Nunnenkamp, Peter

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Relocation, offshoring and labour market repercussions : the case of the German automobile industry in Central Europe

Relocation, Offshoring and Labour Market Repercussions: The Case of the German Automobile Industry in Central Europe

By Peter Nunnenkamp*

Abstract:

The paper raises the proposition that Central Europe's integration into the international division of labour has added significantly to competitive pressure in the German automobile industry. Based on production and trade data, we trace two dimensions of competitive pressure: relocation of assembly operations and offshoring of automotive parts production. The knowledge-capital model of multinational enterprises provides the analytical basis for the discussion of labour market repercussions. Vertical foreign direct investment in Central Europe may have helped the relatively favourable employment and earnings record of the German automobile industry, compared to other manufacturing industries. Yet recent industrial disputes can be attributed, though not exclusively, to the emergence of Central Europe as an attractive location for assembly operations and autoparts production. Employment and wages diverged considerably within the German automobile industry. Relative to skilled workers, the labour market situation of less skilled workers deteriorated significantly.

JEL codes: *F14, F23, L62*

Keywords: *vertical FDI, trade in intermediates, relative wages, employment*

* The Kiel Institute for the World Economy, Kiel, Germany. E-mail address: peter.nunnenkamp@ifw-kiel.de.

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I. Introduction

The automobile industry is widely regarded as an export champion in Germany. Only France and Japan exported more automobiles than Germany in 2004 (VDA a, 2005: 362). The contribution of exports of road vehicles (SITC 78) to Germany's total exports of manufactures increased from 18.5 percent in 1993 to 22 percent in 2004 (OECD 2005). Moreover, employment and earnings opportunities have traditionally been favourable in the German automobile industry, compared to the manufacturing average (Spatz and Nunnenkamp 2002a, 2002b).

Yet the automobile industry offers a particularly interesting example to evaluate the fiercer competition from Central European countries as well as the production, trade and labour market repercussions in traditional locations such as Germany. The industry witnessed a series of industrial disputes in recent years, most of which were triggered by the threat of German companies to relocate production to cheaper locations, notably in Central Europe. For example, Opel, the German subsidiary of General Motors, decided in mid-2004 to locate part of its Zafira production in Gliwice, Poland, even though the assembly line at the company's headquarter in Rüsselsheim had considerable spare capacity. The decision was based on a comparative analysis that revealed strong competitive advantages of the former location. Low-wage competition from the neighbouring Czech Republic notwithstanding, BMW decided to build its new production site in Saxony. However, Bosch, a major supplier of autoparts, revealed plans to relocate further 800 workplaces from France to the Czech Republic. Continental, a producer of tyres, announced in fall 2005 to close down production lines in Hanover, even though workers had agreed a few months earlier to longer working hours in order to reduce labour costs.

Against this backdrop, the paper raises the proposition that Central Europe's integration into the international division of labour has added significantly to competitive pressure in the German automobile industry, including the production of autoparts, even though this industry is relatively skill and technology intensive and represents a traditional stronghold of advanced countries.[1] According to the knowledge-capital model of multinational enterprises (Carr et al. 2001), the labour market repercussions can be expected to depend on the type of foreign direct investment (FDI) (Section II). Wage inequality or unemployment of less qualified

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[1] Vickery (1996) and Weiß (2000) show that the development and manufacturing of automobiles requires increasing R&D and involves significant fixed costs.

workers in Germany are supposed to increase if *vertical* FDI, which involves the relocation of relatively labour intensive stages of production to lower-income countries, plays a major role with regard to the automobile industry's engagement in Central Europe. The evidence on the relocation of assembly operations and offshoring of autoparts production, presented in Sections III and IV, suggests that this is indeed the case. The labour market effects of fiercer competitive pressure are assessed in Section V. We argue that the recent controversy on whether the automobile industry exemplifies the case of Germany degenerating into a bazaar economy misses an important point, namely diverging employment and earnings trends *within* this industry. Section VI concludes.

II. Analytical Background and Earlier Findings

Based on standard theoretical models on the distributional effects of the liberalization of trade with, and foreign direct investment (FDI) in lower-income countries, the integration of Central Europe into international production and sourcing networks can be expected to negatively affect the labour market situation of relatively low skilled workers in high-income countries such as Germany (Spatz and Nunnenkamp 2002b: 477).[2] In a recent survey on trade and wages, Feenstra and Hanson (2003) argue that trade in intermediate inputs is a potentially important explanation for the increase in the wage gap between skilled and unskilled workers in advanced economies. The literature on the motives and effects of FDI offers further insights which help analyse the labour market repercussions of automobile production in countries with relatively low per-capita income. Marin et al. (2003) and Marin (2004) suspect that the wage and employment effects of outward FDI by economically advanced countries in lower-income countries depend on the type of FDI :

- Companies undertaking *horizontal* FDI produce the same goods and services in their home country and in the host countries.[3] This type of FDI is often motivated by trade barriers, transportation costs and other transaction costs that discourage exports (Carr et al. 2001). FDI is a means to avoid such costs. Horizontal FDI is driven by market considerations. That is why this type of FDI is also known as market-seeking FDI (UNCTAD 1998: 91).

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[2] See also the literature given there.

[3] For an early model of horizontal FDI, see Markusen (1984); more recent models include Markusen and Venables (1998, 2000).

- Companies undertaking *vertical* FDI fragment the production process geographically and locate specific stages of the value chain in countries offering the relevant cost advantages.[4] This type of FDI is motivated by cost considerations. Investors make use of varying factor endowments and differences in factor prices across countries (Zhang and Markusen 1999). FDI of this type is also known as efficiency-seeking FDI (UNCTAD 1998: 91).

According to Marin et al. (2003), wage inequality or unemployment in economically advanced economies is likely to increase if outward FDI is of the vertical type. This is because the investor relocates the relatively labour intensive stages of production to lower-income countries, thereby reducing the demand for unskilled workers in the home country.[5] Unless unskilled workers agree to lower relative wages, they will face deteriorating employment opportunities. By contrast, these authors do not expect horizontal FDI to have effects on wage inequality or employment opportunities in the advanced country.

