3 Competitiveness: A Market Perspective

Georg Licht, Wolfgang Sofka, and Waltraud Urban

3.1 Overview

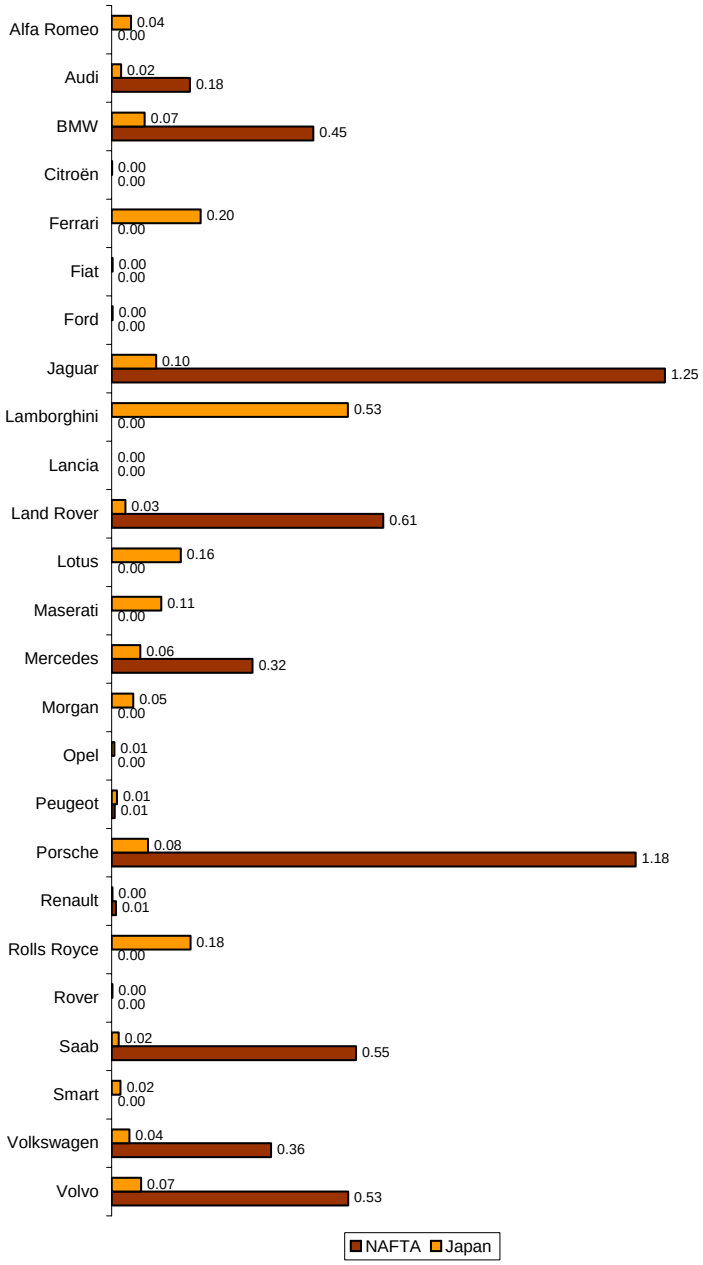
The concepts of competitiveness and competitive advantage have traditionally been discussed on a firm level base. National competitiveness has long been solely treated as the result of factor-based comparative advantages. Among others, Porter (1990) has pushed this approach towards a competitive advantage of nations by demanding that "a rich conception of competition includes segmented markets, differentiated products, technology differences, and economies of scale."

The following analysis uses both frameworks as scaffolding. At first, it focuses on the performance of the European automotive industry on international markets, both in terms of trade and foreign direct investment. This follows the simple rationale that markets (in this particular case international markets) are the single most efficient mechanism to filter and condense decentralised information from all relevant sources. Put simply, the market participants that perform best on the world market must be competitive (in the absence of trade distorting measures). This concept fits nicely with the definition put forward by Scott and Lodge (1985): "national competitiveness refers to a country's ability to create, produce, distribute and/or service products in international trade while earning rising returns on its resources." While this aspect reflects mostly comparative advantages the following section on the home market introduces the points that Porter mentioned above by moving from comparative to competitive advantages.

3.2 International Markets

Operating globally has become almost a prerequisite of success for the automotive industry. It allows automotive companies not only to open up new sales opportunities but also enables them to tab into scarce pockets of regional expertise to attain competitive advantage. Figure 23 focuses on the sales motive and illustrates the varying importance of overseas markets for European car manufacturers. It also highlights how crucial especially the North American markets are for European premium quality manufacturers.

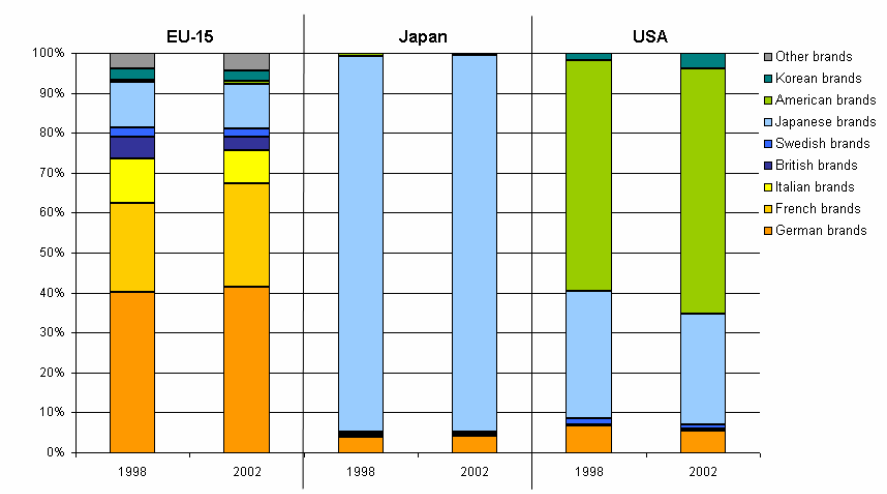
Fig. 23. New passenger car registrations in NAFTA and Japan as ratio of Western European registrations in 2002 for major European brands



Source: ZEW calculation using ACEA, VDA data; Ford covers only Ford Europe.

A brand perspective is also helpful in assessing market shares for passenger cars. While production of most automotive producers in the world is spread over various countries in their value chain the brands are still considered to reflect some national identity. The following figure shows the market shares of major brands in a geographic and historically dynamic context.

Fig. 24. Brand segmentation in new passenger car registrations or sales in EU-15, Japan and USA 1998 and 2002[33]



Source: ZEW calculation using VDA data; no comparable data available for the new member states.

In Europe (EU-15) only slight shifts in the composition of the market shares between 1998 and 2002 are visible. The market is dominated by European brands. German and French brands hold by far the largest shares and were even able to expand their market presence while Italian and British market shares declined. Japanese brands are the largest external players on the European markets considerably in front of Korean brands. Albeit the market shares of both Asian brand groups remained almost static compared to 1998. It should be mentioned that this is strictly a brand and unit perspective. While this presentation gives the big picture it could very well be that the distribution in prices and hence sales among brands is somewhat different. Still, this is a suitable solution due to the lack of other applicable data. Also, it should be mentioned that the large American manu-

[33] German brands (Audi, BMW, Ford, Mercedes, Opel, Porsche, Smart, Volkswagen); French brands (Citroen, Peugeot, Renault); Italian brands (Alfa Romeo, Ferrari, Fiat, Lamborghini, Lancia, Maserati); British brands (Ford, Jaguar, Land Rover, Lotus, Morgan, Rolls Royce, Rover, Vauxhall); Swedish brands (Saab, Volvo); Japanese brands (Daihatsu, Honda, Isuzu, Mazda, Mitsubishi, Nissan, Subaru, Suzuki, Toyota); American brands (Chrysler, Ford, General Motors); Korean brands (Asia, Daewoo, Hyundai, Hyundai Prec., Kia, Ssangyong); other European brands (Seat, Skoda).

facturers serve the European markets, mostly through their European branches and hence brands (e.g. Opel). Therefore, traditional American brands may be absent from the European markets, the US manufacturers are not.

The Japanese brands control almost the complete Japanese market. Only some German brands make recognisable inroads into that market. Their share remains relatively stable between 1998 and 2002. In the US market American brands hold the largest shares and even expanded them compared to 1998. Japanese brands hold a sizeable stake of that market, still their market share has diminished. German brands hold the third largest share of the US market although their share has slightly declined compared to 1998. To the contrary, Korean brands have gained considerably in the US between 1998 and 2002.

The notion of a home market bias in demand for cars will we elaborated shortly in more detail. At first, the channels through which these international markets are served (trade and FDI) will be analysed.

The following sections stress two major forces in international competitiveness: Trade and Foreign Direct Investment (FDI). Common sense would suggest that implementing one of those internationalisation strategies would supplant the other, i.e. by investing in a particular country exports towards this country should diminish. If this would be true, focussing on one mode of internationalisation only would be sufficient to assess competitiveness. Albeit, empirical research suggests quite the opposite. FDI and trade streams can go hand in hand. This does also hold when specifically applied to the automotive industry. Based on panel data from the Japanese automobile industry Head and Ries (2001) find net complementarity between trade and FDI. Trade in intermediate inputs as well as exports from supplying firms facilitate this connection. Beyond this argument of an internationally embedded value chain, different stages in the individual product life cycle might also require different internationalisation strategies. This concept put forward initially by Vernon (1966) states that the uncertainty associated with new products requires closer customer interaction in production which could best be accomplished by on-site operations and hence foreign direct investment. Once the product becomes more ripe and standardised cost considerations become the central driver of production decisions and therefore markets will best be served through exports from the most cost effective production sites. In conclusion, an analysis that confines the performance on international markets to trade aspects would be incomplete. Thus, the subsequent sections feature both trade and FDI to gain maximum insight on the performance of the European automotive industry on international markets.

3.2.1 International Trade

Imports and exports have always been a major driver for the competitive positioning of countries. Not surprisingly the success in international trade is deeply connected to the post-war recoveries of Germany, Japan and South Korea. The exposure to the fierce competition in international markets forced domestic companies to enter a virtuous circle of demanding customer feedback, peer pressure from

global competitors and growing domestic excellence in operations. Only the most efficient and responsive companies could survive this competition but those few remaining global champions would reap the benefits. Besides, from an economic perspective trade implies production at home which translates into jobs and tax revenues. Subsequently, trade performance is a cornerstone of any competitive analysis among nations.

Trade theory dates back to Ricardo who introduced import and export flows among countries as a result of differing comparative advantages. Heckscher and Ohlin deviated from that concept and explained trade as a consequence of varying factor endowments among countries. Krugman and the New Trade Theory finally stress the importance of economies of scale in imperfect markets. Still, tracing the roots of trade is not at the core of this analysis. Instead, the European position in trade in automotive products should be an important indicator for its competitiveness. Following the framework for competitiveness suggested by Buckley et al. (1988) the position in trade should give useful insight both with respect to competitive performance as well as competitive potential.[34] The former represents the past up to the present and can best be described by the world market shares of the European automotive industry. The latter, though, indicates whether this performance will be sustainable in the future. Concepts of comparative advantage should give valuable insights in this field. The subsequent sections will highlight both aspects: performance and potential.

The following presentation emphasises the main developments and sets some focal points. The interested reader might turn to the appendix for the full set of trade related data (exports, imports, trade surpluses, world market shares and RCAs).

A brief overview sets the stage and should help to put the following numbers into context. In 2001 all OECD countries combined exported automotive products (SITC 78) worth almost USD 523 bn to the world (total merchandise exports were almost 4 trillion USD). 58% of that value were exports of passenger cars (SITC 781), 10% trucks (SITC 782), 3% buses (SITC 783) and 25% parts (SITC 784).[35] EU-15 accounted for almost USD 270 bn of those exports while only USD 85 bn were exports outside EU-15. Since the comparison with non-European competitors was at the centre of this analysis internationally comparable data was required. The OECD provides this data. Unfortunately, not all new member states are covered by the OECD. Still, the major automotive producing countries, among them Poland, the Czech Republic, the Slovak Republic and Hungary, are included.

---

[34] Buckley et al. (1988) find three levels of competitiveness: competitive performance, competitive potential and management process. Obviously, the contribution of the management process on turning competitive potential into performance is considerable. Albeit, it is a deeply firm specific factor and would hardly fit into the predominantly country comparison framework presented below. Therefore, this factor will only be included through selective mentioning while performance and potential can safely be presented on a country level.

[35] All numbers based on data from OECD: ITCS – International Trade By Commodity Statistics, Rev. 3, 2001, 2002.

They exported a combined total of USD 13.6 bn to the world. The USA exported automotive products worth USD 56.7 bn, Japan USD 80.8 bn. The former is only the third largest export country in that field, the latter the second largest. Germany tops the list with USD 105 bn exports. Canada is ranked fourth (USD 52.7 bn), France is fifth (USD 38.9 bn). In terms of export growth total merchandise exports from OECD countries grew by 11% between 1998 and 2001 as did automotive products as a whole; cars increased by 16%, trucks by 12% and parts by 7%, only exports of buses to the world market fell by 20%.

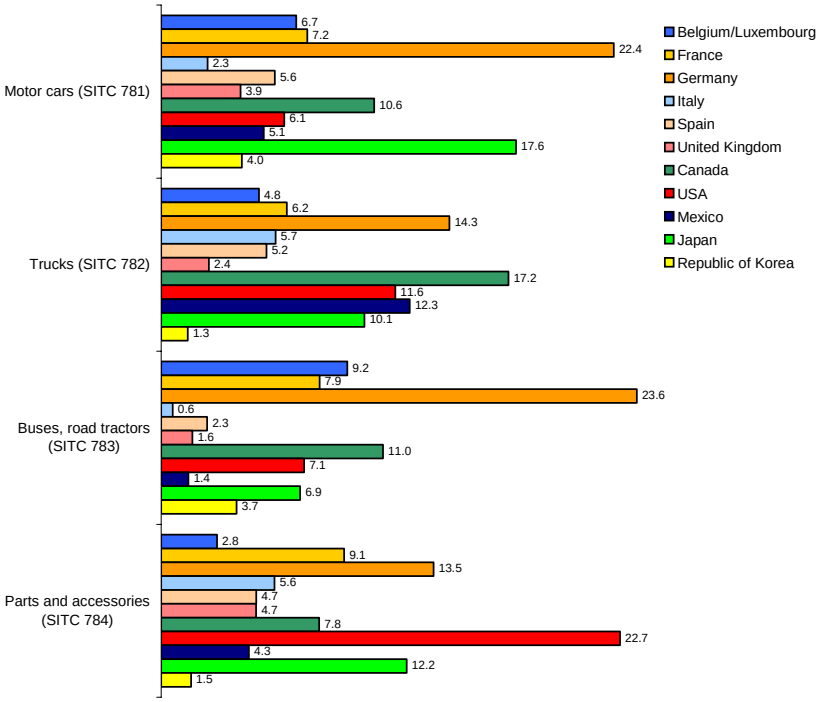
With an eye on imports in 2001, OECD countries combined imported automotive products worth almost USD 486 bn (total merchandise imports were almost 4 trillion USD) from the world. The division among the automotive segments is almost identical to the export segmentation mentioned above. EU-15 imported roughly USD 231 bn in automotive products, while only USD 46 bn stemmed from outside EU-15. Poland, the Czech Republic, the Slovak Republic and Hungary imported almost USD 11 bn in automotive products. Automotive product imports to the USA accounted for almost USD 159 bn whereas Japan imported only USD 9.6 bn. This makes the USA by far the largest import country for automotive products followed by Germany (USD 44.5 bn), the United Kingdom (USD 38.8 bn), Canada (USD 37.3 bn) and France (USD 30.7 bn).

Trade in absolute numbers gives a good idea of the importance and the size of the sector for the global economy. The performance of a particular country, though, is best assessed in comparison with major competitors on the global markets. Figure 25 shows the world market shares for major exporting countries.

From a European perspective, the most eye-catching fact from this figure is the strong performance of Germany across all market segments. It commands world market shares well above 20% for cars and buses, with a significant lead in each segment. For trucks and parts Germany finishes second. What is more, Germany's world market shares differ hardly from what they were in 1991. Obviously, Germany has performed well as the prime location for car manufacturing in the world.

A closer look at the car segment reveals Japan in second place. Although 17.6% of the large world trade market for cars in 2001 is quite an accomplishment it pales compared to the 27% Japan enjoyed in 1991. Canada follows in third place. Both Canada and Mexico increased their world market shares over the last ten years which should be due to NAFTA and the consequent easier access to the large US market. The USA itself accounts for only 6% of world car exports which is lower than France and Belgium/Luxembourg, the European forces in car exports behind Germany. On the downside, the weak performance of Italy in world car exports should be mentioned. Being among the major car producing countries in Europe its share in the world trade markets declined from 3.5% in 1991 to a weak 2.3% in 2001. It is now also below the South Korean world market share of 4% which is South Korea's only significant showing in international markets apart from the bus segment. Against common belief South Korea's car export share is only expanding slowly from 3.2% in 1995.

Fig. 25. World market shares 2001 in percent for major exporting countries (share of export value among OECD countries)

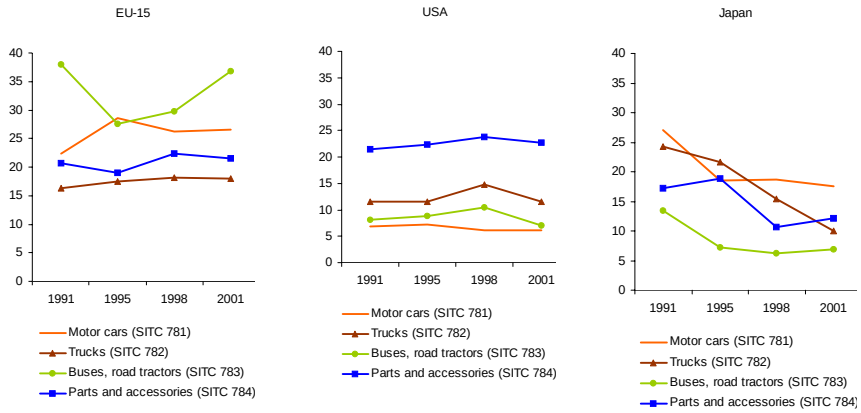


Source: NIW calculation using data from OECD: ITCS – International Trade By Commodity Statistics, Rev. 3, 2001, 2002.

