign intermediates in output has risen in both countries considerably (Slovenia 13 %, Poland 14 %). The only country, where the total domestic share in 2000 exceeded the previous value is Hungary. EUVs show a clear tendency to rise in all but one country, Slovenia.

Figure 11: Chemical product – Bazaar effect



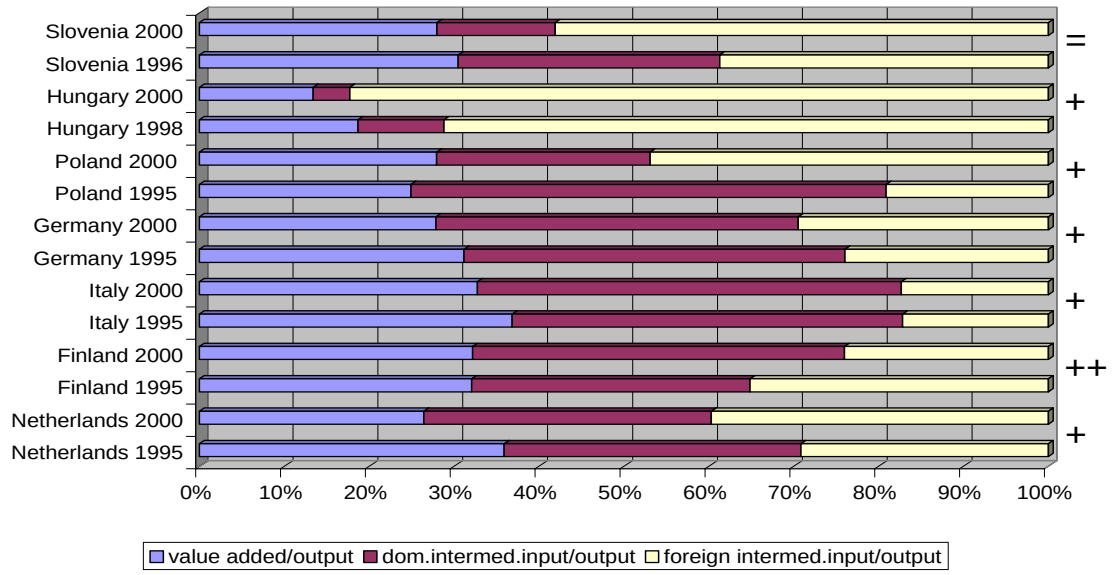
Radio, Television and Communication Equipment

The figure is not as harmonious any more in the radio, television and communication equipment industry.

The new EU member states stand out through relatively low shares of value added and domestic intermediates. This is valid for Slovenia and Hungary for both years considered and for Poland especially for the year 2000. Furthermore the share of foreign intermediates is extraordinarily high, reaching values of over 80% in Hungary. Also the very strong increase of the foreign intermediates is striking: 27% in Poland and 19% in Slovenia. As mentioned above, small countries are expected to have higher shares of foreign intermediates, since they are more dependent on foreign trade (especially foreign imports) than big open economies, but also compared to other western European small economies such as the Netherlands, these ratios are very high. Hungary with merely 13% of value added and 4% of domestic intermediates appears to be the real bazaar economy in the radio, television and communication equipment industry.

The only country with a relative stable share of foreign intermediates is Italy, and the only country with a decline in the share of foreign intermediates is Finland. The latter here is not surprising, and adding the outstanding rise in EUVs in this industry underlines the dominant position of Finland in the telecommunications market. However, it is worth noting that one can also observe a rise in EUVs in most other countries.