In particular the so-called knowledge-capital model of multinational enterprises (Carr et al. 2001) offers several arguments to suspect that the engagement of German automobile companies in Central Europe is largely vertical in nature. In many respects, this engagement resembles the vertical production networks of US-based automobile companies with their affiliates in NAFTA partner countries, notably Mexico (Hanson et al. 2005). First, the motive for horizontal FDI to avoid high trade and transaction costs associated with exporting from the German home base should be of minor importance for serving Central European markets.[6] These markets are fairly close to the home base of German investors (i.e., transportation costs are relatively low), and the protection of these markets is rather weak as trade costs resulting from import barriers have been removed since various countries prepared for EU membership.[7] Second, markets for (new) automobiles in Central Europe are small compared to the German home market.[8] This limits the potential to exploit (plant-level) economies of

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[4] For an early model of vertical FDI, see Helpman (1984); see also Helpman and Krugman (1985).

[5] Feenstra and Hanson (2003) argue along similar lines. However, they consider foreign outsourcing which extends beyond FDI-related offshoring and includes arm's-length trade in intermediate goods.

[6] In Helpman's (1984) model of vertical FDI, trade costs were assumed to be zero. As noted by Carr et al. (2001), this assumption, in combination with plant-level economies of scale, removes the motive for horizontal FDI.

[7] Prospective EU member countries had abolished import duties on cars imported from the EU by 2001 (van Tulder 2004: 106).

[8] Even in Poland, i.e., the largest Central European market for automobiles, first registrations of passenger cars in 2001-2004 did not exceed one tenth of first registrations in Germany (VDA b).

scale in assembly operations located in Central European countries, which, in turn, should reduce the incentive to engage in horizontal FDI (Carr et al. 2001).

Third, different factor endowments and factor price differentials between Germany and Central Europe, in combination with low trade costs and geographical proximity, provide incentives to undertake vertical FDI. Central Europe tends to be better endowed of relatively skilled labour than many developing countries. According to Zhang and Markusen (1999: 237), the case for vertical FDI no longer exists if "countries become extremely different", i.e., sufficiently skilled labour being so scarce in the potential host country that multinational companies will find it difficult to hire local staff such as technicians and administrative employees. Likewise, vertical FDI is supposed to depend on the host country meeting minimum standards with regard to power supply, transport and telecommunication infrastructure as well as legal institutions. In contrast to many developing countries, it can be assumed that Central European countries fulfil these basic requirements for vertical FDI to take place.

Nevertheless, the labour market repercussions of the engagement of the German automobile industry in Central Europe are open to question for both analytical and empirical reasons. The differentiation between horizontal and vertical FDI is not as clear-cut as it might appear at first sight.[9] On the one hand, the labour market implications of vertical FDI depend on whether the cost reduction associated with such a strategy results in an overall expansion of the investing company, including complementary operations at home (Becker et al. 2005). On the other hand, FDI appears to be horizontal if automobile companies produce the same final good, namely finished cars, at home and abroad. Yet, under certain circumstances, this engagement may be motivated by cost considerations and can have labour market repercussions at home. For instance, this may be the case if the automobile company produces higher quality cars at home, but relocates the production of models serving the lower segment of the market to countries offering cost advantages in the assembly of such cars. Even FDI undertaken for the assembly of cars that are similar to those assembled at home can be

[9] According to Hanson et al. (2005: 666), different affiliates "fall in a continuum with pure horizontal FDI at one extreme and pure vertical FDI at the other extreme." Ekholm et al. (2003) model so-called export-platform FDI which has both horizontal and vertical features. The model of Markusen and Venables (2005) encompasses both market-serving and export-platform motives for fragmentation of production. While it mainly depends on trade costs whether countries engage in market-serving or export-platform activity, it is mainly determined by factor endowments whether countries specialize in production of components or assembly of final goods.

considered vertical as long as technology intensive and human-capital intensive activities such as the design and development of cars are concentrated in the relatively skill-abundant home country.[10]

Empirical studies portray an ambiguous picture with respect to the type of FDI in Central Europe and possible labour market repercussions.[11] Earlier surveys typically suggest that market considerations are prominent motives for FDI in Central Europe (e.g., Lansbury et al. 1996: 104). Bechert and Cellarius (2004) note that "the great majority" of local employees of German subsidiaries in this region "are also involved in production that is intended for local markets." As concerns the automobile industry, Sturgeon and Florida (1999: 53) find "a large measure of convergence toward building vehicles where they are sold." Buch et al. (2005) show that the market size of host countries has a relatively large impact on German FDI in the automobile industry. The estimation results of Carstensen and Toubal (2003) indicate that both horizontal and vertical FDI exists in Central Europe.[12] Marin et al. (2003) show that the affiliates of German companies in the machinery and transport equipment sector of Central and Eastern European countries deliver almost 40 percent of production to their German parents, which, according to Hanson et al. (2001), is a clear indication of vertical FDI. The incentives for vertical specialization are stressed by Marin (2004), who finds that German direct investors can reduce unit labour costs by about 70 percent in several Central European countries.

Few studies have assessed the repercussions of FDI-related relocation and offshoring on German labour markets.[13] Becker et al. (2005) estimate a translog cost function to assess how outward FDI affects employment at home. With respect to German companies in Central and

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[10] Carr et al. (2001) derive the motive for vertical FDI, i.e., locating knowledge intensive activities such as R&D where skilled labour is relatively cheap and production where unskilled labour is relatively cheap, from two assumptions: (i) knowledge intensive activities can be geographically separated from production and supplied to production facilities at low cost, and (ii) production requires less skills than activities such as R&D.

[11] This also applies to the earlier literature on the labour market effects of US FDI in lower-income countries (notably in Mexico in the context of NAFTA). This literature is shortly reviewed in Nunnenkamp (2006). See also Blomström et al. (1997) as well as Braconier and Ekholm (2000) on Swedish FDI, and Federico and Minerva (2005) on Italian FDI.

[12] These authors find a robust and strong impact of the market potential of host countries on FDI. At the same time, relative unit labour costs are shown to exert a significant influence on FDI.

[13] The survey on the labour market implications of global production sharing by Feenstra and Hanson (2003) clearly reveals that the relevant literature is strongly concentrated on the case of the United States. Hardly any references are made to the case of Germany. At the same time, Feenstra and Hanson stress that more research is needed on outsourcing in Central and Eastern Europe, which should be of particular relevance to German companies.

