The Single Market Review

EUROPE

SUBSERIES II: IMPACT ON SERVICES

Volume 5:
Road freight transport

The Single Market Review SUBSERIES II IMPACT ON SERVICES

The Single Market Review

IMPACT ON SERVICES

ROAD FREIGHT TRANSPORT

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The Single Market Review

IMPACT ON SERVICES

ROAD FREIGHT TRANSPORT

The Single Market Review

SUBSERIES II: VOLUME 5

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This report is part of a series of 39 studies commissioned from independent consultants in the context of a major review of the Single Market. The 1996 Single Market Review responds to a 1992 Council of Ministers Resolution calling on the European Commission to present an overall analysis of the effectiveness of measures taken in creating the Single Market. This review, which assesses the progress made in implementing the Single Market Programme, was coordinated by the Directorate-General 'Internal Market and Financial Services' (DG XV) and the Directorate-General 'Economic and Financial Affairs' (DG II) of the European Commission.

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by

NEA

It does not, however, express the Commission's official views. Whilst every reasonable effort has been made to provide accurate information in regard to the subject matter covered, the Consultants are not responsible for any remaining errors. All recommendations are made by the Consultants for the purpose of discussion. Neither the Commission nor the Consultants accept liability for the consequences of actions taken on the basis of the information contained herein.

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Table of contents

List of tables

List of figures

List of abbreviations

B	Belgium (België/Belgique)
CSTE	Commodity classification for transport statistics in Europe
D	Germany (Deutschland)
DATAR	Délégation à l'aménagement du territoire et à l'action régionale
DC	Distribution Centre
DK	Denmark (Danmark)
DM	German mark
DRIVE	Dedicated Road Infrastructure for Vehicle Safety in Europe
E	Spain (Spanien)
EC	European Community
ECIS	European Centre for Infrastructure Studies
ECU	European Currency Unit
EDC	European Distribution Centre
EDI	Electronic Data Interchange
EEC	European Economic Community
ELA	European Logistic Association
EMS	European Monetary System
EU	European Union
Eurostat	Statistical Office of the European Communities
F	France
FTL	Full Truck Load
GR	Greece
I	Italy
IFMS	Integrated Fleet Management Systems
ISO	International Organization for Standardization
IT	Information Technology
JIT	Just in time
kWh	Kilowatt per hour
LTL	Less than truck load
NDC	National Distribution Centre
NEA	NEA Transport research and training
NL	Netherlands (Nederland)
RDC	Regional Distribution Centre
RVI	Rijks Verkeers Inspectie
TIR	International carriage of goods by road
UK	United Kingdom
VAL	Value Added Logistics
VAT	Value Added Tax

1. Summary

1.1. Introduction

In its task to create a single market the European Union adopted a series of measures aimed at liberalizing road freight transport and harmonizing conditions to allow for a level playing field in the market. Two types of measure can be distinguished. Sector specific (vertical) measures directly affecting road freight transport and horizontal measures that are affecting both the hauliers and the shippers. Although the vertical measures mostly apply to cabotage and international transport, which cover no more than 3% in tonnes and no more than 20% in tonnes-kilometres of the total EU road freight transport performance in 1992, both types of measure have had a substantial impact on the road freight sector.

The methodology used is an analysis of horizontal and vertical measures taken as well as their impact on both the supply and the demand side of road freight transport. By using a sophisticated (and by real data validated) cost model, the isolation and quantification of the effects on transport operators resulting from different measures have been made possible. In some cases, combinations of data research have led to aggregated conclusions for the sector. Other findings, which are the result of other studies or expert opinions, are validated by collected data or supported by business survey results. Finally, four case studies have been conducted to link these findings to the daily business environment.

1.2. Liberalization

By far the most important measures for shippers and hauliers are those related to liberalization of trade and services. On the demand side of the market, the removal of internal frontiers and the elimination of trade barriers enabled shippers to take up the opportunities offered by the single market in order to reduce the relatively high capital costs, compared to transport costs, by the reduction of inventory holding and lead times, reallocation of production and the establishment of European Distribution Centres (EDCs).

Helped by the internationalization of business and in search of more efficient sourcing and distribution channels, shippers started to outsource their transport-related activities, shifting operations from own-account towards hire and reward transport. The lifting of restrictions in market access on the supply side for transport operations clearly stimulated this process, letting new hire and reward operators enter, some of them owners/drivers, thus pushing competition to even higher levels.

The answer to increased competition for larger hauliers became logistic chain management and the development of stable long-term relationships with shippers, willing to outsource transport activities on a European or even global scale. Such strategies could only be applied by large companies. These larger companies, however, in order to reduce their fixed costs, in turn, subcontracted smaller companies, often owners/drivers to carry out the growing number of transport operations. Thus, liberal markets and integration strategies increased the scope for logistics services, which meant an increased shift by the larger transport operators towards forwarding, warehousing and value-added services.

Liberalization also had clear advantages for international haulage. Although full completion of the single market for cabotage must await July 1998, it already enables hauliers to operate more efficiently, as the elimination of frontier controls meant less transit time and fewer administrative costs. On average, calculations for a standard trip of 1,000 km indicate that, when measured in German marks (DM) and with fluctuations in exchange rates excluded, liberalization reduced the costs for border-crossing transport, ranging from a minimum cost reduction of 5.1% for a haulier from Spain to a maximum of 6.2% for a haulier from the Netherlands or Denmark (these cost reductions result from both cabotage/cross-trade transport and the elimination of border delays).

1.3. Harmonization

Harmonization was also an important issue in completing the single market for road freight transport. By far the most important impact is experienced from the harmonization of excise duties on diesel fuel. Although a minimum level was set, almost all Member States introduced higher levels by means of national legislation, causing a certain divergence in duties on fuel. The question remains whether completion of the single market can be held fully responsible for the increase of total costs (due to taxes) ranging from 6.8% for Germany to 11.7% for Spain. Other harmonization measures, such as harmonization of vehicle taxes, introduction of the speed-limiting device and harmonization of weights and dimensions, driving and resting hours, have had a smaller effect.

For domestic transport, harmonization (calculated for an average standard trip length of 400 km) had a cost-increasing effect ranging from 0 to 6.5% depending on the Member State. When tax measures are fully taken into account, this range for cost increase becomes 2.7 to 16.5%. For international transport, these figures are 1 to 2.5% (tax measures excluded) and 7.9 to 12.3% (tax measures included) again depending on the individual Member State (again, all calculations were made in DM and with exchange-rate fluctuations excluded).

1.4. Impact on sectoral performance

As an outcome of liberalization and harmonization total costs for domestic transport increased, while costs for international transports were reduced on average by around 4% when tax measures were excluded, but increased by around 4% when tax measures were fully included. Only a very small convergence in costs is witnessed. The calculated difference between domestic transport and border-crossing transport is caused by the fact that domestic transport does not gain from liberalization measures, such as cabotage, and the elimination of border-crossing delays.

During the same period, due to the already existing fierce competition which only increased as a result of liberalization, freight prices for border-crossing transport dropped. Indications of this decline in prices are somewhere between 1 and 8% for border-crossing transport (again expressed in DM). Another explanation for the decline of tariffs is found in the deregulation of domestic transport.

By deregulating their domestic markets, Member States anticipated the expected more liberal regime. For border-crossing transport, deregulation of tariffs was of far less importance, as they were already widely ignored.

The same calculations expressed in ECU show a similar pattern. When tax measures are fully included, EC measures increased costs for border-crossing transport by 15%.

Total costs (EC measures as well as other cost-increasing effects included) increased by 22%. Tariffs in turn increased by 3 to 10%. This situation has put profits under constant pressure, and only large companies, benefiting from economies of scale and frequently operating in close co-operation with shippers, were able to maintain profitability and to modernize their business by means of investment and innovation. Smaller companies, subcontracted and unable to differentiate from other companies to compensate for the declining profit margins, often split up into owners/drivers in order to take advantage of the possibilities to reduce social charges, or took rules on driving and resting times or maximum vehicle weights less restrictively.

The resulting reduction in labour costs was not, however, the only reason for subcontracting by larger companies. Better motivation and lower absence through illness improved productivity significantly and became important side-effects. Medium-sized carriers found themselves squeezed between price-competitive smaller companies and efficient larger service-driven companies, which led many to focus on dedicated transport services. Similarly to the liberalization of air transport, the possibilities to differentiate are ultimately limited, and a reduced role for medium-sized companies is foreseen.

Liberalization of business also affected the relation between international and domestic transport. Increased internationalization of economic activities of shippers caused a much stronger growth of international transport compared to domestic transport.

Indications were also found of a changed market orientation of transport operators from different Member States. As the hauliers' factor productivity originating from north-west European Member States remains relatively high by comparison with those from southern Europe, north-west European hauliers seem to concentrate on integration strategies (vertical integration along the logistics chain). South European hauliers concentrate on simple point-to-point transport, competing on prices.

As a result, three types of sub-markets within the road freight market appeared: one market for larger companies concentrating on organizational aspects of transports, one dominated by dedicated transports and a huge market of very small companies handling physical transports, mainly in general haulage. The latter can be characterized as an unstable market with a high level of competition.

1.5. Equilibrium

The single market is not yet completed. Not only because several measures are not fully implemented (such as cabotage, infrastructure levies), but also because the adjustment process of companies has not finished. Large operators are still building up their international networks while medium-sized companies are still reviewing their strategies as their role in the market declines. The smaller companies on the other hand are hampered by the volatility in the market. The easy access to the profession combined with the somewhat 'non-rational' behaviour of smaller companies, where often no distinction is made between operational, business and private household expenses, pushes competition to extremes. Although several small companies were shaken out of the market, they sometimes re-enter under the same

conditions. As a result, in a market dominated by smaller companies there are no guarantees that an equilibrium will soon appear.

1.6. Remaining obstacles

A number of obstacles remain. As discussed earlier, national legislation on excise duties on diesel fuel is not fully harmonized, causing unfair competition among Member States. In 1994 the price range within the European Union varied between ECU 0.46 (Greece) and ECU 0.68 (United Kingdom) per litre diesel. Although a minimum rate has been set, the rates for annual vehicle taxes are not harmonized yet. Finally, differences exist between Member States which apply tolls and/or user charges and Member States which do not.

There remain obstacles with a social dimension. Although driving and resting times are harmonized, their enforcement is not uniform. Controls on larger operators are more frequently applied, leaving scope for small companies to compete unfairly. Easy access to the profession of transport operator forms no barrier to stop this process. The interpretation of good repute, sound financial standing and professional competence – the qualifications needed – is rather subjective.

Further harmonization in social regimes with respect to wages is also recommended. While profitability figures dropped as a result of increased competition, differences remain in labour costs and, therefore, in total trip costs, again stimulating the phenomenon of owner/driver companies. Furthermore, as wages are responsible for over 40% of average trip costs, they still have a large potential impact on competitiveness, causing unstable market situations.

The diversion of controls of vehicles registered in a non-member state to the external borders of the European Union requires harmonization of conditions. Until now, market access for non-member states depended on bilateral agreements. East European hauliers, being relatively poorly equipped and taking certain rules less restrictively, form an especially competitive threat to hauliers from the European Union.

The lack of a Community transit agreement with third countries distorts the functioning of the single market. Until now, the number of as well as the costs for transit licences needed to cross non-Community countries differ amongst Member States causing comparative (dis)advantages (historically, this is also the case since 1991 in relation to the 'new' Member State Austria).

Furthermore, certain factors prevent the market from functioning as a competitive market, such as exchange rate fluctuations in the European Monetary System (EMS).

2. Scope of the study and general introduction to the sector

2.1. Introduction

The objective of this report is to assess the impact of single market measures on the organization and performance of the road freight transport sector. Single market liberalization is believed to be particularly relevant in road freight transport. This report contains and discusses NEA's findings, over six chapters.

This chapter contains an introduction to the road freight sector in the European Union. It also discusses a number of general economic developments in the last decade and their impact on road freight transport.

Chapter 3 discusses important relevant measures taken by the European Union to realize the single market and sets out the state of affairs regarding the implementation of measures in national legislation. The impact on sectoral performance is discussed in Chapter 4 with analyses supported by empirical evidence where available. Chapter 5 focuses on business strategies employed. Finally, in Chapter 6, the conclusions of the study will be presented. The appendices contain relevant supporting material.

2.2. Relevant economic and political developments in the period 1985–95

Insight into the economic and political developments is important in order to disentangle and assess the observed effects in the road freight transport sector. It is very difficult to completely identify and quantify, on the one hand, effects resulting purely from measures taken to complete the single market and, on the other hand, those effects caused by autonomous developments such as economic recession or the opening up of East European markets. The road freight transport sector does not operate in a vacuum. It operates within the national and international business and economic environment.

Two of the most important developments in the study period were the collapse of the East bloc regimes in the late 1980s and early 1990s, and the reunification of Germany which affected most of the economic sectors in the European Union. In road freight transport it resulted in, amongst other things, changes in the size and composition of freight flows and competition. Some Member States (Germany, for example) were, of course, more affected by these developments than others.

Another important factor affecting road freight transport is the exchange rate developments in the decade studied. Via fuel prices the exchange rate of the US dollar has had an important indirect effect on the cost structure of transport companies. The crisis in the EMS in the early 1990s also had a significant effect on the market. As a result prices, in some cases, changed by 20 to 30%.

The economic recession, starting around 1992, has been another factor affecting both the supply and demand sides of freight transport. Unfortunately, the recession more or less coincided with domestic and inter-Union deregulation, causing adjustment problems, in particular in those countries with less liberal road freight transport markets.

Another important factor is the mounting pressure from the public as well as from governments to raise standards on environmental performance. These opinions affect road transport in particular because it is widely believed that road transport performance is responsible for a major part of carbon monoxide and nitrogen oxide emissions. Other externalities in transport, such as congestion, road accidents and noise, are also considered as negative side effects of increased road freight transport operations.

2.3. General introduction to the road haulage sector in the European Union

The road freight transport sector is very important in all European Union Member States. It is by far the fastest most flexible mode for door-to-door transport.

Professional road transport in the European Union accounts for about 30% of added value in the transport and communications sector and 20% of investment[1]. Its contribution to the gross domestic product (GDP) is more than 2% and, due to the increasing interest in value added logistics (VAL), is expected to grow, as is also the case for its contribution to total employment.

It is not within the scope of this study to determine the role of road freight transport compared to other transport modes. Instead we focus on domestic and international road freight transport itself.

Figure 2.1 provides total performance in tonnes for each European Union country in 1992 (the last year for which complete and reliable statistical data are available), and also shows a split between domestic and border-crossing transport. Except for remote countries such as Ireland and Greece, it illustrates that all European Union Member States have a high performance in transport. Furthermore, total performance is dominated by domestic transport. For the total Community the share of international transport is no more than 3.1% (see Appendix D, Table D.3).

In Figure 2.2 a similar picture is provided in terms of million tonnes-kilometres. As average trip distances for international haulage are greater than for domestic transport, the respective share of international haulage is larger and equals 19.8% for the total Community (see Appendix D, Table D.4).

In Figures 2.3 and 2.4, international market shares are provided with respect to nationality of haulier. Figure 2.3 illustrates the striking position of Dutch and Belgian hauliers. Despite being rather small countries they both have a relatively large market share in international road freight transport. As a remote country without a clear transit function, the performance for the United Kingdom remains relatively small.

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1 Hire and reward segment only.

Figure 2.1. Performance in 1,000 tonnes, 1992

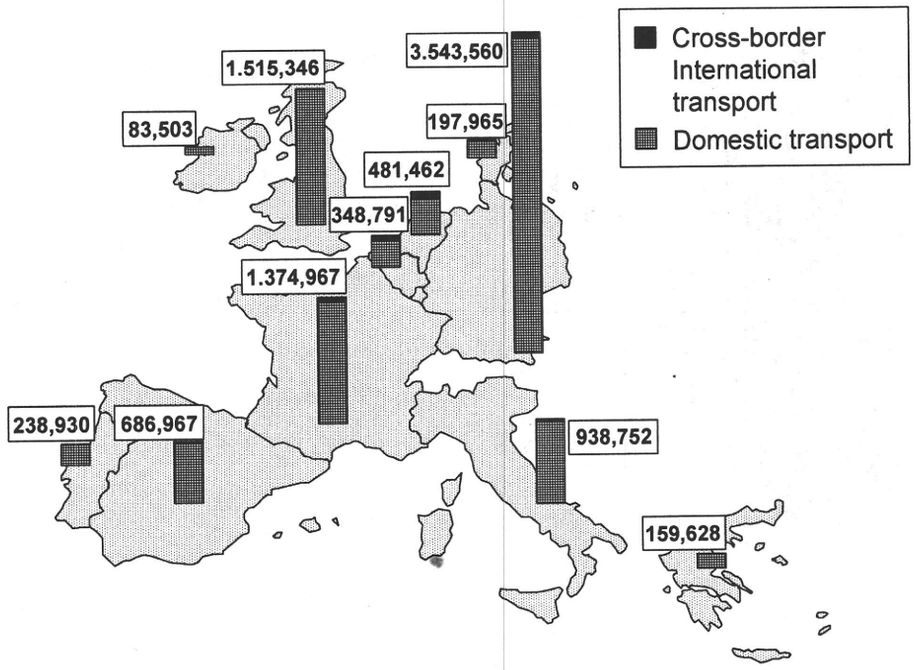


Figure 2.2. Performance in million tonnes-kilometres, 1992

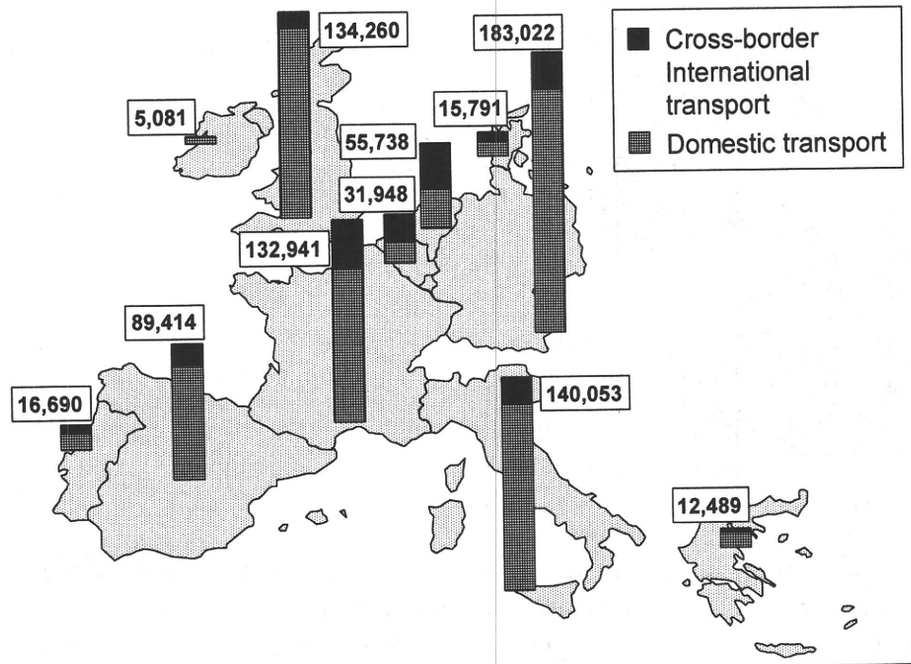


Figure 2.3. International performance in tonnes, 1992, shares in %

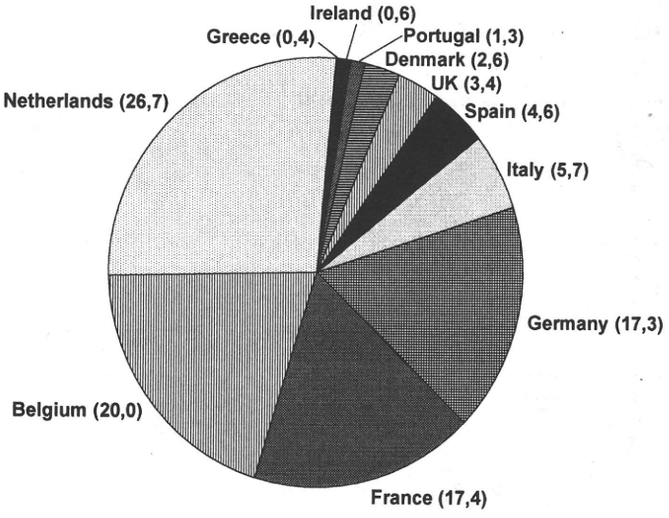
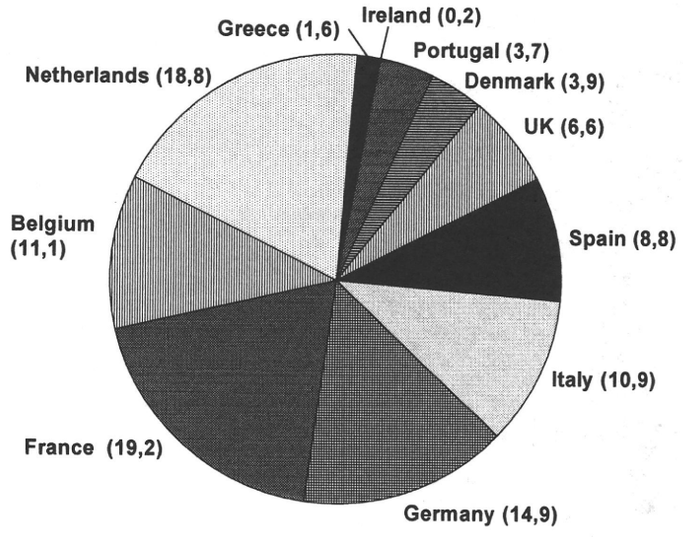


Figure 2.4. International performance in tonnes-kilometres, 1992, shares in %



Throughout this report a distinction between hire and reward versus own-account transport will be made. According to Eurostat the average European Union market share for own-account transport declined from around 12% (1986) to 7.4% in 1992 (when measured in tonnes-kilometres).[2]

2 Other sources indicate a smaller decline. See Table 4 annexed to the Report of the Committee of Enquiry of July 1994 (Bayliss et al., 1994).