Figure 12: Radio, television and communication equipment – Bazaar effect

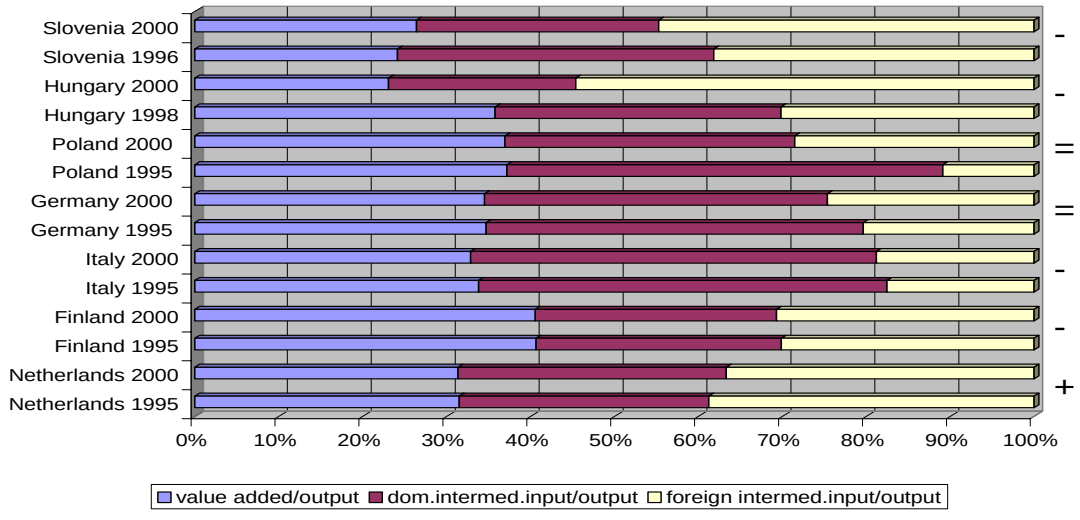


Textiles

In contrast, export unit values decline in most of the countries in the textiles industry. Only in Poland and Germany do the EUVs seem to stagnate, and there is weak increase in the Netherlands.

The Netherlands is also the only country, for which the share of foreign intermediate inputs has declined (by roughly 2 %); in all other countries the share has increased. The strongest increase occurred in Hungary with 24%, followed by Poland with 17%, and Slovenia with roughly 7%. At the same time, value added rose by 2.5% in Slovenia and declined by almost 13% in Hungary. This does not underline the predictions of the traditional trade theory, namely that eastern European countries will mainly specialize in labor intensive production due to the abundance of labor. However, there are other labor intensive industries, such as wearing apparel and leather and fur, where some of the new EU member states have considerable comparative advantages.

Figure 13: Textiles – Bazaar effect



Office Machinery

Finally, we take a look at the composition of the industrial production of office machinery. It reveals the most diversified picture of all industries.

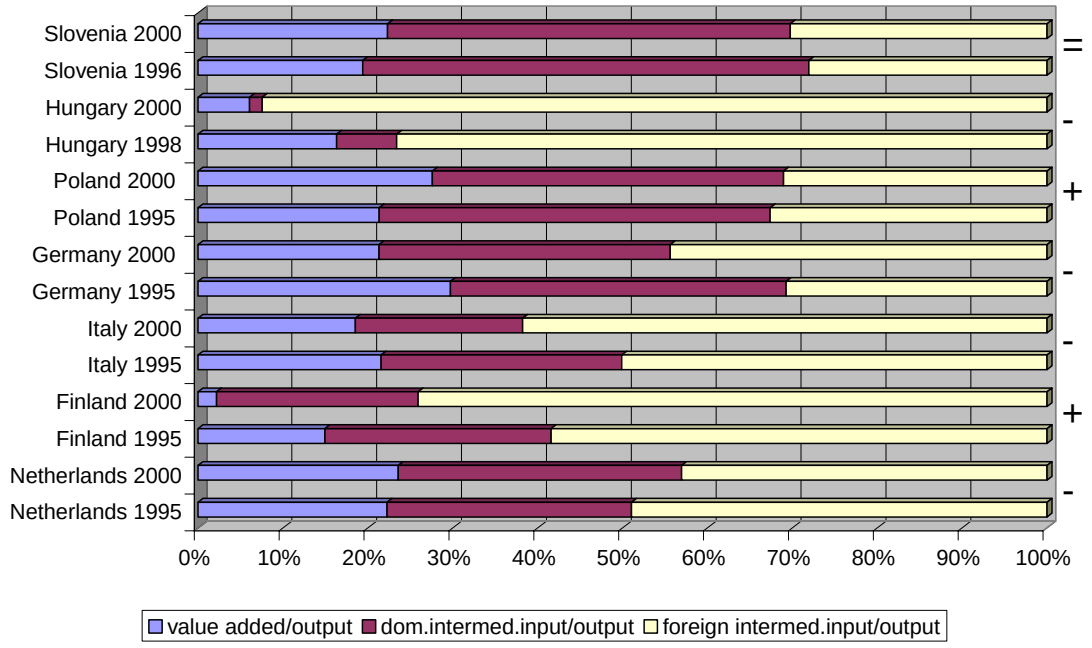
In general the share of foreign intermediates is highest as compared to the other industries. Starting with 28% in Slovenia in 1995, the average share is roughly 40-60%, with extremely high shares of over 90% again in Hungary. But also in Finland and Italy, the share of foreign intermediates far exceeds 50% of output.