In the truck segment the strength of the NAFTA countries becomes apparent. Canada holds the largest world market share, Mexico is third and the USA fourth. Only Germany squeezes between them in second place. Still, a fair amount of trade in trucks should happen among the NAFTA countries. Canada and Mexico are the most important trading partners for US truck exports. While US and Canadian world market shares are virtually unchanged compared to 1991, Mexico remarkably leveraged its share from half a percentage point in 1991 to more than 12% in 2001. This trend indicates that new truck assembly opportunities in the NAFTA region were largely realised in Mexico to supply the whole market. The most troubling signs in the truck segment come from Japan which lost more than half of its world market share between 1991 (24%) and 2001 (10%). From a European perspective the major truck producing countries defended their world market during this ten year time span. This fact is especially encouraging for Germany which maintained its world market share at an already high level. Another positive sign for the European truck producing industry is Spain which was able to gain ground in the international markets. It roughly doubled its share in world exports from 2.2% in 1991 to 5.2% in 2001. Apparently, Spain increased its competitive-

ness as an operation site for truck assembly with the goal of supplying foreign markets.

Fig. 26. World market shares 1991, 1995, 1998 and 2001 for EU-15, USA and Japan



Source: NIW calculation using data from OECD: ITCS – International Trade By Commodity Statistics, Rev. 3, 2001, 2002; EU-15 excludes intra EU-15 trade; World market shares calculated as share of exports on OECD exports.

In bus exports, too, Germany exhibits a dominant market position. Almost every fourth bus exported in the world 2001 stems from there. What is more, Germany expanded its world market share from an already high level of 20.8% in 1991. Canada and Belgium/Luxembourg follow as the distant second and third. While the former has increased its world market share significantly since 1991, the latter fell during that time from 13.4% to 9.2%. The loss of world market shares is more extreme for Japan the 2001 value of which (6.9%) is almost half of what it was in 1991 (13.5%). This slide might be due to strongly increased bus production in other Asian markets that traditionally relied on imports from Japan but benefit now from lower labour costs at home. While Japan suffers significant losses in world market shares, South Korea was able to expand its share in bus exports from 2.3% in 1995 to 3.7% in 2001. With an eye on the European situation Italy again shows some worrying signs. It held a bus world market share of 4.6% in 1991 which almost completely evaporated and is at 0.6% in 2001.

As automotive value chains become more internationally dispersed exports of intermediate automotive products, part and accessories gain more importance. In this segment the USA is the undisputed world market leader. It defends its world market share which has been well above 20% since 1991. Some of this remarkable lead might be due to the strategy of major American car producers to invest abroad and supply local markets from American production sites, e.g. General Motors operates in the European market largely through their Opel and Vauxhall operations. This would necessarily result in weaker export shares for cars from the

USA but would still open up export channels for intermediate products or parts from supplying firms. This argument should also hold for automotive value chains that span NAFTA. Accordingly, Mexico's world market share in the parts segment skyrocketed from 0.7% in 1991 to 4.4% in 2001, while Canada's share remained relatively stable during that time at 7.8%. Nevertheless, even in light of these value chain effects the continued lead of US parts exporting firms in direct competition with local competitors at the transplant assembly sites underscores the extraordinary performance of the USA in this field. The global number two in world market shares for parts is Germany which largely defended its 13.5% share consistently from 1991 till 2001. Japan as the third largest player in international parts exports comes close with 12.2%. Still, compared with its share of 17.1% in 1991 the loss is significant. Unfortunately, from a European perspective the UK (1991: 8.1%; 2001: 4.7%) and France (1991: 12%; 2001: 9%) suffered significant setbacks.

As stated previously the world market shares give a good idea of the competitive performance of a country in the past. The concept is transparent and straightforward. Whether this performance is sustainable for the future, i.e. generates competitive potential, requires a slightly more elaborated construct. The revealed comparative advantage (RCA) appears better suited for that task. It treats imports and exports simultaneously and puts them into the context of the overall import-export relation of a particular country. The concept originates from Balassa (1965). Its formulation in logarithmic terms yields at the same time continuous, unbound and symmetric results (Wolter, 1977). Mathematically it is described as follows:

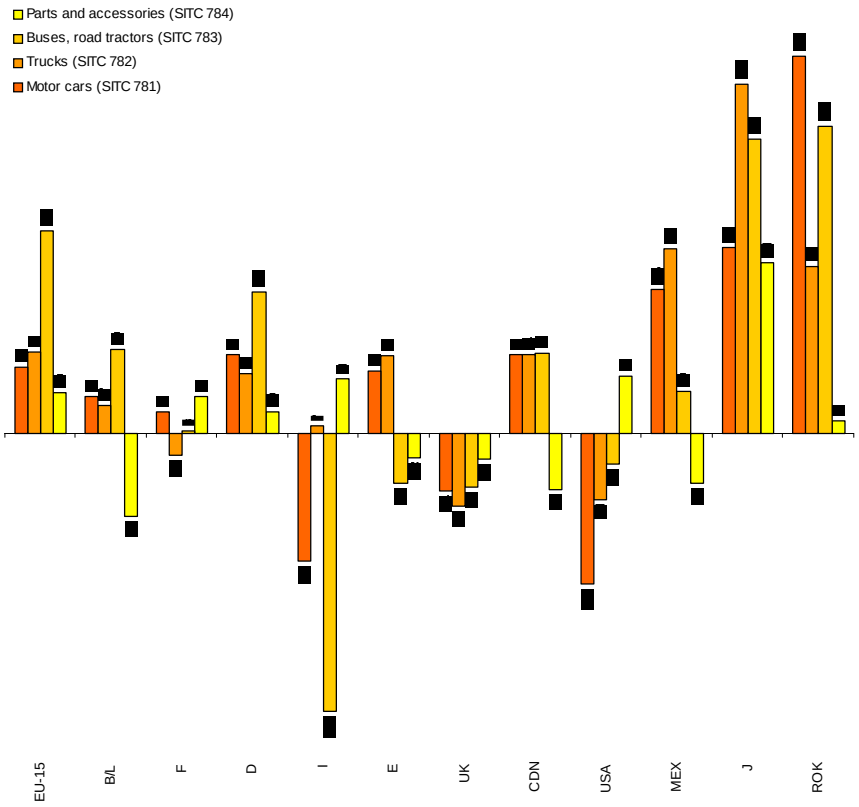
$$RCA_{ij} = 100 \ln \left[\frac{X_{ij} / M_{ij}}{\left(\sum_j X_{ij} \right) / \left(\sum_j M_{ij} \right)} \right]$$

with X: Exports; M: Imports; i: Country index; j: Product group index.

In essence, the strength of the RCA analysis stems from the opportunity to assess how successful a country was on foreign markets (exports) in comparison to the foothold foreign competitors were able to gain in the domestic market (imports). Additionally this ratio is compared to the overall export/import ratio of a particular country with the world. To be precise, this concept measures not only whether exports of a specific product have outweighed imports, but also whether the trade position for this particular product is stronger than the overall trade performance of this country. Hence, RCA is a comprehensive measurement of competitiveness in international markets that stresses specialisation for one particular product or product group. Therefore, positive RCA values indicate advantages in competitiveness while negative values imply disadvantages. Obviously, RCAs are vulnerable to any trade distorting measures, e.g. import duties, export subsidies. When interpreting the results this shortcoming should not be ignored. Still, following the purpose of this report, the concept was applied anyway under the explicit assumption that this trade distorting measures were non-existent or applied by all countries under consideration to more or less the same degree. Figure 27 summa-

rises the 2001 RCAs for major automotive producing countries while Figure 28 puts those numbers for EU-15, Japan and the USA in a historic perspective.

Fig. 27. Revealed comparative advantage (RCA) 2001 for major exporting countries



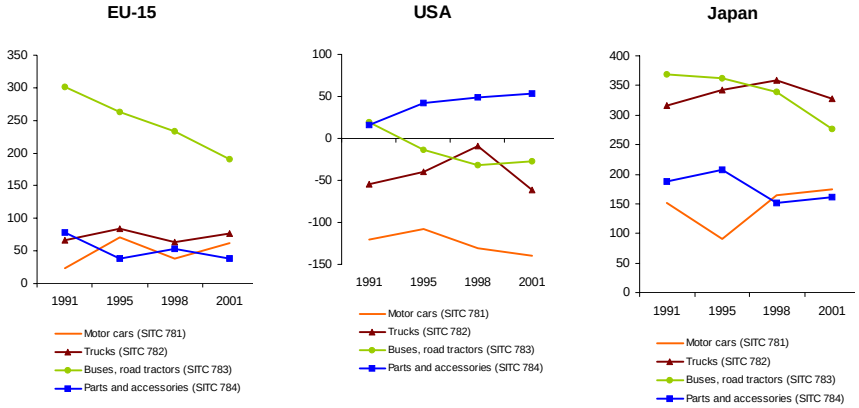
Source: NIW calculation using data from OECD: ITCS – International Trade By Commodity Statistics, Rev. 3, 2001, 2002; EU-15 excludes intra EU-15 trade.

Even at first glance it becomes clear, that the distinction between competitive performance (via world market shares) and competitive potential (via RCA) makes sense. Incorporating automotive imports and the overall trade position of a country allows significantly more insights.

Japan is a good example to illustrate how the RCA as an instrument of specialisation works. From the presentation on competitive performance one would expect, that Japan's diminishing world market shares would also have translated into lower competitive performance. In fact, this is not the case. What happened was a relatively strong increase in overall merchandise imports to Japan between 1991 and 2001 while overall exports grew more modestly. This translates into a diminishing denominator in the RCA formula above. Eyeing specifically the car seg-

ment now, the diminishing world market share shows that Japanese car exports expanded slower than the world market. Albeit, its car imports to the Japanese markets grew almost in unison with Japanese exports, which implies that the car export/import ratio (the numerator in the RCA formula) is 2001 close to what it was in 1991. Besides, this ratio is still strong: Japan exported 2001 roughly 8 times more cars (measured in value) than it imported, an export strength that is second only to South Korea. Accordingly, overall foreign companies became more successful in the Japanese market compared to the fate of Japanese firms overseas and their export performance; but this is not true for Japanese car manufacturers which defended their home market almost to the same extent as they were able to gain ground abroad. Therein lies the strength of the RCA as a specialisation measurement concept. Japan has superior competitive potential in the truck segment, while its RCAs are second best in cars and buses. Still, cars are the only segment where its RCAs significantly increased compared to what they were in 1991, trucks developed relatively flat, while current RCAs in buses and parts are 25% and 14% respectively below 1991 values.

Fig. 28. Revealed comparative advantage (RCA) 1991, 1995, 1998 and 2001 for EU-15, USA and Japan



Source: NIW calculation using data from OECD: ITCS – International Trade By Commodity Statistics, Rev. 3, 2001, 2002; EU-15 excludes intra EU-15 trade.

The other Asian country under consideration, South Korea, has also very strong RCAs in the cars, trucks and buses segments. As mentioned before, South Korea benefits from superior performance in car exports compared to imports. In 2001 it exported roughly 48 times the value in cars that it imported. Not surprisingly, its RCA is high. Compared to 1995, South Korea even improved on its RCA position both cars and trucks, while the trend for buses is negative. Remarkable is the South Korean performance in the parts segment where they turned a negative RCA in 1995 (-76) into a positive one in 2001. This is mostly due to the fact that

South Korea reversed its position in trade in parts from being a net importer in 1995 towards being a net exporter in 2001. However, the strong South Korean numbers should be interpreted carefully. They rest on weak automotive imports to South Korea. Since those absent import streams are partly the result of an environment that posts obstacles to free trade, they should be interpreted carefully and do not adequately represent the competitive potential of South Korea.

The NAFTA countries show an interesting picture. While in cars, trucks and buses the USA show a negative RCA, Canada and Mexico post strong numbers. In sharp contrast, the parts segment turns this impression upside down. The import and export streams among those countries are highly intertwined in the value chain. As imports from Canada and Mexico lower the US RCAs in assembled vehicles, they rely heavily on parts and intermediate automotive products from the USA. Therefore, the competitive potential for the USA in cars, trucks and buses might be small, but it is strong when it comes to the parts segment. In the case of Mexico its current car RCA (136) looks impressive but the 1991 counterpart was well above 300. The Mexican trend is more impressive in trucks (+145% between 1991 and 2001) and in buses where they turned a highly negative RCA in the mid and early 90s into a positive one in 2001.

From a European perspective the majority of automotive trade happens within the European Union. Therefore, export advantages of a particular country necessarily translate into import induced disadvantages for partner countries. EU-15 without its intra trade has the strongest RCA's and hence competitive potential in the bus segment. While these numbers tend to decline over time the RCA's for cars, trucks and parts are fluctuating but consistently positive. Exploring the competitive potential for major automotive exporting member states gives some additional insights.

In the cars segment the competitiveness potential for Germany, France, Belgium/Luxembourg and Spain is strong while it is bleak for Italy and the UK which post negative RCAs since 1991. Germany boosted its RCAs most compared to 1991 which is mostly due to the fact the German export/import ratio in cars shifted from 1.5 in 1991 towards 2.8 in 2001. In trucks, the most troubling signs come from the UK with a negative turnaround in RCA since 1991. The UK used to export trucks worth 1.6 of what it imported in 1991, a value that shifted towards 0.4 in 2001. Besides, the revealed comparative disadvantages for France in this segment has hardly changed since 1991. All other European countries under consideration here show positive competitive potential for trucks with the strongest improvements compared to 1991 for Spain and Germany. In the buses segment, the downturn in British competitive potential since 1991 is almost a mirror image of the truck situation. France achieved a notable positive RCA in 2001 while it exhibited negative values in this area previously. Still, the highest potential lies in Germany and Belgium/Luxembourg which are also the countries that improved their RCA position most since 1991. The competitive potential for Italy lies in the parts segment where its exports consistently outpace imports. Accordingly, the optimal positioning for Italy in a European automotive value chain lies in the parts segment. Germany and France exhibit advantages in that field, too, but their RCAs

are declining compared to 1991. Spain, the UK and Belgium/Luxembourg are on a consistent negative RCA trend.

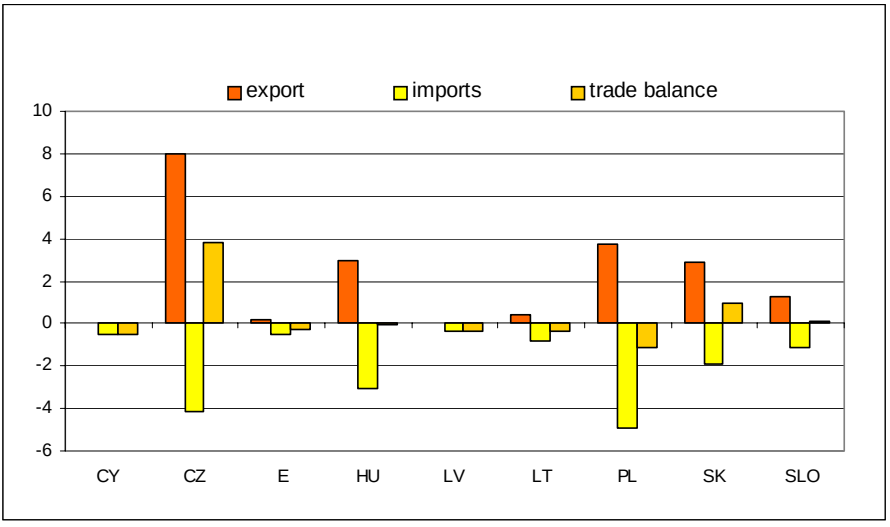
3.2.1.1 Special Focus on the New Member States

Foreign trade plays a very important role in the NMS automotive sector on the export as well as on the import side. In 2002, the largest exporters of road vehicles were the Czech Republic, exporting road vehicles and parts (SITC 78) worth USD 8 bn, Poland (USD 3.8 bn), Hungary (USD 3 bn) and Slovakia (USD 2.9 bn), followed with a certain distance by Slovenia (USD 1.3 bn); see Table 78.

The most important import market for road vehicles and parts was Poland, absorbing USD 4.9 bn, followed by the Czech Republic (USD 4.2 bn), Hungary (USD 3 bn), Slovakia (USD 1.9 bn) and Slovenia (USD 1.2 bn). The Baltic countries, Cyprus and Malta were rather small players due to their small size and lacking specialisation in this field (Table 78).

Typically, the sectoral trade balance is positive or balanced for those NMS specialising in the automotive industry (Czech Republic, Hungary, Slovakia and Slovenia) and negative for the rest, including Poland, which has the second largest automotive production of the region but the share of this industry in total manufacturing being relatively small (see Figure 29 and Table 78).

Fig. 29. NMS trade in road vehicles (SITC 78), 2002



Source: UN trade database.

Moreover, in the NMS with a relative big automotive industry, the export quotas are extremely high, particularly in the foreign invested enterprises (FIEs). According to the wiiw FIE database in the year 2001, export sales made up 81% of total sales of FIEs in the Czech automotive industry, 92% in Hungary, 64% in Poland and 82% in Slovenia. The export shares of domestic enterprises were sig-

nificantly lower, between 50% and 60% and only 14% in Poland (see Table 79). The export share in the automotive industry was rising over time. The disproportionate growth of automotive exports is also reflected in their shares in total manufacturing exports rising significantly. In the Czech Republic, for instance, road vehicle exports (including bodies and parts, SITC 78) came up to 8% of total manufacturing exports in 1995 but reached 19% in 2002. In the Slovak Republic the rise was from 5% to 22%. In Hungary, the relative increase was somewhat less spectacular but the shares still doubled (from about 5% to 10%). Only in Slovenia the already high share (12%) did not increase (see Table 80). Passenger cars (SITC 781) are the backbone of NMS exports, also rising fastest, with some important exceptions as parts and bodies (SITC 784) in Poland and trucks and special purpose vehicles (SITC 782) in Slovenia.

3.2.1.2 The Increasing Role of the NMS in Automotive Trade Worldwide and in the EU

As a consequence of this dynamic development, the world market shares of those NMS specialising in automotive production have risen as well, although from very low levels – and they are still small. The rise was most significant in the Czech Republic, increasing from 0.4% in 1995 to 1.4%, followed by Slovakia (0.09% to 0.51%), Hungary (0.17% to 0.53%) and Poland (0.27% to 0.67%) – the world market share of Slovenia remained constant at 0.23% (see Table 81).