2.4. Typology of the road freight market

This section introduces a typology which serves as a framework for the assessment of business strategies of transport companies in Chapter 5.

Due to growing volumes the market for road freight transport is one of increasing complexity. This complexity arises not only from the rapidly changing consumer and shipper demands, but can also be due to different strategic reactions that companies have employed. Studying the market for road freight transport, therefore, needs a simple but distinctive typology. Apart from these criteria the typology chosen should not remain theoretical. Eurostat data, available for several years, should be applied in a useful way. Given these considerations the following criteria should be met:

(a) the typology should have a close relation to the various aspects of study for which it is designed, such as strategic reactions due to completion of the single market, (specialist versus generalist, cost leadership versus distinction strategies, transport company versus logistic service provider etc.);
(b) the typology should be validated by hard data;
(c) the typology should remain simple and understandable.

A typology has been worked out which meets the criteria mentioned above. It implicitly defines four types of transport companies, representative of the four market segments.

Market segment 1: the specialist
The specialist's market segment can best be described as point-to-point transport of large amounts of cargo over great distances. Specialization can be based upon geographical connections or coverage, type of shipping industry, commodities, technology or dedication.

Market segment 2: vertical logistical chain director
The market for the logistical chain director is dominated by shipping industries. The company is closely located to 'its' shipper. Well-known examples are value added logistics as well as warehousing and physical distribution customized to specific shippers' needs. Physical transport itself is often contracted out to charters, while the contractor concentrates on forwarding and control.

Market segment 3: capacity focused transports
The business of capacity focused companies consists of full truckload transports (FTL transports) of mainly general cargo. The core business is transport itself, sometimes according to predefined schedules, sometimes on an *ad hoc* basis. Container trucking is a well-known example.

Market segment 4: networker
The market for network transport is a combination of international point-to-point transport with a strongly national or regional network of collection and distribution. Within the network small consignments are consolidated and distributed on a door-to-door basis (LTL transports).

According to estimates around 30% of total intra-EU transport performance (measured in tonnes-kilometres) is handled by the specialist. Another 30% is handled by capacity focused companies, another 30% again is transported by networkers. The vertical integration segment takes care of the remaining 10%. At first sight this distribution looks skewed and suggests that another market

segmentation approach might be better. On the other hand, as will be shown in Chapter 4, the market share of the vertical integration segment is the fastest growing segment and as a result the distribution will be more balanced (some 40% above European average).

A more thorough description of this typology as well as a statistical classification of Eurostat data according to this typology are given in Appendix A.

3. Legal and administrative measures taken to complete the single market

3.1. Introduction

The purpose of this part of the study is to identify the measures that need to be taken into account in order to assess the effects of single market integration. The measures studied are aimed at deregulating, liberalizing and harmonizing the road transport market in the EU and ensuring fair competition based on harmonized social, technical, physical and financial conditions. The objectives and contents of the relevant measures are described in this chapter.

Two types of measure have been identified in the study:

(a) vertical or sector-specific measures: measures which are specifically aimed at the deregulation and harmonization of the road freight transport market;
(b) horizontal measures: general measures which are applicable to several or all sectors (e.g. road transport, air freight, water transport and short-sea shipping etc.).

Amongst others, the following topics are relevant:

(a) access to the profession and to the market;
(b) harmonization of vehicle taxes;
(c) harmonization of excise duties on fuel;
(d) removal of internal border controls;
(e) introduction of environmental tax levying;
(f) introduction of infrastructural tax levying;
(g) introduction of the speed-limiting device;
(h) changes in other technical regulations (weight and volume dimensions).

The relevant Community measures are described in essence in the following paragraphs. Section 3.2 deals with the vertical or sector-specific measures, and Section 3.3 discusses the horizontal measures. The expected relative importance and effects of each of the horizontal and vertical measures on the international road haulage sector in the EU have been assessed in the concluding Sections 3.2.8 and 3.3.2. Vertical measures are listed and indicated by 'V' and horizontal measures by 'H'. It is possible that one measure includes more than one aspect of road transport operations. Therefore, it is not always possible to allocate certain measures to a specific topic, as it sometimes forms part of or overlaps with other topics. Section 3.3 provides an overview on the state of affairs regarding the implementation of EC measures. Section 3.4 describes the remaining obstacles and shortcomings. Bibliographical references of Community legislation etc. are listed in Appendix G.

3.2. Vertical or sector-specific EC measures: the road freight transport market

An extensive list[3] summarizing the vertical measures taken to deregulate the single road freight transport market is presented below.

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3 Information is taken from a.o. European Commission [1994]: *Internal Market, current status 1 July 1994*: Volume 1: A common market for services. Volume 2: The elimination of frontier controls. Volume 3: Conditions for business co-operation. Volume 4: A new Community standards policy.

3.2.1. Access to the market and the profession

Admission to the occupation of road transport operator and mutual recognition of diplomas (V.1)

> To harmonize admission to the occupation of road transport operator in national and international transport and to facilitate the effective exercise of the right of establishment of those operators.

Directive 89/438/EEC of 21 June 1989 amending Directive 74/561/EEC on admission to the occupation of road haulage operator in national and international transport operations, and Directive 77/796/EEC aiming at the mutual recognition of diplomas, certificates and other evidence of formal qualification for road haulage operators, including measures intended to encourage these operators effectively to exercise their right to freedom of establishment closely define the three requirements which persons wishing to exercise the occupation of road haulage operator must satisfy.

These are as follows:

(a) A good reputation: a screening on serious criminal offences; respect of the rules in force, i.e. absence of conviction for serious and repeated infringement of regulations related to the conditions of pay and work in the sector (driving hours, weight, dimensions and safety).

(b) Appropriate financial standing: minimum financial resources required: ECU 3,000 per vehicle or ECU 150 per tonne of the maximum authorized weight. In practice, wide variations exist between EU Member States. In Portugal, a working capital of ± ECU 277,000 is required in addition to ECU 3,225 per vehicle. In Greece, France, Ireland and the United Kingdom: a minimum of ECU 3,000 per vehicle. Other countries vary between these limits.

(c) Professional competence: either successful completion of a written examination (level of education equivalent to that of the compulsory school-leaving age) on law, commercial and financial management, technical operations, safety and possible international operations, or five years of management experience in a transport company.

The levels and duration of courses which are not always compulsory vary considerably between EU Member States (e.g. 65 hours in the United Kingdom and 300 hours in the Netherlands), as do the examination requirements.

Carriage of goods by road between Member States (V.2)

> To create the right conditions for instituting fair competition and ensuring minimum disturbance to the market.

In the past, bilateral quotas agreed bilaterally between Member States and generally limited to hauliers from the two Member States concerned, were complemented by annual Council regulations allocating quotas for the international carriage of goods by road between any two Member States. With the adoption of Regulation (EEC) No 881/92, quantitative quota restrictions on international transport between Member States were abolished as of 1 January 1993. Access to the international hire and reward road transport market now solely depends on the qualitative criteria referred to in point V.1 above. A licence is issued by the relevant

authorities in each Member State and is valid for a period of five years after which it can be renewed. Tariffs for international transport are liberalized and completely free as from 1 January 1990.

Inland cabotage: non-resident carriers in the national market (V.3)

To lay down a definitive system for inland cabotage.

Cabotage was introduced on 1 July 1990. Restrictions on cabotage still exist, but cabotage will be completely deregulated and free as from 1 July 1998. Council Regulation (EEC) No 3118/93 lays down the conditions under which non-resident operators may operate national transport services within a Member State. Only those operators offering international transport services qualify for a cabotage authorization. Non-resident carriers with a Community cabotage authorization may operate national transport services on a temporary basis without further quantitative restrictions.

The quota system is set at 30,000 annual authorizations for 1994; this will be increased by 30% annually until 1 July 1998. Germany, Greece, Italy, Spain and Portugal currently retain control of market entry to their domestic markets by setting quotas. Italy and Spain also have national price controls. The latter four countries retain tight control of market entry, although unauthorized operations are believed to be extensive.

3.2.2. Harmonization of levy systems of taxes related to infrastructure costs

The levy systems mainly include three areas:

(a) vehicle taxes;
(b) excise duties on fuel (diesel);
(c) toll and user charges for road infrastructure.

The EU has taken various measures in the areas described above. The most important ones are:

Taxation of the carriage of goods by road (V.4): vehicle taxes, excise duties on fuel and user charges

Common rules applying to (charging systems): vehicle taxes (V.4.1), excise duties on fuel (V.4.2) and user charges (V.4.3) – with a view to establishing a fair mechanism for charging infrastructure costs to hauliers in order to eliminate distortions of competition between transport undertakings in the various Member States.

Council Directive 93/89/EEC of 25 October 1993 seeks an approximation of the level of charges and duties in order to eliminate distortion of competition. Through this directive two objectives have to be achieved: harmonization of taxes on certain road transport vehicles and framework conditions for tolls and user charges for certain infrastructures. The directive is applicable to vehicles that are intended exclusively for the carriage of goods by road and with a maximum permissible gross laden weight of not less than 12 tonnes. Member States are still allowed to continue to charge for specific taxes or charges like registration or parking fees.

The directive lays down minimum tax rates for annual vehicle taxes. The minimum rate is based upon the number and configuration of axles, maximum permissible gross laden weight and type of suspension system.

Furthermore, according to the directive, tolls and/or user charges can be levied only on motorways or similar roads, bridges, tunnels and roads crossing mountain passes without discrimination as to the nationality of the vehicle and there should be no controls at internal borders.

Following the adoption of the directive, Germany, Denmark, Belgium and Luxembourg (all from 1 January 1995) and the Netherlands (from 1 January 1996) have introduced a common road user charge, the so-called 'Euro-vignette'. All vehicles using the motorway network in one or more of these countries during a given time period (e.g. day, week, month, year) have to pay this Euro-vignette. Rates for vehicles of 12 tonnes or more with five or more axles are ECU 1,250, ECU 125 and ECU 33 for a year, month or week respectively. The daily rate for all vehicles is ECU 6.

Excise duties: petrol and diesel: approximation of rates (V.5)[4]

To set a minimum rate of excise duties for mineral oils (petrol, gasoil).

Council Directives 92/81/EEC, 92/82/EEC and 92/108/EEC are all aiming at harmonizing excise duties amongst others diesel. Council Directive 92/82/EEC lays down minimum rates for excise duties on mineral oils, such as diesel, which are compulsory. These levels are currently exceeded in the majority of Member States. The minimum rate for excise duties on diesel applicable from 1 January 1993 is ECU 245 per 1,000 litres of diesel. No official proposal to raise the excise rate minimum has been made.

3.2.3. Safety and social measures

Social regulation: driving and resting hours (V.6)

Harmonization of the different national regulations of the individual Member States on maximum driving hours and minimum resting hours and the ages and requirements on professionality.

EC regulations set requirements on the maximum driving and minimum resting hours (Articles 6 and 7 of Council Regulation (EEC) No 3820/85), and on minimum ages of drivers (Council Regulation (EEC) No 3820/85). Regulation No 3820/85 is applicable to national and border-crossing road transport within the frontiers of the EU with a vehicle of a maximum permissible weight (including any trailer or semi-trailer) exceeding 3,500 kilograms. Regulation No 3820/85 also sets the minimum qualification of truck drivers.

Hauliers are obliged to equip their vehicles with tachographs in order to monitor the compliance with the social legislation (laid down by Regulation (EEC) No 3821/85). Minimum requirements regarding this monitoring were set in November 1988 (checks of a

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4 In contrast with V.4.1 above, this measure defines a minimum level where V.4.1 is merely related to the system of charging.

minimum of 1% of working days per year). Sanctions and fines, on the other hand, are set by national governments.

These regulations are set in order to obtain improvements in road safety and social conditions and to harmonize the competitive conditions between hauliers from different Member States. There are no differences in interpretation by national legislation. However, for national transport, Member States may apply legislation that is more stringent.

Road safety: transport of dangerous goods (V.7)

To lay down uniform safety rules for the transport of dangerous goods by road.

Here, it concerns a Council Directive (94/55/EC) aiming at laying down the conditions and prerequisites under which dangerous goods may be transported in packaged form and in bulk. The directive is set to harmonize the national safety rules from the Member States. Consignments by post or transport of dangerous goods by national armed forces are excluded from this directive.

Road safety: checks on the transport of dangerous goods by road (V.8)

To harmonize procedures for checks on the transport of dangerous goods by road in order to make them more efficient.

Council Directive 95/50/EC (which enters into force on 1 January 1997) aims at laying down uniform procedures for checks by Member States on dangerous goods by road. The checks must be part of normal roadside checks within the Community or on the external Community frontier (no border crossing checks within the Community). They must be carried out at different places and times without discrimination. Illegal vehicle transport may be immobilized and required to conform to the prescribed conditions in order to continue the journey.

3.2.4. Customs controls and formalities

Customs controls and formalities: elimination of transport checks at frontiers (V.9)

To abolish frontier checks and formalities related to road vehicles (and inland waterway vessels), their drivers and the corresponding documentation.

Council Regulation (EEC) No 4060/89 (which entered into force on 1 July 1990) and its amendment, laid down in Council Regulation (EEC) No 3356/91 (which entered into force on 1 January 1992), eliminate the Community's internal border controls which take place under Community or national law for, amongst others, road transport (e.g. checks and inspections of driving licences, roadworthiness certificates for motor vehicles and their trailers, weights and dimensions of road vehicles, checks on social provisions relating to transport).

Customs controls and formalities: abolition of internal frontier controls in road transport and their transfer to the Community's external frontiers (V.10)

To abolish and transfer to the Community's external frontiers the controls on internal frontiers carried out by the Member States in the field of road transport by means of vehicles registered or put into circulation in a non-Community country.

Council Regulation (EEC) No 3912/92 (which entered into force on 1 January 1993) in essence abolishes the internal border controls on road transport vehicles registered in a non-Community country and diverts these controls to the external border of the Community. The regulation concerned, however, does not withhold the right of Member States to carry out controls regarding authorization on transport carried out by operators registered in a non-Community country in or through the territory of the EU Member State concerned. This means that the controls are no longer exercised at the internal borders of the Community, but must be seen as part of normal controls in the territories of Member States.

Customs controls and formalities: Community transit: use of TIR and ATA carnets (V.11)

> To abolish checks and formalities at the Community's internal frontiers on transport operations under cover of TIR or ATA Conventions.

Council Regulation (EEC) No 719/91 regulates the use of TIR carnets and ATA carnets in the Community as transit documents; in the case of transport or transit transport of goods carried under the TIR or ATA Convention, the regulation regards the European Community as one single territory. If goods are carried from one EU Member State to another via a non-Community country, the goods have to be checked at the points of leaving and re-entering the EU territory. Furthermore, Regulation No 719/91 provides that a Member State is entitled to impose charges or penalties in case of an offence or irregularities committed during transport operations. The implementation of Council Regulation (EEC) No 719/91 is provided for by Commission Regulation (EEC) Nos 1593/91, 3689/92 and 3691/92.

3.2.5. Environmental regulations

Noise pollution (V.12)

> To set standards for maximum permissible values of noise emissions from freight vehicles.

The limit values for noise emissions were originally set by Directive 70/157/EEC. Directives 77/212/EEC and 84/424/EEC lowered the standards for maximum permissible values of noise emissions. The reduction for freight vehicles is significant (10 dB).

The most recent limit values are laid down in Directive 92/97/EEC as follows:

Engine power	Limit value (maximum permissible noise pollution)
– below 75 kW:	81 dB
– 75 kW–150 kW:	83 dB
– over 150 kW:	84 dB

Air pollution: emissions from diesel engines: new standards (V.13)

> To further reduce limit values for emissions of three gaseous pollutants (carbon monoxide, hydrocarbons and nitrogen oxides) and of particulate pollutants from commercial vehicles.

Council Directive 88/77/EEC, amended by European Parliament and Council Directive 96/1/EC, aims to harmonize the national laws of the individual Member States relating to the

measures to be taken in order to reduce the emission of gaseous and particulate pollutants from diesel engines used in vehicles.

A gradual introduction of limits on emissions of diesel engines/vehicles and the implementation of a Community type approval (replacing the national type approval) of new vehicles meeting the emission standards is applied by the directives.

As from 1 January 1992 Member States may no longer refuse the EU type approval of diesel engines and vehicles as well as the use and sale of diesel engines and vehicles provided they comply with the legal provisions in force (Directive 88/77/EEC).[5] From 1 July 1992 the Member States may no longer grant EU type approval or must refuse national type approval of diesel engines and vehicles if they do not comply with the emission standards of line A, Table 1 of Appendix I to Council Directive 88/77/EEC.

This directive sets the emission standards for diesel engines (effective from 1 October 1990) at 14.4 g/kWh NO_x, 2.4 g/kWh HC and 11.2 g/kWh CO (Table 4.13). More stringent standards have been introduced by Directive 91/542/EEC. This directive has set the (Euro-1) limit values for emissions at 8.0 g/kWh NO_x, 1.1 g/kWh HC, 4.5 g/kWh CO and 0.36 g/kWh PT. These values have been effective from 1 July 1992 (except those for PT emissions). As from 1 October 1996, the respective limit values were replaced by new, again more stringent, standards through the same directive (91/542/EEC). As Euro-2 standards the new limit values are 7.0 g/kWh NO_x, 1.1 g/kWh HC, 4.0 g/kWh CO and 0.15 g/kWh PT (Table 4.13).

The restrictions on the entry, type approval and use of new vehicles were intensified as from 1 October 1996. Member States have to refuse registration, sale and use of new vehicles with diesel engines that are not in conformity with the emission standards laid down in line B, Table 1 of Annex I to Directive 88/77/EEC.

A derogation has been provided for small diesel engines with a swept volume of less than 0.7 dm^3 and a rated power speed of more than 3,000 min^{-1}.

Individual Member States are free to introduce tax incentives for the import or production of diesel engines and vehicles meeting the standards laid down by the relevant directives.

3.2.6. Measures to endorse technical harmonization

Road vehicles: weights and dimensions (V.14)

> To harmonize Member States' rules on the weights and dimensions of certain commercial road vehicles with a view to permitting the improved use of such vehicles in traffic between Member States.

Regulation regarding the dimensions, weights and other technical characteristics of vehicles was initially laid down in Directive 85/3/EEC. Many amendments were made by Directives 86/360, 86/364, 88/218, 89/338, 89/460, 89/461, 91/60, and 92/7. These directives are applicable to road freight vehicles with at least four wheels, maximum speeds exceeding 25

5 Exceptions to these rules had been valid until 30 September 1993 and applied to those vehicles which had received a type-approval certificate before July 1992.

kilometres per hour and maximum laden weights of the total vehicle (truck plus possible trailer, semi-trailer, etc.) exceeding 3.5 tonnes. Specific rules apply to vehicles with five or six axle combinations.

The directives are aimed at harmonizing road freight transport vehicles operating between Member States. In national transport the Member States are free to be exempt from the EU standards and apply different provisions.

When adopted, a proposal for a new Directive will supersede the above legislation. This will consolidate the provisions into a single piece of legislation and will extend harmonization of the lengths and widths of freight vehicles and combinations to cover national transport.

The directive will harmonize the width of non-refrigerated vehicles at 2.55 metres (with zero '+' tolerance) throughout the EU, whilst the length of road trains will be 18.75 metres with a maximum load length of 15.65 metres. The transport of 45-foot containers by road will be prohibited as from 2006. International weight limits will remain as specified in the existing legislation, but national weight limits are not yet harmonized.

Speed-limiting devices for heavy vehicles (V.15)

> To limit the maximum speed of heavy vehicles used to carry goods (or passengers) on the Community's roads.

With regard to the introduction of speed-limiting devices, Council Directive 92/24/EEC (which entered into force on 1 January 1993) regulates the technical requirements for all new vehicles (within the EEC type-approval procedure) and Council Directive 92/6/EEC (which entered into force on 1 January 1993) is aimed at laying down the compulsory installation and use of speed-limiting devices on trucks with a gross laden weight of 12 tonnes or more and buses with a gross vehicle weight of 10 tonnes or more.

According to these two directives, speed-limiting devices must have been installed on trucks and buses before 1 January 1995 for vehicles used for international transport operations and before 1 January 1996 for vehicles used exclusively for national transport operations. For trucks the requirements are that the stabilized speed of the vehicle cannot be more than 90 kilometres per hour; that is the reason for which this type of vehicle has a speed set so as not to exceed 85 kilometres per hour at the state of technology current at the time when Council Directive 92/6/EEC was adopted.