A clear bazaar effect can be identified in Finland, Italy, Germany and Hungary. In these countries the share of domestic value added decreased strongly. In all these countries the share was already rather low in 1995, but it almost disappeared in the year 2000, mostly in Hungary with 6% and in Finland with merely 2%. Especially Hungary, with a domestic intermediates share of 1.5%, seems to play only a bazaar function on the office machinery market.

However, we also find countries, within which the share of domestic value added increased in the second half of the 1990s. In the Netherlands it rose by 1.5%, in Poland by roughly 6%, and in Slovenia by 3%. In addition the share of domestic intermediates rose in the Netherlands by 4.6%, added up to an increase in the domestic share of production by almost 6%. This is the clear opposite effect to the bazaar. This effect is also visible in Poland with an increase in the domestic share of production by 1.6 %.

At the same time, EUVs show a clear tendency to rise in Poland and fall in the Netherlands. The latter is the case for almost all other countries as well, which indicates that the bazaar-hypothesis is strongly relevant in the market for office machinery, particularly in Italy, Germany and Hungary.

Figure 14: Office machinery – Bazaar effect



All in all, it is important to look at the sectoral level when analyzing the bazaar effect, since the differences among the industries are large. Also it is not the share of domestic value added that matters, but the sum of the shares of domestic value added and domestic intermediate inputs. Only if this sum declines can we see an increase in the foreign intermediates inputs, which might have negative implications on domestic factor markets such as the labor market.

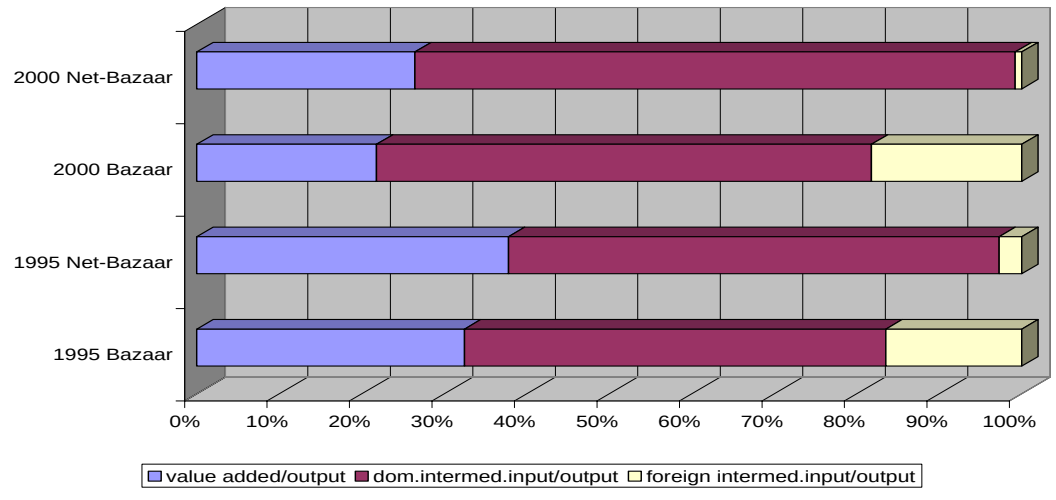
3.3. Net Bazaar Effect

Finally one might not only look at the "gross" bazaar effect as described above, which controls for the intermediate imports in production and thus in exports in country I. One should also consider that imports of country I from country II also contain to some extent exported intermediates from country I to country II. Controlling for this would reduce the "gross" bazaar effect, which we call the "net-bazaar effect".

It is rather challenging to calculate the net bazaar effect for a country, because one would need statistical information on the share of intermediate products in exports in relation to the share of intermediate products in imports. We can, however, approximate by assuming that the import/export ratio in total foreign bilateral trade corresponds to the import/export ratio of bilateral trade in intermediates. Thus one can calculate the net bazaar effect on a bilateral basis. The effect is visible if one calculates the net bazaar effect towards the most important trading partners.