However, the bulk of NMS trade in automotive products is with the European Union and with Germany in particular. In 2002, the share of the EU-15 in total road vehicle exports (SITC 78) was around 80% in most countries (see Table 12). Only in the Baltic states, where automotive exports are small any way and comprise parts and bodies for vehicles (SITC 784) mainly, EU trade is less dominant due to their traditional trade links with the former Soviet Union. Also, in the case of the Czech Republic, a significant share of automotive exports went to the neighbouring NMS, in particular to Slovakia, but to Poland and Hungary as well with the three countries reaching a combined share of more than 13% in total exports and outpacing individual trading partners in the EU, except, of course, Germany (35%). In general, the exports of the major product group which are passenger cars (SITC 781) were most heavily geared to the OMS, while vehicle parts and bodies (SITC 784) are being increasingly sold in the neighbouring NMS as well. This underpins the emergence of an automotive cluster in the region, comprising the Czech and the Slovak Republic, the south of Poland and western Hungary – forming a kind of ‘oval’ (Lepape and Boillot, 2004). In some cases, where prominent foreign investors come from countries outside the European Union, such as GM (USA) and Suzuki (Japan) in Hungary, exports of vehicle parts to the mother country of the foreign investors play a certain role as well.

Table 12. EU-15-shares in vehicle trade of the NMS, in % (2002)

	Exports[1)]					Imports[2)]				
	78	781	782	782	784	78	781	782	782	784
Cyprus	100.0				100.0	49.9	54.2	36.8	83.6	57.1
Czech Rep.	74.1	71.5	25.3	68.2	80.6	85.1	81.0	91.6	86.0	87.5
Estonia	34.8	20.0	39.8	14.2	54.2	70.6	62.3	83.1	89.4	83.0
Hungary	84.4	97.2	53.2	10.6	73.8	77.1	74.0	75.8	72.3	81.8
Latvia	41.1	39.0	10.7	54.8	52.7	73.4	74.0	81.2	63.3	73.4
Lithuania	5.3	3.5	7.1	17.3	29.2	80.5	77.5	94.5	96.9	68.7
Malta	93.5				93.5	76.8	80.5	58.5	72.7	70.7
Poland	86.5	90.3	91.3	61.0	83.9	82.8	79.8	97.3	95.2	77.9
Slovak Rep.	80.2	81.4	10.3	52.0	79.6	72.9	50.0	81.5	74.5	83.0
Slovenia	86.6	87.9	71.1	34.0	87.9	88.2	84.1	97.6	85.7	89.9

[1]) Exports to the EU-15 divided by total exports of the respective product group.
[2]) Imports from EU-15 divided by total imports of the respective product group.
Source: UN Trade database, wiiw calculations.

The European Union is a dominant source for automotive imports of the NMS as well, including the Baltic states. However, except in the Baltics, the EU-15 sometimes played a lesser role in imports than in exports, because of overseas suppliers penetrating the growing NMS automotive market – especially in the passenger car segment where the EU-15 share was typically around 75%. However, their share in the NMS market is still small.[36] Intra-regional exports of parts and accessories find their expression in imports as well – this is particularly true for the Slovak Republic where imports (of cars and parts) from the Czech Republic play an important role.

3.2.1.3 Revealed Comparative Advantage (RCA) of Different Product Groups

RCAs as defined in Table 81 compare the relative shares of exports and imports of a particular industry with the share of the country's total manufacturing exports and imports. A positive value indicates a relative competitive *advantage*, while a negative value points to a competitive *disadvantage* in this field. Our results show a large competitive advantage in the automotive industry as a whole (SITC 78) for the Czech Republic and Slovakia, but only a small competitive advantage for Hungary and Slovenia, and a competitive disadvantage for Poland, the Baltic states and the two Mediterranean NMS. At the level of subgroups, the revealed comparative advantage was typically largest for passenger cars (SITC 781), fol-

[36] A notable exception is Cyprus, where Japanese vehicle imports reached 42% but also Estonia, where vehicle imports from Japan ran up to 14% and those from Russia had a share of 6% in 2002 (UN trade data base).

lowed by parts & bodies for motor vehicles (SITC 784). Regarding the other subgroups SITC 782 and 783), only Poland shows a slight comparative advantage in trucks etc. (goods, special transport vehicles (SITC 782).

3.2.1.4 Conclusion

In conclusion, the European automotive industry shows mixed signs: First of all, the performance of the German and French industry is strong. Their success in international markets is substantial and sustained. Furthermore, they show positive competitive potential (RCAs) for the future which indicates that the management processes applied in German and French automotive companies succeed in turning the performance of the past into sustainable potential for the future. Spanish firms appear also to be moving towards growing success in international markets. Still, the signals coming out of Italy and the UK are less promising. Both countries have not only lost shares in the automotive world market but their RCAs have significantly declined. As a result, their automotive competitive potential for the future is in danger. Albeit, this is notably not true for the Italian parts segment. Still, the vast majority of trade of European automotive companies takes place within the European Union. The single market facilitates production concentration on few sites from which subsequently the whole European market is supplied. This necessarily translates into more import and export activities. A current study by ECG (2004) shows that automotive manufacturers are moving towards plants that produce a single model or two at maximum. Moreover, they show that 75% of all vehicles produced in EU-15 are destined for another country, 58% for another member state.

The same rationale appears to apply to the NAFTA areas where stable or diminishing trends in Canada and the USA respectively are offset by the growing performance and potential of Mexico. Apparently, the automotive value chain configurations in the NAFTA region place vehicle assembly in Canada and increasingly Mexico while the parts stem predominantly from the USA. The Asian competitors Japan and South Korea show differing signals. South Korea expands its presence on international markets as Japan's world market shares decline. Both countries post strong RCA numbers indicating competitive potential but this is largely due to low imports from the rest of the world. This deficit in imports can only partly be explained by superior competitive performance. Substantial parts of it are due to measures that hamper free trade. These must not necessarily take the form of tariffs but can also imply a lack of harmonisation in regulations, standards and certifications. Therefore, those RCA values can very well be compared among segments (giving Japan the most competitive potential in trucks, and South Korea in cars) but cannot be applied in direct comparisons among countries.

Trade indicators give some important insight into a country's performance in international competition. Still, as indicated before the times when only finished products or vehicles could cross borders are long gone. Increasing mobility, international integration and diminishing transaction costs facilitate value chain configurations that span across different countries leveraging performance reservoirs that can only be fully exploited by operating locally. The following section analy-

ses these trends as the second major pillar of internationalisation: foreign direct investment.

3.2.2 Foreign Direct Investment

Investments abroad have become a significant factor in corporate internationalisation strategies. Dunning (1981) describes three major reasons why multinational companies should invest in a particular country: (1) The ownership advantage stems from the multinational corporation itself and may lie in size or better resource capability and usage. (2) The location advantage implies certain immobile factors that can only be fully utilised in the area where they exist. (3) Finally, the internalisation advantage originates in market imperfections that might be of structural (e.g. imperfect competition) or cognitive nature (e.g. costly or scarce information on the marketed products).

Fig. 30. Global leverage points

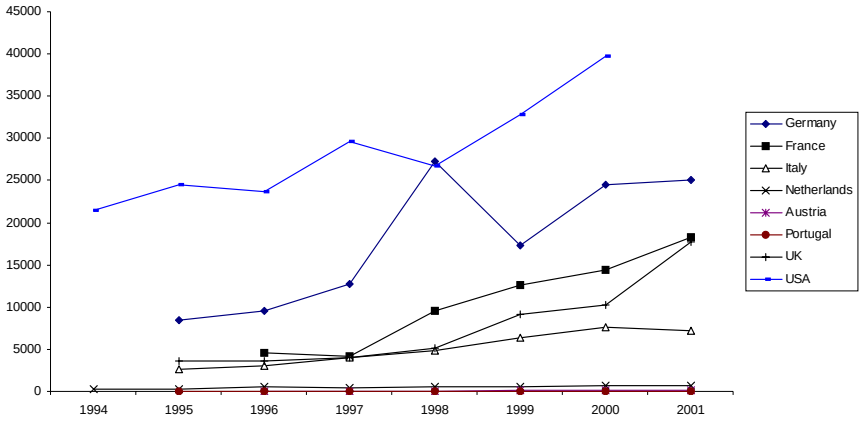
Source: Lessard (2003).

In the same context, Bartlett and Goshal (1989) find three "leverage points" that can be augmented through different forms of internationalisation: Efficiency (global economies of scale, comparative advantage of location), knowledge (use people and ideas globally), responsiveness (adapt to local customer demands) leverage. The European automotive industry could potentially benefit from all those leverage points. The question remains whether it prefers to use the market mechanism to utilise them, i.e. trade, or invest directly abroad. The latter appears especially appropriate since production expertise and customer preferences are sticky, i.e. they can hardly be extracted and formalised to be transferred from one country to another without substantial losses or at high costs. Investing in espe-

cially influential regions be it for R&D, production or distribution reasons opens up a more efficient channel for companies to harness these forms of tacit knowledge from abroad. On a side note it should be mentioned that extensive trade distorting measures may also pressure foreign companies into investing directly in a particular country. From an economic perspective this result is far from efficient. Still, it is a reality on international markets and should be borne in mind when interpreting the results.

With an eye on outgoing FDI the German automotive industry is the most active in Europe among major producing countries followed by France, Italy and the UK; but all are significantly below the outgoing US-FDI. Summed up over the last five available years FDI from the automotive sector has the most importance in Germany (5% of all outgoing FDI). For Italy this key figure is at 3.7%, France 3.3%, the UK 1.4% and the USA shows 3.2%.

Fig. 31. Outgoing FDI from major automotive producing countries in EUR mn (NACE 34)

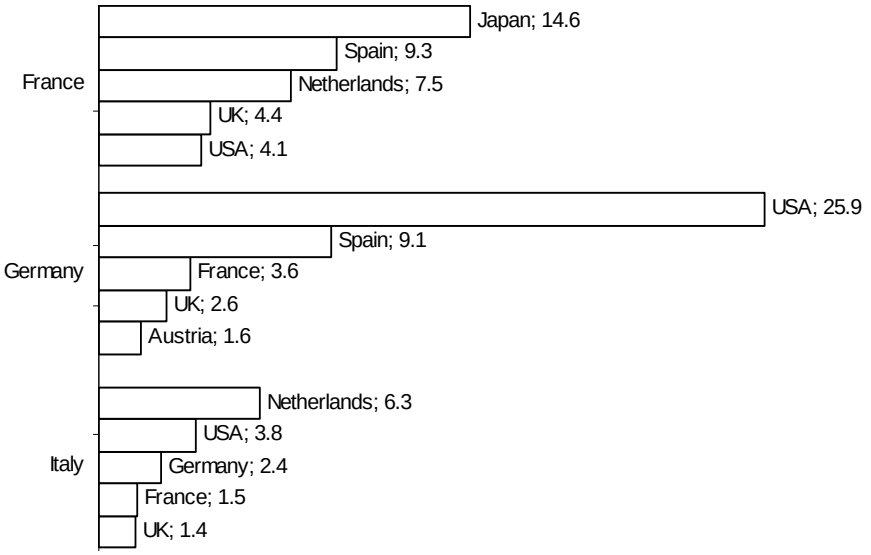


Source: Eurostat (2003), by definition of reporting country.

The strong outgoing FDI numbers for Germany might be due to the decelerating growth trends in the home market as well as the importance of foreign markets for German brands (Figure 23). This could point towards a possible responsiveness leverage abroad which German manufacturers try to gain through FDI by opening up new growth potentials outside their home market. The USA as the prime target of German outgoing FDI (Figure 32) supports that argument. The high involvement of the French automotive sector in Japan indicates a knowledge leverage FDI strategy. The example of Renault and Nissan shows that these transfers of knowledge are no one way street. As industry experts indicate, Renault gained access to Nissan's excellence in production while Nissan benefited from Renault's abilities in streamlining the value chain. Additionally, the importance of FDI in other EU member states becomes obvious. Considering the single European market those engagements should primarily be driven by efficiency and

comparative advantages since minuscule border barriers among member states make it easy to supply the EU as a whole from few production or distribution sites.

Fig. 32. Top 5 sum of outgoing FDI 1997-2001 from selected European automotive producing countries by country of destination in EUR bn (NACE 34)

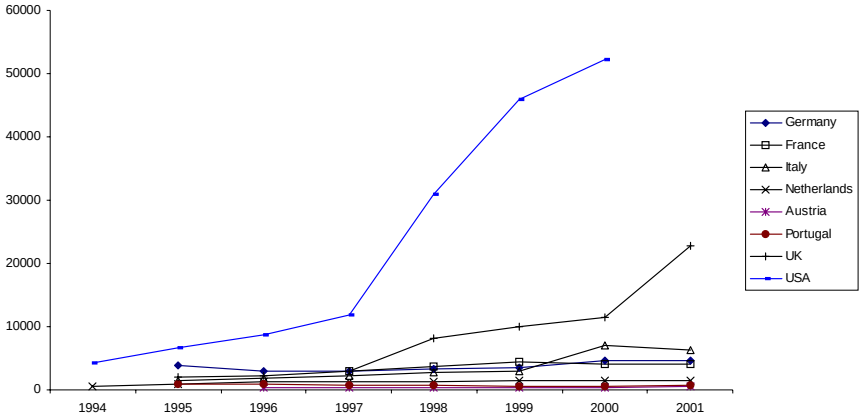


Source: Eurostat (2003), by definition of reporting country.

Assessing ingoing FDI streams the performance of major European countries is far behind FDI flows towards the USA. Especially the increase of ingoing FDI for the US automotive industry is remarkable, whereas the development in Europe is relatively flat. This does not hold for the UK where FDI inflows are the strongest among European countries under consideration both in absolute level and in relative growth terms. Considering the importance of the FDI inflows for the automotive sector as a fraction of all FDI inflows (combined over the last five available years), Italy shows the highest ratio (4.1%) followed by the UK with (2.8%). In France and Germany this factor is of less importance with percentage rates of 1.6% and 1.2% respectively. The corresponding value for the USA is 3.7%.

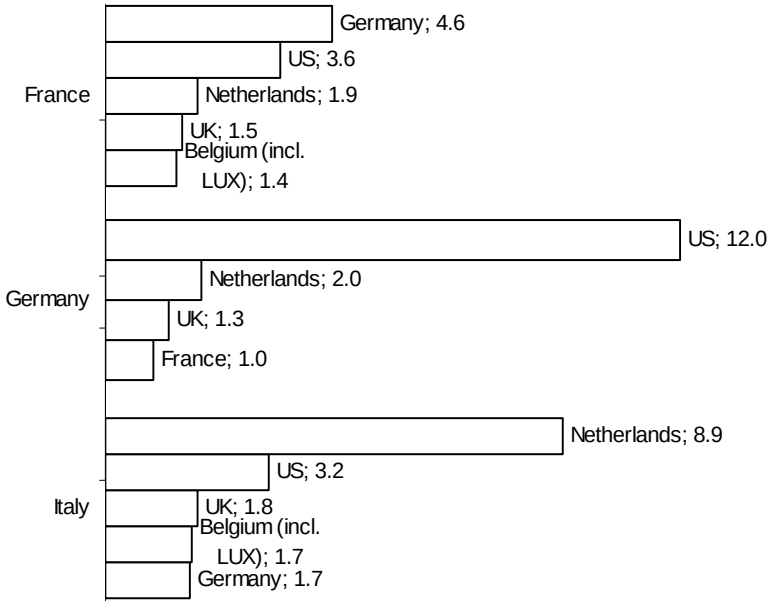
Closer inspection on the sources of those foreign direct investments in major automotive producing countries in the EU (Figure 34) shows that the USA is a major player in that field especially in Germany. Additionally, the strong engagement of other EU member states becomes obvious, pointing towards the utilisation of resources that are only available on a regional level but can be leveraged later on for the European Union as a whole.

Fig. 33. Ingoing FDI for major automotive producing countries in EUR mn (NACE 34)



Source: Eurostat (2003), by definition of reporting country.

Fig. 34. Sum of ingoing FDI from 1997 till 2001 for selected European automotive producing countries by country of origin in EUR bn (NACE 34)

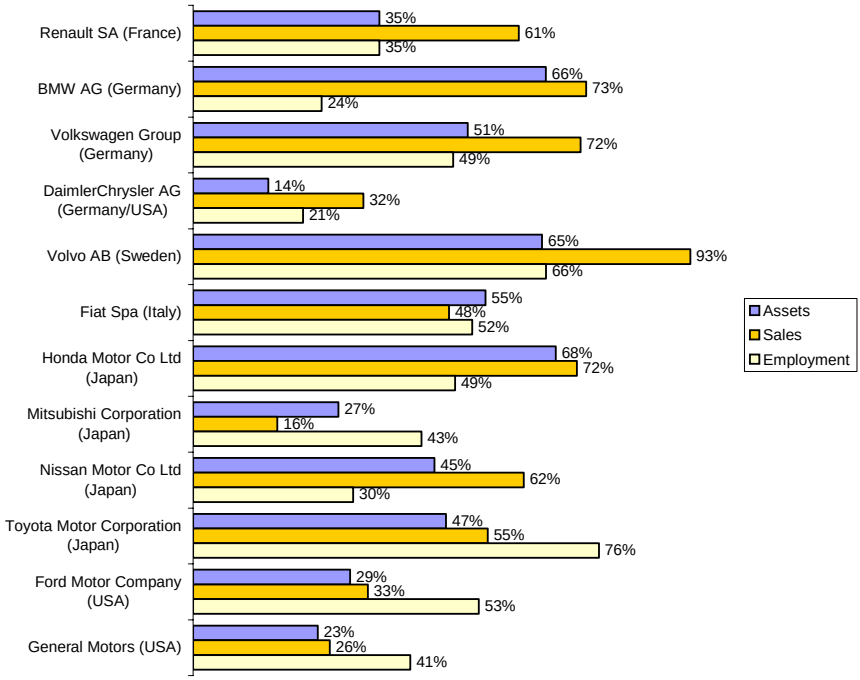


Source: Eurostat (2003), by definition of reporting country; numbers for Belgium include Luxembourg.

Equal evidence for corporate strategies towards internationalisation beyond exports can be found on the company level. Figure 35 shows how strict export

driven strategies from a home market have lost importance in the automotive sector. Not only do motor vehicle producers realise sizeable if not dominant (Volvo) shares of their sales abroad, but they also hold significant assets there.[37] This trend is especially strong for Honda, BMW and Volvo. In terms of employment Toyota, Volvo and Ford show the strongest tendency for operating outside the home market. To the contrary, DaimlerChrysler, BMW, Nissan and Renault rely mostly on employees in their home market. However, DaimlerChrysler should be interpreted carefully here since it is considered the only company with multiple home economies (Germany and the USA).