Eastern Europe, it turns out that a one percent wage reduction at existing affiliates in this region reduces employment in German parent companies, though only by about 0.04 percent. By contrast, Konings and Murphy (2001) reject the hypothesis that FDI by European direct investors, about 30 percent of which were based in Germany, has contributed to a relocation of domestic jobs to Central and Eastern Europe. By estimating the labour demand function of German parent companies, Marin (2004) even finds that a 10 percent wage decline for affiliates located in Central European EU-accession countries increases employment at home by 1.6 percent. Domestic job creation is attributed to cost savings and, thus, improved competitiveness that parent companies achieved through FDI-related offshoring.

Apart from ambiguous findings, the aforementioned studies offer an incomplete picture of possible labour market repercussions of German FDI in Central Europe. In addition to the effects on employment in the parent companies, offshoring may affect employment in German companies which traditionally served as input suppliers of these parent companies. This suggests to assess labour market effects at the industry level, rather than only at the company level. Furthermore, vertical FDI in Central Europe may not only affect employment at home but also the wages paid there. Finally, none of the studies captures the distributional effects that can be expected to result from vertical FDI. More precisely, the question whether less skilled workers in Germany suffered deteriorating *relative* employment and wage prospects due to relocation and FDI-related offshoring to Central Europe is still unsettled.

Data constraints typically prevent an adequate differentiation between skill groups. However, as shown below for the automobile industry, industry-specific case studies may offer at least tentative insights into the distributional effects of vertical FDI. Before returning to this issue in Section V, we present some stylised facts on the relocation of automobile assembly (Section III) and offshoring of autoparts production (Section IV) that are supposed to reveal the type of FDI undertaken by the German automobile industry in Central Europe.

III. Relocation of Car Assembly to Central Europe

FDI by the German automobile industry, including autoparts, in Central and Eastern Europe has gained considerable momentum. FDI stocks soared fivefold since 1995 to € 6 billion in 2003 (Deutsche Bundesbank 2005). Since the late 1990s, Central and Eastern Europe has hosted higher FDI stocks than Latin America, which had traditionally been the preferred

investment location of the German automobile industry outside the advanced OECD area. Hungary, the Czech Republic and Poland accounted for 80 percent of FDI stocks in the region in 2003.[14] FDI stocks held by the German automobile industry in Hungary exceeded those in China, even though automobile multinationals consider China to be the most promising market and are eager to build or acquire production capacities there.

As noted before, it is fairly difficult to clearly distinguish between horizontal and vertical FDI. Yet there are several indications that the activities of the German automobile industry in Central Europe are not restricted to horizontal FDI. The regime change in Central Europe, the region's opening up to world markets and the accession of various countries to the EU not only promised new markets and export opportunities for German automobile producers, but also offered profitable investment opportunities.[15] In contrast to China and Latin America, Central Europe has emerged as an important export platform for German automobile producers. Production and trade data for passenger cars (units) reveal that the character of German FDI in Central Europe differs from that in other low-income locations (Table 1).

In China and Latin America (proxied by the most important locations, Brazil and Mexico), car production of German companies developed independently from trade. German car exports to these markets hardly existed before companies invested there; exports were no reasonable option because of high import barriers. As a consequence, labour market repercussions in Germany resulting from exports being replaced by foreign production are highly unlikely. At the same time, German car imports from China and Latin America remained marginal throughout the period under consideration, largely because production in China and Brazil lacked international competitiveness and transportation costs are high. Hence, production in Germany could hardly be affected negatively by rising imports from these locations.

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[14] The Slovak Republic, most likely, accounts for much of the rest, mainly because of Volkswagen's engagement in this country. However, the Slovak Republic is not listed as an individual host country in the Bundesbank statistics (Deutsche Bundesbank 2005).

[15] Humphrey and Memedovic (2003: 34) reckon: "The initial attraction for…extending production networks from…Western Europe to the peripheral regions was a combination of access to growing markets and reducing costs through the development of low-cost production sites." For a similar line of reasoning with regard to Volkswagen's acquisition of Skoda, see Pries (1999). The survey results of Dichtl and Hardock (1997) reveal that labour costs played an important role in motivating the first waves of relocation to Central Europe. Van Tulder and Ruigrok (1998) as well as van Tulder (2004) point out that European car manufacturers pursued different strategies: Some companies rated Central Europe primarily as a market, some as a production site, and some aimed at both.

Table 1 — Passenger Cars: Foreign Production by German Companies and German Imports and Exports, 1990–2004 (1000 units)

	Central Europe[a]			China			Brazil and Mexico		
	prod.	imp.	exp.	prod.	imp.	exp.	prod.	imp.	exp.
1990	0.0	11.0	6.6	0.0	0.0	2.8	425.8	1.3	1.1
1996	240.1	68.9	126.2	226.4	0.0	4.0	735.0	6.9	11.9
2002	782.4	261.6	100.7	437.6	0.3	22.9	799.8	24.0	33.9
2004	817.3	233.3	114.8	575.5	5.6	44.2[b]	748.9	42.6	22.9

[a]Czech Rep., Hungary, Poland and Slovak Rep. – [b] 2003.

Source: VDA (a).

A different situation prevails with regard to Central Europe. Almost one third of car production by German companies in the Czech Republic, Hungary, Poland and the Slovak Republic was destined for the German market in recent years. German car imports from these countries have multiplied since the early 1990s. Van Tulder and Ruigrok (1998: 10) expect this development to have labour market repercussions in Germany, as "the (threat of) reimportations puts the domestic bargaining arena under pressure."

Labour market repercussions resulting from car imports may be moderate for the time being. The ratio of imports from the four Central European locations to passenger car production in Germany increased substantially from 1.5 percent in 1995/96, but the ratio did not exceed the 5 percent mark in 2003/04. Moreover, it might be questioned that assembly operations in Germany were affected significantly since producers such as Volkswagen used production sites in Central Europe to complement their existing product range. Consequently, substitution effects may be minor even though the focus on relatively cheap lower-end cars may be characterized as vertical FDI (Section II).

However, German car exports to the four Central European countries increased by much less than German imports. As a result, Germany reported a considerable import surplus in recent years (Table 1). Furthermore, the import surplus is no longer in terms of units only, as observed in the 1990s by van Tulder and Ruigrok (1998). In value terms, the German trade balance for motor vehicles (including chassis) vis-à-vis the four Central European countries switched from an export surplus of € 250 million in 1995 to a deficit of almost € 3 billion in 2004 (VDA a).