This is done in the following for the German – EU14 bilateral trade for the motor vehicle industry. First one has to identify the share of EU 14 imports in German total imports. This accounts for 60.4% in 1995 and for 54.8% in 2000. Furthermore, the import/export share of motor vehicles for the bilateral trade between Germany and EU 14 in the year 1995 is 0.7, and in the year 2000 it is 0.56. Subtracting the intermediate exports contained in intermediate imports reduces the share of foreign intermediate imports accordingly.

Figure 15: The gross and the net Bazaar-effect in the motor vehicles industry in Germany's trade towards EU 14



According to the figure, the share of foreign intermediates declines in 1995 from 16.5% to 2.4%, and in 2000 from 18.2% to 0.7%. Thus the domestic share of production (measured as the sum of the share of value added plus the share of domestic intermediates) rises. The greater the economic importance of the trading partner, the greater the corresponding difference between the gross and net bazaar effect.

3.4. The Current Account and Intermediate Products plus FDI

The current account can be specified on the basis of a simple export function, an import function and (net) profit transfers, which yields several new results compared to the traditional view of trade and the current account. To simplify we will consider inward foreign direct investment and thus an asymmetric two country perspective. Moreover, we will take into account the arguments of FROOT/STEIN (1991) who – emphasizing a world with imperfect capital markets – have argued that foreign investment will increase after a devaluation of the currency of the host country (country I): In international mergers and acquisitions, firms from country II will be more often successful after the appreciation of the currency of country II since firms then have higher equity capital – expressed in units of country I currency – so that a leveraged merger or acquisition will be easier than before.

Let us consider a set-up where country II is the only host country, country I is the only source country of FDI; and there are no portfolio capital flows. We will thus assume that FDI inflows in country II are proportionate to Y and a positive function of the real exchange rate $q^*=:eP^*/P$ (with e standing for the nominal exchange rate). The share of capital of country II owned by investors from country I is φ and the marginal product rule for factor rewards is assumed to hold in both countries. Production potential in the home country is denoted as Y' and in the foreign country as Y'*. We assume that the higher the production potential in the country is, the higher the exports of country I will be, thereby leading to a supply-side impulse for exports as well as the standard foreign demand-side impulse; in a similar vein we make such an assumption on the import side so that real imports are a positive function of the foreign production potential and a positive function of GDP in country I. This implies at first sight an export function $X=Y'^{\eta}q^{*\alpha}Y^*$ and an import function $J= Y'^{*\eta^*}q^{*-\alpha'}Y$; note that using both Y' and Y* in the export function – and similarly Y'* and Y in the import function - could also be understood as reflecting the fact that some sectors' exports are supply-side driven while others are demand-side driven. Such a view is consistent with the perspective developed by WELFENS (2007), who argues that a hybrid macro model should consider a blending of a supply-side growth model and a Keynesian macro model. Incidentally, it is clear that this approach is consistent with the standard gravity equation. Hence we can express the effective export-import ratio X" in real terms as real exports plus profit transfers received minus FDI flows abroad ($\varphi q^*ß^*Y^* - b"Y^*q^{-ß'}$) relative to imports expressed in domestic goods units (the latter means we have to multiply J by q*):

$$(1) \qquad X" = \{\mathbf{Y'^{\eta}}q^{*\alpha}\, Y^* + [\varphi q^*ß^*Y^* - b"Y^*q^{-ß'}]\}/(q^*q^{*-\alpha'}Y\, \mathbf{Y'^{*\eta^*}})$$

In the standard textbook setting the square bracket is zero – plus the elasticities η and η* are zero – so that the Marshall-Lerner condition would be dlnX“/dlnq* = α +α’ – 1>0, but here the situation is more complex; for the problem at hand, it is also useful to focus on exports plus profits transfers received minus FDI flows abroad minus imports. Moreover, if we want to consider exports of intermediate goods in the import function one may modify the import function as follows (using the notation x” as a proxy for the intensity of international outsourcing/off-shoring and making the assumption that the potential for international outsourcing and offshoring with a focus on intermediate products is proportionate to the foreign capital stock K*):

(2) $J = q^{*-\alpha'}Y + x“K^*q^{*\alpha“}$

The term $x“K^*q^{*\alpha“}$ indicates that “round trip exporting of intermediates” is more attractive if country I’s currency has depreciated. Additionally, one should note that imports should not depend on real GDP but on national income, which is Y + q*φß*Y*where φ is the share which country I investors holds in the capital stock abroad. Hence an adequate specified import function reads