Fig. 35. Share of foreign assets, sales and employment for major motor vehicle producing companies 2001 (home economies in brackets)



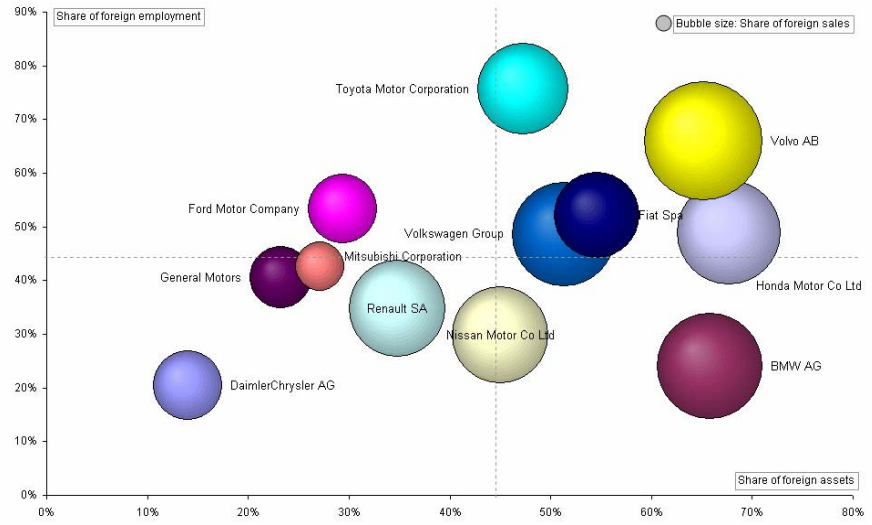
Source: ZEW calculation using UNCTAD World Investment Report 2003; no comparable data available for PSA Citroen.

Figure 36 puts these figures into a strategic context. Large portions of sales abroad appear to require also a strategic shift in assets towards foreign countries. Those investments abroad should generate the crucial sticky information from the

[37] All data provided by UNCTAD relies on company annual reports or revised data based on company survey. The numbers should be interpreted as proxies since precise asset classification and valuation (e.g. financial assets, depreciation) can hardly be achieved at a cross-country comparison level.

target markets for the multinational company as a whole both in terms of a knowledge (e.g. R&D infrastructure, access to clusters of expertise) and a responsiveness (e.g. market trends, customer needs) leverage. Especially, in the case of BMW this must not necessarily imply a massive shift of employment out of the domestic country. The diagram in Figure 35 indicates that the kind of information mentioned before can be channelled through the company without moving the more labour intensive production out of the home market. Still, most manufacturers (Volvo, Toyota, Honda, Volkswagen, Fiat) accompany their international market orientation in sales not only with the investment in assets abroad, but they also transfer employment out of the home market. Those companies most likely utilise all leverage points (efficiency, knowledge and responsiveness) in their internationalisation strategies. On the other hand, those enterprises with relatively low shares of sales abroad (General Motors, Ford, Mitsubishi) and high shares of employment abroad appear to be following primarily an efficiency leverage internationalisation strategy by utilising comparative advantages especially in labour costs in foreign countries.

Fig. 36. Strategic perspective on foreign assets, sales and employment for major motor vehicle producing companies 2001

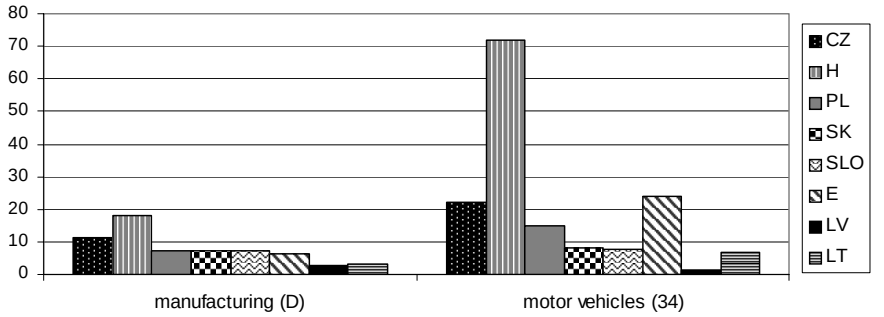


Source: ZEW calculation using UNCTAD World Investment Report 2003; no comparable data available for PSA Citroen.

3.2.2.1 Special Focus on the New Member States

Inward foreign direct investment plays a far bigger role for the automotive sector in the NMS than in the OMS[38]. Many global vehicle producers and suppliers have put up establishments in the region and the development of the automotive industry in the individual countries is closely linked to the location decisions of these global players. The countries which have attracted most FDI in the automotive sector are the same which show a strong specialisation in this industry, namely the Czech Republic, Hungary, Poland and more recently Slovakia as well. Slovenia is the only country with a significant automotive industry, but relatively little foreign direct investment. At the end of 2002, the Hungarian automotive industry showed the biggest stock of foreign direct investment, followed by the Czech Republic and Poland (see Table 77).[39] Taking into account the different absolute size of the economies, the FDI stock *per employee* is probably a better indicator for the relative attractiveness of individual countries as a target for FDI in the automotive industry. As demonstrated in Figure 37, Hungary is top again, but Poland looks less impressive than measured in absolute figures. Notably, the FDI stock per employee is above manufacturing average in virtually all countries. The high attractiveness of the automotive industry for foreign direct investment is confirmed by our data from the wiiw FIE database, showing the distribution of foreign invested enterprises (FIEs) across individual industries.

Fig. 37. Inward FDI stock per employee 2002/2001



Source: wiiw FDI database.

[38] Outward direct investment on the other hand does not play any role in these countries.

[39] For Hungary and Poland FDI data were available at the level of the transport equipment industry (DM) only, including motor vehicles (34) and other transport equipment (45). But as this industry is a minor target for FDI in the NMS, the data are fairly comparable.

3.2.2.2 Foreign Penetration

The dominant role of foreign investors in the automotive industry is best demonstrated by the extremely high penetration rate which can be measured by the share of foreign invested enterprises in various performance indicators of the industry.

Table 13. Foreign penetration of the NMS automotive industry (NACE 34) 1995-2001, in %

Equity	1995	1996	1997	1998	1999	2000	2001
CZ 1)	61.4	64.3	71.2	71.1	83.9	82.3	83.1
H 2)	73.7	76.1	92.7	96.1	94.9	97.9	99.6
PL	62.5	82.1	81.4	85.6	84.5	80.0	83.3
SK 3)	36.8	48.5	54.0	47.1	72.6	73.0	78.6
SLO	74.3	120.2	136.9	133.0	69.7	75.8	76.7
Sales							
CZ	61.3	66.9	76.5	81.5	90.4	87.7	91.0
H	88.1	84.8	95.4	96.8	96.0	93.9	93.9
PL	55.4	82.5	86.8	89.9	90.7	91.4	93.2
SK 3)	56.6	61.4	n/a	92.1	n/a	93.3	95.1
SLO	72.3	82.3	81.8	83.1	82.0	78.8	82.7
Export sales							
CZ	n/a	n/a	82.3	88.0	94.8	90.9	94.0
H	94.1	90.4	98.5	99.1	98.7	96.7	96.6
PL	88.4	93.3	94.2	95.7	96.1	97.4	98.4
SK	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SLO	80.8	86.3	86.5	87.1	84.0	80.1	86.2
Investment							
CZ	70.0	80.2	83.2	85.4	93.8	91.8	94.0
H	94.4	96.1	84.9	98.4	98.5	96.4	97.5
PL	52.9	88.1	79.2	80.0	96.0	94.8	95.3
SK	85.0	33.8	92.6	86.9	94.4	92.6	97.8
SLO	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Notes: 1) 1995, 1996 own capital. 2) 1995-1999 nominal capital. 3) 1995, 1996 DM (=NACE 34+35). 4) Output.
Source: wiiw FIE database.

In 2001 (the last year available), foreign invested enterprises owned 83% of the *equity capital* in the Czech automotive industry, made 94% of all *investments*, sold 91% of all vehicles and had a share of 94% in the industry's exports. These shares were even higher in Hungary and lowest in Slovenia (equity: 76.7%, sales 82.7%, exports: 86.2% see Table 13). In all countries, foreign penetration has increased over time. Notably, foreign invested enterprises are more export oriented, as reflected in their higher share in export sales than in total sales. As will be shown in our trade analysis below, production sites in the NMS are used as an export platform to the OMS mainly.

Table 14. Assembly plants in Central and Eastern Europe

Manufacturer	Country (country of mother company)	Plant site / Name	Products
Andoria-Mot Sp. z.o.o.	Poland	Andrychow	Honker Suv, Lublin
Audi Hungaria Motor Kft.	Hungary (VW Germany)	Györ	Audi TTCoupé/Roadster
Automobile Dacia S.A.	Romania (Renault France)	Potesti	Dacia Berlina/Break, pick up, Supernova
Daewoo Automobile Romania, S.A.	Romania (Rep. Korea)	Rodae, Craiova	Daewoo Cielo, Matiz, Nubiera, Lanos, Takuma (CKD)
Daewoo Avia	Czech Republic (Rep. Korea)	Prague	Avia small trucks
Daewoo-FSO Motor	Poland (Rep. Korea)	Warsaw	Daewoo Matiz, Nubria, Lanos, Fiat Polonez
Fiat Auto	Poland (Italy)	Tychny	Fiat Palio Weekend, Seicento, Nuova Panda
GM Poland	Poland (USA)	Warsaw	Astra Classic
Magyar Suzuki	Hungary (Japan)	Esztergom	Suzuki: Wagon R+, Ignis
MAN	Poland (DaimlerChrysler Germany)	Poznan/Tarnovo Podgorne	Buses
NABI	Hungary	Kaposvar	Compobus vehs.
Opel Polska Sp.z.o.o.	Poland (GM USA)	Gliwice	Opel Agila
Revoz	Slovenia (Renault France)	Novo Mesto	Renault Clio
Skoda Auto a.s.	Czech Republic (Germany)	Kvasiny Mlada Boleslav Vrchlabi	Superb Fabia, Octavia Octavia
Volkswagen Poznan Sp.z.o.o.	Poland (VW Germany)	Poznan	Skoda, Fabia, VW: T5
Volkswagen/Skoda	Czech Republic (Germany)	Vrchlabi	Skoda: Felicia, Octavia
Volkswagen Slovakia	Slovakia (Germany)	Bratislava	VW: Bora, Polo A04, Golf R32, Golf A4, Touareg, Porsche Cayenne bodies, SEAT Ibiza
Volvo Trucks	Poland (Sweden, Scania)	Wroclaw	Volvo trucks

Source: Ward's Automotive Yearbook 2003, p. 18 f.

Table 15. Planned investments in assembly plants in Central and Eastern Europe

Manufacturer	Country (country of mother company)	Plant site/ Name	Products
Hyundai	Slovakia (Rep. Korea)	Zilina	Investment: EUR 700 mn; production starting 2006; employment 3,000-4,000, annual output planned: 200,000-300,000; Kia
PSA Peugeot Citroen	Slovakia (France)	Trnava	Investment: EUR 700 mn, production starting 2006; output planned: 300,000
Toyota /PSA Peugeot Citroen	Czech Republic (Japan / France)	Kolin	Investment: EUR 1.5 bn, starting 2005, output planned: 300,000

Source: Kurier, 6 March 2003.

As mentioned in the overview already, the bulk of foreign direct investment in the NMS comes from manufacturers with European origin[40]. But with the enlargement at the doorsteps, overseas investors have become more interested in the region recently, attracted by growing markets but using the NMS as a location for their all-European exports as well. This has been stated, for instance, by the Hyundai company, which decided in March 2004 to put up its first European assembly plant in Slovakia, with a capacity of 200,000 to 300,000 cars per year, see Table 14. If the investment plans of the other two big ventures become true, namely PSA Peugeot Citroen (Slovakia) and a consortium of Toyota and PSA Peugeot (Czech Republic), the production capacity in the NMS will rise to over 2 million passenger cars in 2006, roughly double the production of 2002, which will definitely be more than can be sold in the region.

3.2.2.3 Conclusion

From a strategic point of view American vehicle manufacturers appear to be the ones who rely the most on their home market. This could certainly be explained by the size of their domestic market. European and Japanese manufacturers are much more multinational not only in sales but also assets and employment. There is neither a unique European nor a unique Japanese pattern when it comes to internalisation.

European automotive companies have been very active in investing abroad. They have mostly adjusted to particular country disadvantages in their home market and chosen sites that allow them to optimise their value chain within the European Union. A second strong flow of foreign direct investment went into the USA in order to tap the large market. Still, both ingoing and outgoing FDI in the auto-

[40] However, with the formation of automotive groups and all kinds of cooperations between individual companies also across groups, the term ‘county of origin’ becomes increasingly blurred in the automotive industry.

motive sector has played only a minor role in total FDI streams to and from Europe. European automotive manufacturers appear to have positioned themselves well to fully utilise all strategic leverage points in international competition.

3.2.3 Emerging Markets

The focus of this analysis on cross country comparisons makes it sometimes difficult to cover the unique aspects of a particular country especially if they do not show off in the date or cannot be adequately covered yet. Hence, two promising automotive markets were singled out to give a more in-depth look: China and Russia.

3.2.3.1 China

Table 16. Important data on the Chinese economy

GDP (billions USD, 2002 est.)	5989	Passenger cars in use (1000 units, 2002)	5570
GDP growth (2002 est.)	8%	Passenger cars new registrations (1000 units, 2002)	1,126
GDP per capita (2002 est.)	4,700	Passenger cars per 1,000 inhabitants (2002)	4.34
Population (billions, 2003 est.)	1,287	Commercial vehicles in use (1000 units, 2002)	14,960
Area in sqkm	9,596,960	Commercial vehicles new registrations (1000 units, 2002)	2,122
Population density (inhabitants per sqkm, 2003 est.)	134	Car production (1000 units, 2002)	1,091
Urban unemployment rate* (2002 est.)	10%	Truck production (1000 units, 2002)	2,160

Source: CIA World Factbook 2003, VDA International Auto Statistics 2003, Wards Automotive Yearbook 2003; *Urban unemployment roughly 10%; substantial unemployment and underemployment in rural areas (2002 est.).

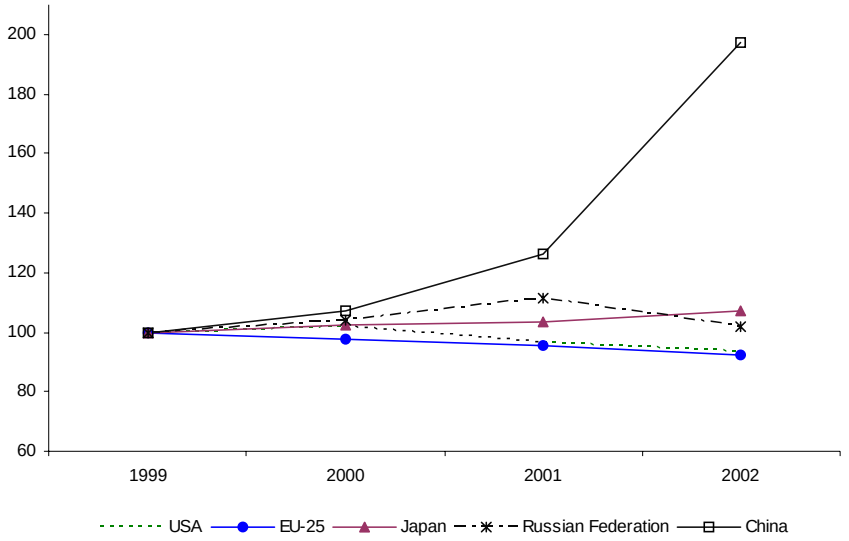
The Chinese Automotive Market

Especially since China joined the Word Trade Organisation (WTO) in December 2001, it is easier for Western companies to set up businesses. The Chinese government welcomes foreign direct investment, which has been flowing into China at a rate of 60 billion USD a year (Wong, 2003). Hence, as Figure 38 shows, Chinese automotive market is growing very rapidly, so there is much opportunity within the country. In the first nine months of 2003 unit sales even increased by 69% reaching 1.45 million cars (Automotive Resources Asia, 2003). Sales of commercial vehicles increased by about 30% from 1999 until 2002 and buses even doubled in the same time. According to forecasts, China will be the third largest market for automobiles by the end of the decade (VDA International Auto Statis-

tics, 2003). Against the backdrop of a highly saturated market in the triad, the enormous potential of the Chinese market has the effect of a magnet on the international automobile industry (Zhang and Taylor, 2001).

Due to China's persistent economic growth, decreasing prices boosted up private demand for automobiles. While in the 1990s the major part was sold to firms for commercial fleets (e.g. taxis) and to the government, the focus moved towards private customers, who will also be the crucial market segment in the future (Weidner, 2004). The increase of private demand will speed up in the next years. Besides, sinking prices due to increased competition and the intent of the Chinese government for making cars more affordable by decreasing charges and taxes propel this development (Hein, 2004).

Fig. 38. Index of new registrations or sales of passenger cars 1999-2002



Source: ZEW calculation using VDA data; base year 1999 = 100.

Although the automotive market is growing, most of the Chinese cannot afford automobiles in the next decades. The growing middle class in Eastern Chinese cities will take the advantage from the increasing prosperity. In the year 2002 only 6 million Chinese citizens had an income of more than USD 6,000 while this population class will rise to 15 million in 2007. Furthermore, car purchases are not inexpensive in China. High import tolls and government determined prices for imports and cars produced in China by foreign companies like VW make automobiles up to 40% more expensive than in Europe. In addition, luxury license number plates and street taxes as well as expensive parking lots (up to EUR 7,500 per year) and street tolls make up keeping a car costly. Nevertheless, automotive de-

mand is increasing. For the Chinese middle class owning a car signals independence, individuality and, above all, wealth and advancement (Weidner, 2004).

This status symbol value is only partly reflected in horse power or cubic capacity, but in design and equipment. For Chinese customers, a car has to look like a dragon: It needs a head and a tail; otherwise it is not a fully-fledged car. The biggest cars are driven with the smallest motors. VW managers in Beijing explain this by the fact that Chinese do not gear up because they drive cars like a bicycle. Accordingly, traffic congestion is not a large problem yet. Besides, two out of ten cars sold in China belong to the upper class limousine segment, which shows that Chinese customers are all the more aware of status and equipment (Weidner, 2004).

Production Conditions for the Chinese Automotive Industry

In 1995 there were 122 automotive manufacturers in China, which produced in low scale for isolated regional markets. Every manufacturer has its own supplier chain on hand. Furthermore, the local automotive industry is protected and supported by the local government. Inland barriers to trade, small economically not survivable automotive manufacturers and component suppliers, inefficient production conditions and technologies put a large burden on the international competitiveness of the Chinese automotive industry until today (Huang, 2002).