At present, and bearing in mind the accuracy of speed-limitation technology, a speed setting of 85 kilometres per hour is no longer considered to be necessary in order to guarantee a maximum speed of 90 kilometres per hour when the vehicle is used on the road. Consequently, Member States might authorize the setting of the speed-limiting device at a higher speed, provided the maximum speed allowed by the speed-limiting device does not exceed 90 kilometres per hour when the vehicle is used on the road.

3.2.7. Other vertical measures

Community safeguard mechanism (V.16)

To introduce a Community safeguard mechanism, to be brought into operation in the event of a crisis in the market in the carriage of goods by road.

Council Regulation (EEC) No 3916/90 introduces a safeguard mechanism as a back-up measure for the complete dismantling of the system of quotas currently regulating the access to the market. It applies to transport by the hire and reward sector of goods by road between Member States in Community territory. In the event of a crisis, the Commission may exercise measures aimed at preventing overcapacity in the market by imposing market-access restrictions or limitations on the growth of existing operators. Safeguard measures can also be taken to exclude cabotage operations.

3.2.8. Overview and relative importance of vertical or sector-specific measures

Table 3.1 has been produced on the basis of the above information on the various vertical measures taken by the European Union. This table shows for each measure the expected relative importance regarding the effects on the level of productivity, costs and quality of road transport operators. The table also illustrates whether individual measures reflect a (direct) harmonization or liberalization objective or both.

The listed measures concerning access to the market and the profession are directly aimed at liberalizing the international carriage of goods between Member States as well as the introduction of cabotage. As a result, competition from foreign road haulage operators both on international and domestic EU markets is expected to increase as quantitative restrictions to market access are removed. The qualitative entry barriers in terms of qualifications for road haulage operators are being harmonized in order to eliminate national differences of market entry and thus distortions through 'unfair' competition. Based on the assumption that hauliers operate on an economically rational base, fair competition will lead to a shake-out effect of inefficient carriers who will leave the market. With the abolition of the minimum and reference tariffs in international transport and, at a later stage, also in domestic transport (i.e. Germany, France), competition will most likely put intense pressure on transport prices in general and severely depress operating margins. The next chapters will show that the majority of these expectations have come true.

Furthermore, the productivity of transport operations in general will most likely also benefit from market liberalization measures, e.g. through improved opportunities to obtain cargo for back-hauls and cabotage transport. Increased competition and decreased profit margins due to rate discounting will intensify the need for efficiency gains and innovation.

The second group of measures, reflecting the harmonization of levy systems of taxes, also contributes to the establishment of fair competition between road transport hauliers from different EU Member States. Fair competition is expected to be improved through a uniform levy system of taxes. Safety and social measures equally strive for harmonization; uniform safety and social standards in road haulage operations enable fair competition. For operators in some EU Member States, harmonization will increase operating costs. For others, it will result in a reduction of costs.

Table 3.1. Overview of vertical or sector-specific EC measures and their relative importance

Vertical measure	Relative importance	Harmonization measures	Liberalization measures
ACCESS TO THE MARKET AND THE PROFESSION			
V.1 Free quantitative access/admission to the occupation of road transport operator	++	✓	✓
V.2 Free carriage of goods by road between Member States	++		✓
V.3 Free carriage of non-resident carriers on domestic markets/admission of inland cabotage	++		✓
HARMONIZATION OF LEVY SYSTEMS OF TAXES RELATED TO INFRASTRUCTURE COSTS			
V.4.1 Harmonization of vehicle taxes	++	✓	
V.4.2 Harmonization of excise duties on diesel	++	✓	
V.4.3 Harmonization of user charges for infrastructure ('Euro-vignette' system)	++	✓	
V.5 Minimum rates for excise duties for petrol and diesel	++	✓	
SAFETY AND SOCIAL MEASURES			
V.6 Social regulation: harmonization of driving and resting hours	++	✓	
V.7 Uniform safety measures for road transport of dangerous goods	+	✓	
V.8 Harmonization of procedures for checks on the road transport of dangerous goods	0	✓	
CUSTOMS CONTROLS AND FORMALITIES			
V.9 Elimination of transport checks and controls at internal frontiers	++		✓
V.10 Abolition of certain internal frontier controls and their transfer to the Community's external frontiers	+		✓
V.11 Abolition of border customs controls and formalities for transport under cover of TIR and ATA Conventions	0		✓
ENVIRONMENTAL REGULATIONS			
V.12 Harmonization of noise emission standards	+	✓	
V.13 Harmonization and introduction of new standards for emissions from diesel engines	+	✓	
MEASURES TO ENDORSE TECHNICAL HARMONIZATION			
V.14 Harmonization of weights and dimensions of road vehicles	++	✓	
V.15 Introduction of speed-limiting devices for heavy vehicles and coaches	+	✓	
OTHER MEASURES			
V.16 Carriage of goods by road: Community safeguard mechanism	0		

Source: NEA.

Notes:

0: Relatively unimportant
+: Important
++: Extremely important
✓: Applicable

The abolition of customs controls and formalities at the internal borders of the EU will reduce total transport transit times as well as the costs related to waiting times at the borders. This again also leads to productivity gains, both in terms of the utilization of manpower and of transport equipment.

Environmental regulations strive for further reduction of the emissions of gaseous pollutants and noise emissions from transport vehicles. Harmonization of national laws on limit values for emissions is necessary to ensure fair competition between carriers from different Member States. Also technical harmonization should contribute in this respect.

3.3. Horizontal or general EC measures

The relevant horizontal measures affecting road transport operations and others in the European Union are discussed in this section. These are general measures that are applicable to several or all sectors, e.g. road transport, air freight, water transport and short-sea shipping, etc. Therefore, the horizontal measures will partially overlap with the measures described under Section 3.2 'Vertical or sector-specific EC measures'. Only the reference to these measures is included in the list of horizontal measures; for more detailed information we refer to the section on the vertical measures.

The following horizontal measures overlap with the vertical measures listed:

H.1	(V.5)	Excise duties: petrol and diesel: approximation of rates
H.2	(V.9)	Customs controls and formalities: elimination of transport checks at frontiers
H.3	(V.10)	Customs controls and formalities: abolition of certain internal frontier controls in road (and inland waterway) transport and their transfer to the Community's external frontiers
H.4	(V.11)	Customs controls and formalities: Community transit: use of TIR and ATA carnets
H.5	(V.13)	Air pollution: emissions from diesel engines: new standards

3.3.1. Description of horizontal EC measures

The following horizontal measures also apply to or affect sectors other than road transport:

Indirect taxation: value added tax: common VAT scheme: uniform base of assessment (H.6)

> Abolition from 1 January 1993 of the need for tax controls at internal frontiers for all transactions carried out between Member States, to approximate the VAT rates applicable to those transactions and to make provision for a transitional phase of limited duration that will ease the transition to the definitive arrangements for the taxation of trade between Member States.

Council Directive 77/388/EEC harmonizes the national laws of the Member States related to turnover taxes, strives for a common system of value added tax as well as a uniform approach of assessment. With Directives 91/680/EEC, 92/77/EEC and 92/111/EEC, and Regulation (EEC) No 218/92, the VAT formalities at the internal EU borders have disappeared from 1 January 1993 onwards.

As from 1 January 1993 border checks regarding VAT payments are no longer exercised and companies can transport their goods through the Community without any VAT formalities or VAT payment while crossing the internal EU borders. The directive does not exempt companies from VAT payments. During the transition phase (1 January 1993 to 31 December 1996) towards a system where VAT is paid in the Member State of destination of the goods, it is compulsory for companies to pay VAT on their purchases made in the Member States of origin. These transactions, however, are subject to the VAT rates and conditions which are used in the Member State of destination of the goods. The minimum standard rate of VAT in each Member State is 15%.[6]

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6 For precise VAT rates in individual Member States, see Table C.3 in Appendix C.

Common system of taxation for parent companies and their subsidiaries (H.7)

To establish, for groups of companies from different Member States, tax rules that are neutral with regard to competition.

Council Directive 90/435/EEC (which entered into force on 1 January 1992) harmonizes tax rules on the distribution of profits received by parent companies in a Member State from their subsidiaries in other states and the profit distributions that subsidiaries in one state make to their parent companies in another Member State. The directive sets uniform tax legislation on the distribution of profits, withholding tax, dividends etc. between parent companies and their subsidiaries. A Member State of a parent company situated in its territory may not charge withholding tax on profits received by the parent company from its subsidiaries. A proposal for a Council Directive extends the purpose of Council Directive 90/435 to corporation tax disregarding its legal form. Furthermore, double taxation (redistributing profits between parent and subsidiary companies) will be eliminated.

3.3.2. Overview and relative importance of horizontal or general EC measures

Table 3.2 shows the identified horizontal measures affecting not only road transport operations within the EU, but possibly also waterway transport operations, air freight, rail transport operations and other businesses.

The adoption of a common VAT scheme for road transport operators from all EU Member States will most likely contribute to enabling true, fair competition. Also a common system of taxation for parent companies and their subsidiaries is important in this respect, though it will affect mostly the larger international transport operators.

Table 3.2. Overview of horizontal EC measures and their relative importance

Horizontal measure		Relative importance	Harmonization measures	Liberalization measures
HORIZONTAL EU MEASURES				
H.6	Introduction of uniform VAT scheme: uniform base of assessment	++	✓	
H.7	Introduction of common system of taxation for parent companies and their subsidiaries	+	✓	

Source: NEA, expert opinion.
Notes:
0: Relatively unimportant
+: Important
++: Extremely important
✓: Applicable

3.4. State of affairs of EC measures in national legislation

Most measures described in the preceding sections are in force and have been applied. Nevertheless, some barriers remain for the free carriage of goods by non-resident carriers on domestics markets (so far only partly implemented) and the harmonization of user charges for infrastructure which has not yet been implemented by all Member States (Appendix F).

4. The impact of the single market on sectoral performance

4.1. Introduction

In the previous chapter a description is given of the measures taken to complete the single market in road freight transport. This chapter focuses on the impact of these measures on sectoral performance. As effects apply to both demand and supply directly (as a result of vertical measures) or indirectly (as a result of horizontal measures) an analytical framework is used based on these elements. The starting point for Section 4.2 is the demand side of road freight transport. It is important to realize that demand as such does not exist; all demand for road freight transport is actually derived demand from shippers and trade. Several important trends will be discussed as well as their (indirect) effects on transport companies. Where possible the relation to the single market programme is discussed in a qualitative manner or proved by quantitative methods. Section 4.3 describes changes on the supply side of road freight transport. Within Section 4.3 a distinction is made between direct and indirect effects. Direct effects, such as changes in cost structure, are related to transport companies only, while indirect effects are not necessarily only related to transport companies but also apply to other actors. In Section 4.4 conclusions will be drawn as a result of confronting supply with demand. Finally, Section 4.5 deals with remaining obstacles and shortcomings.

4.2. Demand side of road freight transport

4.2.1. Shippers' rationalization of activities

> *Final consumer preferences are rapidly and constantly changing. Product life-cycles become shorter. In an attempt to meet customer demand and to reduce costs, shippers are rationalizing both internal and external logistics. 'Back to core-business' became an important strategy, resulting in an overall increase of hire and reward transport services. As a result, carriers in turn are forced to meet shippers' criteria as well. The scope of logistics services, as well as quality-price ratios, become the main driving forces for rationalizing and restructuring their operations.*

Client location has always been a decisive factor in the locational pattern of logistics service providers. From the shipper's point of view, a transport firm in the immediate vicinity of the shipper was much more easily and quickly chosen than companies located further away. With the increase of integrated logistics and business being done on a multinational and even global level, the elements of quality, costs and the geographical coverage of logistics of services are becoming more decisive than vicinity.[7] Along with the rationalization processes taking place at manufacturing companies, the number of carriers hired by shippers has already been reduced dramatically in many cases.[8]

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7 This does not imply that vicinity is not important at all. If companies do comply with changed shippers' demand, vicinity and the resulting lower costs and higher control remain as important as before.

8 Andersen Consulting & Cranfield School of Management [1993]: *Reconfiguring European logistics systems*; NEA Transport research and training & Cranfield School of Management [1995]: *Future logistics structures*.

The rationalization of manufacturing and distribution sites continues to be accompanied by a rationalization of carriers. However, the move to focused manufacturing and centralized inventory holding extends the catchment area served by any single company location. Naturally, any carrier working from these locations will have to meet the increase in travel distances that such centralization implies. As truly pan-European carriers are missing from the market-place, shippers tend to allocate their logistics needs to carriers operating on a European regional basis, e.g. Iberian peninsula, northern Europe and Scandinavia. Such changes imply greater traffic flows through fewer but larger carriers using sub-contractors. This implies that the role of medium-sized carriers is under threat. The financial investment associated with European regional logistics services – transport, storage, transhipment points and, in particular, their information technology costs – works against the medium-sized carrier.

Despite the trend toward integrated logistics management and carrier rationalization a recent in-depth study into the logistics strategies of 22 large European multinational companies[9] has revealed some important conclusions. They emphasize that demand for road freight transport must be understood as derived shippers' demand. As a result the following restructuring processes are taking place:

(a) A clear tendency amongst shippers to contract out transport and logistics services. In some cases this concerns longer term contracts and mutual agreements with an interest in open book accounting with an agreed rate of return. Other firms prefer to contract out (specialized) transport and warehousing treatment activities providing logistics vendors with opportunities for value added logistics.

(b) A reduction in the number of contracted transport and logistics service providers. Companies will monitor their contractors' services provision and evaluate their ability to provide high service levels (customization).

(c) With centralization of production and distribution, a larger European market will be served. Carriers will have to serve larger markets and cope with different languages and cultures.

(d) With the trend towards European Distribution Centres (EDCs), a growing importance of Regional Distribution Centres (RDCs) has also been identified. This leaves space for regionally operating, often medium and small-sized transport firms able to comply with changed shippers' demand.[10] Transport and logistics service contractors are selected according to their capabilities to meet specific shipper requirements, mostly from within the region where their manufacturing plants or distribution centres are located.

(e) As real pan-European carriers are missing, shippers tend to strive for a reduced number of regional/national specialists. Even if a real pan-European carrier existed, shippers would not now or in the future opt for contracting out transport and logistics services as integrated packages to one or even two true pan-European carriers.

(f) In the selection process between logistics service providers, quality has become a qualifier. EDI and IT support systems for tracking and tracing have also become a qualifier, instead of merely a competitive advantage.

(g) Shippers striving for geographical integration of their manufacturing and logistics systems at the level of the EU, tend towards strategic alliances with third-party logistics

9 Ibid. note 8.

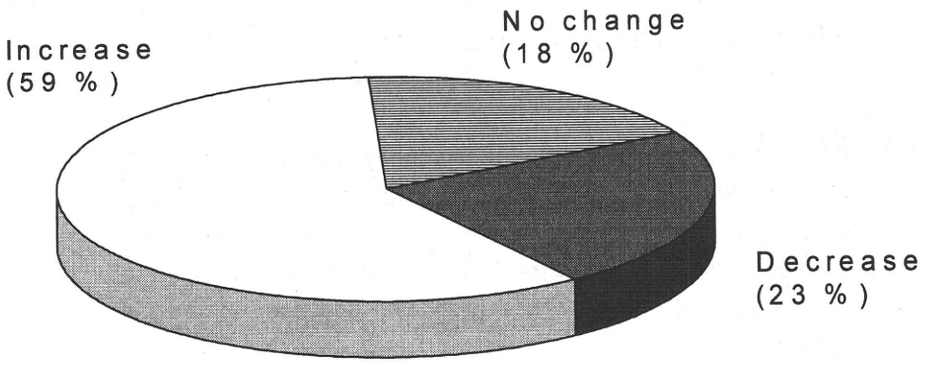
10 Unfortunately, as will be discussed later on, only a limited number of medium-sized companies are able to meet these new requirements.

vendors. These logistics service providers provide business solutions for logistical questions and problems faced by the shipper.

Thus, in general it may be said that along with the general tendency towards integrated logistics, shippers will be looking for differential transport and logistics services and their providers. In some cases, this will be long-distance FTL transport from a single EDC and in other cases regional (national) distribution and customization of products. Availability of logistics services in a particular region is no longer an important locational factor for shippers. Quality and scope of the logistics services available have become just as important.

The restructuring of logistic operations, however, has not only taken place within large multinational companies. As an answer to increased competition, back to core-business became a strategy accepted by almost every shipper. In the 1980s and the early 1990s, this strategy caused many companies to outsource their distribution activities to professional road transport operators. This trend could also be observed in studies of companies in the United Kingdom[11] where figures clearly show that substantially more shippers (59%) had increased their expenditure on third-party distribution than those that reduced it (23%) in the period 1990–92.

Figure 4.1. Changing expenditure on third-party distribution, United Kingdom, 1990–92



11 *Contracting out or selling out?* PE-International, 1993.

Table 4.1 shows the increased role for hire and reward services during the 1986-92 period.[12]

Table 4.1. 1992 indexes on border-crossing transport (1986=100)

	Own account		Hire & reward		Total	
	tonnes	t-km	tonnes	t-km	tonnes	t-km
Germany	133	116	122	122	124	122
France	100	73	187	191	171	176
Italy[1]	90	200	236	91	94	94
Netherlands	119	111	154	162	149	158
Belgium	129	143	152	169	144	160
United Kingdom	65	100	243	258	214	241
Ireland	112	98	107	98	108	98
Denmark	148	139	147	147	147	146
Greece					137	129
Spain[2]	653	1,563	121	216	128	230
Portugal					324	345
EU[3]	114	118	150	167	144	162

Source: Eurostat.

1 In statistics provided by Eurostat, several figures for Italy in relation to other EU Member States are missing. Figures refer to the 1990–92 period.

2 Large index for own-account due to very small performance in 1986. According to Eurostat the total performace of Spain in 1986 was 65 million tonnes-kilometres.

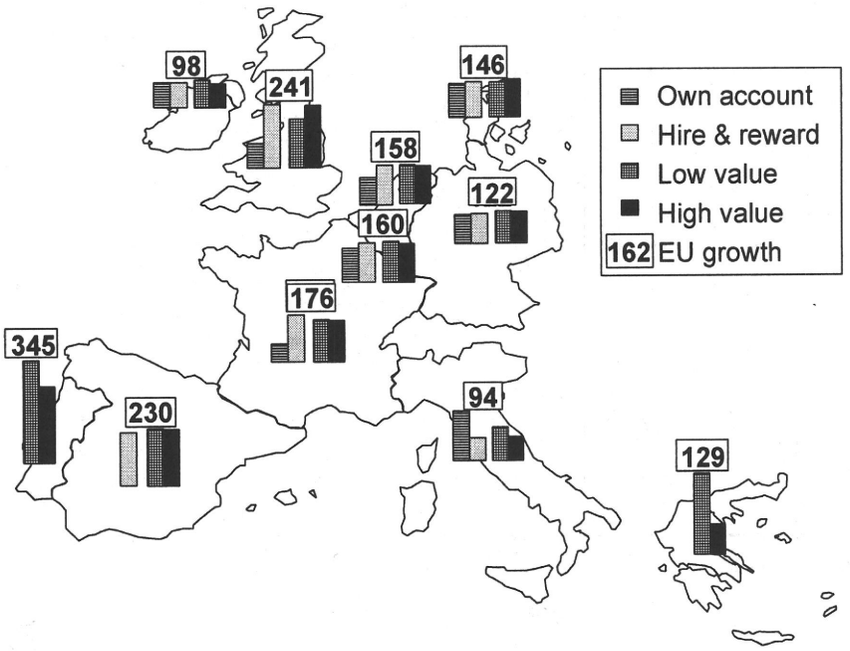
3 Italy ommitted from analyses.

Although the own-account segment still grew during the period 1986–92, Table 4.1 clearly indicates that the pace is significantly lower than for the hire and reward segment (in tonnes-kilometres: 18% versus 67%). In international transport, outsourcing of transport-related activities have clearly contributed to a shift from own-account towards hire and reward services.

In Figure 4.2 the performance indexes for own-account and hire and reward services as well as a split for high-value and low-value commodities are given. The pattern of this figure illustrates an overall growth in transport performances regardless of the value of the cargo. Exceptions are Greece, the United Kingdom and Portugal (see Appendix D, Table D.5). However, strong evidence for a relation between outsourcing of activities and value of commodities is lacking.

12 The figures in Table 4.1 are based upon statistics provided by Eurostat in October 1995. A similar table has been produced by the European Commission in July 1994. Small differences between the two can be witnessed. European Commission : *Le transport routier de marchandises au sein du marché unique européen*, July 1994.