The development over time of German exports of passenger cars to Central Europe provides further clues to substitution effects. Exports peaked in 1996 and remained almost flat thereafter, i.e., exactly when production by German automobile companies in the region soared from about 0.2 million units per annum to 0.8 million units in 2004 (Nunnenkamp 2005: Figure 2). It is almost impossible to decide how exports to Central Europe would have developed if German companies were not engaged in assembly operations in this region. Yet, it is striking that the Czech Republic, Hungary, Poland and the Slovak Republic together absorbed less German exports of passenger cars than neighbouring Austria in 2002 (Nunnenkamp 2004). Additional substitution effects may have occurred in third markets if German companies exported assembled cars from Central European production locations to markets other than the German home market.[16]

To summarize, the import and export patterns associated with assembly operations of German automobile companies in Central Europe suggest that production in this region is more likely to affect domestic production and, thus, labour markets than the assembly operations of German companies in other host countries with relatively low per-capita income. In contrast to Latin America and China, production locations in Central Europe allowed for an internationally competitive assembly of automobiles close to European core markets.

IV. Offshoring Production of Autoparts

Substitution effects at the level of assembled cars are not the only transmission mechanism through which the emergence of Central Europe as an important player in the automobile industry may have repercussions on German labour markets. Additional labour market effects can be expected to result from the offshoring of automobile parts production to Central Europe through vertical FDI by car assemblers and so-called follow sourcing by parts suppliers.[17] This is even though Kleinert (2003) does not find strong support for the offshoring hypothesis in time-series data on German FDI. As noted by this author, the finding that it is not so much outward FDI by German companies but rather FDI by foreign

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[16] Due to data constraints, it is not possible to assess the extent to which such exports replaced exports from Germany and, thus, affected domestic production of passenger cars.

[17] Follow sourcing results from the preference of car assemblers to use the same suppliers in various locations. According to Kinkel (2004), there is strong pressure on parts suppliers to locate in the vicinity of their customers.

companies in Germany which drives German imports of intermediate goods may disguise that the importance of offshoring differs strongly between industries and host countries. Horizontal FDI probably accounts for the bulk of outward FDI by German companies that enters the analysis of Kleinert (2003),[18] while vertical FDI seems to play a more prominent role in the case of FDI by the German automobile industry in Central Europe.

Humphrey and Memedovic (2003) argue that changes in the strategies of automobile multinationals, particularly the integration of lower-income countries into corporate strategies, may be most obvious in car assembly, while even more significant changes were taking place in the production of parts and components. At the same time, these authors reckon that the key driving force in the restructuring of the Central European automobile industry was the creation of production networks and a closer division of labour with Western Europe. Van Tulder and Ruigrok (1998) and van Tulder (2004) show that several automobile multinationals, including German ones, aimed at a vertical division of labour with Central Europe and have integrated host countries in this region into international sourcing networks. For instance, Audi's and Opel's investments in Hungary were mainly to supply parts and components (notably engines) to Germany. In addition, Central European governments requested foreign car assemblers to help establish an advanced local industry of parts suppliers. For these reasons, companies such as Volkswagen developed local supplier bases in Central European host countries "through a mixture of encouraging follow sourcing by major transnational companies in components and the upgrading of existing local suppliers" (Humphrey and Memedovic 2003: 13).

Various important component suppliers are located close to the assembly lines of German car assemblers in Central Europe. All member firms of the Association of the German Automobile Industry (*Verband der deutschen Automobilindustrie, VDA*) employ about 160000 workers in Central European countries that joined the EU recently; about 100000 of these workers are employed by autoparts suppliers (VDA 2004: 37).

Offshoring does not necessarily result in one-way trade in autoparts from Central Europe to Germany. The fragmentation of the value chain by car assemblers and follow sourcing by parts suppliers through outward FDI may indeed help sustain employment in Germany, as the

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[18] Note that about 85 percent of total German FDI stocks were located in industrialized countries in 2003 (Deutsche Bundesbank 2005). Horizontal FDI is likely to dominate in these host countries due to strong similarities in factor endowments.

analysis of Kleinert (2003) suggests. This is because the host countries tend to import assembled cars from where FDI originates, and also the imports of intermediate goods originate predominantly from the home base of foreign investors. For instance, the export-oriented production of engines by German companies in Hungary relies heavily on inputs imported from Germany (Humphrey and Memedovic 2003).

Nevertheless, the significance of trade in autoparts between Central Europe and Germany is likely to have added to labour market pressure in Germany. In the remainder of this section, we provide a short summary of trade patterns with the four major host countries of German automobile companies in Central Europe (the Czech Republic, Hungary, Poland and the Slovak Republic) by aggregating the most relevant items, i.e., engines and parts thereof as well as other parts and accessories.[19]

Central Europe has increasingly become integrated into the production networks of German automobile companies. This can be shown by relating the sum of German exports and imports of engines as well as other autoparts and accessories (in constant € as of 2000) to/from the four Central European countries to the volume of domestic automobile production in Germany. By this measure, trade in autoparts soared from less than € 400 per unit in 1995 to more than € 2800 in 2004.[20] The integration of Central European countries through trade in autoparts is most advanced for Hungary, followed by the Czech Republic and Poland. The ranking of the four Central European countries is the same with regard to their share in total German imports of engines and other autoparts in 2004 (Figure 1). Taken together, Hungary, the Czech Republic, Poland and the Slovak Republic accounted for 28 percent of German imports; their share has increased fivefold since 1995.[21]

Furthermore, similar to trade in assembled cars (Section III), it is no longer true what van Tulder and Ruigrok (1998) observed in the late 1990s, namely that Germany has a bilateral trade surplus with all major Central European countries. Rather, the German trade balance turned significantly negative vis-à-vis the Czech Republic and Hungary (Figure 2). The trade