(3) $J = q^{*-\alpha'}[Y + q^*\varphi ß^*Y^*] + x“K^*q^{*\alpha“}$

In order to have a rather simple expression we rewrite real imports as

(4) $J = q^{*-\alpha'}[Y + q^*\varphi ß^*Y^*] - x“K^*q^{*-\alpha“}$

For the special case of α’=α” this expression could now be written as $q^{*-\alpha'}\{[Y + q^*\varphi ß^*Y^*] - x“K^*\}$. However, we do not want to focus on this special case and rather take a look at the more general statement: The current account balance X’ therefore is given by

(5) $X'=\{\mathbf{Y'^{\eta}}q^{*\alpha} Y^* + [\varphi q^* ß^*Y^* - b”Y^*q^{-ß'}]\} - J = q^{*-\alpha'}[Y + q^*\varphi ß^*Y^*] - x“K^*q^{*-\alpha“}$

(6) $dX'/dq^* = -aq^{*(-\alpha'-1)} + [Y + q^*\varphi ß^*Y^*] + q^{*-\alpha}[\varphi ß^*Y^*] + a''x''K^*q^{(a''-1)}$

(7) $dX'/dq^{*(-q'-1)}[Y + q^*]$

This expression holds under the assumption q* = 1,

(8) $-\alpha[Y + q^*\varphi ß^*Y^*] + [\varphi ß^*Y^*] + a''x''K^*$

It is positive if it holds,

(9) $-\alpha[Y + q^*\varphi ß^*Y^*] < [\varphi ß^*Y^*] + a''x''K^*$

This expression is much more complex than the standard expressions so that we may emphasize the following: In a realistic setup with foreign direct investment, the reaction of the current account with respect to a change in the real exchange rate is somewhat different than the Marshall-Lerner condition suggests.

4. Policy Conclusions

The global innovation race has intensified and therefore more flexibility and greater incentives for innovations, learning and flexible adjustment are needed in Europe. There is an adjustment overhang in those countries which have high unemployment rates, and this particularly concerns some of the large Euro zone countries. Germany and Italy are two countries with serious problems, but Germany has adopted broader reforms than Italy. Italy's rising unit labor costs after the start of the Euro zone point to a failure of the country's collective bargaining system to adjust to the new monetary reality. However, Germany is not much better since the Euro zone's largest economy has had enormous problems for many years beginning with German unification. The R&D-GDP ratio which stood at 2.9% in 1989 has fallen over a decade and only after 1999 has there been a modest increase; the goal of the Lisbon Agenda, namely R&D expenditures of 3% of GDP by 2010 can hardly be achieved. Germany's position in ICT is favorable in some sub-sectors, but the overall ICT position is not top in the EU, and recent analysis (WELFENS/JUNGMITTAG/VOGELSANG, 2005) points to problems with technological progress in core regions of both western Germany and eastern Germany. In 2006/07, a cyclical expansion in Germany facilitated structural adjustment in the EU's largest economy; at the same time, however, it has become apparent that the country suffers from ineffective prudential supervision (no less than three major banks almost went bankrupt in the period 2000-07, and the federal supervisory agency BaFin which shares competences with Deutsche Bundesbank seems to be rather weak and also largely intransparent so that there are doubtful incentives for managers of banks).

France has emphasized high-technology growth in Western Europe more than other EU15 countries. However, it has recorded both success stories – including Airbus (actually an EU joint venture) and the nuclear industry – and failures (e.g. Bull in the computer sector which was largely a failure) with its industrial policy. Germany's structural adjustment has been relatively slow in industry, the adjustment dynamics in the UK and France were more pronounced. Italy is rather dependent on the international economy and it risks – similar to Germany – facing reduced growth if global economic growth should slow down.