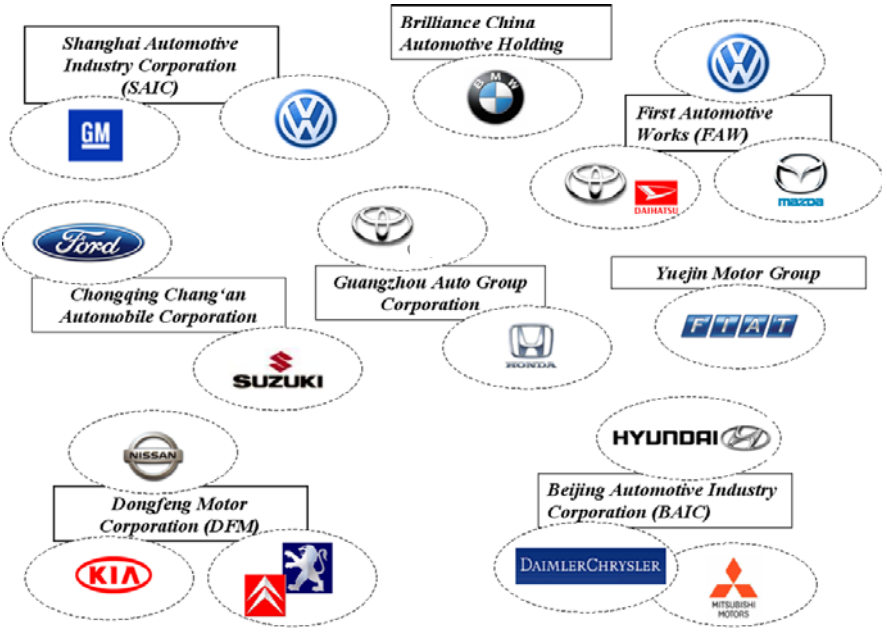
Since 1994 Chinese government has followed up an explicit industrial policy for the automotive sector. The objective is to set up an own and independent automotive industry. To ensure international competitiveness the Chinese government follows the strategy of involving international automobile corporations through minority joint ventures with local firms. By doing so China not only retrieves capital and technologies from other countries, but also valuable know-how for the domestic automotive industry. It also dictates the rules for international companies: Imports are constricted, earnings have to be reinvested and component suppliers and their prices are predetermined, too (Hoon-Halbauer, 1999).

Chinese automotive manufacturers are learning very quickly. They profit from the technology transfer by establishing joint ventures with more than only one international manufacturer (Zhang and Taylor, 2001).

Beside, China aims to restructure its own automotive industry, to propel competitiveness through economies of scale. For that purpose, the number of manufacturers should be reduced or combined to manufacturer groups. The same should happen to the component suppliers with a target of 5 to 10 companies. The update of the Chinese automotive policy issued by the National Development and Reform Commission (NDRC) in Spring 2004 addressed some of these issues (Yu, 2004): Minimum investment thresholds for new auto projects (2 bn yuan) and production permit withdrawal mechanisms were enacted to prevent a further dissipation of the market. Then again, multinational automotive producers can still own not more than 50% in a joint venture with Chinese partners. The stated goal of the new policy is to satisfy Chinese demand through domestically produced vehicles before 2010 and enter international markets significantly. While the policy also encourages private car ownership and auto loans it primarily appears to focus on facilitating a sustainable pace in a highly dynamic market. The positive effect of

the new policy on automotive exports from China remains doubtful. The combination of the need to source from local less efficient and hence more costly suppliers with the capital intensive production methods of foreign producers that do not fully leverage China's advantage of affordable labour puts Chinese automotive products in a difficult position on international markets (Farrel, 2004).

Fig. 39. Joint ventures of international and Chinese automotive manufacturers for passenger cars production in China



Source: WZB discussion paper SP III 2004-105.

Since China joined the World Trade Organisation the automotive industry has been subject to more deregulation. Import quotas for foreign automotive manufacturers were increased by 20% per year until 2006, starting from 30,000 units. The quota will be eliminated by 2006. Furthermore, import duties will decrease from 80-100% to 25% following 2006 (10% on components). Companies are allowed to finance car purchases by foreign non-banks (Weidner, 2004; Zhang and Taylor, 2001).

As Table 17 shows all major car manufacturers are moving aggressively into the Chinese market. This is mostly realised through the buildup of new production capacities. This fact in combination with the elimination of import barriers described above points towards increased rivalry and hence diminishing profit margins. Although labour costs in China are low, it remains to be seen whether Chinese plants will be able to produce efficiently enough to turn domestic overcapacities into exports. Table 17 highlights the risk exposure that foreign producers incur by investing in China. Volkswagen still benefits from its first mover advantage in

the market. Accordingly, it is most vulnerable to the risks of the Chinese market but not to a troubling degree. Besides, there is no special pattern in the way European companies enter the market compared to major international rivals. Some manufacturers in the premium segment (BMW, DaimlerChrysler) are moving cautiously which might be due to the fact that the protection of intellectual property rights (e.g. technology, design) is still difficult in China and there are obstacles for the manufacturers in controlling the quality of their value chain in services and repair which in turn could tarnish their reputation.

Table 17. Rated auto manufacturers exposure to mainland China market

Company	Exposure to China market (2002)	Units
Heavy existing or planned exposure		
Hyundai Motor Co./Kia Motors Corp.	3% of total unit sales	Current: 100,000; by 2007: 650,000 (incl. Kia)
Nissan Motor Co. Ltd.	Some import activity	Current: 0; by 2010: 900,000 (passenger cars and commercial vehicles)
Volkswagen AG	10.3% of total unit sales	Current: 600,000; by 2006: 1.6 million
Medium existing or planned exposure		
Fiat SpA	1.5% of total unit sales	Current: 70,000; by 2007: 150,000
General Motors Corp.	3.3% of total unit sales	Current: 380,000; by 2006: 766,000
Mitsubishi Motors Corp.	5.8% of total unit sales	Current: 120,000; by 2010: 300,000
Peugeot S.A.	3.0% of total unit sales	Current: 150,000; by 2006: 300,000
Toyota Motor Corp.	3.8% of unit sales (total Asia excl. Japan)	Current: 180,000; by 2010: 650,000 (incl. Daihatsu)
Limited existing or planned exposure		
BMW AG	1.7% of total unit sales	Current: 0; by 2005: 30,000
DaimlerChrysler AG	4.4% of revenues (total Asia)	Production capacity expansion from 80,000 to 100,000 units
Ford Motor Co.	3.3% of revenues (total Asia-Pacific)	Current: 20,000; future: 150,000
Honda Motor Co. Ltd.	1.2% of total unit sales	Current: 150,000; by 2004: 290,000
Renault S.A.	0	0
Suzuki Motor Corp.	n/a	Current: 250,000; expansion plans: 0

Source: ACEA and Standard & Poor's (2004).

In conclusion, the deregulation leads to a stronger competitive pressure for Chinese as well as foreign manufacturers. Earning margins as a result of officially

predetermined prices will considerably decrease. But Volkswagen Group CEO Bernd Pischetsrieder and rating agency Standard & Poor's warned to be aware of increasing competition, price decline and overcapacities. Considering the still existing legal uncertainty on the Chinese market and its intensifying competition on the one hand as well as the estimated increase of the automotive market by 25 to 30% in 2004 on the other, aggressive engagement holds risks while growth prospects are undeniably strong (SPIEGEL-ONLINE, 2004).

3.2.3.2 The Russian Federation

Automotive Industry in the Russian Federation

The Russian automotive fleet has more than doubled over the last ten years from 10 million cars in 1992 to 22 million at the end of 2002 with an average annual growth rate of 8%, reaching 152 cars per 1,000 inhabitants (Figure 40). This rate of growth is stronger than in the European Union and this trend is likely to continue. The Russian government estimates that car ownership in Russia will reach 230 cars per 1,000 inhabitants within the next ten years which means an additional growth by 12 million cars (Ashrafian and Richet, 2001; PricewaterhouseCoopers, 2002a).

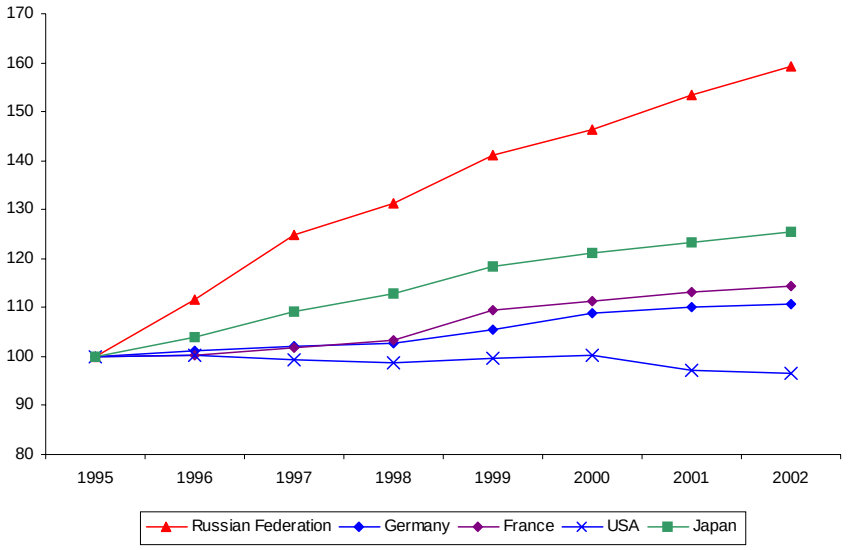
About 70% of the market demand in 2000 is for passenger cars priced below USD 5,000. In the near future demand is expected to shift to passenger cars in the USD 5,000-10,000 price range and to a lesser degree to USD 10,000-15,000 priced cars. The segment for more expensive cars is expected to remain stable. These changes will be the result of price increases for locally produced cars and the introduction of import tariffs on used foreign cars in the segment below USD 5,000 (Ashrafian and Richet, 2001).

Table 18. Important data on the Russian economy

GDP (USD bn 2002 est.)	1,409	Passenger cars in use (1,000 units, 2002)	22,100
GDP growth (2002 est.)	4.3%	Passenger cars new registrations (1,000 units, 2002)	941,908
GDP per capita (2002 est.)	9,700	Passenger cars per 1,000 inhabitants (2002)	152.22
Population (millions, 2003 est.)	145	Commercial vehicles in use (1,000 units, 2002)	4,540
Area in sqkm	17,075,200	Commercial vehicles new registrations (1,000 units, 2002)	178,954
Population density (inhabitants per sqkm, 2003 est.)	8.5	Car production (1,000 units, 2002)	980
Urban unemployment rate* (2002 est.)	7.9%	Truck production (1,000 units, 2002)	239

Source: CIA World Factbook 2003, VDA International Auto Statistics 2003, Wards Automotive Yearbook 2003.

Fig. 40. Index of car ownership per 1,000 inhabitants for selected markets



Source: ZEW calculation using VDA data; base year 1995 = 100.

Replacement sales are a big factor. Only one third of the passenger cars in Russia today are less than five years old. Nearly 47% are between five and ten years old and the rest of the fleet is more than ten years old. The average age of cars is 10.8 years. The main reason for this is the low purchasing power (OSEC, 2003). Older vehicles will become more expensive to operate as auto insurance becomes compulsory by about mid-2004. Ernst & Young expect these factors to push many people into newer vehicles, including imported used vehicles. Nevertheless, demand for new cars has been growing at an overall rate of more than 10% annually. There is great potential for stronger growth, especially for foreign brands because usually they offer better quality and reliability (Ernst & Young, 2003).

In Russia sedans are much more popular than coupes. Among the wealthy class sports utility vehicles are popular. In used cars, German and Japanese models are in high demand. Volkswagen is by far the most popular used-car brand with more than 215,000 passenger cars currently rolling on Russian roads, although the biggest new-car import brands in Russia are Toyota, Daewoo, Mitsubishi and Renault (Ernst & Young, 2003).

Like in China, Russian automotive manufacturers are still organised as huge industrial complexes that include auxiliary and component-producing facilities. They supply 80% of the market demand in Russia. The biggest companies are AvtoVAZ, GAZ, IzhMash-Auto and UAZ. The large manufacturers still produce up to 70% of their components on their own, thus preventing Russian manufacturers from operating efficiently (Kansky, 2000). Furthermore most of them use outdated and inefficient technologies which hamper improvements in product

quality and labour productivity. The models the plants produce are 15 to 20 years out of date by world standards. Still, this is the main reason why high production volumes have been possible. There has been a lack of investment to develop new models, although the situation has changed with new Russian strategic investors (Ashrafian and Richet, 2001).

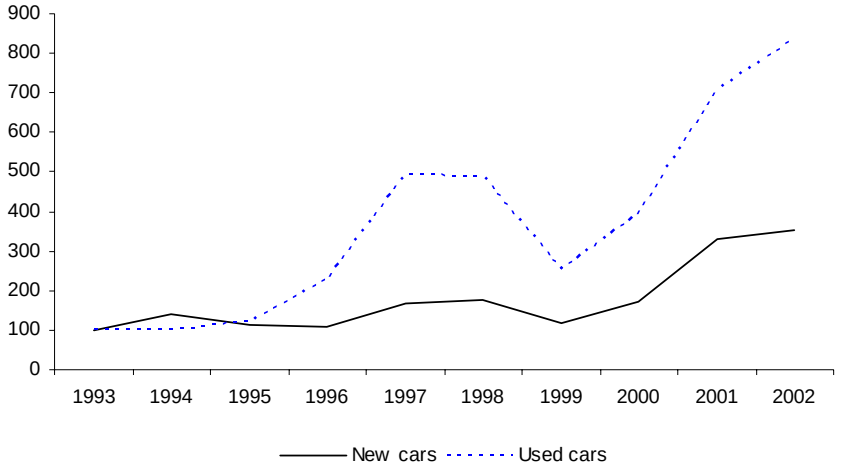
Russian car manufacturers have to cope with the new competitive environment like the presence of foreign car makers in the country, the lowering of tariffs and the new constraints coming from the WTO regulation when Russia will join the WTO. Recently some companies began implementing restructuring programmes, which include shifting component production to independent companies. It seems likely that efficiency will increase. But this also means that some companies vanish from the market. Moskvic, the fifth biggest manufacturer in 1999, is an example for this dynamic in negative terms, while other producers like IzhMash Auto increased production significantly (VDA International Auto Statistics, 2003).

In order to survive the relentless increase in competition in the industry, Russian manufacturers have begun exploring ways of cooperating with Western car and component makers mainly through joint ventures (PwC, 2002a). Peugeot delivers engines for other models of Russia's largest carmaker AvtoVAZ. BMW and Kia assemble their cars (BMW 2,200, Kia 3,500 cars in 2002) at the Avtotor facility in Kalingrad based on imported assembly kits. Ford has chosen a different way on a green field site near St. Petersburg. The Focus models are produced there with about 1,700 vehicles in its first year of production 2002. The current capacity is 25,000 cars a year but could be boosted up to 100,000 if demand continuous increasing (WardsAuto.com, 2003). Volkswagen, the most successful foreign brand in Russia, has not announced any intentions to produce in Russia, while Toyota recently signalled plans to produce their Landcruiser model there in 2006 (PwC, 2002a).

In contrast with most other emerging automotive markets Russia and the EU are direct neighbours with a shared land border. Hence, the potential trade channels are broader and more flexible. Not surprisingly, car exports from EU-15 to Russia have sharply increased since 1993 (Figure 41). Interestingly, used car exports have paved the way for the entrance of European cars in the Russian market. Apparently, Russian customers cannot yet afford new cars but show strong interest in European brands anyway. Right now this interest is covered through used cars but these exports should give European producers an edge in brand recognition once incomes in Russia will increase and customers begin shifting their attention to new cars.

Russia is facing an increase in the automotive industry and may soon follow China as next big new market in this sector (Ernst & Young, 2003). Demand for vehicles is rising quickly, but manufacturers and suppliers face unique challenges. The forthcoming entry of the WTO could be the necessary spark that ignites the coming out of the emerging Russian market. Albeit, recent developments in Russian trade regulation behaviour (35% tariffs on imported cars) cast serious doubts on Russia's readiness to be a responsible partner in free trade.

Fig. 41. Index of new and used car exports from EU-15 to Russia 1993-2002, value



Source: ZEW calculations using Eurostat intra- and extra-EU trade 2003 data. Base year 1993 = 100.

3.2.4 Conclusion

The position of the European automotive industry in international markets is strong. Major European producing countries control considerable shares of the world market. Still, as developments in trade and FDI streams show European producers rely on streamlining their operations within Europe. Besides, they have managed to tap valuable resources outside of Europe both in terms of knowledge and customer responsiveness.

3.3 The Home Market

3.3.1 Market Size

A large home market enables domestic firms to utilise economies of scale and scope. Hence, they benefit early in the product life cycle from learning curve effects and an increasing expertise in production. This in turn leads to diminishing unit costs and consequently prices which make the domestic products more competitive on foreign markets. Besides, a large domestic customer base provides the invaluable feedback for innovative products and features that shape their future design. A significant home market for primary products also opens up new opportunities for secondary products and services that might not reach the necessary

critical mass to evolve elsewhere. Therefore, a comprehensive assessment of home market size as a possible source of competitiveness includes both the market in total numbers and its segmentation.

3.3.1.1 Passenger Cars

With 209 million passenger cars in use in 2002 the European Union (EU-25) is by far the largest single market for cars in the world. It accounts for roughly 38% of all cars on major international markets, followed by the USA and Japan. Table 38 in the appendix gives the total numbers for all countries under consideration.

Size becomes more important in relative terms. Car ownership in Europe varies widely indicating the relative importance of cars for citizens of different countries. On average four out of ten EU inhabitants own a car which is fairly in line with data from Japan and the USA. Luxembourg, Italy and Germany post the highest values here among member states. For countries with high ownership ratios we expect cars to have the highest importance not only in terms of use but also as a status symbol.

Explaining the differences in car density should yield some interesting insights on market segmentation. Assessing this segmentation in demand on an aggregated country comparison level requires the identification of meaningful drivers in demand for passenger cars that are also available internationally in comparable format. Thus, those factors are necessarily broad.