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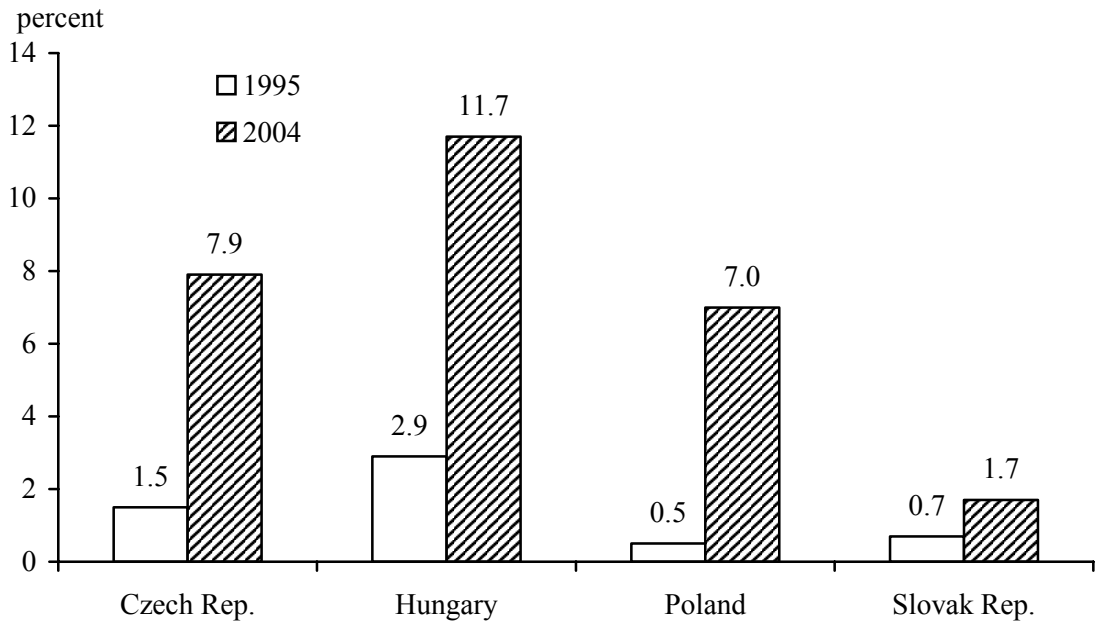
[19] For a more detailed picture of trade in autoparts between Central European countries and Germany, see VDA (2004: 59-68).

[20] In 2004, German imports of autoparts accounted for 52 percent of total trade in autoparts (German exports plus imports) per unit of domestic automobile production.

[21] Note that steeply increasing imports of autoparts from Central Europe represent *additional* offshoring by the German automobile industry, rather than trade diversion to the detriment of other low-cost locations such as Spain and Latin America. As shown in Nunnenkamp (2004), German imports of autoparts from other locations continued to increase (in real terms) when imports from Central Europe gathered momentum.

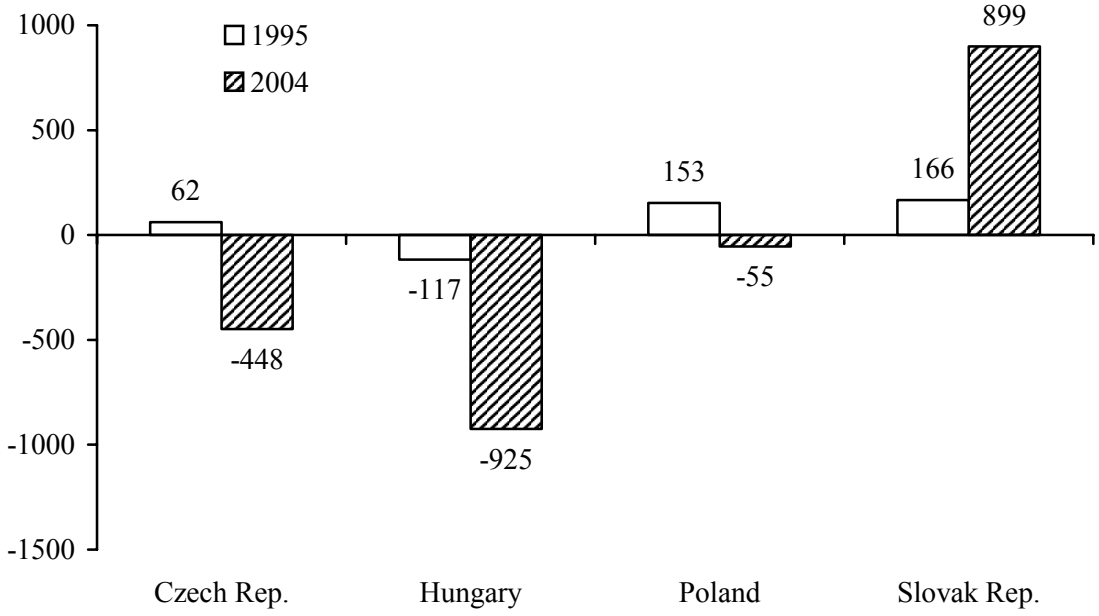
Figure 1 — Share of Central European Countries in Germany's Total Imports of Engines and Other Autoparts,[a] 1995 and 2004 (percent)



[a]Car bodies not included.

Source: VDA (a).

Figure 2 — Trade Balance[a] for Engines and Other Autoparts: Germany vis-à-vis Central and Eastern European Countries, 1995 and 2004 (million €)



[a]German exports minus German imports. Car bodies not included.

Source: VDA (a).

surplus vis-à-vis the Slovak Republic would shrink from € 0.9 billion to € 0.2 billion if car bodies were subsumed under autoparts.

V. Labour Market Implications

The labour market implications of the relocation of assembly lines and the offshoring of parts production to Central Europe are heavily disputed. The notion of Germany degenerating into a bazaar economy has been coined by Sinn (2004). Accordingly, companies use offshoring to overcome the competitive disadvantages at home. This is considered the reason why real value added of the German industry increased by only 5 percent between 1995 and 2003 and industrial employment decreased by 10 percent, even though industrial production increased by 15 percent. Sinn (2004) explicitly refers to the automobile industry to substantiate the argument that German companies remain competitive in international markets only because of "their Eastern European hinterland." The export of Audi passenger cars whose engines are produced in Hungary is presented as an example of German sales of "high-quality products that were not produced in the country."[22] One may add that also the assembly of automobiles is increasingly taking place in Central Europe, as shown in Section III.

Most interestingly, the opponents of this view, too, refer to the automobile industry when stressing *positive* labour market effects of international production networks and offshoring. For example, Klodt (2004) argues that employment losses are concentrated in industries that have failed to make use of offshoring, whereas high outward FDI and imports of autoparts are supposed to have helped a significant increase in employment in the German automobile industry since 1995.[23] Bechert and Cellarius (2004) point to "numerous positive examples of outsourcing processes" that went along with rising employment at the companies' German home base. The latter observation tends to support the reasoning of Becker et al. (2005), according to whom vertical FDI may add to employment at home if cost reduction through offshoring supports an overall expansion of the company (Section II).