Figure 4.2. Performance indices for international transport in million tonnes-kilometres, 1986–92

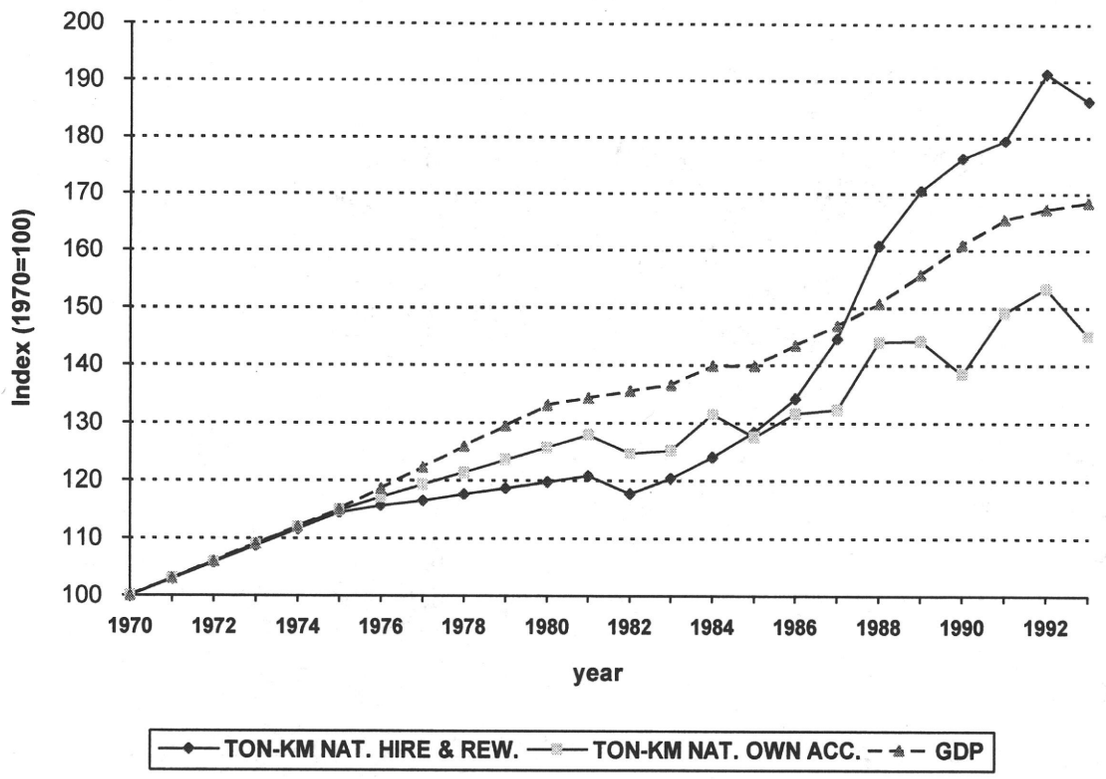


The question remains, however, whether this change towards professional hire and reward services can be related to single market effects either by substitution (direct) or trade creation (indirect). In the United Kingdom, where transport markets have never been regulated,[13] the own-account performance in tonnes-kilometres remained stable. In France, where a bilateral tariff system was abolished in 1990, the situation changed dramatically. French transport performance not only increased significantly above the EU average, but also showed a decreasing role for own-account transport. Total performance grew by 76%, while own-account performance dropped by 27%. However, as the survey methodology has been changed in France these findings should be interpreted with care.

As data supporting long time series for border-crossing transport are not available, several regressions have been carried out to validate these findings for domestic transport (for the own-account as well as the hire and reward segment). Figure 4.3 shows time series for GDP, hire and reward domestic transport as well as own-account domestic transport. A dummy, to reflect the single market effect, is active from 1985 onwards, which is the starting year of the period to be analysed.

13 Some bilateral regulations did exist between the United Kingdom and other EU Member States, although in practice many companies did not fully comply with the agreed bilateral reference tariffs.

Figure 4.3. Development of domestic road freight transport for hire and reward and on own-account and GDP (1970=100)



Two equations are estimated: first, an equation for hire and reward domestic transport, second, one for own-account domestic transport. As the domestic transport market is hardly affected by the disappearance of internal frontiers, the dummy in both equations refers to the contribution of a direct (substitution instead of trade creation) single market effect as a result of the liberalization of the market for transport operators.

tonnes-kilometres (hire & reward) = 0.7 + 0.94*GDP + 17.4 * dummy ; adj. r-square = 0.91
(0.1)(5.7) (2.5)

tonnes-kilometres (own-account) = 31.3+ 0.71*GDP - 0.96 * dummy ; adj. r-square = 0.96
(5.0) (13.9) (-.04)

The null-hypothesis tested is whether the single market did not have a significant impact on domestic transport performance for own-account as well as hire and reward operations. In other words, if the single market did have an impact on the individual segments, the underlying time series should provide indications thereof. In fact, the dummy in the own-account regression equation turned out to be insignificant, indicating a single market effect for hire and reward operations only.[14] These findings suggest a single market effect on the growth of hire and reward operations caused by the liberalization of the transport market.

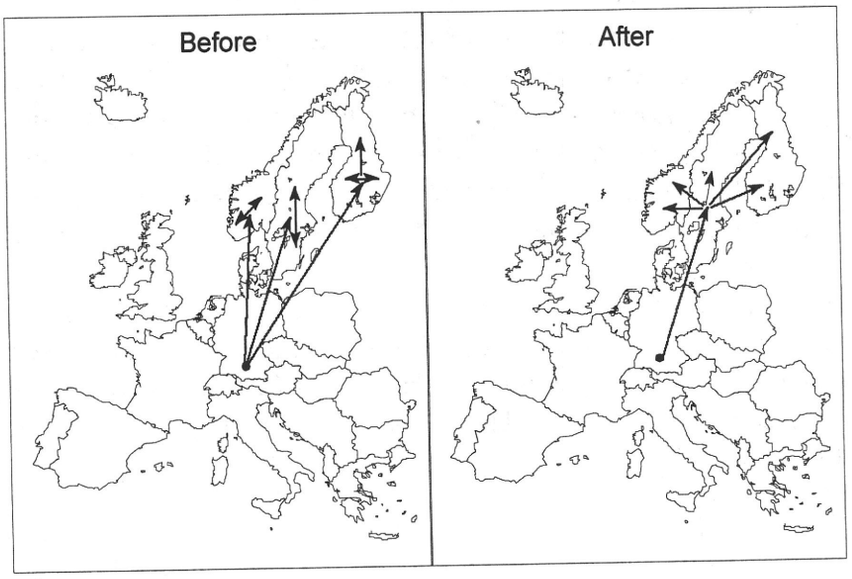
[14] Alternative equations with, for example, fuel prices are not considered, as this violates the assumption of independent explanatory variables (high correlation between GDP and fuel prices).

4.2.2. Internationalization of activities

The single European market, together with the decline of fuel prices since 1985, enabled the reallocation of production sites. As a result, shipments of (semi-) manufactured goods are transported over greater distances and in less bulky quantities. Internationalization of activities emerged and the spatial behaviour of both industries and logistics service providers leads to a clear tendency towards local geographical concentration.

What we can see in general in the shipping industry today is that companies are striving to raise productivity and lower total costs while at the same time achieving better customer service. This is achieved, amongst others, by rationalizing and re-configuring their logistic structures across national boundaries, often resulting in a geographical concentration of manufacturing and distribution activities. From recent studies[15] it appears that many shipping companies in Europe already have reassessed the key elements of their logistics systems. Since 1993, they can base their logistics strategies on Europe as a whole. Not only do they have better access to the different national markets within Europe, they also have greater opportunities for product standardization and for the rationalization of their distribution systems (see the example of Bosch-Siemens in Figure 4.4).

Figure 4.4. Bosch-Siemens manufacturing and logistics systems reconfiguration in Scandinavia



Source : Andersen Consulting & Cranfield School of Management (1993).

In many industry sectors the number of the different logistic sites (units of production, warehouses, terminals for transhipment and groupage and de-groupage) is decreasing very rapidly. Examples are found within business equipment industries, fast moving consumer goods industries, food and agricultural products industries and chemical processing

15 Andersen Consulting & Cranfield School of Management [1993]: *Reconfiguring European logistics systems*; NEA Transport research and training & Cranfield School of Management [1995]: *Future logistics structures*.

industries.[16] Their interdependent relations are increasing across national boundaries and across industrial sectors. New European logistic structures are being created in order to be able to internationalize rationally and economically. This reconfiguration of the logistics systems of shipping industries has been made possible by the removal of trade barriers within the EU.

The single European production plant is therefore no longer a rare phenomenon. There is a strong tendency in industry towards specialized production sites, serving the European and even the global market within a company's broad range of products. According to the French transport economist Bonnafous, the geographical model of implantation, which is clearly developing nowadays within the EU, is one of plants specialized in the production of one or two finished products (or a maximum range of similar finished goods). The complete range of products of a company is produced at different plants, mostly in different countries. This model also applies to plants for the production of intermediary goods. Plants for the production of finished goods serve larger markets than before.

Distribution of finished products is done over greater distances than the supply of intermediate goods, which in turn are destined to serve more plants at distances much larger than in previous years.[17] The outcome of this spatial restructuring process along with the tendency towards lean production and just-in-time logistics is that shipments of (semi-) manufactured goods are not only being transported over longer distances, they are also being transported in less bulky quantities.[18]

A stimulating factor for this process was the decrease in fuel prices after 1985. Compared to developments in the previous decade, the past decade was characterized by relatively low energy prices and relatively high capital costs. This shift in the cost structure occurred in 1985 when, in a single year the fuel prices decreased by 40% (this was caused by a sharp decline of the United States dollar). Fuel prices remained low from 1985 until around 1990 (see Figure 4.5). From 1990 onwards the fuel prices gradually started to rise again in most countries, mainly because of excise duties imposed on them by governments. By that time, investments in energy savings, which had already started in the 1970s began to materialize everywhere in the economy. Cost structures were not as dependent on fluctuations of fuel prices as before.

In contrast to fuel prices, capital costs have remained high during almost the entire decade. Consequently, companies have concentrated more on reducing capital costs than on reducing energy costs, which was one of the main objectives in the previous decade. It forced them to look more critically at the capital invested in depots and warehouses and at the trade-off between transport and storage.

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16 NEA Transport research and training and Cranfield School of Management [1995]: *Future logistics structures.*

17 Alain Bonnafous [1993]: 'Circuler en 2000–2001'. In: Alain Bonnafous, François Plassard & Bénédicte Vulin (ed.): *Circuler Demain.* Collection Monde en Cours. Série Prospective et territoires. DATAR/Editions de l'Aube, p. 10.

18 It is important to realize that the decline of fuel prices in relation to high capital costs is the main driving force behind this logic.

Figure 4.5. Development of diesel prices, VAT included, in national currencies (1982=100)

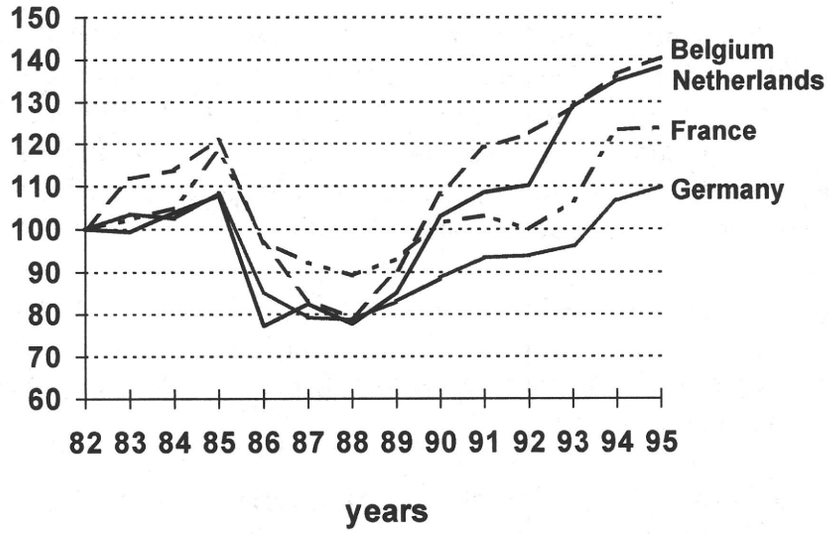

Table 4.1 provides evidence for these findings. The last column shows that the total transport performance for border-crossing transport in tonnes within the EU increased by 44%. During the same period, performance measured in tonnes-kilometres grew by 62%. The average number of kilometres grew by 12.5%.[19] This implies an increase in average distance, a reduction in size of shipments, but more likely a combination of both elements.

As an outcome of these logistic re-configurations, we observe that complementary logistic organizations and networks of producers and their suppliers (e.g. retailers, wholesalers and logistics service providers) come into existence. Spatially, they are increasingly being concentrated along the main European transport infrastructure and, to a lesser extent, along links connecting this main infrastructure (corridor) with more peripherally located markets (e.g. Spain and Portugal or Norway and Sweden).

There is a clear tendency towards the geographical concentration of logistic activities of manufacturing, retailing and distribution activities. A rationale behind this logistics polarization process is not so much that firms prefer to be as close to each other as possible (physical proximity). It seems that some regions are preferred more than others, because they offer the best conditions in terms of guaranteeing preferred lead-times to the markets of suppliers and customers. In a report prepared for DATAR, the French economist Colin asserts that at the aggregate level of the EU, the processes of logistics reconfiguration will amount to increasing strategic polarization and concentration in the logistics network structures of shipping industries (in terms of material as well as immaterial links between nodes).

19 (1.62 - 1.44)/1.44 = 0.125 * 100%= 12.5%.

Certain regions in the economic heartland (the so-called 'economic banana') of Europe are increasingly becoming important nodes in the logistics and transport chains of shippers and logistics service providers. The spatial area of economic development stretches from the south of the United Kingdom, via the Benelux, northern France, Baden-Württemberg and Bayern in Germany to Italy and southern France. New developments also occur on transport corridors from the heartland of Europe in the direction of Scandinavia, the north and south of Eastern Europe and the north-east of Spain.[20]

Figure 4.6 clearly shows that approximately from 1984/85 onwards international transport increased with a substantially higher growth rate than in previous years. Moreover, this growth seems to be surprisingly stable. In 1992, it halts rather abruptly (due to the recession). Since the time series of domestic transport does not display a similar spectacular increase in the growth rate, the explanation of the growth in international transport cannot be found in variables which affect domestic and international markets equally.

The short-term development of fuel prices (see also Figure 4.5), which may be expected to have a more pronounced effect on the time series of international transport, does not offer a good explanation either, because if it did, one would expect to see a significant slowdown of the growth in the latter years of the last decade.

The only natural explanation of the structural break in the time series in 1984/85 is the single market programme, i.e. the internationalization of economic activities of shippers due to the disappearance of internal frontiers or the reconfiguration of their logistics systems.

As argued in the first part of this section, the (long-term) development of costs (in particular the trade-off between capital and fuel costs) was one of the most decisive factors in the strategic decision-making process of shippers. So this implies that indirectly, via this strategic decision-making process, (expectations regarding) fuel costs may have had an influence (as well as the expectations regarding developments of capital costs) on the increase in international road freight transport after all.[21]

By using so-called dummy variables, one can test whether or not there is a structural break in the time series of international road freight transport. By including similar dummy variables in both equations, one can test the effects of the single market programme as discussed above.

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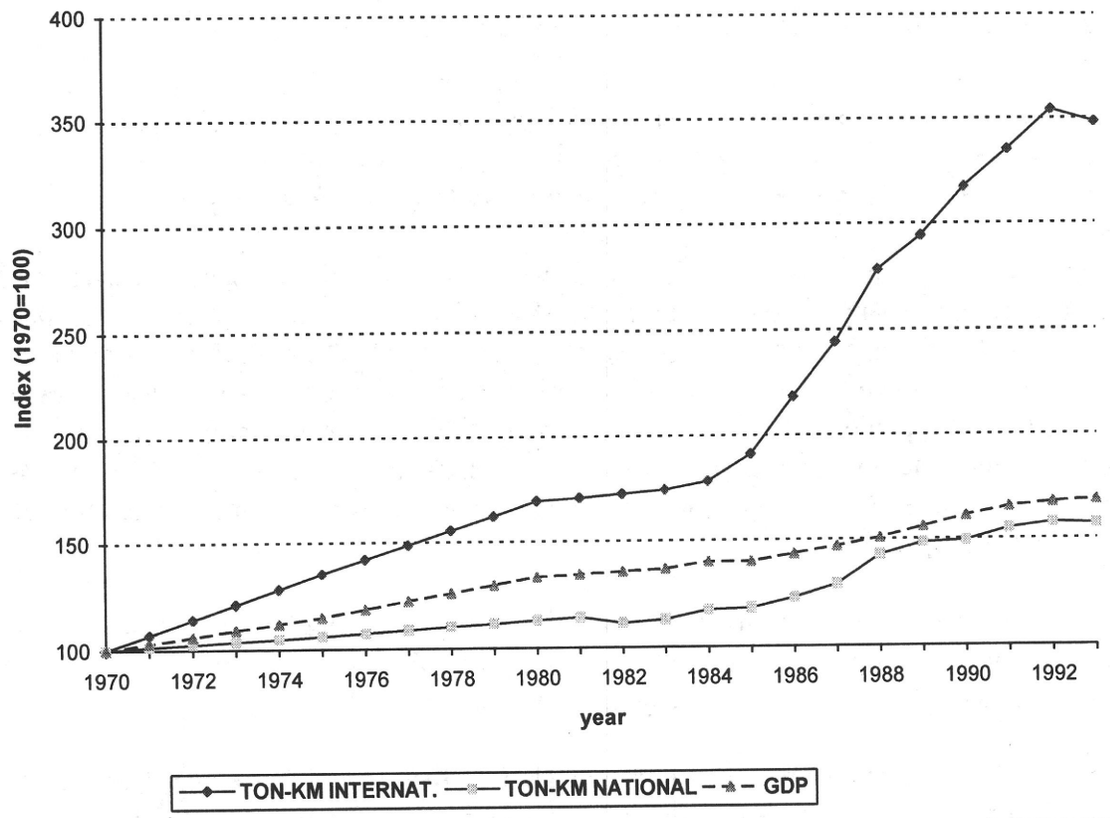
20 J. Colin [1993]: 'Les entreprises européennes et leurs réseaux de transport'. In: Alain Bonnafous, François Plassard & Bénédicte Vulin (ed.): *Circuler Demain.* Collection Monde en Cours. Série Prospective et territoires. DATAR/Editions de l'Aube, pp. 59-72.

21 Note, however, that long-term expectations of strategic decision-makers regarding fuel costs will generally be quite different from the (short-term) highly volatile time series in Figure 4.5.

Figure 4.6. Development of international and domestic road freight transport and GDP (1970=100)



The shape of the time series in Figure 4.6 suggests a single market effect for the international segment only. This will be the kind of empirical support required.

Estimation gave the following results (t-values between brackets):

Border-crossing tonnes-kilometres = -206 + 2.90 * GDP + 42.7 *dummy ; adj. r-square = 0.94
(-4.9) (8.4) (3.0)

Domestic tonnes-kilometres = 29.5 + 0.65 * GDP + 11.9 *dummy ; adj. r-square = 0.91
(2.3) (6.2) (1.7)

In the second equation the dummy is not statistically different from zero, while in the first it is. Therefore, statistically, international road freight transport (as a result of either internationalization of business or logistical reconfiguration) was indeed encouraged by the single market programme.

These findings agree with the results of a large business survey recently carried out by the European Commission.[22] Over 40% of all transport operators within the EU indicate a positive impact of measures to facilitate cross-border operations in other EU Member States.

22 Eurostat, April 1996, *Single market evaluation.*

Furthermore, around 20% of all operators indicate a positive effect of measures on sales to other EU countries.

4.2.3. Logistical integration between shippers and large service providers[23]

As a result of outsourcing transport related activities by shippers, the role for large logistics service providers following integrating strategies becomes increasingly important. Large operators clearly benefit from economies of scale which enables them to meet shippers' requirements against low costs.

Large logistics service providers already have a strong international presence with subsidiaries, often in many different countries. Table 4.2 contains the number of subsidiaries of the top 27 networkers (by annual turnover) in Europe in 1993. The majority of companies in Table 4.2 built up their international network during the last decade. In some cases, strategic alliances among companies listed in Table 4.2 emerged. Well-known examples are the Trans European Alliance Member (TEAM) in which a.o. Thyssen Haniel Logistics, DFDS and Mory are active, the Danzas-ASG co-operation and the groupage network of Sceta International in which Dachser co-operates.

In their logistics behaviour patterns, there has always been a strong preference for particular sites and regions, e.g. seaports, airports and infrastructural nodes like border passages and important inland (waterway or railway related) terminals.

What we have witnessed from the 1980s onwards is that logistics service providers are becoming increasingly integrated into the logistic solutions and channels of the industry and retail business. This is an important driving factor behind the economic concentration and internationalization of the logistics service industry in Europe. Along with these processes goes a strategy of the large logistics service providers to build up international networks (e.g. the networks of Danzas, Salvesen, Kühne & Nagel, TNT, UPS). Companies like NFC, Calberson, Schenker and Wim Bosman, which still have a strong national base, are also building up international logistic networks of warehouses and transhipment nodes concentrated at particular points in the different European Member States (often close to their national markets, e.g. Benelux, Ruhr, London Metropolitan region, Hamburg region, Frankfurt region, Milan region, Marseille region, Lyon region, Barcelona region). This tendency is accompanied by a rationalization of national networks (reduction of sites).

Although there is a clear trend amongst shippers to contract out transport and logistics services, shippers, however, are looking for differentiated transport and logistics services. In some cases, the need is mainly for long-distance FTL transport (from units of production to EDCs/NDCs). In other cases, specialized regional transport companies are required (for example, in European car distribution) or regionalized physical distribution services combined with warehousing activities are needed (as is the case in the Benelux distribution of business equipment and food products). Logistics integration between shippers and logistics service providers takes on many forms.

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[23] Although this section also applies to the supply side of road freight transport (especially because manufacturing sectors can only benefit from economies of scale when transport costs are low, e.g. supply effects), the consultant deliberately places this section here to underline that logistical integration is initiated by changed shippers' demand.