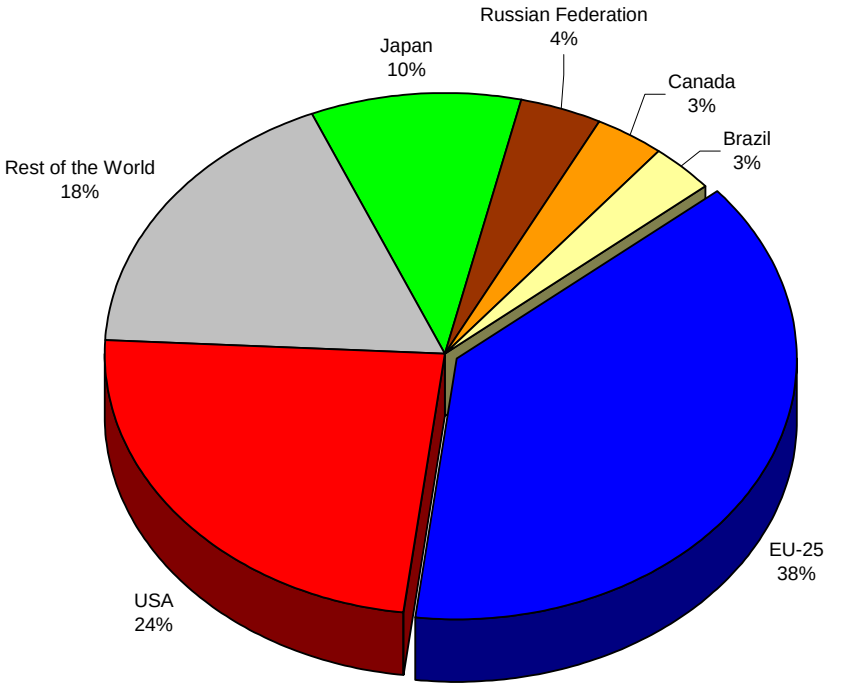
Building on the reasonable assumption that there is an internationally equally optimal level of car density national deviations from this level become the centre of interest. Or to put it more simply: Why would some countries buy more cars than others?

Obviously, the mere need of passenger transportation comes to mind. This factor should be especially important in countries with low population densities, since the citizens of those countries need to travel longer distances on average for every aspect of social interaction. Still, this factor may be not totally comparable among countries since those distances could also be overcome through bus, rail or air transportation. Availability, affordability and flexibility of those alternative modes of transport influence their relative attractiveness. Those connections should not be ignored when analysing the results but incorporating every aspect of a particular national transportation system would clearly not serve the purpose of this analysis. Additionally, cars are by far the dominant mode of transportation in the European Union while the combined contribution of all other modes of transportation is slightly below 20%.[41] Transport by car has some unique advantages over all other forms of traffic. It is essentially the only mode of transportation that enables the users to choose their travel time and exact destination individually. Besides, it is the only option in a customer's transportation portfolio that allows direct door to door trips. Hence, the benefits from owning a car as the dominant mode of passenger transportation should be directly connected to the customer's need for

[41] Passenger cars accounted for 80.4% of all passenger kilometres in EU-15 2001; European Commission (2003).

transportation which in turn is related to population density. Accordingly, people per square kilometre was utilised as a proxy for the necessity to own a car for citizens to get from point A to point B.

Fig. 42. Passenger cars in use in major international markets 2002

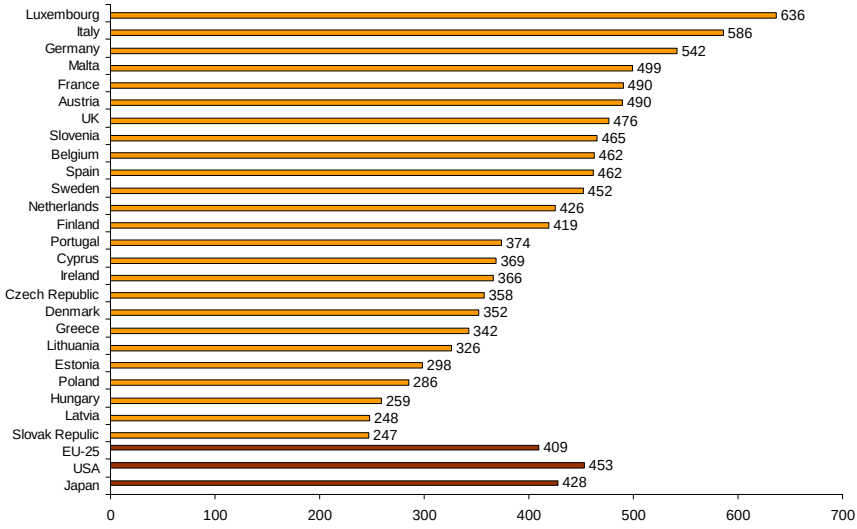


Source: ZEW calculation using ACEA, VDA, EUROSTAT data; for Cyprus, Estonia, Latvia, Lithuania and Malta 2001 data was used.

On the other hand, cars and the attitude of owners towards them appear to run much deeper than their practical value in use. Although this argument might have been dominant in the early days of motorisation, the days of a “one size fits all” black Ford T model are long gone. Today’s car manufacturers offer a startling variety of different models to facilitate their customer’s needs. Those needs include rational deliberations like the wish for spacious family vans. Then again, the Volkswagen New Beetle or the Chrysler PT Cruiser hardly fit that category. The success of cross utility vehicles and sports utility vehicles, not to mention the established convertible segment, clearly indicates that through the eyes of the

customer cars are more than just four wheels and an engine. Today even the small and medium sized car segments have a luxury segment that finds its customers as exemplified by BMW's new Mini. Cars have become an element of style and empower their drivers to express themselves and their individuality. The choice in car models reflects this clearly as does the wide variety of supplementary interior and exterior car equipment. Cars have a social signalling function, proofing that one can afford a special car or even more than one. This trend certainly reflects a country's wealth but also its general tendency to treat cars as a status symbol. As a proxy variable for this impact factor GDP per capita was used. Other possible income related variables might have some advantages over GDP per capita but its availability and comparability across countries outweighs its deficiencies. Figure 44 shows the relationship between the proxy variables and car density.

Fig. 43. Cars per 1,000 inhabitants 2002

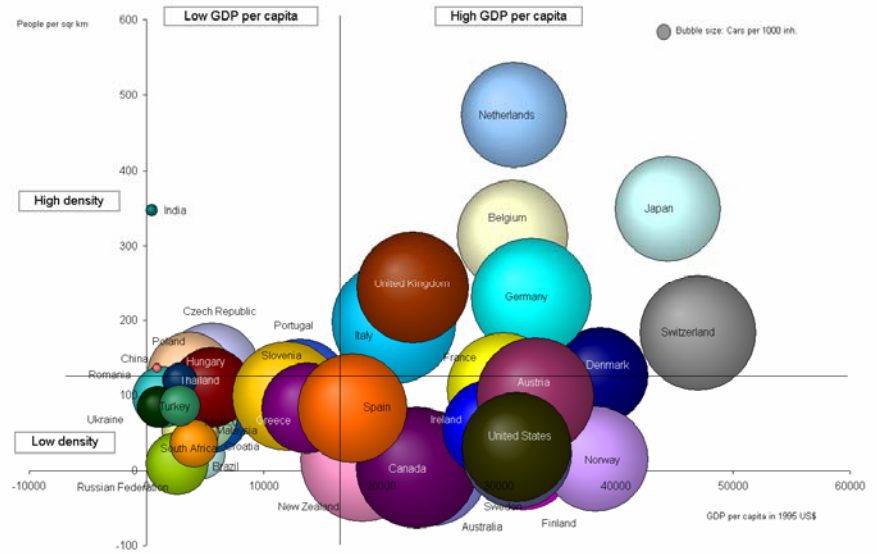


Source: ZEW calculation using ACEA, VDA, EUROSTAT data; for Cyprus, Estonia, Latvia, Lithuania and Malta 2001 data was used.

An accompanying multivariate regression analysis shows that GDP per capita has a highly significant positive impact on car density whereas population density shows only a positive influence at an 80% significance level. In major European markets (Netherlands, Belgium, Germany, Italy, UK) high car density ratios can hardly be explained by the need for transportation among sparsely populated areas. Instead, these countries appear relatively affluent and invest in cars, which points towards the previously mentioned argument of an affinity for cars beyond mere practical use. The same is true for Japan. For the USA, Australia, Canada, Spain, Sweden and France affordability as well as the transportation motive appear in more congruence. Especially in the new member states high car densities

appear to be mostly motivated by the requirement to own a car as the primary source of mobility and less as a status symbol.

Fig. 44. Population density, GDP per capita and cars per 1,000 inhabitants 2001 for major markets



Source: ZEW calculation using ACEA, VDA, Worldbank World Development Indicators data; covering 38 major car markets.

Consequently, the member states of the European Union cover all customer segments in this relatively broad classification which appears reasonable for country comparisons. The mix of states with a primary interest in affordable passenger transportation and better-off car-enthusiast member states should prevent the industry from myopic, idiosyncratic product designs.

Excursus: For What It Is Worth – The Preferences of German New Car Consumers

From the description above one might easily argue that there is no uniform European car buyer and market segmentation should go much deeper. To get a clearer picture of the typical new car customer and its preferences it makes sense to focus on a single national market in more detail. The largest national European market, Germany, is an obvious choice.

Modern cars are complex products. They bring various functions to their owners: speed, safety, security, entertainment, individuality, to name a few. Still, they can only buy the whole bundle when purchasing a car. Disentangling those value drivers through the eyes of the customer should give some valuable insight into what exactly people cherish in their cars. The best setting to observe such preferences is not in hypothetical survey situations but when customers actually buy a

car on the market. The idea is to treat the individual car purchase not as a black box product but instead as a bundle of functional components that in combination generate enough value for the individual customer to justify the price. Therefore, through econometric analysis it becomes possible to estimate a relationship between prices and corresponding quality features. This so-called hedonic method is widely used for the quality adjustment of price indices. The presentation here focuses on the results. The interested reader might turn to the appendix for the full set of the applied hedonic functions and econometric details.[42]

In essence, the hedonic approach uses a large number of price and corresponding quality information and infers how and to what degree these price differentials can be explained through differences in quality. For this analysis we used the information on 1,160 different passenger car models that where available on the German market in 2000 as provided by the leading market intelligence company Schwacke.[43] The sample covered car models from 28 different brands with prices between EUR 7,000 and EUR 121,000 and engines from 42 hp to 420 hp. Additionally, we had information on major quality characteristics like the type of engine or the availability of an anti-lock braking system. Figure 45 shows the available variables and the coefficients of the regression results. These numbers are mostly denoted as shadow prices since they put a price tag on a quality component that could not have been priced individually before.

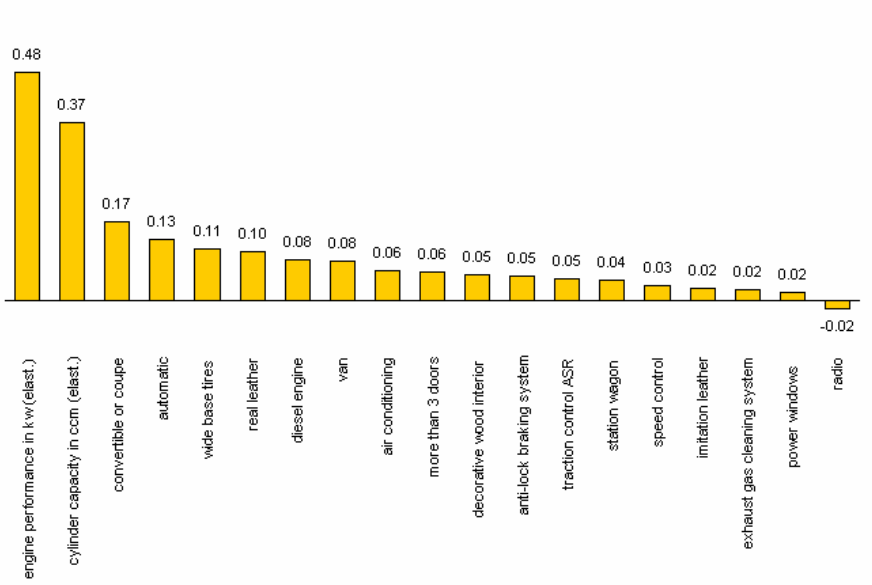
Not surprisingly, German customers are willing to accept price increases in exchange for stronger motor performance. Both engine performance and cylinder capacity should be interpreted as elasticities, i.e. a 1% increase in kW engine performance would justify a 0,48% increase in price through the eyes of the customer. All other quality features can be interpreted more easily since they were introduced as so-called dummy variables indicating whether a quality component was included or not. For example, German customers would accept a mark-up of 17% in price if the car was a convertible or coupe. From a broader perspective, German customers are willing to pay for features that make their car more unique (e.g. convertible, wide base tires, real leather). This fits nicely with the status symbol argument presented previously. Most likely the accepted price increase of 8% for a diesel car is justified through lower fuel costs during the time of ownership. The willingness to spend on safety features (ABS, ASR) is significantly smaller while the picture is unclear for convenience elements. German customers prefer driving convenience (automatic) over day-to-day comfort (power windows).

---

42 For a full description of the hedonic analysis see Berndt (1991). In accordance with most contributions to the field and as a result of the Box Cox procedure the hedonic function containing price and quality information was estimated in the double log functional form.

43 All models were treated equally as one observation. Weights for sales volumes would have been preferable but were not available for most models. Besides, the pricing information reflects list prices which do not incorporate any rebates, trade-ins or throw-ins. These arrangements are quite common in car purchasing. Albeit, in the absence of more detailed price information, list prices should be a reliable proxy.

Fig. 45. Price mark-ups due to quality improvements on the German new car market 2000



Source: ZEW calculation using Schwacke data, where indicated values should be interpreted as elasticities.

Still, customers would also assign a lower shadow price to a particular component if they consider it granted that this item should be included or they prefer replacing it anyway which might explain the radio coefficient. This set of quality features explains roughly 90% of the price differentiation among car models on the German markets. While this overall high number indicates that German customers make a rather rational decision on what car to buy there may still be some unobserved characteristic that allows some car manufacturers to charge higher prices than others. Those elements might include the value of the car in resale or the assumed reliability of the car translating into lower repair costs. Additionally, some quality characteristics might be more accentuated in different car models than in others. It is possible that the quality characteristics in use do not address these particularities comprehensively. Nevertheless, all these aspects are usually not attributed to a specific car but to the car brand as a whole. To capture these brand effects a second hedonic equation was estimated taking into account the car brand. Figure 46 gives the results.

Accurately defined, Figure 46 gives the relative price mark-up a customer is willing to accept for the brand of his/her new car compared to what (s)he would be willing to pay for an equally equipped reference car (Kia was chosen as reference here). Apparently, Porsche is the most valuable brand here. Customers would pay twice the price of the reference car with equal features, a unique position among the brands in the German market. Obviously, this fact indicates an enormous excellence in operations at every stage of the value chain. It not only ends in design

and production but notably includes customer communication. Porsche makes its customers realise the premium quality of the product and those in turn are willing to pay superior prices. The 40%+ premium segment in Germany is dominated by European brands. Notably, half of the brands in this category (Jaguar, Saab and Volvo) are non-German brands. Volkswagen is an interesting case in this analysis. Its branches Audi, Volkswagen, Seat and Skoda are well positioned along the brand scale: Audi in the high mark-up segment, Volkswagen in the upper middle-class, Seat in the lower middle class and Skoda in the more price sensitive section at the bottom of the scale. It becomes apparent that the Volkswagen company as a group with different brands targets all price segments with an individual brand.

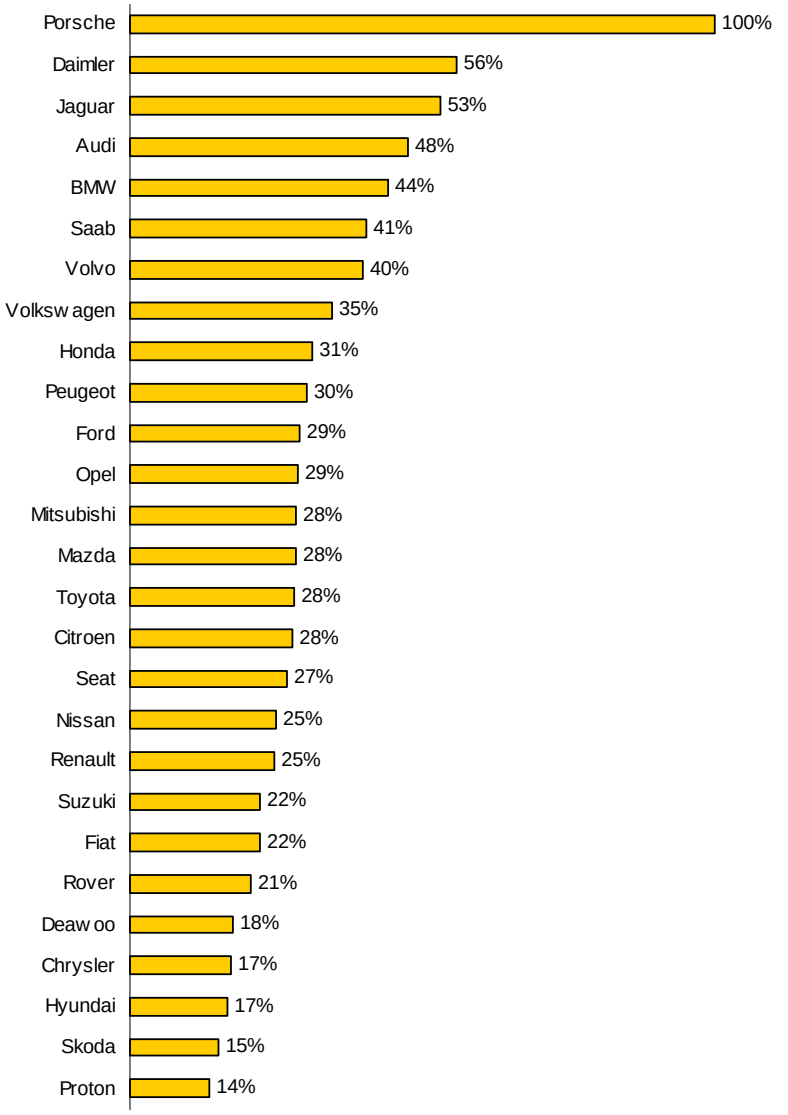
The different brands make it easier for the customers to assign themselves to a particular market segment and find an individual brand as a counterpart instead of a one size fits all Volkswagen brand. Still, this differentiation materialises in the cognition of the customer and leaves room for integrated procurement and production systems across different Volkswagen brands, hence realising economies of scale and scope. Honda is the non-European brand with the best brand value. Ford and Opel as the branches of major US car manufacturers in Europe can't enter the segment with high brand esteem. Among European players, Fiat, Rover and Skoda don't get much brand-based price mark-up from German customers.

In conclusion, in the largest European car market Germany, higher price margins can best be achieved through features that improve driving performance and convenience or make the vehicle more exclusive or individual. Besides, German customers recognise quality through the car brand and are willing to pay for it accordingly. Porsche exhibits the best performance in leveraging its assigned quality perception while Volkswagen executes a matching multi-brand strategy for each segment.

To be precise, at this point of the analysis this demand advantage is an attribute of the market not the industry. This strategic resource turns only for those producers into a defendable competitive advantage that have complete access to the relevant market and customer information. The question remains whether European car manufacturers benefit predominantly from the size of their home market.