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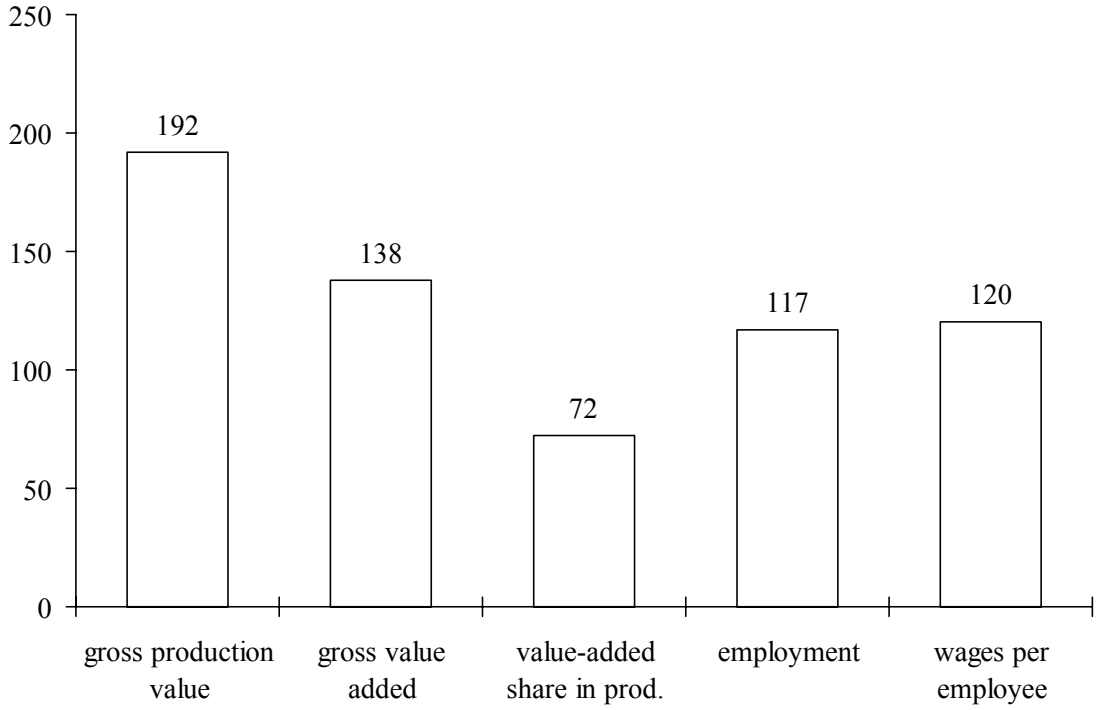
[22] Applying the classification of Markusen and Venables (2005), the German automobile industry would represent the case of exporting assembled goods produced with imported components, which are assumed by these authors to be capital intensive relative to assembly.

[23] For a similar line of reasoning, see VDA (2004: 9).

The evidence presented in the following qualifies both of these seemingly opposing views. In contrast to the decline in overall industrial employment referred to by Sinn (2004), employment in the German automobile industry has increased considerably since 1995 (Figure 3). Furthermore, the average wage earned in the automobile industry was about 25 percent higher than the average wage earned in the German manufacturing sector in 2004/05 (VDA a). Earlier wage comparisons reported by Spatz and Nunnenkamp (2002a: 67) suggest that the wage differential in favour of the automobile industry remained fairly stable over the last two decades. The earnings and employment situation does not appear to have suffered from relocation and offshoring if the German automobile industry as a whole is compared to other manufacturing industries. Yet, Sinn (2004) has a point when stressing the gap between production and value-added trends. Figure 3 reveals that gross production of the automobile industry (motor vehicles and parts) almost doubled in 1995-2004, whereas value added increased by less than 40 percent. Consequently, the share of value added in gross production declined by 9 percentage points to 24 percent in 2004.

Figure 3 — Production, Value Added, Employment and Wages in the German Automobile Industry, 2004 (1995=100)



Source: VDA (b).

Both sides of the debate tend to ignore diverging developments within the German automobile

industry. Spatz and Nunnenkamp (2002a, 2002b) argue that the inter-industry perspective, i.e., comparing the automobile industry with other manufacturing industries, needs to be complemented in two respects in order to fully account for the labour market repercussions of relocation and offshoring. First, the differentiation of the automobile industry into assembly operations (including engines) and the production of parts and accessories reveals striking intra-industry differences:[24]

- The gap between production and value-added trends widened dramatically in assembly operations, but less so in autoparts production. Comparing 1995 and 2004, the share of value added in production declined by more than 10 percentage points (to 21 percent) for assembly operations, compared to a decline by 7 percentage points (to 33 percent) for autoparts production.

- Employment growth was by far higher in parts production than in assembly operations (36 versus 10 percent when comparing 1995 and 2004). This may have been helped by relatively low wages in the former segment of the automobile industry. However, the wage gap did not widen during the period under consideration.[25] Successful adjustment to competitive pressure from lower-income countries, including Central European countries, through specialization in parts production appears to be another factor explaining the relatively favourable performance of this segment of the automobile industry (Spatz and Nunnenkamp 2002a, Nunnenkamp 2004).[26]

Second, and more importantly, employment and income trends diverge between specific groups of employees. Skill-specific employment and wage effects of relocation and offshoring may be captured by applying the conventional assumption that non-production workers are better qualified than production workers (Feenstra and Hanson 2003: 147). In

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[24] Details (covering the period 1995-2004) are not shown here, but are available upon request.

[25] Wages paid in parts production amounted to 80-85 percent of wages paid in assembly operations in 1995-2004.