Table 4.2. Number of subsidiaries, western Europe

	NL	B	UK	IRL	D	CH	A	F	E	P	I	GR	TR	DK	N	S	FIN	Tot.	Excl
ASG		1		1	1									10	9	100	14	135	35
Bilsped-ition	4	3	13		14	1		5			1			12	10	>116	21	>199	84
Christian-Salvesen	7	4	>22		9			5	4	1								>52	30
Dachser	1	1	2		65	3	2							2				83	18
Danzas	3	13	12		59	44	2	112	17	3	65	7	1					338	294
DFDS	2	5	10	1	2				2	1				8	4	5	1	41	34
Footwork-Hamacher	5				30		8											52	13
Frans Maas	19	8	20	2	20	2	4	18	4	2	3			4	1	8	1	116	97
Harry Vos	10	1						1	1									13	3
Kühne & Nagel	8	7	13		74	8	6	10	6	4	11	3	3	3	2	5	2	165	91
LEP	3	3	60	4	78	19	15	10	7	11	17	2	2	5	2	8	1	247	187
Mayne Nickless	5	4	147					32	50									239	239
Mory								110										110	0
Nedlloyd	72	19	29	1	51	9	4	10	9	6	28	1	1		1	1		242	170
NFC (Exel)	4		136		8			30	17	1								196	60
Nippon Express	4	2	9	2	13	2	1	3	4	2	3					1		46	46
Ocean Group (McG)	9	6	40	3	24		5	15	18	3	12				1	1		136	96
P&O	9	3	48	2	39	3		11			2			2	1	3		123	75
Pakhoed	34	9	6		3	3		3								1		59	25
Panalpina	2	6	14		23	10	9	12	3		10		2					91	81
Saima Avandero	1	4	4			5	1	2	1		42							60	18
Sceta	1	6	>6		14			>138	46		66	1		14				±300	±150
Schenker-Rhenus	11	3	10	3	138	10	54	30	9	7	19	5	2	6	3	12		322	184
TDG	10		21		2			7		1								41	20
Thyssen Haniel					38	2			10									47	12
TNT	5	4	25	5	36	15	12	25	19	5	28	9	4	1	3	6	2	204	204
UPS	5		54		70													350	350
Wim Bosman	6	1						1										8	2

Source: Buck Consultants international (1994): *The locational pattern of logistics services companies in Europe*, Nijmegen.

Key:
Tot. = Total number of subsidiaries in Europe.
Excl. = Total number of subsidiaries in Europe excluding subsidiaries in country of origin.

NL	Netherlands	**CH**	Switzerland	**P**	Portugal	**DK**	Denmark
B	Belgium	**A**	Austria	**I**	Italy	**N**	Norway
D	Germany	**F**	France	**GR**	Greece	**S**	Sweden
UK	United Kingdom	**E**	Spain	**TR**	Turkey	**FIN**	Finland
IRL	Ireland						

Subsidiaries in country of origin

Shippers, who achieved logistics channel integration and are in the middle of the process of European geographical integration of their logistics systems, tend to see the third-party logistics provider relationships as strategic alliances. What these shippers want are companies which can provide business solutions for the logistic questions and problems that the shippers are facing. What they offer are long-term partnerships. Often, the overall logistic control will remain with the shippers. The general impression is that these strategic alliances and long-term partnerships with logistics service providers will increase.[24]

This tendency seems to be related to the advent of large transport operators in Europe. In the past, transport and distribution companies often served a regional and/or local market, and spatial integration in terms of physical proximity was almost evident. In time, international transport relations developed on a point-to-point basis. Now, especially the large logistics service providers are constructing efficient pan-European transport networks, often providing a different type of spatial integration, namely proximity in terms of lead times to customers. The assumption is made that distances are controlled in time and that the development among shippers to use a limited number of regional transport specialists requires logistics integration and geographical integration by means of networks. In order to establish proximity in lead times, accessibility in terms of infrastructure (road infrastructure as well as communication and information infrastructure) and the management in terms of use of the infrastructure in the network must be optimal.

The opportunities for logistics integration depend on the choices and management approaches of shippers. More often than not, a preference for standard logistics services implies contracting a logistics service provider in the region where it is needed. There is no necessity for any form of logistics integration or spatial integration, or any necessity for spatial concentration. Notwithstanding all that, in many cases shipper and logistics service provider are located in each other's vicinity. This has everything to do with the locational factors of logistics service providers: proximity to its markets (shippers).

In cases where there is logistics integration between shipper and logistics service provider and value added logistics services are provided, spatial integration as well as spatial concentration may occur. The transport network of the logistics service provider has become the logistic network of the shipper. The facilities of the logistics service provider are located near or at the premises of the shipper. This has everything to do with the contracting out of (parts of) the logistics activities of the shipper, which remain a part of the manufacturing or retailing businesses.

Nevertheless, the overall trend towards geographical integration in the manufacturing and retail industries may also involve only the hire of physical services of third-party logistics operators. Shippers deliberately do not outsource the organization and control of these services. The ultimate control remains with the shipper. Hence, the decision of certain shippers to divide the outsourcing of activities into two categories. For transport operations, small carriers are used for their relatively low tariffs or large carriers for their European regional geographical expertise. More sophisticated, capital-intensive, warehouse operations (e.g. conditioned storage, distribution, assembly activities) are placed with specialists, not necessarily the same as the transport providers.

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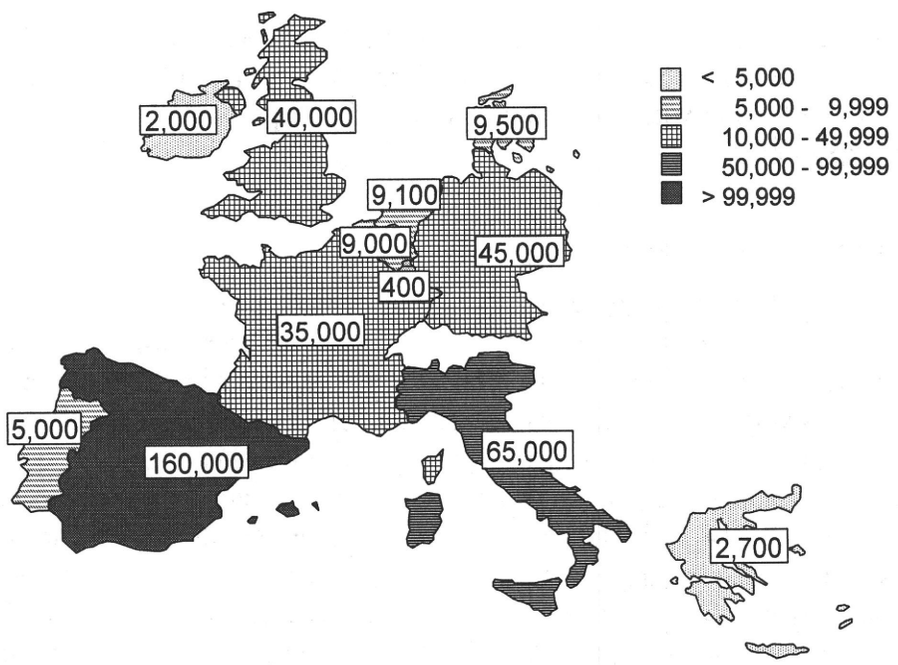
24 See the results of the AT Kearney/ELA study: *Logistics Excellence in Europe*. 1,000 companies reveal their problems, needs and solutions. AT Kearney, London, 1993.

Large logistics service providers such as Danzas, Schenker-Rhenus, Kühne & Nagel and Nedlloyd are responding to all the tendencies mentioned above. They are constructing efficient pan-European transport networks (horizontal integration) and at the same time they are developing value-added logistics services for particular clients (vertical integration). Through their efficiently operating transport networks these logistics service providers are able to offer to their clients highly reliable transit times of transports and thus reliable lead-times. The nodes or 'hubs' in the transport networks of these logistics services providers follow their own locational logic. Mostly, they are located in the same (European) regions which are favoured by the manufacturing and retail industries because of their infrastructural accessibility (material infrastructure as well as communication and information infrastructure).

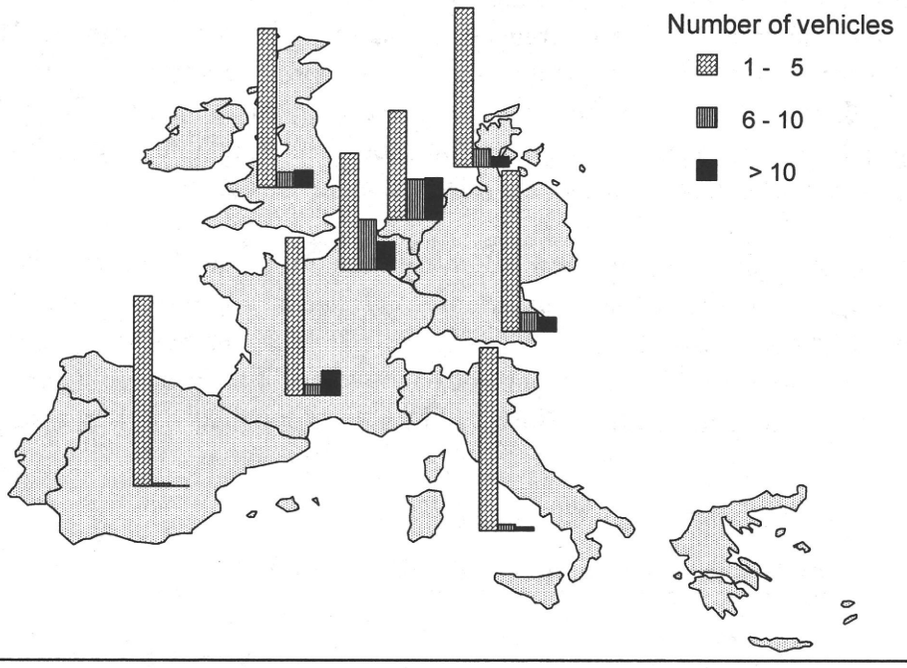
It is important, however, to realize that the top 30 integrators in Table 4.2 are western European companies. Figure 4.7 shows the number of road haulage companies per EU Member State, Figure 4.8 shows the size of distribution for EU Member States. It can be concluded that the relative presence of large companies in western European countries is stronger compared to the situation in southern Europe which is dominated by (very) small companies.

Figure 4.7. Number of road haulage companies in the EU, 1988–93[1]



[1] Due to incomplete statistics the figures refer to averages between 1988 and 1993.

Figure 4.8. Percentage of road haulage companies by number of vehicles in the EU, 1990



Also, indications are found that factor productivity for western European carriers is higher than those for those originating from southern European countries. Figures for total turnover, number of vehicles, number of employees and an estimation of factor productivity are given in Tables D.2 and D.6 in Appendix D.

4.3. Supply side of road freight transport

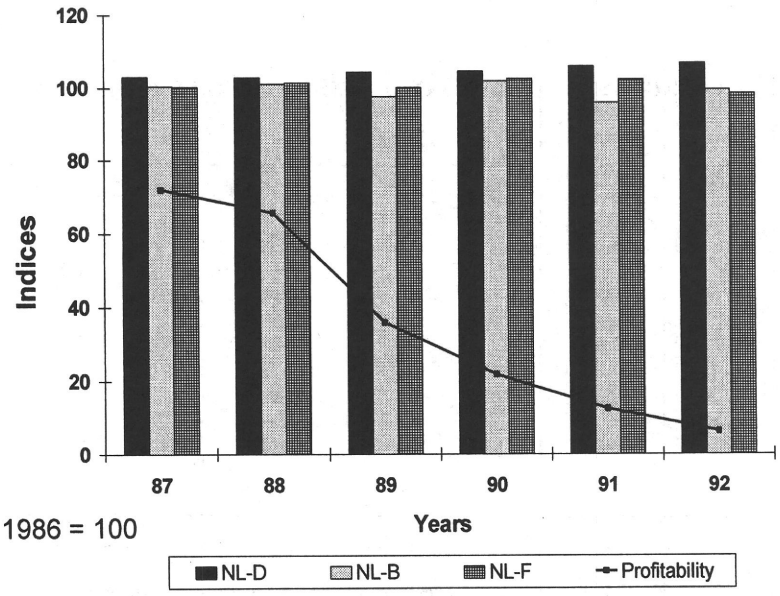
Suppliers in the market of road transport services compete on price and quality of service. In this respect the freight transport market does not differ much from other free markets. Whether price or quality dominates in competition depends on the market segment and the nature of the transport. Generally for relatively high value goods, quality becomes increasingly important. During the last decade the average customer has gradually shown more interest in the quality aspects of the transport service, and dedicated transport strategies became more important. This change has largely been caused by a changed attitude of customers towards logistics, as discussed in Section 4.2. Providers of transport services responded to this development by investing more in high-quality performance and broadening the range of services offered. This development was particularly prominent in market segments like physical distribution (vertical integration) and the transport of hazardous goods (specialist). In other market segments (for example, container transports), the price of the service offered remained the most important factor in market competition.

4.3.1. International market shares

In contrast with large companies able to control profit margins, smaller companies must be considered as price-takers and they prefer to control their respective market shares.

Another important aspect is whether transport companies show profit maximization behaviour. Although this must be true for larger companies operating on a European scale, this does not necessarily hold for the majority of smaller companies. The price level in the market is determined by the average level of costs and productivity. Perhaps, apart from some large-sized and specialized companies, most companies must be considered to be price-takers. In contrast with larger companies and specialists, most companies are not in a position to negotiate with suppliers. The percentage of costs to be considered as fixed and therefore beyond managerial control is very high. As a result, they are not in a position to control profit margins. It must be emphasized that these companies in the freight transport market generally do not show typical profit-maximizing behaviour. As small companies are not well equipped for quick transfer of activities to other regions and/or market segments, they prefer to control their market share (by lowering their price) and despite declining profits, hope for better times. This becomes clear by the comparison of time series of profits and market shares. Figure 4.9 shows indexes on market shares of Dutch operators on three different relations as well as an index of profitability. The decline of the profits over the years contrasts sharply with the stability of the time series of market shares.

Figure 4.9. Development of market shares and profitability for Dutch hauliers compared with Belgium, Germany and France, 1987–92



A general decline of profits is a sign of increasing competition in the market. Section 4.4 provides empirical evidence for the existence of this phenomenon and shows that an increase in overall costs was not accompanied by an increase in transport prices, which clearly indicates fierce competition. Also, the large services survey mentioned before indicates that competition amongst transport companies indeed increased.[25] According to the outcome of the survey competitors in general originate from other EU Member States (international competition). Furthermore, regardless of the country from which the competitor originates, price competition is recognized more frequently than competition on the basis of quality and choice of service.

Another explanation for the findings of Figure 4.9 can be found in the advantage of incumbents. Companies which already have a significant market share have the best chance of increasing this market share. This is explained by the logic of increasing returns to scale. But this has also been stimulated by the fact that most shippers nowadays are interested in building long-term relationships with contractors.

Although some reports[26] signal a 'substantial volatility' in the market with regard to customers changing contractors, a vast majority of road transport companies keeps contracts much longer than one year. The total volume of goods on which companies actually compete is only a small fraction of the total volume that is transported annually.

Therefore total international market shares did not change dramatically. Table 4.3 reflects the development of border-crossing market shares within the EU. Except for Germany, Portugal, Spain and the United Kingdom, market shares remain fairly constant over time. This corresponds to the findings of Figure 4.2, as the total growth for these countries differs significantly from total EU growth. However, conclusions from the first column must be drawn with care, because the calculated shares refer to the EU total excluding Italy, and therefore overestimate the 'true' market shares of the remaining Member States to some extent.

Table 4.3. Development of international market shares (million tonnes-kilometres) (%)

	1986	1990	1993
Germany	22.4	14.3	14.5
France	19.8	19.2	18.2
Italy[1]		12.7	11.1
Netherlands	21.7	18.0	19.5
Belgium	14.0	12.4	11.2
United Kingdom	5.0	6.5	7.1
Ireland	0.9	0.7	0.2
Denmark	4.9	3.4	3.9
Greece	2.4	1.4	0.8
Spain	6.9	8.2	9.6
Portugal	2.0	3.2	3.4
Total	100	100	100

Source: Eurostat.

[1] No figures for 1986 available; figures for 1990 and 1993 should be interpreted with care, according to Eurostat.

25 Eurostat, April 1996, *Single market evaluation.*

26 According to PE-International 58% of the customers in the United Kingdom reported to have changed contractors in the period 1990–92. PE-International interpreted this as a substantial volatility in the market. However, this figure can be interpreted in another way as saying that on average contractors continue their annual contracts in 80% of the cases.

It should also be mentioned that the market shares refer to the total performances of the corresponding EU Member States. As we will see in Chapter 5, the development of market shares according to the four segments of the typology introduced in Chapter 2 is quite different.

The previous section showed that the past decade appeared to be a period in which road transport companies were under constant pressure to change their organization and approach to customers. Hauliers had to co-operate more closely with shippers in a number of different branches, which at the same time were more demanding. Consequently, the operational environment became more complex as road transport operations became more time-critical and the average shipment size declined.

In this rapidly changing environment, large companies had clear advantages. Mainly because of their marketing potential, their financial and investment capabilities and their control over large transport networks, they were more attractive partners for the large shippers.

4.3.2. Cabotage

Cabotage is an important expected final result from liberalization of the single market. It provides opportunities to improve efficiency and its role continues to increase.

One important result of the single market programme is the productivity gains expected from cabotage. However, the liberalization of the market for cabotage will not be completed before July 1998.[27] Until then, quotas are allocated to foreign operators. Cabotage transports are growing fast, and further growth is expected in direct relationship to the development of quotas allocated to EU Member States. Smaller countries with large international market shares such as the Netherlands and Belgium, account for the largest shares of cabotage, about 50%. This result is far from surprising. Smaller countries, which by definition lack a large domestic market, have always concentrated on international transports, while larger countries were relatively more orientated towards their (sometimes) regulated domestic markets. In addition, the geographical location of the Netherlands and Belgium and corresponding large amounts of transit flows stimulate carriers from these countries to operate on an international scale.

Table 4.4. Figures on cabotage by nationality of haulier (million tonnes-kilometres)

	1990[1]	1991	1992	1993	1994
Germany	20	74	70	44	56
France	26	110	98	125	172
Netherlands	38	128	202	226	350
Belgium	42	139	142	233	237
Luxembourg	15	48	66	80	78
United Kingdom	3	33	34	41	41
Ireland	6	13	8	5	11
Denmark	15	58	69	59	
Spain	2	5	13	19	38
Portugal	0	3	3	3	6
Total	167	611	705	835	989

Source: European Commission.
[1] 1990, second half figures only.

27 Council Regulation (EEC) No 3118/93.

Cabotage takes place mainly in countries with large domestic markets. Table 4.5 provides data on cabotage in partner states. The markets for cabotage in Germany and France are still growing strongly, while performance in other, never regulated, markets like Belgium and the United Kingdom is declining. This leads to the conclusion that cabotage by companies seems to be an opportunity to improve efficiency in international transport. International transport often lacks sufficient return cargo. Through cabotage companies can gain in efficiency.

Table 4.5. Cabotage in partner states (million tonnes-kilometres)

	1991	1992	1993
Germany	370	431	534
France	54	61	106
Italy	99	103	89
Netherlands	13	12	5
Belgium	17	23	11
United Kingdom	36	35	28
Ireland	5	5	3
Denmark	3	2	4
Greece	0.08	0.3	3
Spain	15	22	34
Portugal	1	10	14

Source: European Commission.

The growing importance of cabotage in cost terms is quantified and discussed in Section 4.3.4.

4.3.3. Deregulation of domestic markets

Deregulation of tariffs for domestic transport is an important step towards liberalization of the single market for road freight transport. Before deregulation and the introduction of cabotage, a situation in which intense price competition was absent, relatively high tariffs for domestic transport and corresponding high profitability were used as guidelines for tariffs applied to border-crossing transport. As an answer to the price-competitive threat of foreign hauliers, governments like those of France and Germany started to deregulate their domestic markets in an attempt to prepare their transport sector for international competition.

Before 1985 border-crossing transport was dominated by bilateral agreements on tariffs. In general, operators complied with the mutual agreements between the Netherlands, Germany, Belgium and France, and intense price competition was absent.[28] In that period, as a result of the introduction of measures to complete the single market, so-called bilateral reference tariffs were introduced between the 'old' and new Member States, e.g. Germany and the United Kingdom. The prospect of a liberal market, however, diminished the importance of such agreements significantly. Bilateral tariffs agreements, as well as reference tariffs, were taken less restrictively than before.

Directly related to liberalization of border-crossing transport, and of growing importance, was deregulation of domestic markets in France and Germany, which started somewhere around 1990.[29] Before deregulation, domestic transport was highly profitable and the domestic tariffs

28 Apart from transport between Belgium and the Netherlands, any two out of four Member States applied such bilateral agreements.

29 In France deregulation started earlier.

were used as a guideline for border-crossing transport tariffs as well. The decline of border-crossing transport prices, as a result of liberal international markets, has put serious pressure on the competitive position of hauliers, especially those from Germany. Foreign hauliers, already in the midst of price competition with the introduction of cabotage, became a serious threat.

As a result of the single market programme and in an attempt to improve their competitiveness, France and Germany started deregulating their domestic markets. The decline of domestic prices indeed improved competitiveness on international markets. After a first decline of international market share during 1986-90, the German transport sector maintained its international market share during the 1990-93 period (see Table 4.3).