It becomes reasonable here to switch to a brand perspective since the brands are the primary channels through which the customers recognise the manufacturers. Figure 47 shows the market shares of major brands in selected markets. It suggests a strong affiliation of French and German car buyers towards brands that originated in their respective home market. This implies an atmosphere of trust into cars that were domestically built and designed. For Italian, Swedish and British brands this link is weaker. Customers there appear to be less focused on domestic brands but keep a strong interest in other European brands. Combined European brand shares command more than 80% of the market in the five selected European markets. Korean and Japanese brands exhibit significantly smaller shares but are slightly better positioned in European countries without a strong home market brand affiliation.

Fig. 46. Price mark-ups due to brand esteem on the German new car market 2000 in relative positioning to an equally equipped Kia car



Source: ZEW calculation using Schwacke data; to control for equal quality among brands the quality characteristics from Figure 46 were introduced to the hedonic function again, but will only be reported in the appendix.

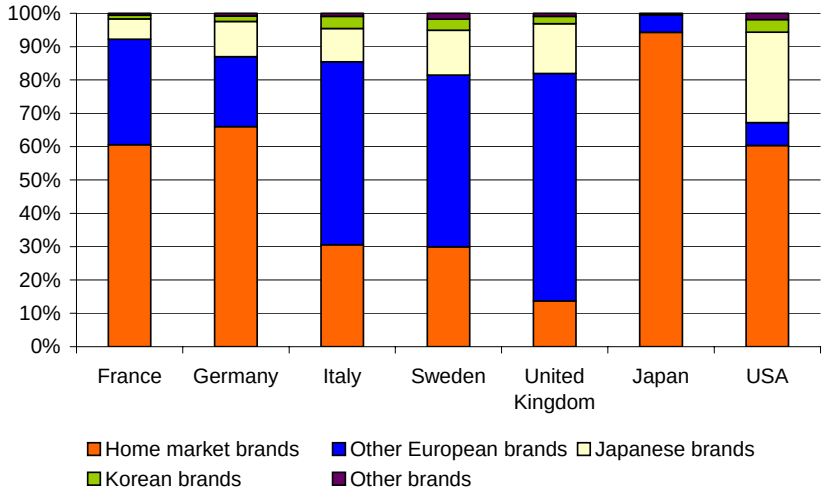
In contrast Japanese brands enjoy an enormous popularity in their home market where all other brands are of minor importance. In sharp contrast, American

brands command only about 60% of first car registrations. At least in terms of units sold Japanese brands control a large portion of the US market for new cars.

There is evidence that this demand advantage in the home market has already translated into success abroad. The average buyer of European brand cars in the USA has a far higher median household income (USD 115,492) than the customers of Asian (USD 70,353) or American brands (USD 58,154).[44] This indicates that the demand for premium cars at home and the subsequent customer feedback help to shape products that are attractive to wealthy customers abroad.

In essence, the European Union is the largest single market for passenger cars. European car buyers prefer their national brands or substitute them to a large degree with other European brands. This home market demand leverage is even more accentuated in Japan but weaker in the USA.

Fig. 47. Brand segmentation in first registration cars for selected markets 2002



Note: German brands (Audi, BMW, Ford, Mercedes, Opel, Porsche, Smart, Volkswagen), French brands (Citroen, Peugeot, Renault), Italian brands (Alfa Romeo, Ferrari, Fiat, Lamborghini, Lancia, Maserati), British brands (Ford, Jaguar, Land Rover, Lotus, Morgan, Rolls Royce, Rover, Vauxhall), Swedish brands (Saab, Volvo), Japanese brands (Daihatsu, Honda, Isuzu, Mazda, Mitsubishi, Nissan, Subaru, Suzuki, Toyota), American brands (Chrysler, Ford, General Motors), Korean brands (Asia, Daewoo, Hyundai, Hyundai Prec., Kia, Ssangyong), also European brands (Seat, Skoda).
Source: ZEW calculation using ACEA, VDA data.

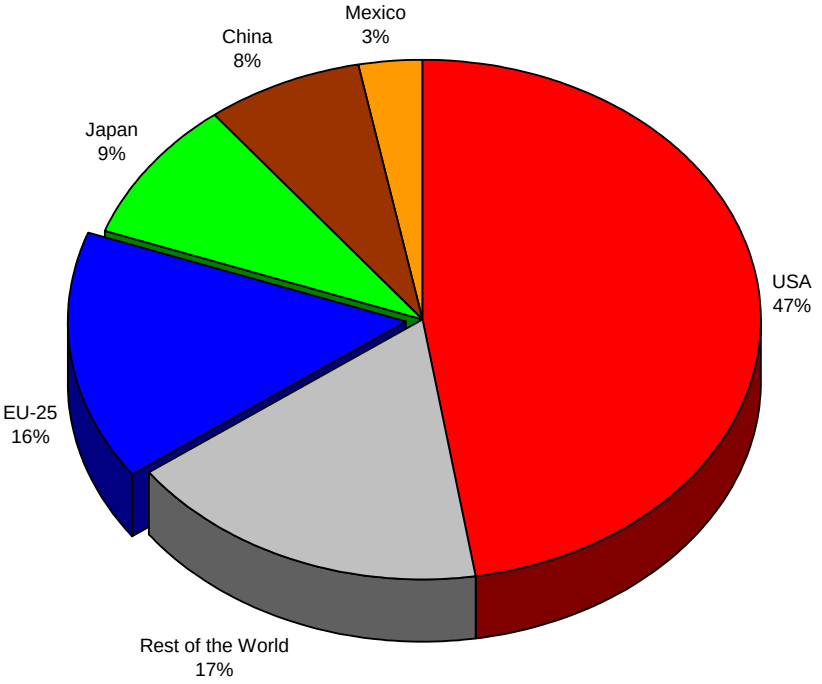
3.3.1.2 Commercial Vehicles

The European Union is the second largest market in the world for commercial vehicles with slightly more than 30 mn vehicles in use in 2002 followed by Japan

[44] See Ward's Automotive Yearbook 2003.

and China. Still, the USA's 92 mn commercial vehicles make it a distant second. Significant pieces of that gap might be due to the fact that light trucks have made remarkable inroads in the US market for passenger cars. In 2002, 8.1 million passenger cars were newly registered in the US compared to 8.7 million light trucks.[45] There is currently no meaningful distinction between light trucks that supplant passenger cars in the private use segment and those that go into traditional commercial use. Accordingly, this gap should be interpreted carefully. Table 39 in the appendix gives the relevant information on use and sales for all countries under consideration.

Fig. 48. Commercial vehicles in use in major international markets 2002



Source: ZEW calculation using ACEA, VDA, EUROSTAT data; for Cyprus, Estonia, Latvia, Lithuania and Malta only 2001 data was used.

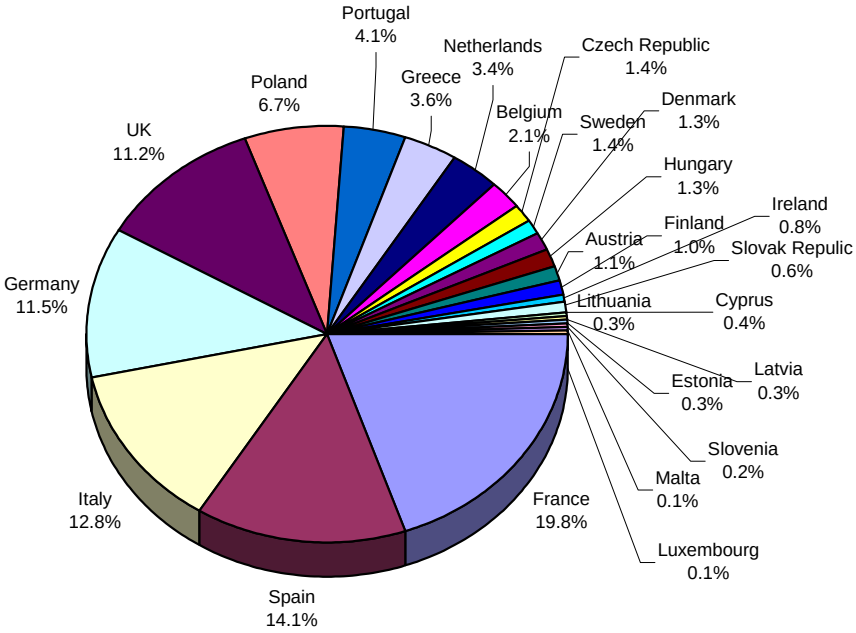
From the intra-perspective on the European Union France holds the largest share (19.8%) of commercial vehicles in use in 2002 followed by Spain (14.1%), Italy (12.8%) and Germany (11.5).

Demand for commercial vehicles is certainly a derivative of the importance of freight transportation on the road. This degree of reliance on commercial vehicles is highly influenced by an adequate infrastructure and the opportunity costs of alternative modes of transportation which include not only price differences but

[45] See VDA: International Auto Statistics 2003.

also availability and flexibility in use. In Greece and Ireland road transportation appears to be the almost indisputable dominant form of transportation. This trend is also strong in Italy, Portugal, Spain and the UK. To the contrary, only 40% or less of goods transport ton-kilometres in Lithuania, the Slovak Republic, Estonia and Latvia are performed on the road. Although the intermodal split of goods transportation is not unanimous among EU member states road transportation is a strong if not dominant pillar in most EU countries' transportation backbone. Accordingly, demand for commercial vehicles should remain substantial.

Fig. 49. Commercial vehicles in use in the European Union 2002

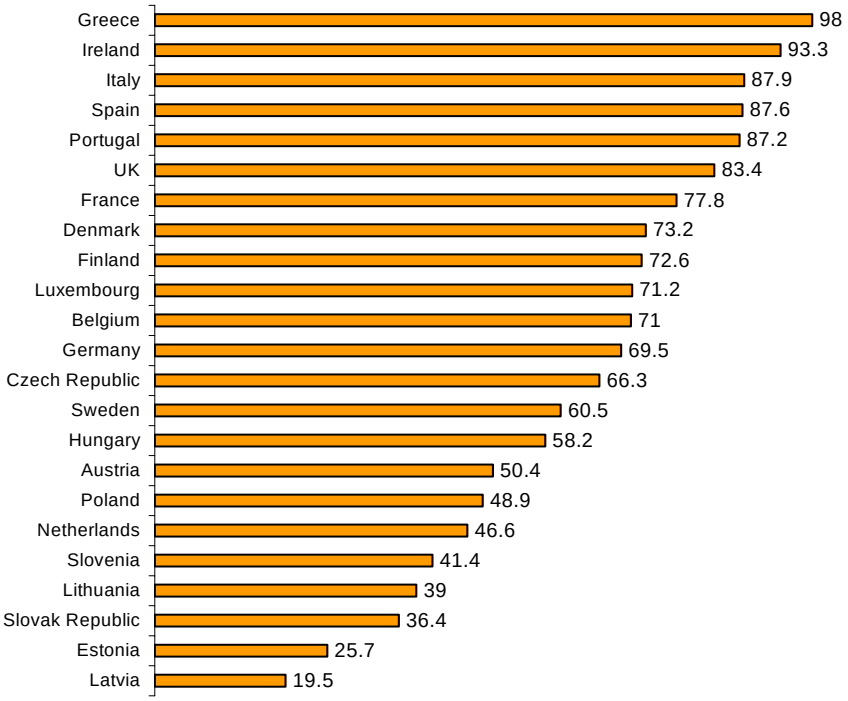


Source: ZEW calculation using ACEA, VDA, EUROSTAT data; for Cyprus, Estonia, Latvia, Lithuania and Malta only 2001 data was used.

By combining transported goods and kilometres travelled, the diagram above disguises the primary fields of use for commercial vehicles in the EU. Figure 51 draws a clearer picture in this regard. Most goods in the European Union (as indicated by their weight in tons) are transported over rather short distances. Especially in Ireland, Germany, Finland and Austria the vast majority of transport happens over distances below 150 kilometres. In other member countries this relationship is weaker (Belgium, Italy, Luxembourg) but the share of short distance transportation volume is still above 60%. Consequently, the emphasis on shorter distance road transportation in the European Union should give rise to commercial vehicle concepts that address their specific needs. These could include intelligent and flexible transport solutions with sophisticated but cost effective

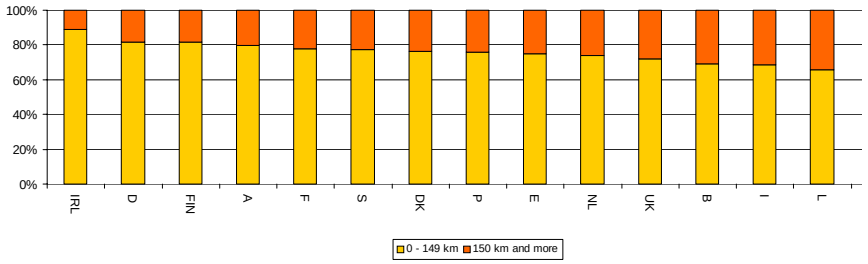
command and control infrastructures instead of maximum distance transport units. Those longer distance commercial vehicles would primarily transport lower weight products in the EU.

Fig. 50. Percentage share of goods transport ton-kilometres on the road in total goods transport 2001



Source: EU Energy and Transport in Figures 2003; for new member states 2000 data was used; no data available for Cyprus and Malta.

Fig. 51. Share of million tons transported on the road by distance 2001



Source: EU Energy and Transport in Figures 2003; no data available for Greece and the new member states.

The special impact of light trucks for private use in the USA should not be overemphasised. The European Union is still an attractive volume market for commercial vehicles. Most European countries rely heavily on road transportation. This fact reflects heavy investments in a suitable infrastructure both from the private (e.g. value chain configurations) and the public sector. These sunk costs provide significant obstacles for alternative modes of transportation and ensure a stable demand for commercial vehicles in the foreseeable future. Most road freight in the EU is transported over shorter distances which should open up opportunities in this segment for vehicle manufacturers, due to experienced and sophisticated customers.

3.3.2 Market Growth

It has been shown that a large market size can generate significant sources of competitive advantage. Still, to a certain degree this reflects a market dynamic of the past. At this point the second important determinant of demand attractiveness enters the picture: market growth. Naturally, already large markets can still generate strong volume growth but it becomes more and more difficult for them to provide relative growth. It is this sort of new sales opportunities, though, that helps automotive companies to continue to grow and benefit from the up-to-date input of dynamic markets. As a result, market growth is as much a prerequisite for home market demand advantages in international competition as market size.

3.3.2.1 Passenger Cars

Some measurement concepts of growth find it difficult to cover cyclical fluctuations of demand or are highly sensitive to the base year choice. Furthermore, simple relative percentage growth rates usually promise stellar market expansion while they are mostly due to small base numbers and growth in unit terms remains rather limited. To avoid those pitfalls an alternative concept was utilised. By estimating the slope of an assumed linear trend in demand over several years, market growth can be safely represented. This concept incorporates both the market dynamic and the volume increase factor. Figure 87 illustrates this concept distinguishing between a long and a short-term trend. It should be mentioned that this procedure is primarily designed to cover trends from the past and should not be misinterpreted as a precise prediction for the future. Such forecasting techniques would certainly need to take into account demographic trends as well as the cyclical (an obviously non-linear) nature of automotive demand. The concept applied here aims at covering basic multi-year market trends that can easily be compared among countries. It was designed for that specific purpose and should be treated as a supplement, not substitute, for traditional market prognosis.

The separation between long-term and short-term trends allows more insight into general trends but also more recent developments. Both trends are obviously intertwined but the factors that drive them can be quite different. The long-term trend in car sales is driven by more fundamental elements. Among the most time

persistent ones are customer preferences towards cars or alternative modes of transportation respectively. The same is true for factors like availability, quality and affordability of the infrastructure. For car passenger transportation as well as all other modes of transportation the infrastructure upgrades (e.g. railway tracks, motorways) take years to be planned and implemented. On the other hand, short-term trends might be more influenced by the overall economic situation or the customer confidence in the future economic developments that influence their present consumption behaviour. Those trends might include unemployment or the fear thereof, as well as fluctuations in interest rates. Since most new car sales today substitute only the buyers' previous car the majority of owners can easily postpone the replacement purchase and stick with what they have for a longer period of time. Differences in the average age of the car fleets across major European countries reflect this mechanism. In 2002 the average car in Belgium was 7.6 years old while its counterpart in Greece was 11.3 years of age.[46] Hence, customers can easily control their time of purchase which could severely influence the short-term trend while the long-term trend should be hardly affected.

Besides, the combined information from the short- and the long-term development of the market in unit terms gives valuable insight into a country's potential for the future. Using Figure 87 as an example, the long-term trend would suggest a splendid future for this car market while the short-term trend indicates that this impression is mostly due to the more distant past while more recent observations point towards a levelling off. Presenting this information as well as setting this into context is the rationale for the following passages.

Table 34 shows the trend numbers for all member states. In the long run the UK, Spain and Italy show the strongest increase in demand. Austria, Poland and Europe's largest market, Germany, follow a negative trend. All other member states show a slightly upwards trend. In the short run, again the UK shows a remarkable growth trend. If this trend continues new registrations could go up there by 133,000 cars annually. Additionally, Hungary and France are on a strongly increasing trend, although significantly below the UK. Still, the majority of member states (16 out of 25) shows a negative trend, with the Netherlands, Poland and Germany at the end of the scale. If this negative short-term trend in the EU would continue, new registrations in the EU-25 would go down by more than 300,000 cars per year. While this number is troubling, it should be emphasised that it reflects only the four year short-term trend and given the cyclical nature of demand in cars, the linear trend assumption could easily overstate the actual development. The long-term trend is more revealing and it indicates continuing growth for the EU-15 (unfortunately there is no comparable time series data available for the new member states) of roughly 190,000 units a year. Albeit, the short-term trend for EU-15 points downwards in almost the same order of magnitude. In essence, growth in the European car market is decelerating.

A look outside the boundaries of the EU helps to put these numbers into perspective (Table 35). The countries under consideration with the strongest long-

[46] Information specifically compiled by ANFAC.