Some of the EU accession countries have shown remarkable structural adjustment; technological upgrading has been an important element in several eastern European countries which have been able to attract high FDI inflows. Given high sustained unemployment rates in most accession countries one must, however, be worried about the unemployment problem. Jobless growth could be one of the new problems in transition countries. To the extent that the mass unemployment problem contributes to social and political conflicts as well as political radicalization, high long-term unemployment could contribute to political destabilization which in turn will raise the political risk premium and weaken growth in the long run. EU25 in which economic divergence across countries should be observed is likely to be highly unstable. Already in 2005, merely a year after EU enlargement, the EU show signs of increasing weakness; failed referenda in France and the Netherlands have shown that the EU has lost broad popular support in EU founding countries. The apparent inability – thus far – to complete the Euro zone as originally planned, namely by including the UK also shows lack of consistency and political

consensus. Overblown projects such as Turkish EU enlargement have clearly undermined the political support for EU integration in Germany, the Netherlands, France, Austria and some other EU countries. If EU25 should turn out to be a rather heterogeneous political club with weak economic growth and an inability to organize innovation, growth and sound public finance in combination with low inflation rates and full employment, the EU is unlikely to survive for many decades.

The basic policy conclusion is that the EU25 should be able to benefit from both EU enlargement and from economic globalization. The EU is a major host country of FDI and also a major source country so that it can benefit from outsourcing. In high wage economies of Western Europe it is fairly clear that the accelerated structural change in Europe requires more wage differentiation which should be more in line with differential productivity growth rates in EU countries. The existence of a high minimum wage is a doubtful exercise, in particular if it is a nation-wide minimum wage as in France and Italy which both have high unemployment rate. Germany's social security system is still relatively generous and implicitly defines a minimum wage which is relatively high, namely in the sense that overall labor costs of unskilled labor is high. The specific unemployment rate of unskilled workers should gradually be brought down to the average unemployment rate; greater wage dispersion as well as stronger retraining could be useful in Germany, France and Italy. More wage dispersion could go along with a higher average growth rate of wages provided that greater wage flexibility brings about higher average productivity – partly related to higher regional labor mobility. As regards incentives of firms to invest more in training and retraining, one should clearly point out that the globalization process is weakening such incentives; the average tenure of workers is declining so that the incentive for firms to invest in training and retraining is declining. Here government's tax policy might want to envisage new adequate incentives which stimulate training and retraining.

In an EU in which national R&D programs are increasingly likely to generate cross-border benefits through international technology spillovers, there is some risk that national policymakers will cut innovation promotion expenditures; R&D expenditures could fall below an optimum level – positive external effects of innovation would not be fully internalized in the EU. Shifting more funds in R&D to the supranational policy level might not be a reasonable way to cope with the problem since the poor political control of the European Commission and the established budgetary priorities for agriculture and structural funds does not allow us to expect an efficient EU innovation policy. However, the EU could be quite useful in innovation policy, in particular by regularly analyzing innovation dynamics in EU countries and in various regions of the EU. More transparency could generate stronger incentives towards adequate national policy reforms. In Europe's ageing society, there is also the problem that a majority of increasingly elderly voters might be reluctant to support rising outlays for education and for higher R&D-GDP expenditure ratios. Rather a political bias in favor of spending more on social security could undermine necessary increases for R&D or the education system.

In eastern European accession countries, economic development has been relatively favorable in the decade from 1995 to 2005. However, even with growth rates of about 5% p.a. in several years in the run-up to accession, Poland, Hungary, the Czech Republic and other transition countries witnessed very high stubborn unemployment rates. If joining the

EU should bring about more rigid labor markets, there could be a tendency towards sustained mass unemployment in Eastern Europe. As firms in accession countries themselves will face considerable pressure for outsourcing internationally some of the problems of the large Euro zone core countries could soon be a plague in Eastern Europe as well. Eastern European countries face the problems of ageing not less than western Europe; thus policymakers should stimulate innovations and human capital formation, on the other hand it will be important to encourage the creation of new firms which often not only create new jobs but contribute to overall flexibility and innovativeness.

The European Council adopted the Lisbon strategy in 2000 as a political agenda to encourage growth and employment in the EU. While many small EU15 countries and the UK have been rather successful in this respect, Germany and Italy – and to a lesser extent France – have faced slow growth, insufficient innovation dynamics and only modest ICT dynamics outside mobile telecommunications. Here governments should reconsider ICT policies as well as R&D and education policies. New tax incentives for encouraging training and retraining might be useful. At the same time expenditures in the field of social security policies and most subsidies (not for R&D!) should be cut. Inflexibility of labor markets and wage rigidities seem to be problems in those countries so that policymakers, trade unions and employer federations should look for remedies. If the EU15 should be unable to regain sustained growth and full employment, this will undermine the overall integration of EU25, undercut political support for integration and erode Europe's position in the global competition of market systems. As regards the role of the EU itself, it is not clear that Brussels really can stimulate innovation, growth and employment in the Community in the early 21st century.