4.3.4. The impact of measures on the internal cost structure

Measures taken to complete the single market significantly affected the cost structure of companies. Effects of liberalization, such as cabotage and elimination of border delays, clearly improved productivity and had a decreasing effect on costs. Harmonization measures, however, resulted in a cost-increasing effect. Due to national legislation, the exact contribution of the single market to the level of taxes is hard to isolate. When effects of harmonization of excise duties are fully included, the total calculated effect shows a large increase of total costs for domestic as well as a more moderate increase of total costs for border-crossing transport. When excluded, the cost effects for domestic transport were very small, while costs for border-crossing transport even declined. However, cost changes, due to measures taken to complete the single market programme, accounted for 50% in the overall observed change in total costs.

Cost effects on border-crossing transport

This section elaborates on the results obtained by comparing cost prices between the EU Member States. The comparison is made between a base date (1986) and a reference date (1994). This reference date reflects the *predicted* effects on the cost structure, resulting from measures taken to complete the single market.

This prediction is produced by the use of a micro-economic cost model for transport company operations. A description of this model as well as the translation of the measures into the variables of equations of the model are given in Appendix B.

Two types of effects are especially interesting. First, it is interesting to see what the effects of the individual measures on the cost price have been. Second, it is interesting to examine whether the competitive position of hauliers from individual Member State has been affected. In Table 4.6 the results of estimating the partial effects on the cost price for each measure and for a particular trip are presented (% change with respect to the base date). For a fair comparison and to rule out the effect of exchange rates, all figures presented (unless otherwise indicated) are based upon calculations in German marks (DM).

From Table 4.6 it can be concluded that the partial effects (expressed as changes in percentages) of the EC measures in general did not differ much between individual hauliers. Predicted changes for the absolute cost levels show larger differences.

The largest differences occurred when vehicle taxes and the excise duties on fuels were introduced. The question remains if the single market programme can be held fully responsible for the resulting increase in costs. Sometimes national legislation as well had a cost increasing effect, especially when excise duties on fuels are taken into consideration.

The speed-limiting device shows a larger effect on the cost price for the Netherlands, because in the Netherlands this device is set at a lower maximum speed.

Table 4.6. Partial effects of EC measures on cost price in international transport (%) (modal international relation, 1,000 kilometres)

Nationality of haulier	Cabotage/ cross-trade transport (1)	Elimin-ation of border delays (2)	Harmon-ization of vehicle taxes (3)	Harmon-ization of excise duties (4)	Speed-limiting device (5)	Euro-vignette (6)	Weights and dimensions (7)	Driving and resting hours (8)
B	-4.1	-2.0	+0.4	+9.9	+1.4	+1.3	-0.8	0
D	-3.3	-2.1	-3.0	+9.8	+1.4	+1.3	-0.8	0
DK	-4.1	-2.1	-1.9	+9.7	+1.5	+1.2	-0.6	0
E	-3.3	-1.8	+0.3	+11.4	+1.0	+1.5	-0.8	0
F	-3.3	-2.0	+0.2	+10.3	+1.3	+1.3	-0.8	0
UK	-3.3	-1.9	-1.3	+10.3	+1.1	+1.3	-0.8	0
GR	-4.1	-1.9	-0.4	+12.0	+1.0	+1.6	-0.9	0
I	-3.3	-2.1	+0.4	+9.7	+1.4	+1.2	-0.6	0
NL	-4.1	-2.1	-0.9	+9.7	+2.4	+1.2	-0.6	0

Source: NEA.

Effects as a result of liberalization (cabotage in column 1 and border delays in column 2) have had a considerble cost decreasing effect on the cost price (a 5% to 6% cost reduction), whereas the impacts due to harmonization have had a strong cost increasing effect on the cost level (8 to 14%).

In Table 4.7 the predicted total effect of EC measures on the cost price is presented for the nine EU Member States in the model. This total effect is not necessarily equivalent to the sum of the partial effects, as the combination of the effects can either reinforce or weaken each other (the column on the right refers to the effects calculated when tax measures such as vehicle taxes and excise duties on diesel fuel are excluded).

Table 4.7 also illustrates that the total effect of the EC measures (taxes fully included) has resulted in an overall increase in costs, ranging from 2.5% (Germany) to 7.2% (Spain).

Table 4.7 Total effect of EC measures on cost price in international transport (%) (modal international relation, 1,000 kilometres)

Nationality of haulier	Total effect on cost price	Effect on cost price, tax measures excluded
B	+5.0	- 4.6
D	+2.5	- 3.8
DK	+2.8	- 4.5
E	+7.2	- 3.9
F	+6.1	- 4.0
UK	+4.6	- 4.0
GR	+6.0	- 5.0
I	+6.0	- 3.8
NL	+4.5	- 3.7

Source: NEA.

In Table 4.8 the relative cost prices are included for the nine EU Member States, both for the base date and for the reference date. Greece, the most cost competitive country (in both cases), has been chosen as base (relative cost price Greece=100).

Table 4.8. Relative cost prices for nine EU countries at the base date and after implementation of EC measures; Greece=100 (modal international relation, 1,000 kilometres)

Nationality of haulier	Base date 1986	EC measures included	EC measures included (re-computation with Greece=100)
B	119.5	125.7	118.3
D	120.7	123.7	116.6
DK	122.4	125.8	118.6
E	104.7	112.2	105.8
F	115.2	122.2	115.2
UK	115.4	120.8	113.9
GR	100.0	106.0	100.0
I	122.8	130.1	122.7
NL	121.5	127.0	119.8

Source: NEA.

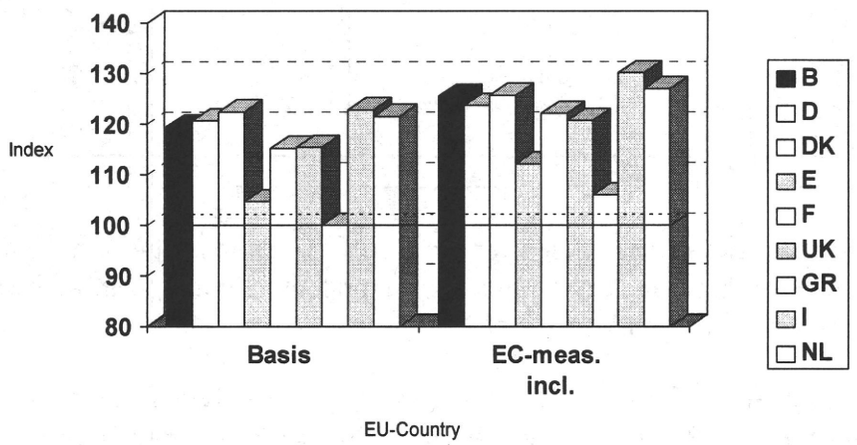
Table 4.8 shows a substantial difference in the cost prices for, on the one hand, Greece and Spain, and, on the other hand, the other EU Member States under study. Of the latter, France and the United Kingdom can be seen as an in-between group, whereas Belgium, Germany, Denmark, Italy and the Netherlands have cost prices close to one another.

From the right-hand column of Table 4.8 a small converging trend can be witnessed. The calculated standard deviation declined from 7.7 to 7.2. A graph based on Table 4.8 is shown in Figure 4.10.

Volume and price effects in international transport

It is worthwhile to isolate cost effects resulting from EC measures from other factors determining cost levels, such as inflation and changes in labour costs. Table 4.9 is produced on the base of availability of data in the individual countries. A distinction is made for volume and price effects.

Figure 4.10. Relative cost prices for international transport; base and EC measures included (Greece=100)



The EC measures as mentioned in Table 4.9 can be divided into three groups:

Volume effects	Cabotage (1),	Border delays (2),	Weights & dimensions (7),	Driving & resting hours (8)
Price effects	Vehicle taxes (3),	Excise duties (4),	Euro-vignette (6)	
Both	Speed-limiting device (5)			

Table 4.9 illustrates that the increase in costs has not been compensated by a decrease of the cost level due to volume effects.

The last two columns of figures in Table 4.9 are based on true observed changes in cost levels. These figures are obtained from studies on international cost comparisons in road freight transport, carried out by NEA in the past. From the price effect and the total effect, the volume effect can be deduced.

Table 4.9 also shows that EC measures contribute for 40% to 60% to the total observed volume effect and for 60% to 75% to the total observed price effect (based on ECU). The remaining part is the result of price changes not related to EC measures (increases in purchase costs, insurance costs etc., autonomous decisions of transport companies, and efficiency improvements).

Table 4.9. Volume and price effects of EC measures on the cost price in international transport (modal international relation, 1,000 kilometres), and observed total volume and total price effects on the cost price, for some of the EU Member States under study, during the 1986–94 period, based on ECU

Nationality of haulier	Total effect of EC measures on cost price (%)	Of which volume effect (%)	Of which price effect (%)	Real observed changes in cost price - Total volume effect (%)	Real observed changes in cost price - Total price effect (%)
B	+17.2	-7.4	24.6	-12.3	+34
D	+14.4	-6.5	20.9	-12.3	+35
F	+18.4	-6.3	24.7	-11.7	+34
NL	+16.6	-4.8	21.4	-11.6	+32

Source: NEA.

Cost effects for domestic transport

This section deals with the impact of measures on the cost structure for companies involved in domestic haulage. A number of assumptions have been made.

First of all, calculations are based upon the same type and size of vehicle as used for the international transport model. Therefore, a similar basic cost structure is assumed. Although this might be unrealistic to some extent (smaller vehicles, shorter distances), the lack of sufficient data for domestic transport made this assumption necessary. As the assumption is made for all countries, the outcomes of the calculations were not seriously affected. In comparison with the model for international transport, some amendments with respect to the input variables indicating the impact of the EC measures taken must be made. Furthermore, the overall differences between cost structures for international and domestic transport are negligible.

In translating the measures into the variables of the model, the following amendments have been made:

(a) cabotage and possibilities for cross-trade transport are considered to have no impact on domestic transport;
(b) no borders have to be crossed, so elimination of border delays is irrelevant;
(c) as far as harmonization of the excise duties on diesel fuel is concerned:
  (i) the national diesel fuel prices are taken for the base date,
  (ii) the national changes in excise duties on diesel fuel are taken into account;
(d) effects of infrastructure taxes (Euro-vignette) are only included for those countries that have introduced the system (Germany, Denmark, the Netherlands, Belgium).

In Tables 4.10, 4.11 and 4.12 the results of the domestic transport model are presented. The same layout as for the international model has been used. Table 4.10 shows the partial effects on the cost price for each measure (in relative change to the base date).

Table 4.10. Partial effects of EC measures on cost price for domestic transport (%) (400 kilometres)[1]

Nationality of haulier	Harmonization of vehicle taxes (3)	Harmonization of excise duties (4)	Speed-limiting device (5)	Euro-vignette (6)	Weights and dimensions (7)	Driving and resting hours (8)
B	+0.4	+8.0	+1.2	+1.3	-0.8	0
D	-3.1	+4.4	+1.2	+1.2	-0.8	0
DK	-1.8	+7.6	+0.8	+1.3	-0.6	0
E	+0.3	+6.5	+0.8	0	-0.8	+1.3
F	+0.2	+5.4	+0.8	0	-0.8	0
GR	-0.5	+11.2	+1.3	0	-0.9	+0.7
I	+0.5	+9.3	+1.2	0	-0.6	0
NL	-0.9	+11.4	+2.4	+1.3	-0.6	+3.6
UK	-1.3	+3.4	+0.7	0	-0.8	0

Source: NEA.
[1] Only small differences appear when distances of less than 400 kilometres are taken.

Table 4.11 summarizes the total effect of the EC measures on the cost price. As before, this total effect is not necessarily equivalent to the sum of the partial effects, as combinations of measures can either reinforce, or weaken each other.

Table 4.11. Total effect of EC measures on cost price for domestic transport (%) (400 kilometres)

Nationality of haulier	Total effect on cost price	Effect on cost price, tax measures excluded
B	+10.7	+ 2.0
D	+2.8	+ 1.6
DK	+7.0	+ 1.3
E	+9.3	+ 2.0
F	+5.4	0
GR	+13.0	+ 1.9
I	+10.0	+ 0.4
NL	+16.5	+ 6.5
UK	+2.7	+ 0.4

Source: NEA.

As the effects resulting from liberalization (volume effects) are irrelevant, the total cost increase for domestic transport is greater than for international transport. The third column in Table 4.11 contains the cost effects when tax measures are excluded. The underlying reason is that the disentanglement of tax effects resulting from harmonization is hard to achieve.

In Table 4.12 the resulting relative cost prices are given for nine EU Member States.

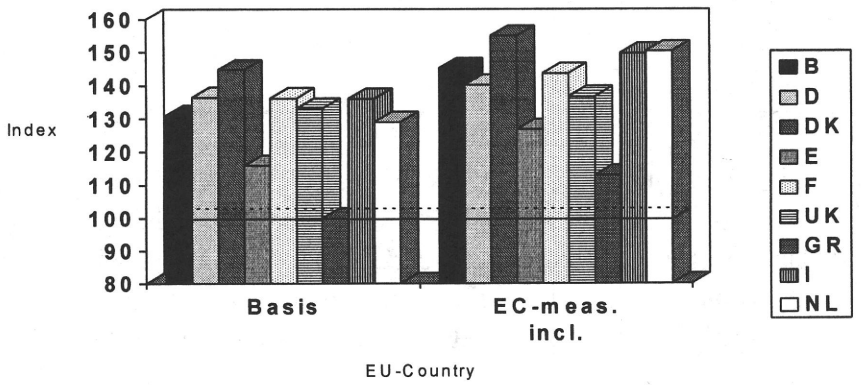
Table 4.12. Relative cost prices for nine EU Member States before the base date and after implementation of EC measures; Greece=100 (domestic transport, 400 kilometres)

Nationality of haulier	Base date	EC measures included	EC measures included (Greece=100)
B	131.0	145.1	128.4
D	136.4	140.1	124.0
DK	144.7	154.9	137.1
E	115.9	126.7	112.1
F	136.2	143.6	127.1
UK	133.1	136.7	121.0
GR	100.0	113.0	100.0
I	136.0	150.0	132.4
NL	129.0	150.3	133.0

Source: NEA.

A small converging tendency can be observed. The calculated standard deviation declined from 12.6 to 12.3. A graph using the results of Table 4.12 is shown in Figure 4.11.

Figure 4.11. Relative cost prices for domestic transport; base and EC measures included (Greece=100)



4.3.5. Contribution to sustainable development

It is generally recognized that road freight transport has negative side effects on the environment, particularly noise and air pollution. In the last decade transport volumes in the international road freight transport sector increased, with growth rates significantly above the growth rate of GDP. As discussed in the previous sections, the single market has been one factor contributing to this growth. Logically this means that to this extent at least the single market programme may be held responsible for the negative effects on the environment as well.

However, this statement has to be qualified in at least two ways. First, the single market is not completed yet. Although in road freight transport the progress is substantial, in other modes of

transport the speed of implementation of measures was less impressive. In a completely liberalized transport market, market shares of road freight transport may be expected to be lower. Second, the single market programme also includes specific measures meant to curb the negative impact of road freight transport on the environment.

Figure 4.12. Total fuel consumption (diesel) in the EU

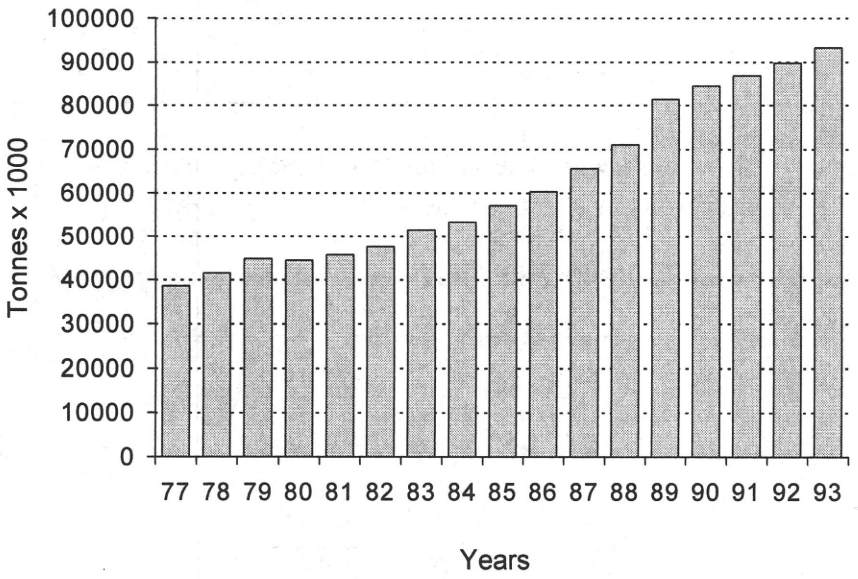


Figure 4.12 shows total fuel consumption of commercial vehicles in the EU over a number of years. In recent years the growth rates have diminished. This decline in the growth of fuel consumption, which is also observed for passenger cars, can be mainly attributed to the increased fuel-efficiency of vehicles. For many years car manufacturers have worked on improving the fuel economy of the commercial fleet (stimulated by oil crises) which finally resulted in curbing growth.

Reduction in emission levels

The most important reduction of pollutants in the field of road haulage will very likely be achieved by reducing engine emissions. This technical progress is stimulated by Community directives specifying maximum limits and establishing timetables for their implementation in new vehicles. In Table 4.13 we list the relevant directives.

Table 4.13. Emission standards for diesel engines of commercial vehicles

Regulation	Entry into effect	Standards in g/kWh			
		NO_x	HC	CO	PT
UN Regulation No 49	before 1986	18.0	3.3	14.0	-
Directive 88/77/EEC	1 October 1990	14.4	2.4	11.2	-
Directive 91/542/EEC	1 July 1992 (Euro-1)	8.0	1.1	4.5	0.36
	1 October 1996 (Euro-2)	7.0	1.1	4.0	0.15[1]

Source: European Commission.
[1] According to Swiss regulations, 0.7 g/kWh after 1 October 1991.

In 1986 the situation more or less corresponded to the emission factors set by the standards of United Nations Regulation No. 49. The results of the Euro-2 standard, effective from 1995, will most likely not be observable before 2010. By this time a full replacement of the total fleet can be expected. To assess the possible effects of these regulations it is necessary to make some projections outside the period under review (1985–95). Fortunately some calculations, using a 2010 transport scenario, are already available from another study,[30] and some of the results are listed in Table 4.14a. It is important to note that the figures presented in Table 4.14a only take account of inter-regional transport flows which represent 22% of all transport flows in 2010.

Table 4.14a. Trends in pollutant emissions from inter-regional transport of goods between 1986 and 2010 (million kilograms)

Type of emission	1986	2010	Reduction in % from 1986 to 2010
Nitrogen oxides NO_x	902	628	31
Hydrocarbons HC	104	64	38
Carbon monoxide CO	144	76	47
Particles PT	59	24	59

Source: NEA.

The reduction from 1986 to 2010 will be substantial. In the calculations a growth factor of transport volumes of 2.5% was assumed in the period 1986 to 2010. This amounts to an average annual growth rate of 4.4% which may be considered rather high. In spite of this high growth rate, the emission level is expected to drop by the proportions listed in Table 4.14a.

Similar findings are also reported in another study[31] which states much higher reductions of pollutants in 2010 (the assumption of expected growth rate was set at 1.5%).

Traffic noise

Exposure to noise may cause health problems. As traffic volumes increase, populations become increasingly sensitive to traffic noise and reduction of noise levels becomes more important. Noise levels are, however, not frequently discussed in studies. As time series on (costs of) noise pollution due to road freight transport, necessary to assess the impact of EC measures, have not been found, figures illustrating the external costs of noise for EC Member States for a single year are shown in Table 4.14b (figures in bold refer to Member States for which estimated relative external costs for noise are higher than relative external costs for air pollution).

30 *The transport of goods by road and its environment in the Europe of tomorrow*, NEA, Rijswijk, 1992.

31 *Towards more rational transport policies in Europe,* Achim Diekman, Deutscher Instituts-Verlag GmbH, Köln, 1995.

Table 4.14b. Relative external costs of road freight transport noise, 1991

Country	ECU/1,000 t-km
NL	13.6
B	**12.5**
UK	15.1
IRL	**24.6**
D	**10.9**
F	**23.9**
DK	17.0
E	**8.9**
P	**8.8**
I	7.7
GR	**17.4**

Source: IWW, Karlsruhe, 1995.

Only four Member States show relative external costs for noise lower than for air pollution, indicating the seriousness of the subject. The relative external costs of road freight transport can be further differentiated for heavy and light weight vehicles. Due to higher load factors, heavy weight vehicles on average contribute less (ECU 12.2/1,000 t-km) to the external costs than light vehicles (ECU 15.7/1,000 t-km). Estimates of external costs of noise, available from several studies,[32] range from 0.01 to 2% of GDP, indicating how difficult it is to measure noise nuisance.

Measures taken to complete the single market have resulted in contradicting effects on noise levels. Lower speed limits have had a decreasing effect and so have improvements in vehicle technology and better infrastructure planning.[33] However, as noise levels are almost directly related to the amount of traffic, issues like load factors (defined as the quotient of cargo weight and load capacity), the expected growth of road freight transport and logistical concepts (especially in urban areas with concepts for city distribution) are much more important.