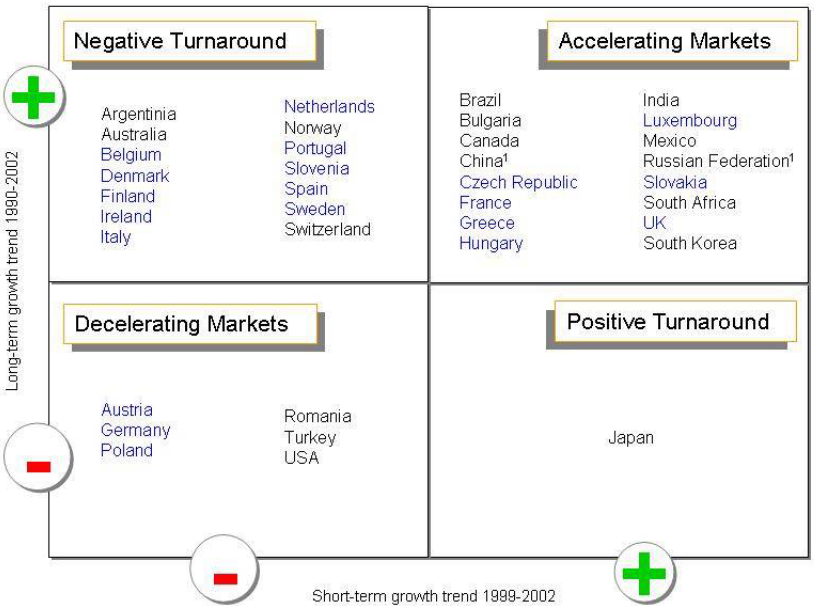
term growth trend are Brazil, India, Mexico, South Korea and Australia. On a long-term shrinking trend are Romania, Turkey, USA and Japan.

The numbers for passenger cars in the USA might be somewhat misleading since demand for light trucks in private use has significantly picked up there and this form of substitution might put additional pressure on the sales of traditional passenger cars. For US environmental requirements (CAFE) it is preferable to register especially the popular SUVs as light trucks instead of passenger cars. Put simply, in the traditional international segmentation this inflates the US numbers in commercial vehicles and lowers the equivalents in passenger cars. To account for this special effect, some studies combine cars and light trucks to a segment usually called light vehicles. Using the available information, 16.8 million light vehicles were sold in the USA in 2002, 8.1 passenger cars and 8.7 light trucks. The distinction in the truck segment is rather new. Therefore only a short-term growth trend for light vehicles in the USA could be estimated. As expected, the trend differs from the passenger car trend. Still, the short-term direction of the market for light vehicles is the same. Judging from the last four available years the linear trend suggests that sales diminish by roughly 73,000 light vehicles annually. While this trend is certainly of interest when analysing the USA the lack in comparable data makes it hardly applicable in cross country comparisons. Since this is the central aspect of this analysis the traditional segmentation appears better suited while the interpretation of the US results has to be conducted carefully and with the special trend in mind.

Over the most recent four year observation period the massive increase in demand for cars in China jumps to mind, followed by South Korea, Japan, Mexico and Brazil, making these countries the most intriguing markets for growth in passenger cars. From a European perspective only the UK would also fall into this category. For Japan this short-term upward trend indicates that the negative long-term trend has been overcome. On the downside are Argentina, Turkey and the USA where large parts of the decrease can be attributed to the popularity of light trucks. To facilitate a conclusion the long-term and short-term growth trends have been combined into the following matrix (Figure 52).

There is no uniform development in long-term and short-term growth trends for Europe. The most troubling signs come from Europe's largest car market. Germany suffers from downward pressures. Most European countries are on a positive upward trend while there are strong indications that they might have reached a growth plateau. Still, a couple of member states posts promising growth trends both from a long and a short-term perspective. The UK clearly stands out in the EU car market with growth trends that make it one of the most attractive car markets in the world. On an international level, besides China optimistic long-term and even stronger short-term trends make Brazil, Mexico and South Korea excellent growth markets.

Fig. 52. Algebraic signs of short-term and long-term growth trends for passenger cars



[1] Due to data availability long-term trend was only estimated for 1995-2002.
Source: ZEW.

3.3.2.2 Commercial Vehicles

The same technique was applied to commercial vehicles new registrations or sales figures. Table 36 shows the results. The long-term trend here is positive for almost all EU member states with the large markets Italy, Spain, France and the UK in lead. A notable downward trend is only recognisable in Poland. Over the shorter four year observation period Italy, the UK and France perform best. Most member states find themselves on a sidewards track. Germany, Spain and Portugal exhibit the strongest downward slope which indicates that their positive long-term trends might come to an end. EU-25 as a whole would loose 24,000 new registrations annually if the short-term trend continues. EU-15, for which a long-term trend is available, adds more than 50,000 new registrations in commercial vehicles a year according to the long-term trend while the short-term trend is negative with almost -10,000 new registrations annually.

Major markets outside should be considered to put the EU numbers into perspective (Table 37). In the USA long-term and short-term growth trends are strong which, again, should be interpreted carefully since a significant number of light trucks in that segment supplants passenger cars instead of going into traditional commercial use. Besides, Canada, Australia, Brazil and Mexico show the best long-term growth trends. On the downside, South Korea and notably Japan are on

a highly negative trend. Over the last four years a number of countries has entered a significant positive demand trend for commercial vehicles. On top of the list is China which would, if its four year trend continues, add more than a quarter million commercial vehicles new registrations to its fleet. Excluding the USA, Indonesia, Australia and Thailand are also on strong short-term growth trends. Declining demand for commercial vehicles becomes visible in Turkey and Argentina but foremost Japan where the long-term downward trend appears to have been accelerating in recent years.

As before, the market growth potential can be evaluated best by putting long and short-term trends together.

Fig. 53. Algebraic signs of short-term and long-term growth trends for commercial vehicles

[1] Due to data availability long-term trend was only estimated for 1995-2002.
Source: ZEW.

Demand for commercial vehicles in the EU is on a relatively stable long-term growth trend in most member states. However, some negative short-term country trends indicate that the climax of this growth has been surmounted. Then again, the trend development looks especially promising in the large markets Italy, France and the UK. Outside the EU China exhibits remarkable growth trends, which spearheads other growth markets in the Asian region.

3.3.3 Special Focus on the New Member States

Income levels, the most important indicator for vehicle demand, are relatively low in all NMS. In 2003, GDP/capita (at purchasing power parities) varied from around 40% (the Baltic states and Slovakia) to 75% (Malta, Slovenia) of EU-15 average. Only Cyprus reached 86% and the two South European candidate countries had a GDP/capita of less than 30% of EU-15 average only (see Table 19). But the NMS economies have been growing faster than the OMS for the last couple of years and the catch-up process is expected to continue in the future. Between 1995 and 2003, the Baltic countries showed average annual growth rates of about 5% and in most of the other NMS GDP rose faster than 3% annually.

Table 19. GDP per capita at current PPPs (EUR), from 2004 at constant PPPs

	1990	1995	1999	2000	2001	2002	2003	2004	2005 [1)]	2006 [1)]	2010 [1)]	2015 [1)]
Czech Rep.	10,319	11,137	12,701	12,491	13,248	14,063	14,599	15,081	15,684	16,312	19,082	23,216
Hungary	7,797	7,844	10,200	11,032	12,018	12,845	13,404	13,846	14,386	14,962	17,503	21,295
Poland	4,974	6,177	8,405	8,955	9,546	9,901	10,355	10,769	11,200	11,648	13,627	16,579
Slovak Rep.	6,553	7,114	9,161	9,914	10,479	11,329	11,714	12,241	12,853	13,367	15,638	19,026
Slovenia	9,793	10,240	13,494	15,044	15,843	16,597	16,535	17,097	17,696	18,403	21,529	26,194
Estonia	.	5,500	7,515	8,492	9,015	9,661	10,322	10,900	11,456	11,915	13,938	16,958
Latvia	7,815	4,636	6,434	7,138	7,791	8,382	9,325	9,810	10,370	10,784	12,616	15,350
Lithuania	8,059	5,454	7,312	7,959	8,690	9,413	10,287	10,873	11,526	11,987	14,023	17,061
Cyprus	10,173	13,185	15,815	17,192	18,189	18,299	18,749	19,499	20,279	21,090	24,673	30,018
Malta	.	11,134	14,052	15,062	15,123	15,479	15,620	16,244	16,894	17,570	20,554	25,008

European Union (25) average = 100

	1990	1995	1999	2000	2001	2002	2003	2004	2005	2006	2010	2015
Czech Rep.	.	68	66	61	62	64	66	66	68	69	75	82
Hungary	.	48	53	54	57	58	60	61	62	63	69	76
Poland	.	38	43	44	45	45	47	47	48	49	53	59
Slovak Rep.	.	43	47	48	49	52	53	54	56	57	61	67
Slovenia	.	62	70	73	75	76	74	75	76	78	84	93
Estonia	.	33	39	41	42	44	46	48	50	50	55	60
Latvia	.	28	33	35	37	38	42	43	45	46	49	54
Lithuania	.	33	38	39	41	43	46	48	50	51	55	61
Cyprus	.	80	82	84	86	83	84	86	88	89	97	106
Malta	.	68	73	73	71	70	70	72	73	74	80	89

[1] Projection assuming 4% p.a. GDP growth and zero population growth p.a.
Sources: National statistics, Eurostat, wiiw estimates.

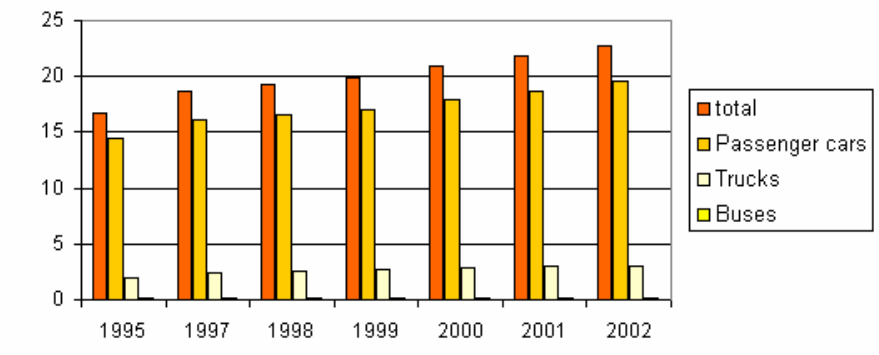
For 2004 and 2005, the Vienna Institute for International Economic Studies (wiiw) has forecast annual growth rates between 4%-5% for most of the NMS and even higher rates for the Baltic states (see Table 73). In a longer term perspective until the year 2015, wiiw thus expects some of the NMS to approach EU-average incomes (Cyprus, Malta, Slovenia, Czech Republic) and the others to have reached more than 60% of the average level. Industrial production, as an important determinant for transport services and thus commercial vehicles, is expected to grow even faster than GDP in many countries (see Table 74).

Looking more specific at the development and status quo of vehicle use and motorisation in the NMS, the picture is as follows:

3.3.3.1 Vehicles in Use

As in other countries, passenger cars take the lion's share of all vehicles used in the NMS. Accordingly, in absolute figures, the highest increase of vehicles used in the major NMS[47] between 1995 and 2002 was in this category, rising from 14 million to 19 million, at an average annual rate of about 4%, much faster than in the OMS on average. Although the number of trucks increased from 2.6 million to 4 million only, the relative increase was even faster, reaching nearly 6% p.a., reflecting the higher growth of industrial output than GDP mentioned above. The number of buses stayed nearly constant as an indicator of the poor and deteriorating public transport systems in most NMS, handicapped by the curtailment of public expenditure (see Table 75 and Figure 54).

Fig. 54. Vehicles in use 1995-2002 (CZ, HU, PL, SK, SL)



Source; VDA, International Auto Statistics.

Despite the rapid increase of trucks in use, transport in the NMS is still much more relying on railways than in the OMS, pointing to a large potential for further growth in road transport. This is particularly true for the economically less advanced countries, such as the Baltic states but Poland as well. Apart from lower

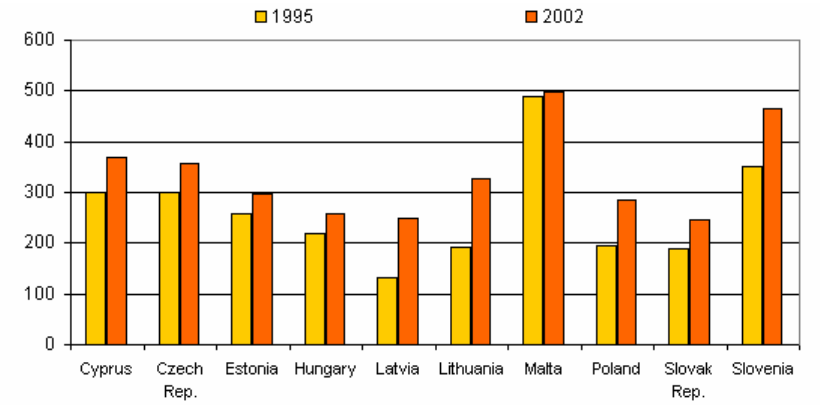
[47] No comparable data were available for the Baltic states, Malta and Cyprus.

income levels than in the OMS, the low motorway density in the NMS plays a certain role as well. Motorway density is particularly poor in Poland as for instance compared to the Czech Republic and Hungary, but all countries (except Cyprus and Slovenia) compared badly with the EU-15 in 2001[48]. The improvement of the road infra-structure will thus be a great challenge for the future and an important determinant for the development of car use in the NMS.

3.3.3.2 Motorisation Rate

Over the period 1995-2002, the number of passenger cars per 1,000 inhabitants in the NMS increased much faster than in the OMS, but was still significantly below EU-15 average at the end of the period in all countries, except in Slovenia and Malta. This points to a considerable growth potential for passenger cars in the long run. The motorisation rate was between 250 and 350 cars per 1,000 inhabitants in most NMS, compared to about 450 in the EU-15 on average (see Figure 55 and Table 76).

Fig. 55. Passenger cars per 1,000 inhabitants



Source: Statistical yearbook on candidate countries, 2000, 2002, 2003; wiiw Handbook of Statistics 2003; VDA.

3.3.3.3 First Registration of Cars

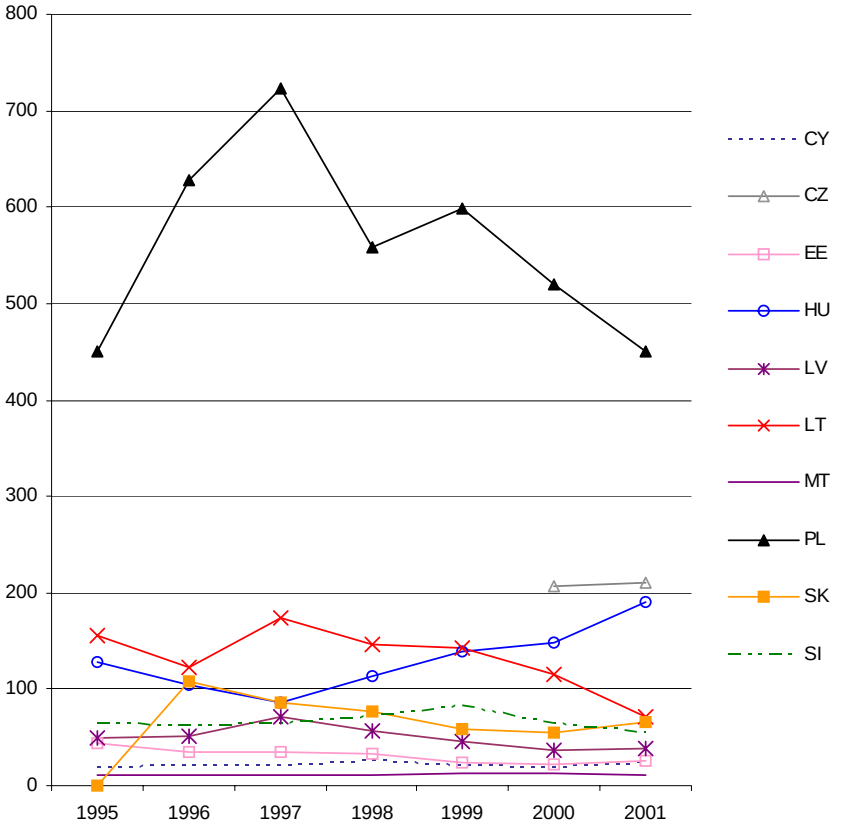
From a longer term point of view, under-motorisation and catching-up of the NMS in terms of per capita GDP suggests a faster growth of car sales in these countries than in the OMS. However, in the shorter run, satisfaction of pent-up demand, business cycle fluctuations and consumer confidence play a significant role as well.

---

48 See Eurostat, Statistical Yearbook on Candidate Countries 2003.

As depicted in Figure 56, the number of first registrations does not show a smooth upward trend but relatively strong fluctuations and an explicit downward trend after a certain peak, typically around 1997, in various countries.

Fig. 56. First registrations of cars



Source: Statistical yearbook on candidate and south-east European countries, yearbook 2000, p.168; Statistical yearbook on candidate countries, 2002 and 2003 edition; pp. 142 and 154.

3.3.4 Conclusion

3.3.4.1 Passenger Cars

The European Union is the major market for passenger cars in the world. The car fondness of its citizens seems to go beyond simple practical value in use. This turns into an important home market advantage since European customers are loyal to their home brands or alternative European brands. This fact ensures that

European producers primarily benefit from the leverage of the huge market in terms of economies of scale and scope. Besides, it allows European manufacturers to gain the necessary critical mass audience for the new products early and benefit from the feedback of a large sophisticated customer base.

In terms of market growth, though, Europe has apparently reached a growth plateau in unit terms. New car registrations increase much stronger in other world regions. This should not come as a surprise on a relatively established and ripe European market.

The feedback from sophisticated users in their home market in combination with the easy access to customer and market information through superior customer loyalty has given European brands already an edge in the premium segment of the important US market. This advantage is stable and can hardly be copied by competitors from abroad. Therefore, it should open up more sales opportunities abroad.

European customers are attracted to new cars if the environment is right. Short-term trends indicate that the economic downturn translates into declining markets. Still, the example of the remarkable growth of the British market – where according to industry experts a backlog in demand in combination with promising macroeconomic trends triggered the current car boom – shows that customers are ready and willing to invest into new cars under more promising economic conditions.

3.3.4.2 Commercial Vehicles

In the commercial vehicle segment Europe also has a strong position when it comes to market size. The tonnage bulk of Europe's road transportation is conducted over shorter distances, which indicates that feedback for vehicle producers from this market segment should be especially accentuated and hence valuable. Growth trends of new registrations of commercial vehicles in Europe have been modest. However, in terms of growth EU markets can hardly compete with the dynamics on major Asian markets.

The European transport system relies heavily on the road as its backbone and therefore ensures stable demand for commercial vehicles. The reliance on road transportation is deeply entrenched in the European transport configuration and only massive interventions could disturb this relationship in the foreseeable future. Hence, alternative modes of transportation that would supplant road freight transportation and consequently the demand for commercial vehicles face enormous barriers to entry.

The commercial vehicles segment, too, has felt the fallout from the economic downturn in major European markets. Therefore, short-term growth trends are negative. A continuing weakness in economic development in Europe would certainly shrink the market even further.