All in all, policy makers should not understand our argument as broad support for naïve industrial policy. In accession countries it would be wise if policy makers would emphasize education and R&D support in the course of catching-up, which implicitly means strictly controlling social policy. For EU 15 countries it is important to set the right incentives for the actors in labor markets to avoid overpricing, especially in market segments for unskilled labor

Annex 1

A Demand-side and Supply-side Growth Perspective

We basically will argue that in a medium term perspective actual output Y is determined according to

(1a) $Y = (1- \alpha)Y^d + \alpha Y^{pot}$;

Note that α is a weighting parameter in the interval 0,1 and basically is determined by the dominant type of expectations which assign long run output potential Y^{pot} a certain weight α – under long run full employment equal to unity - and thus present demand conditions a weight (1-α).

Such a joint impact of Y^d and Y^{pot} indeed is obtained if we assume a special variant of the permanent income hypothesis, namely that consumption is determined by the weighted impact of current real income and expected long run income – this is dubbed a hybrid consumption function - which is assumed to coincide with the production potential (for simplicity we have no discounting here):

(1b) $C= c(1-\alpha')Y + c\,\alpha' Y^{pot} = cY + c\,\alpha'[Y^{pot}-Y]$

Thus consumption is proportionate to current real income; if consumers expect long run income to exceed current income – and hence anticipate real income to rise – current consumption is higher than cY. If α' is flexible variable (not a constant parameter) one may assume that a lasting gap between Y and Y^{pot} will lead to a decline of α'; and the combined impact of a rising gap and a falling α' could indeed imply a fall of consumption.

Assume that we have aggregate demand in an open economy given by the following simple equation which assumes that consumption C is determined according to a the hybrid consumption function and that investment I and imports J are proportionate to actual income while export X is proportionate to foreign output Y* (γ is the exogenous ratio of government expenditures to output Y):

(1c) $Y^d= c(1- \alpha')Y+c\alpha' Y^{pot} +b'Y +\gamma Y –jY + xY^* = [c(1- \alpha') + b'+ \gamma – j]Y + c\alpha' Y^{pot} + xY^*$

Inserting (1c) in (1a), namely $dY/dt = (1- \alpha)dY^d/dt+ \alpha dY^{pot}/dt$ we get:

(1d) $dY/dt = (1- \alpha) [c(1- \alpha') + b'+ \gamma – j]dY/dt + [(1- \alpha)c\alpha' +\alpha]dY^{pot}/dt + (1-\alpha)xdY^*/dt$

Let g denote growth rates; then we have (note that $Y^{pot}/Y =: u'$ which is the inverse of the degree of capacity utilization U') in a medium term perspective with a production function $Y^{pot}=K^{ß}(AL)^{1-ß}$ and defining $s'=1-(1- \alpha) [c(1- \alpha') + b'+ \gamma – j]$:

(1e) $g_Y = [(1- \alpha)c\alpha' +\alpha][u'/s'][ßg_K + (1-ß)(g_A+g_L)] + (1- \alpha)[x/s'][Y^*/Y]g_{Y^*}$

Annex 2

NACE rev. 1.1. Classification (in parts)

D Manufacturing

15 Manufacture of food products and beverages

16 Manufacture of tobacco products

17 Manufacture of textiles

18 Manufacture of wearing apparel; dressing and dyeing of fur

19 Tanning and dressing of leather, manufacture of luggage, handbags, saddlery, harness and footwear

20 Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials

21 Manufacture of pulp, paper and paper products

22 Publishing, printing and reproduction of recorded media

23 Manufacture of coke, refined petroleum products and nuclear fuel

24 Manufacture of chemicals and chemical products

25 Manufacture of rubber and plastic products

26 Manufacture of other non-metallic mineral products

27 Manufacture of basic metals

28 Manufacture of fabricated metal products, except machinery and equipment

29 Manufacture of machinery and equipment n.e.c.

30 Manufacture of office machinery and computers

31 Manufacture of electrical machinery and apparatus n.e.c.

32 Manufacture of radio, television and communication equipment and apparatus

33 Manufacture of medical, precision and optical instruments, watches and clocks

34 Manufacture of motor vehicles, trailers and semi-trailers

35 Manufacture of other transport equipment

36 Manufacture of furniture, manufacturing n.e.c.

37 Recycling

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