Given these considerations, it is not clear how completion of the single market affected noise levels. Internationalization increased the number of tonnes-kilometres, but liberalization and harmonization clearly improved network management (see Chapter 5) and reduced the number of empty trips. So did increased competition as the corresponding decline of profits forced operators to accept back-haul cargo at low prices (thereby avoiding unnecessary trips).

In Section 4.3.4, the findings concerning the reduced costs for international road transport due to improved possibilities for cabotage are commented on. These findings indicate a reduction in the ratio of empty vehicle kilometres compared to total vehicle kilometres. However, this does not necessarily imply an improvement of load yields. As the price as well as the costs for transport services only partly depend on the size of cargo (in terms either of weight or of volume), many operators charge shippers for the amount of vehicle kilometres (even if they carry a single pallet). As a result, a reduction in the number of empty trips (again relative to the total number of trips) is in most cases compensated by a reduction in average trip load (see Section 4.2.2).

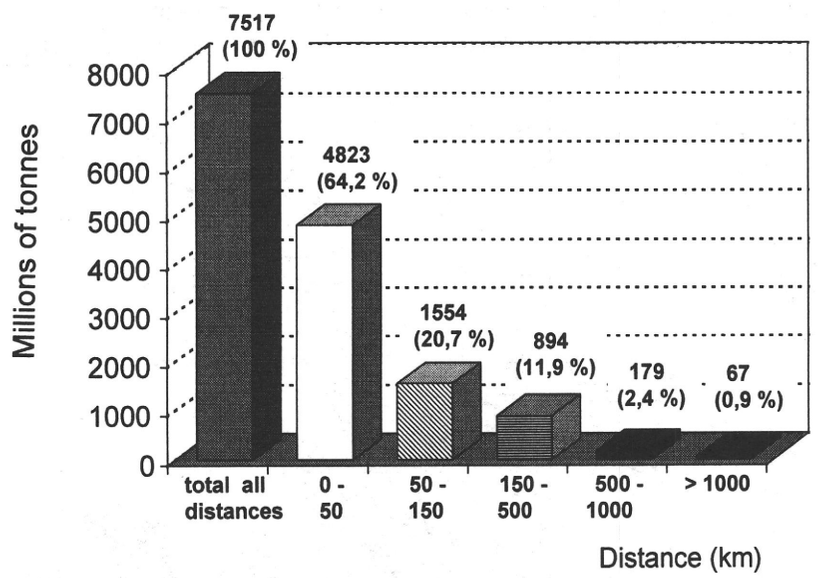
32 IWW/INFRAS, *External effects of transport*, Table 15-7, 1995.

33 Community legislation on noise from heavy-goods vehicles was recently amended (Directive 92/97/EEC).

Some evidence to support these findings is available from large samples of international transport operators and official statistics in various countries. While the proportion of empty vehicle kilometres in the total number of vehicle kilometres decreased by 2% between 1985 and 1993, the load factor declined by 5% (corrections have been made for the development of high volume transport: otherwise this figure would have been much higher).

Cabotage, regulations on weights and dimensions as well as the disappearance of internal frontiers have had their (limited) impact on these developments. Of much more importance are the balance in trade between two nations (lack of back-haul cargo), shippers' rationalization (JIT management) as well as the actual market conditions. Consequently, in times of low profitability one can witness a relatively low number of empty kilometres. In such market conditions, an operator only accepts a (long) trip if back-haul cargo can be obtained.

Figure 4.13. The transport of goods by road (domestic and international) by distance within the EU



Source : Eurostat 1986
NEA Regionalized data bank 1986

Intermodal transport

Other measures with possibly important environmental effects are:

(a) modal shift towards inland navigation and rail;
(b) harmonization of maximum vehicle weight within the European Union;
(c) reduction of traffic congestion;
(d) application of information and communication technology.

The most frequently discussed option is the first, which requires a well equipped multimodal (technological) infrastructure. Until now the contribution of multimodal transport to the environment is still rather limited as can be concluded from Figure 4.14. Multimodal transport is only believed to be a realistic alternative for road transport if the distance of transport

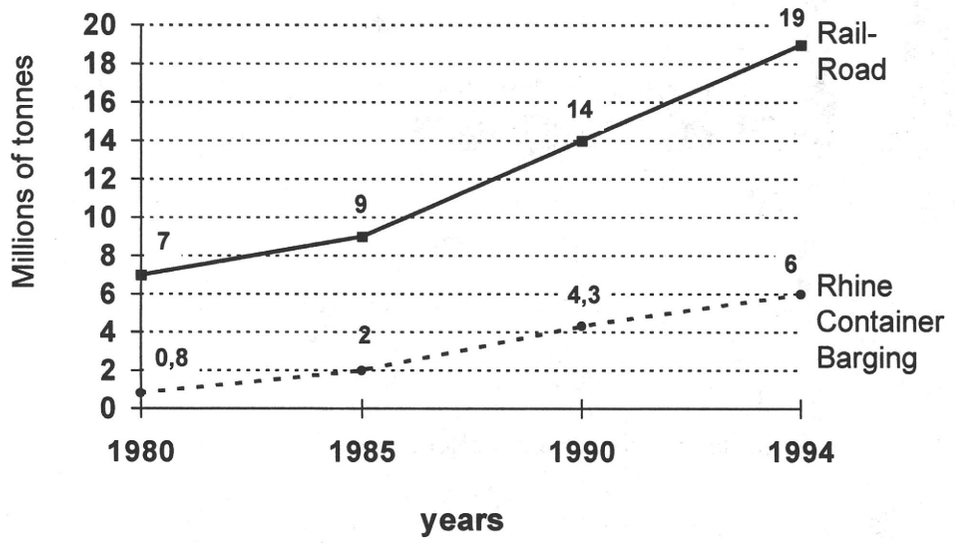
exceeds 500 kilometres. Figure 4.13 shows that only 3.3% of the total road transport volume meets this criteria.

The development of combined transport in terms of modal share for inter-EU border-crossing transport remains poor. For the period 1985-94 the total share of combined road/rail transport remained almost constant at 5.6%. When excluding Italy (Alpine country) from the analysis, this figure drops to 1.7%.

The total share of combined barge/road transport grew from 1.2% in 1985 to 1.6% in 1990. Finally, in 1994 this figure was 2%.[34] As the majority of combined transport is either intercontinental or national transport, these figures have to be interpreted with a certain caution. Countries like Germany and France have an especially well developed intermodal infrastructure. As a result Germany and France have a total share of 60% of all EU domestic flows.

Given the fact that combined transport becomes economically rational over great distances and that from 1985 onwards the average distance of transport has become greater, a small effect on the performance of multimodal transport was expected (see Section 4.2.2). Figure 4.14 shows the development of rail/road as well as barge/road border-crossing inter-EU transport.

Figure 4.14. EU border-crossing combined transport



Source : ECIS, 1995

In spite of the fact that Figure 4.14 indicates an upward shift after 1985, hard evidence for a positive effect from completion of the single market is lacking. Combined transport is still relatively expensive and remains less flexible than road transport alone. Also, the potential for

[34] ECIS, 1995.

combined transport is transport that demands no special requirements from road operators. Such operators compete on prices in a market dominated by fierce competition. Without further development of the concept of multimodal transport in terms of more efficient use of transhipment points and international rail infrastructure, the effects of completing the single market might have a negative impact on the future performance of combined transport. EC measures have stimulated fierce competition, especially among truckers. This development has led to lower prices and will result in a comparative advantage for road transport above combined transport.

4.4. Impact on sectoral performance by size distribution of companies

4.4.1. Introduction

The road freight transport market shows a development of increasing costs and declining transport tariffs during the period 1986–94, causing a sharp decline of profits and profitability. However, the transport companies managed to adapt to the new situation and even succeeded in raising the level of customer satisfaction.

Section 4.3.3 discussed the effects on the cost level for transport operations. Table 4.15 summarizes some results and provides information on changes in price levels for four EU Member States.

Table 4.15. Costs and freight price development (%) for border-crossing transport, 1986–94

Country	% changes in costs (based on ECU)	% changes in freight price (based on ECU)	% changes in freight price (DM)
Belgium	+22	+8	-3
Germany	+23	+3	-8
France	+22	+5	-6
Netherlands	+20	+10	-1

Source: NEA.

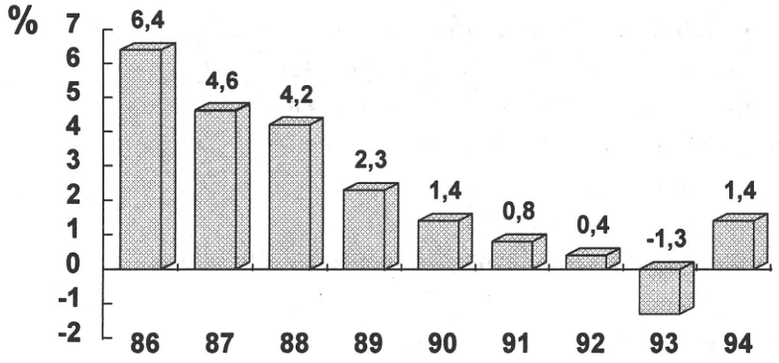
In 1986 Germany and France had a system of obligatory tariffs in domestic transport that was well complied with (see Section 4.3.3). Transport companies active in domestic transport as well as on the international market used domestic tariffs as a guideline for their international price setting. As a result, due to the relatively high freight prices in domestic transport, freight prices in international transport in general were rather high. Since deregulation this price-increasing effect disappeared.

This explains the large decreases of tariffs from German and French operators. This effect is shown in the far right column of Table 4.15. When including the appreciation of the German mark (+11%), tariffs expressed in ECU seem to have increased.

During the period 1986–94, the increase in total costs for border-crossing transport was not accompanied by an equal increase in freight prices. During the same period, the prices (in national currency) even dropped, causing a sharp decline of profits and profitability. Easy access to the profession, increased competition due to foreign hauliers entering local markets

and the abolition of tariff systems are the main explanations for this decline. Profitability (defined as the quotient of profits and turnover) has declined for several years now and only in 1994 has this decline been reversed. Figure 4.15 shows the situation for the Netherlands.

Figure 4.15. Profitability in international road haulage in the Netherlands



Source : NEA

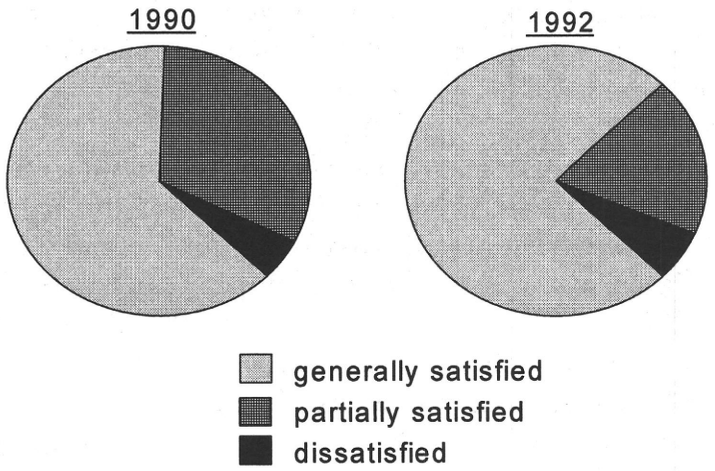
Although Figure 4.15 only refers to Dutch hauliers, no indications were found to show that this trend did not apply to other Member States. Experts' views in Germany and France confirm this tendency. However, it must be remarked that the fall in profit rates in these countries seems not to be as pronounced as in the Netherlands. This is due to the relative importance of the domestic transport market in those countries.

In spite of the difficulties, and perhaps in contrast with expectations, the road transport sector has adapted quite well to the changed environment and even succeeded in raising the level of satisfaction of their customers.

This result is documented in a study of companies in the United Kingdom (see Figure 4.16), and corresponds with findings elsewhere.[35] Transport companies are thus found to be very flexible and well equipped to meet new criteria.

35 See also the report *Kwaliteitszorg in de transportsector*, NEA, Rijswijk, 1994.

Figure 4.16. Level of satisfaction (companies in the United Kingdom)



A further and more detailed analysis of business strategies as a response to the deteriorating economic environment is presented in Chapter 5.

As transport companies generally produce services under conditions of increasing returns to scale, one expects to see that the number of small companies will rapidly diminish and the larger companies will become relatively more important in markets which become gradually more competitive. In Table 4.16 this tendency can indeed be observed in a number of countries.

Table 4.16. Changes in the size distribution

Country	One to five vehicles (%)		More than ten vehicles (%)	
	1980	1990	1980	1990
B	73.5	60.1	15.4	14.1
NL	64.5	56.8	15.6	21.7
UK	87.0	83.0	6.0	9.0
F	80.0	81.6	12.5	12.8
D	88.7	83.1	3.6	7.2
DK	89.4	83.7	4.5	5.3

Source: IRU.

Generally, the relative share of large companies seems to rise in the period examined. However, the figures in Table 4.16 underestimate the real importance of large companies, because such figures do not take into account the large extent of subcontracting (if the subcontractors are legally independent companies they will be classified as small or medium-sized).

It is well known that in all EU Member States subcontracting plays a very important role.[36] Historically, these were especially countries in southern Europe (Spain, Portugal and Italy) and the United Kingdom in which subcontracting was a familiar feature.

36 See also the report by the Committee of Enquiry on road freight transport in the single European market, p. 43.

4.4.2. The market for small transport operators remains unstable

The formation of a single European market for transport operators and shipping industries in combination with the lifting of restrictions on market access, has finally resulted in a market situation for small operators where prices for transport operations dropped, costs increased and profits declined. The typical non-rational behaviour of small transport companies provides no guarantees that this situation will change. On the contrary, a structurally unstable market situation has arisen with some serious negative side-effects.

Unlike the larger companies (see Section 4.2), small businesses do not gain from economies of scale. Unable to raise prices in a very competitive market and dependent on subcontracting from larger companies, small businesses such as owners/drivers improved their competitiveness by increasing labour productivity. Some small businesses were not able to compete and were indeed shaken out of the market, but as a result of low barriers for market access almost immediately re-entered the market under the same conditions. Together with the typical non-rational behaviour of small business,[37] where no clear distinction between private household and business operations can be witnessed, the easy access to the profession causes a high degree of competition.

These findings correspond with experience in other markets dominated by small business, like agriculture, fishing industries and inland waterways. As a result, some serious negative side-effects, such as evading laws on labour agreements and on driving and resting hours arose.

4.4.3. A squeeze-out of medium-sized companies is foreseen

Completion of the single market enabled large companies to meet shippers requirements. A process of building up large international networks (often using small low-cost companies as subcontractors) has started and has not come to an end yet. As a result of the limited possibilities to differentiate, a squeeze-out of medium-sized companies is foreseen.

The effect of subcontracting will partly offset the trend towards an increase of the relative share of larger sized companies and will, in the long run, stabilize the size distribution of transport operators. Finally, the outcome will probably be a more uniform market structure in European road haulage which will be more or less similar to the current market structure in southern European countries: a few very large companies and many small companies which are subcontractors of the large companies.

In the long run a gradual erosion of the number of medium-sized companies is expected, because the possibilities to differentiate in transport are ultimately limited. The revenue distribution of transport companies ranked according to firm size becomes a two-peaked distribution in the long run (a peak for the large number of small-sized companies and a peak for the few mega-companies).

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37 This irrationality is best illustrated by companies competing on prices below average variable cost levels.

Although no hard empirical evidence was found for the expected squeeze-out of medium-sized companies, there seems to be consensus on the existence of this phenomenon.[38] Only large companies have the ability to acquire medium-sized transport companies to build their international networks, while subcontracting smaller companies to carry out the growing volume of transport. Table 4.17 shows the actual situation of companies building up their international network through subsidiaries within Europe.

Table 4.17. Top 27 horizontal integrators' number of subsidiaries abroad, within the EU, 1993

Country	Number of subsidiaries
NL	292
B	0
UK	468
IRL	0
D	318
F	150
DK	34
E	0
P	0
I	18
GR	0

Source: Buck Consultants.

One option left for medium-sized companies not taking part in this tendency towards concentration is specialization. A certain amount of shake-out took place in the number of companies, although the development seems to have stopped at a certain level.

In the Netherlands, for example, 250 takeovers of mainly medium-sized companies were registered during the last five years. In half of these cases a foreign company was involved.[39] However, the number of takeovers declined from over 60 in 1989 to 45 in 1993. A further decline in the number of takeovers is to be expected.

In all Member States, the transport market in terms of number of companies is dominated by very small operators, i.e. fragmented markets (see Chapter 2). The much smaller number of large companies dominate in terms of operations. The total number of enterprises remained almost constant or declined in countries which have never been truly regulated, for example the United Kingdom.

In the United Kingdom, the total number of enterprises declined from 72,444 in 1985 to 70,442 in 1989. In times of growing demand, an increase in the total number of enterprises took place in countries where deregulation and liberalization were still in process. For example, in France the total number of enterprises grew from 26,230 to 33,392 in 1990. This development can be regarded as an adjustment process coming to an end as soon as a new equilibrium has been reached.

38 An explanation for this lack of empirical evidence might be found in the fact that companies, after being taken over, still operate under the same name. National statistics on size distribution of companies do not allow for such refinements.

39 *Transport en Logistiek*, 13 October 1994.

4.4.4. A distinction between integration and non-integration strategies is developing

As an answer to increased competition, a clear distinction can be witnessed in the development of product composition and segments of the road freight transport market. Countries with relatively high factor productivities used economies of scale to differentiate towards integration. Other countries, dominated by a large number of relatively small companies, concentrated on non-integration strategies.

Table 4.18 provides figures for the growth of the typology segments introduced in Chapter 2.[40] The figures refer to the period 1986–92 and are calculated for bilateral border-crossing EU transports. For the total EU the fastest growth is established in the vertical integration segment, indicating the growing importance of integration strategies discussed in Section 4.2.

Some remarkable developments took place within certain Member States. Southern European countries established a significant, above average, growth within the capacity-focused segment. Greece, Spain and Portugal, for example, tripled their total amount of international transports within these segments. The findings are not surprising, as Greece, Spain and Portugal are cost-competitive countries within the EU. They compete on price rather than on quality.

Table 4.18. 1992 index figures on product composition (1986=100, million tonnes-kilometres)

	Specialist	Vertical integrator	Capacity focuser	Networker	Total
Germany	123	134	121	120	122
France	179	182	167	187	176
Italy[1]	88	78	113	93	94
Netherlands	142	204	163	150	158
Belgium[2]	139	198	167	159	160
United Kingdom	211	370	241	208	241
Ireland[3]	72	93	105	126	98
Denmark	147	-	138	136	146
Greece	128	115	303	117	129
Spain	227	66	296	210	230
Portugal	300	274	352	476	345
EU[4]	157	204	159	160	162

Source: NEA/Eurostat.
[1] 1989–92 (1989=100).
[2] 1986–91 (1986=100).
[3] 1986–91 (1986=100).
[4] 1986–92.

Western European countries, where the road freight transport sector is relatively dominated by a significant number of medium-sized and large companies, show a different pattern. France, for example, clearly developed towards both horizontal and vertical integration. The Netherlands, the United Kingdom and Belgium developed towards vertical integration. Dutch companies with highly developed standards doubled the amount of transport within this segment. Instead of competing merely on prices, countries in western Europe compete on value added services as well, and are searching for closer co-operation with shippers.

40 The different segments are directly related to different types of commodity (see Appendix A).

4.4.5. Indirect effects on establishment, acquisition and transfer of subsidiaries abroad

The market for road freight transport is characterized by fierce competition. Profitability is under constant pressure. As a result, completing the single market might offer opportunities for the establishment, acquisition and transfer of subsidiaries abroad.

Because of the large number of suppliers in the market, price levels are very sensitive to changes in demand and the average cost level. Competition in the road transport market cannot, however, be described as the ideal market of 'perfect competition', although it must be said that in certain ways it looks like a perfect competitive market.

Lack of transparency in the nature of services provided and the fact that in most cases services are provided under conditions of increasing returns to scale (which is typical for transport in general and road transport in particular) conflict strongly with the ideal of perfect competition. Particularly increasing returns to scale characterize competition in road transport. Large companies usually control an extensive transport network, which gives them a clear advantage in the competition with small and medium-sized companies. They are also in a far better position to negotiate with suppliers of equipment and fuel as well as customers.

Small and medium-sized businesses can only compete with the large operators when they co-operate closely with each other. In the last years, some of these alliances have indeed emerged, but it is too early to assess whether this will be an important new development in the market. For the time being, it seems that small and medium-sized companies can only be a party for small and medium-sized customers, or work as a subcontractor of large-sized companies.

Reduction of costs can be achieved in several ways. One way is to operate on a more efficient level. The lack of sufficient return cargo implies that lots of vehicle-kilometres are still run empty. Establishment of foreign selling agencies is often used as a method for operating more efficiently; foreign agencies should improve their ability to obtain return cargo. Another possibility is co-operation with companies abroad. In this perspective, very large companies acquire foreign companies, because economies of scale demand the same uniform approach in both managerial and operational activities. Another possibility is completely transferring the business abroad. Because of the effects in terms of employment, this possibility is of special interest to every government. However, a comparison with the maritime sector, in which this phenomenon is well known, shows that only a limited number of companies can apply such a strategy.[41] In this context, some examples are witnessed of companies who, after bankruptcy, re-entered the market from a different location, often eastern Europe, abroad. No examples of transfer of business within the EU have been found.