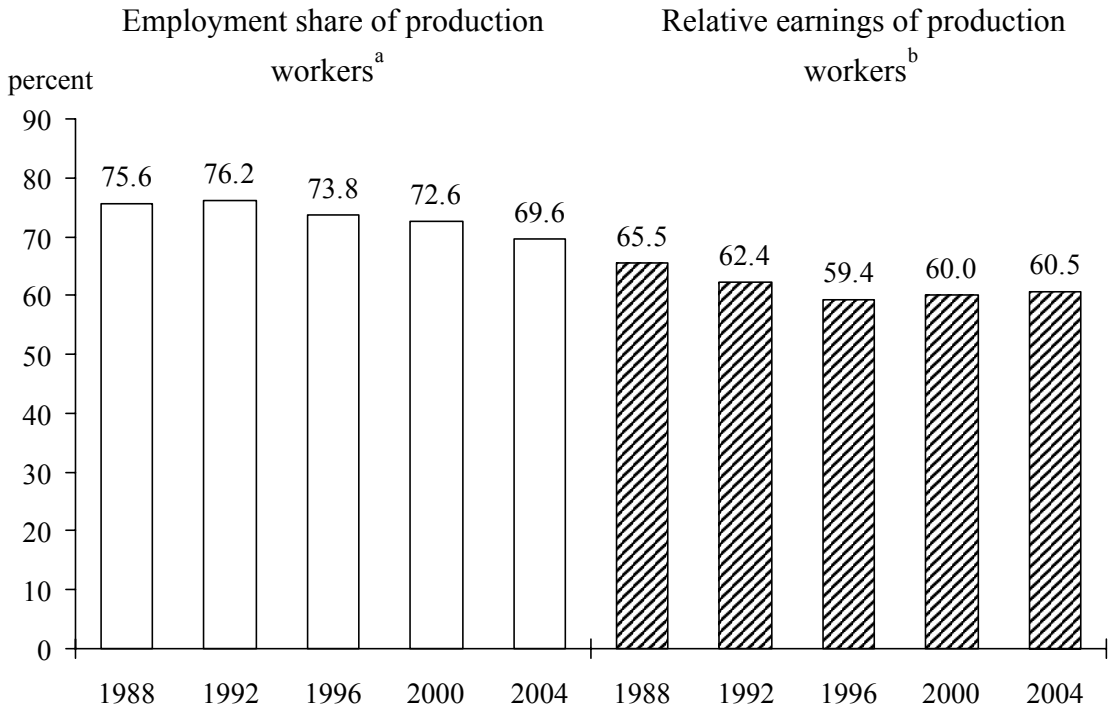
[26] In this context, it may be noted that Sinn's (2004) reference to Audi engines as exemplifying the trend towards a German bazaar economy is misleading. Trade in engines and engine parts expanded in both directions; the production of engines in Hungary relied heavily on the supply of parts from Germany. In other words, the differentiation by Markusen and Venables (2005) between (i) countries exporting assembled goods produced with imported components and (ii) countries importing assembled goods and exporting components is not easily applicable to the German automobile industry. The classification is complicated in two ways. First, case (i) may apply at the level of final goods, while case (ii) may apply once trade in intermediates is analysed at lower levels of aggregation. Second, case (i) may apply for the production of some final goods, while case (ii) may apply for other final goods in the same industry or even within the same company as the examples of Audi and Skoda in the VW Group suggest.

addition, we consider three categories (so-called *Leistungsgruppen*) of production workers in the German automobile industry to assess skill-specific employment and earnings trends for better paid production workers with more demanding tasks (*Leistungsgruppe* 1) and production workers with lower pay and less demanding tasks (*Leistungsgruppen* 2 and 3).

Both approaches to account for skill-specific employment and wage effects reveal that the benefits which relocation and offshoring may offer to the automobile industry as a whole are not equally distributed within the industry. According to Figure 4, the employment share of production workers has declined by 6.6 percentage points since 1992. Employment losses in the early 1990s rested almost exclusively on production workers, whereas the subsequent recovery of overall employment in the German automobile industry benefited non-production workers over-proportionally. Compared to the change in employment shares, the earnings of production workers have declined only marginally relative to the earnings of non-production workers since 1992.

It is debatable whether the labour market situation of production workers deteriorated mainly because German automobile companies discovered Central European countries as competitive suppliers of assembled cars and autoparts. Spatz and Nunnenkamp (2002a) compared longer-term labour market trends for production workers and non-production workers and found that the employment and earnings opportunities of the former deteriorated in the 1980s already. If the "Eastern European hinterland" (Sinn 2004) had a larger effect on production workers than, for example, the previous integration of Spain into the networks of German automobile companies, changes in employment shares and relative earnings should have been particularly pronounced since the mid-1990s, when both the assembly of automobiles in Central Europe and trade in autoparts gathered momentum (Sections III and IV). This is hardly the case.

Figure 4 — Production versus Non-production Workers in the German Automobile Industry, 1988–2004



[a]Percent of total employment (production plus non-production workers). — [b]Per-capita annual earnings of production workers in percent of per-capita annual earnings of non-production workers.

Source: VDA (a).

Our second measure has some limitations, too. Throughout the period under consideration, more than half of production workers are grouped into category 1 and are, thus, considered highly skilled. On the other hand, few production workers are grouped into category 3.[27] More importantly, the comparison of employment shares and relative wages over time may be affected by changes in the classification of production workers into different skill categories.[28] This may raise doubts as to whether categories 1-3 adequately reflect skill differentials which we regard as the critical criterion to assess intra-industry distributional effects. Nevertheless, Figure 5 tends to support the view that the emergence of Central Europe

[27] Therefore, we combine categories 2 and 3 for calculating employment shares in Figure 5.

[28] For example, a significant share of workers previously classified into category 2 appears to have been reclassified into category 1 in 1998. A shift in the opposite direction occurred two years later (Figure 5).

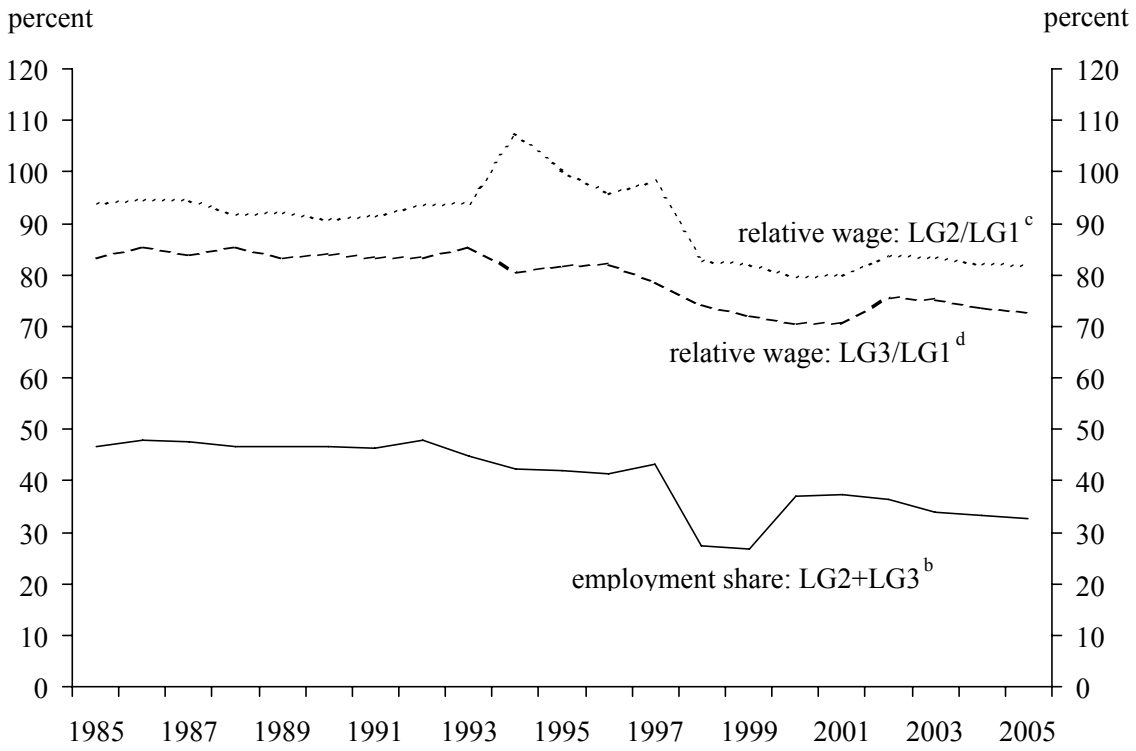
as an attractive production location and a competitive trading partner has affected the labour market situation of specific categories of production workers:

- Less skilled workers (categories 2+3) accounted for a declining share in overall employment of production workers. Moreover, the decline was more pronounced when the assembly of automobiles in Central Europe and trade in autoparts developed most dynamically. The employment share of less skilled workers fell by about five percentage points when comparing 1985 and 1995, but by more than nine percentage points when comparing 1995 and 2005.

- Relative wages of less skilled workers declined only modestly (when comparing category 3 with category 1) or even improved (when comparing category 2 with category 1) until the mid-1990s. Subsequently relative wages dropped significantly, though no longer in most recent years.

All in all, the evidence suggests that the seemingly opposing views on relocation and offshoring, mentioned at the beginning of this section, are not inconsistent with each other. Rather, they refer to two sides of the same coin. On the one hand, the automobile industry as a whole still compares favourably with other manufacturing industries in terms of employment and income opportunities. On the other hand, relocation and offshoring have resulted in distributional effects within the German automobile industry. The rising human-capital intensity of automobile production in Germany, reflected in the structure of employment, and declining relative wages of less skilled workers are longer-term phenomena that cannot be attributed exclusively to the emergence of Central Europe as an attractive location for assembly operations and autoparts production. Especially for less skilled production workers, however, the competition from Central Europe has added to pressure on relative wages and employment opportunities.

Figure 5 — More Skilled versus Less Skilled Production Workers in the German Automobile Industry, 1985–2005[a]



[a]As of January. — [b]Share of categories (*Leistungsgruppen*) 2 plus 3 in total employment of production workers. — [c]Category (*Leistungsgruppe*) 2 in percent of category 1. — [d]Category (*Leistungsgruppe*) 3 in percent of category 1.

Source: VDA (a).

VI. Summary and Conclusions

The economic transformation of Central European countries has added significantly to competitive pressure in the automobile industry, even though this industry is relatively technology and human-capital intensive and, thus, represents a traditional manufacturing stronghold of advanced countries such as Germany. Substitution effects may be limited for the time being, but the relocation of assembly operations is likely to have affected domestic production by inducing higher imports of finished cars from Central Europe and, possibly, also by reducing the growth of exports from the German home base of automobile companies. At the same time, competitive pressure is due to offshoring and intensive trade in automotive parts between Germany and Central Europe.

The finding that the German automobile industry still compares favourably with other manufacturing industries in terms of employment and income opportunities supports the view that relocation and offshoring are important means for German companies to remain competitive. Hence, the integration of Central Europe into the international division of labour is also in the interest of the workers employed in the German automobile industry. However, the benefits to be derived from relocation and offshoring are not equally distributed within the industry. Especially for low skilled production workers, the competition from Central Europe has intensified pressure on relative wages and has impaired employment opportunities.

Competitive pressure and, thus, the need of the German automobile industry to adjust is unlikely to subside. Major automobile producers have announced plans to establish additional production facilities in Central and Eastern Europe.[29] Parts suppliers have little choice but to follow the assemblers. Vertical FDI strategies will continue to be attractive. In 2003, labour costs in the four major Central European host countries of the German automobile industry amounted to only about one sixth of labour costs in Germany (VDA 2004: 23); and Havas (2000: 241) argued already in 2000 that "the productivity gap has almost been closed." Recent agreements on wage restraint and longer working hours with assemblers and parts suppliers, reflecting the weakening bargaining position of trade unions in the German automobile industry, will narrow the gap in unit labour costs to some extent. But it will probably take long until "the catching-up process (of Central Europe) will have a tendency to increase investments by horizontal multinationals and depress investments by vertical multinationals" (Carstensen and Toubal 2003: 17).[30]

For the German automobile industry as a whole, there is no reasonable alternative to exploit the potential of cost savings through relocation and offshoring. Employment and wage prospects at home will depend on innovation and specialization according to comparative cost advantages. However, innovation and specialization offer little relief to low skilled workers unless they succeed to improve their level of qualification. Wage restraint and differentiation may provide part of the solution to the extent that it buys time for skill upgrading. By contrast, it would be counterproductive if economic policymakers and trade unions in Germany

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[29] Heymann (2004) expected that production capacity in Central and Eastern Europe would double until 2006/07, which would add to the overcapacity problem the automobile industry is facing on an international scale.

[30] In a similar vein, Heymann (2004) posits that Central Europe will enjoy a lasting competitive advantage in labour costs; see also VDA (2004: 25-26).

attempted to "protect" low skilled workers, either by insisting on EU harmonization of corporate tax rates and social standards, or by demanding effective minimum wages. Minimum wages would strengthen the incentives to relocate and offshore production to lower-income countries, including in Central Europe. As a result, the employment prospects of low skilled automobile workers would deteriorate further. EU harmonization may help contain distributional conflicts in German manufacturing to some extent in the short run, by reducing the cost advantages of new member states in Central Europe. In the longer run, however, the international competitiveness of German producers would suffer if they were constrained in cutting costs through relocation and offshoring. For industries such as automobile production, facing fierce competition on a worldwide scale, this would mean that employment and income prospects deteriorate for the overall workforce, independently of skill levels.

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