4.5. Remaining obstacles

Although harmonization has produced a certain convergence in costs, large differences among Member States still remain. Also, due to liberalization some serious negative side-effects are to be expected.

41 See Appendix E.

4.5.1. Diesel fuel prices

A number of obstacles causing unfair competition remain. First, there are a number of financial distortions. Although excise duties on fuel are harmonized on a minimum level, price levels for diesel still differ largely among Member States. Figure 4.17 shows the total of prices of diesel in ECU and the percentage excise duties in August 1994. Table 4.19 contains the same information in absolute figures. Despite the depreciation of the Italian lira, the price of diesel fuel in Italy is one of the highest in Europe. The lowest rate for excise duties is found in Denmark (43.7%), the highest in Portugal (57%).

Figure 4.17. Price per litre diesel and share of excise duties in the EU, in ECU, August 1994

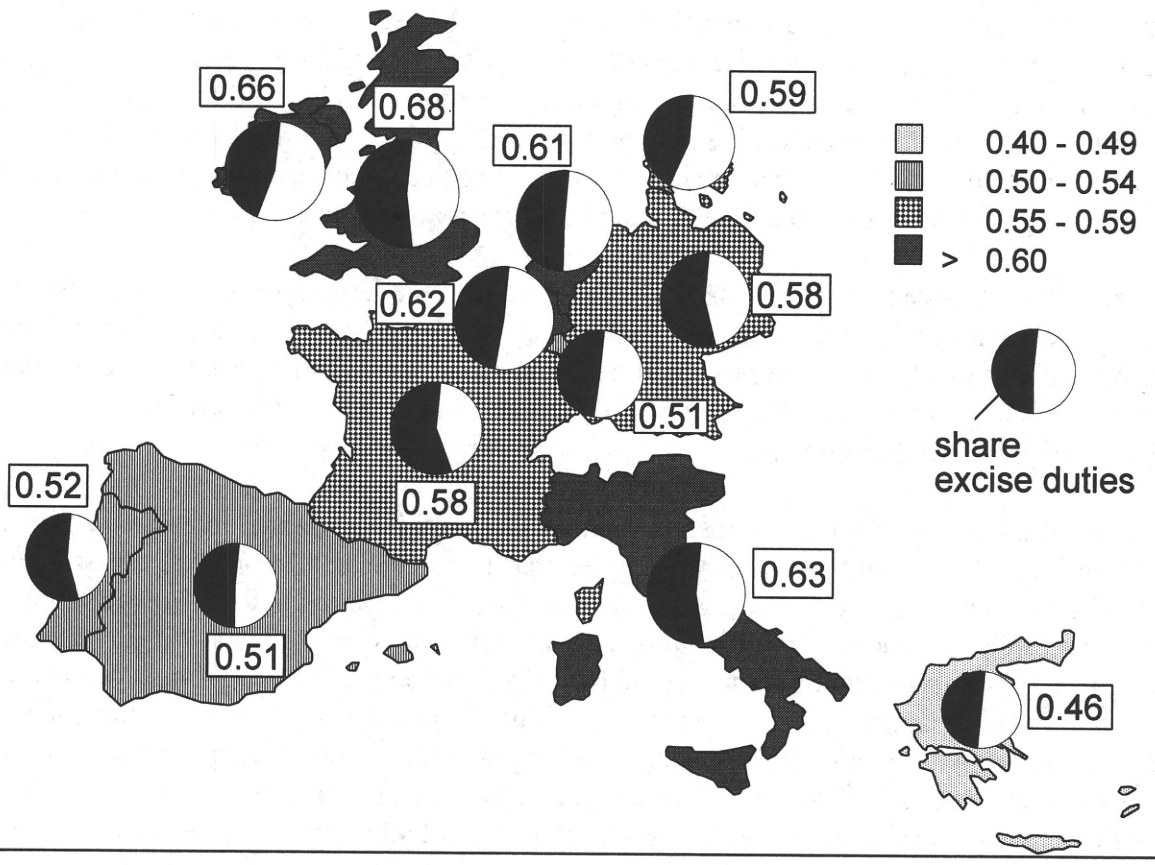


Table 4.19. Price and excise duties per litre diesel in the EU, in ECU, August 1994

	Price	Excise duties
Germany	0.58	0.32
France	0.58	0.33
Italy	0.63	0.35
Netherlands	0.61	0.31
Belgium	0.62	0.30
United Kingdom	0.68	0.36
Ireland	0.66	0.30
Denmark	0.59	0.26
Greece	0.46	0.23
Spain	0.51	0.26
Portugal	0.52	0.29

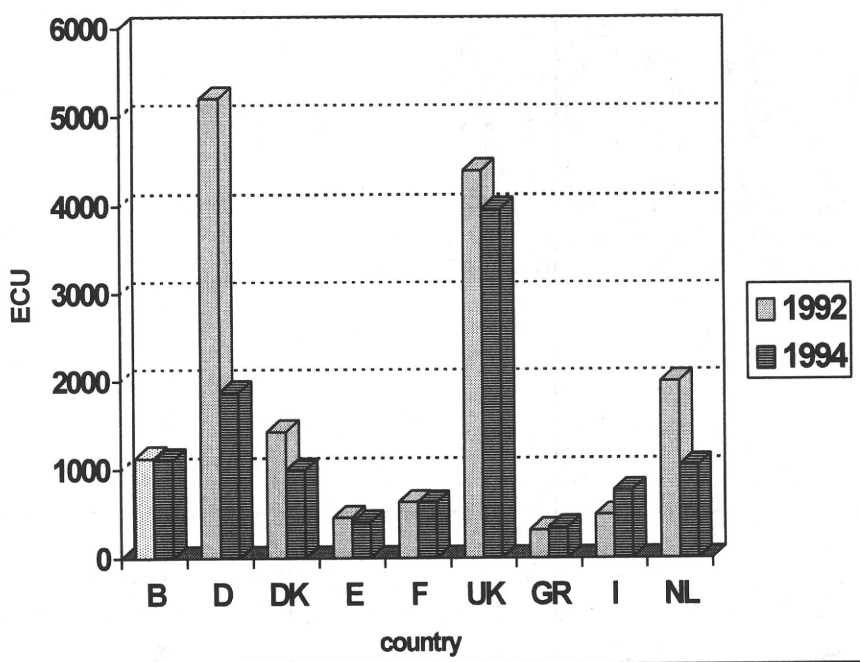
4.5.2. Vehicle taxes/user charges

Council Directive 93/89/EEC has set a minimum rate for annual taxes for heavy goods vehicles. This is a first step towards approximation of conditions of competition but leaves it to the Member States to fix the actual tax at a rate which is higher than the minimum. Some Member States, as Figure 4.18 shows, have used this possibility. In addition, the directive established the framework conditions for the introduction or maintenance of motorway tolls and user charges. Some Member States have made use of this option, some have not.

These rules do not harmonize fully the charges levied on hauliers but constitute the beginning of further Community action in this field. Nevertheless, the rules are non-discriminatory.

The findings of Figure 4.18 provide information on vehicle taxes. The substantial reduction in vehicle taxes in the Netherlands and Germany given in anticipation of the introduction of the Euro-vignette can be contrasted with the rate of vehicle taxes in countries charging tolls like Italy, France and Spain which are among the lowest in Europe.

Figure 4.18. Vehicle tax in the EU, in ECU, 1992–94



4.5.3. Social regulation

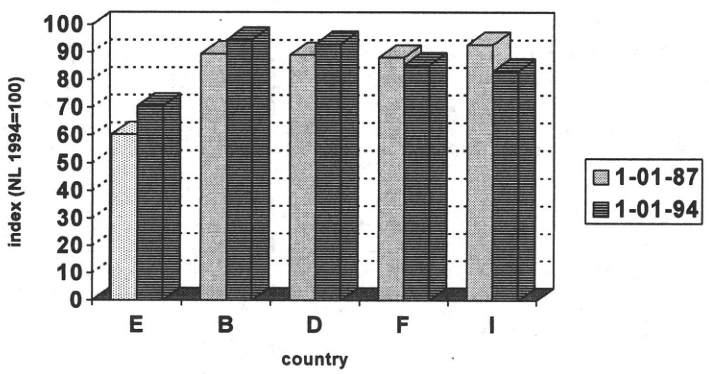
Remaining obstacles with a social dimension are also found. Although driving and resting times are harmonized, the sanctions for companies disobeying these rules are not. As small companies are hard to trace, Member States check larger operators more frequently. This implies a negative side-effect in terms of road safety and offers small companies opportunities for unfair competition. This process is also stimulated by low entry barriers to the profession of road freight haulier. Apart from this, interpretation of good repute, sound financial standing and professional competence – the qualifications needed – are rather subjective. Experiences with low entry barriers in the United States show a significant increase in the number of road

accidents; also, the reputation of truckers continues to deteriorate since the introduction of the Motor Carrier Act in 1980.

4.5.4. Labour costs

Harmonization is recommendable for labour costs. Although on average, costs are somewhat harmonized (due to increased competition and the free movement of labour) there are still large variations. As, on average, labour costs exceed 40% of total trip costs, the phenomenon of owner/driver companies is still stimulated by the existing variation. Figure 4.19 shows the development of labour costs in road freight transport in some Member States in relation to the Netherlands. Although convergence in labour costs is found, important differences still remain.

Figure 4.19. Development labour costs in some EU Member States, 1987–94 (NL 1994=100)



According to Figure 4.19, wages (in money terms) have increased in Spain, Belgium and Germany. In France and Italy, however, the level of wages declined (due to the depreciation of their currencies). However, in 1994 the average wage level in Spain remained 30% lower than in the Netherlands, where wages were the highest in the whole EU.

4.5.5. Border checks

The abolition of border checks has caused some serious difficulties in controlling indirect taxation. As border checks are no longer being exercised, vehicles are hard to trace and 'disappear' anywhere within the Community.

Also, the diversion of controls of vehicles registered in a non-EU state to the external border of the Community requires harmonization of conditions. Until now, the road freight transport market for non-member states depends on bilateral agreements. Former East Bloc hauliers

especially, being less well equipped and taking certain rules less restrictively, form a competitive threat for Member State hauliers.

4.5.6. The lack of a Community transit agreement

The lack of a Community transit agreement with each third country is a clear example of distortion of the functioning of the single market. The number of, as well as the costs for, transit licences for crossing third countries seem to be dependent on bilateral agreements between a third country, on the one hand, and Member States, on the other, affecting the competitiveness of Member States at the periphery of the Community in particular. Due to differences in trade flow volumes between Germany and Bulgaria (in contrast to trade between Greece and Bulgaria), operators originating from Greece have fewer transit licences and have to pay higher transit duties for Bulgaria than German operators.

A somewhat similar situation exists for trade flows crossing Austria. In an attempt to reduce environmental damage from road transport, Austria introduced the so-called ECO(logical)-point system in 1991. This system regulates for each Member State the number of transit licences for Austria. The number of licences, however, is historically based and depends on the volume of trade between Austria and individual Member States. As a result, German operators clearly have competitive advantages above Italian operators on the Germany–Italy route.

4.5.7. Empirical evidence for non-specified shortcomings

The large business survey mentioned earlier in Chapter 4 also indicates that transport operators agree that additional measures are needed to eliminate obstacles to EU trade or to create a genuine single market. Around 30% agree, while no more than 10% disagree.[42]

42 Eurostat, April 1996, *Single market evaluation.*

5. Business strategy

5.1. Introduction

This chapter examines the strategies transport companies have applied in an attempt to consolidate or improve their competitive position. Several starting points for the analyses given below have been chosen. These are:

(a) a macro-economic oriented approach based on Eurostat statistics applied to the typology introduced in Chapter 2 and described in Appendix A;
(b) four case studies;[43]
(c) the opinion of experts.

Section 5.2.4, on development of market shares for different segments of the typology introduced in Chapter 2 and described in Appendix A, relies heavily on a macro-economic orientated approach. The case study results are extensively used in Section 5.2.5 on mixed strategies. Results from other studies and expert opinions are used throughout this chapter.

5.2. Business strategies applied by transport companies

5.2.1. Internationalization of transport activities and the benefits of subcontracting

> *As a result of the completion of the single market, building up large international networks became an important strategy. The companies benefiting most from the newly available opportunities were the larger ones. While harmonization and liberalization improved the management of networks, the disadvantages of harmonization, such as increased costs, have been transferred to small hauliers which were subcontracted. Subcontracting also significantly improved the flexibility of large and medium-sized transport operators. Increased price competition among small companies as a result of liberalization measures offered larger operators the opportunity to hire transport services in a competitive market against low prices, without the need to bother about return cargo or to plan the transport capacity needed. In this respect the smaller companies being subcontracted function as an 'elastic band' within the market.*

The single market particularly enhances the opportunities for transport companies which are active in border-crossing transport in Europe. In this market, the large-sized professional operators dominate in terms of operations. Own-account operators and small-sized professional operators are predominantly active in the domestic and regional markets.

In the last decade, we have seen the advent of a number of logistics service providing companies operating on a European scale. These large-scale companies operate in a co-ordinated manner in the whole European market. They follow a strategy in which a (European) network is systematically being enlarged and clearly apply a uniform approach to the whole European market. Usually other modes of transport are integrated in these networks. Well-known examples of such companies are Kühne & Nagel, Nedlloyd, Bilspedition, Schenker,

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43 One medium-sized specialist from the Netherlands, one large vertical integrator from France, one large networker from Germany and one small capacity focused company from Spain.

Danzas, etc. In some cases these companies have also developed strong positions in specific market segments for specialized transport and logistics services for large shippers, e.g. the automotive industry, the chemicals processing industry (transport and handling of dangerous goods), etc.

The entry barriers to the market of the large-scale network operators have become higher as the required network investments needed to obtain scale benefits, combined with the use of advanced information technology, are becoming enormous and are still increasing (also caused by the need systematically to enlarge those underlying networks).

Therefore a number of already large-scale companies should significantly expand their activities and improve the functioning of their European networks. The improvements realized were not only improvements due to the expansion of the networks[44] as such, but also improvements in the management of their network, which was substantially eased through a greater unity in the regulations of the environment in which they had to operate. A service sector survey, recently conducted by the EC, underwrites these findings. Over 25% of all transport operators indicate that their business has improved due to harmonization, only 10% believes that harmonization has had a negative impact. Furthermore, a positive correlation can be witnessed between such a positive indication on the one hand and the size distribution of companies active in the services sector on the other.[45]

Although some of these carriers claim to have a true pan-European network of their own, not one of them has been able to realize it without the help of agents, the formation of strategic alliances, mergers or through co-operation with other carriers. As a matter of fact, the two largest European networkers from Table 4.2 – Danzas and Schenker, who truly cover a substantial part of Europe – indicate that alliances as well as agents are more important for enlargement of the coverage of their networks than subsidiaries (see also Section 4.2.3). Other large companies like Nedlloyd and LEP rely more on subsidiaries (but still use alliances as well).

Partnerships appear to be necessary to complement one another's geographical range and thus fill up the 'blank spots' in their 'pan-European networks'. The increasing demands of shippers on transport lead times, costs and service limit the possibilities that carriers have, to obtain the necessary scale benefits and low operating costs. Further expansion and scaling-up of the networks in whatever form, strategic alliances – mergers or agencies – etc., provide carriers with opportunities to further reduce total operating costs through improved potential for economies of scale and consolidation possibilities.

At the same time a tendency in the market could be observed to separate the forwarding function from the physical transport operation and the intensive use of subcontractors. In some cases in France and the Netherlands, this development took on the extreme form of completely dissolving existing middle-sized and large companies into a large number of smaller companies and a remaining trunk-company which mainly acted as forwarder and logistics organizer. The former drivers then became owners/drivers and the former transport managers

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44 Transport companies typically operate under conditions of increasing returns to scale. Companies which have a large transport network usually have more possibilities to combine activities and consolidate freight in several places (potential economies of scale) than companies with smaller or less dense networks. The term 'economies of scale' therefore refers to the potential of networks rather than to the number of vehicles.

45 Eurostat, April 1996, *Single market evaluation.*

became forwarders. Recently, top 20 member Frans Maas completely outsourced its transport capacity and start concentrating on management of services only.

At first these developments had little to do with the single market, but indirectly they contributed to the response of many companies in western Europe to the increased competition in the market and the low-cost competition from operators in southern and eastern Europe in particular. In a recent study[46] on the competitiveness of the Dutch transport sector, it is claimed that especially the increase in subcontracting, as witnessed throughout the last decade, was the main reason why many companies could avoid bankruptcy and survive. These smaller companies functioned as an 'elastic band' within the market. They were subcontracted when needed, but did not, however, impose a financial burden in times when transport demand was low (excessive capacity problem). As a consequence, the Dutch transport sector as a whole could consolidate its substantial market share in the early 1990s.

The reason why companies rely so heavily on subcontracting is because of a 10 to 15% difference in the level of labour costs in the official market and the subcontracting market. The difference is explained by the simple fact that subcontractors are more willing to work in their own time and outside the officially allowed working hours. Furthermore, extra costs (which differ by EU Member State) imposed on road transport operators by EC measures, e.g. through increased vehicles taxes, infrastructure charges, excise duties etc., can be diverted to the subcontractors (owners of the vehicles). Contractors can simply purchase transport capacity at market price and benefit from competition among low-cost operators.

To a certain extent, the poor enforcement of rules and regulations (with regard to licensing, driving times, maximum permitted loading of vehicles, etc.) by the authorities may be responsible for this development. Of course, opponents of such a view will argue that these rules and regulations are unrealistic, and strict compliance would only increase consumer prices. The conjecture could be made that European harmonization of social conditions in transport (perhaps as part of the Social Chapter), combined with a stringent enforcement of rules and regulations in all EU Member States, will probably put an end to extensive subcontracting.

5.2.2. Strategies to establish a widening of scope

Building up large international networks requires a certain scale and certain skills. Due to the high level of fragmentation of the market for road freight transport, medium-sized companies too large to be subcontracted and too small to build up international networks started widening their scope. By doing so, these operators became specialists in certain areas of transport.

Some companies reacted in a different way to the increased competition, namely by specialization and concentrating their activities on market segments which require a specific know-how of products and management or special equipment and/or a special fleet of vehicles. Well-known examples can be found within the specialization and vertical integration segments of the typology, such as transport of clothing, dangerous goods, chemicals, (frozen) food products, machinery, etc. This strategy of focusing on market niches is particularly

46 *De internationale concurrentiepositie van het Nederlandse wegvervoer* (The international competitive position of Dutch road haulage), NEA, Rijswijk, 1995.

relevant for medium-sized companies, because it offers them the scarce opportunities to survive in the long run. If a medium-sized company is unable to find a particular market niche, it is destined to end as a subcontractor of a large-sized company or it will be forced to exit the market. Fortunately for those companies, the road transport market is still very fragmented.

Furthermore, many companies have tried to improve their quality performance while simultaneously actively marketing this quality performance to the outside world. A clear sign is the sudden 'explosion' of companies in possession of quality certificates (e.g. ISO 9002). This is quite obviously a strategy to differentiate themselves from their competitors through high quality standards.

Other companies tried to widen their scope of activities by including transport-related activities such as warehousing, packaging and sometimes even assembling and co-producing goods. In general, one describes such activities as 'value added logistics' (abbreviated to 'VAL-activities'). Figures on the increasing average number of employees per company in comparison with the average fleet size point out this broadening of scope (they apparently now perform more transport-related activities). This strategy is set to customize logistics services and often results in binding clients more firmly to a transport company and is as such part of a strategy to increase the exit-costs of clients.

Some empirical evidence for concentration of companies and subsequent wider scope of activities can be found in Table 5.1. It shows both the average annual growth in number of persons employed and number of vehicles for countries for which comparative statistics are available. The figures refer to the corresponding hire and reward segments and are calculated for the period 1985–91.

Table 5.1. Average annual growth (%) in number of persons employed and total number of vehicles for the hire and reward segment, 1985–91

Country	Employees	Vehicles
Belgium/Luxembourg	9.5	4.5
Denmark	2.6	2.5
France	5.2	-
Germany	7.6	-1.3
Netherlands	6.6	5.6
Portugal	7.1	6.4
United Kingdom	-	0

Source: NEA.

For all countries the annual average growth in the number of persons employed is larger than the annual average growth in the total number of vehicles. The number of employees per vehicle is still rising, indicating a widening scope of activities.

5.2.3. Owners/drivers

The split-up into owners/drivers offered companies comparative advantages. Not only could they evade laws on collective labour agreements, they also increased overall productivity by better motivation among drivers and lower sick-rates.

The existence of owners/drivers, as a result of specific cost-driven strategic behaviour of small transport companies, is a well-known phenomenon. As quality became increasingly important,

the motivation of drivers gradually became important, too. By allowing drivers to own their vehicle, companies were able to improve productivity and sick-rates decreased. This development was also encouraged by less restrictive social standards on free enterprise. Collective labour agreements could be avoided and labour costs decreased.

According to Table 4.16, no hard empirical evidence was found for an increase in small one-person companies, which might be the result of registration procedures. Small companies just being subdivided are not always registered as such. Similarly to other small companies that are subcontracted, they play an important role in enabling certain strategies, not in quantitative terms of increased share of distribution.

The growing importance of owners/drivers must be seen, however, in relation to the negative side-effects arising from these strategies. Although hard to prove, these companies take rules on driving and resting times and maximum vehicle weights less restrictively.

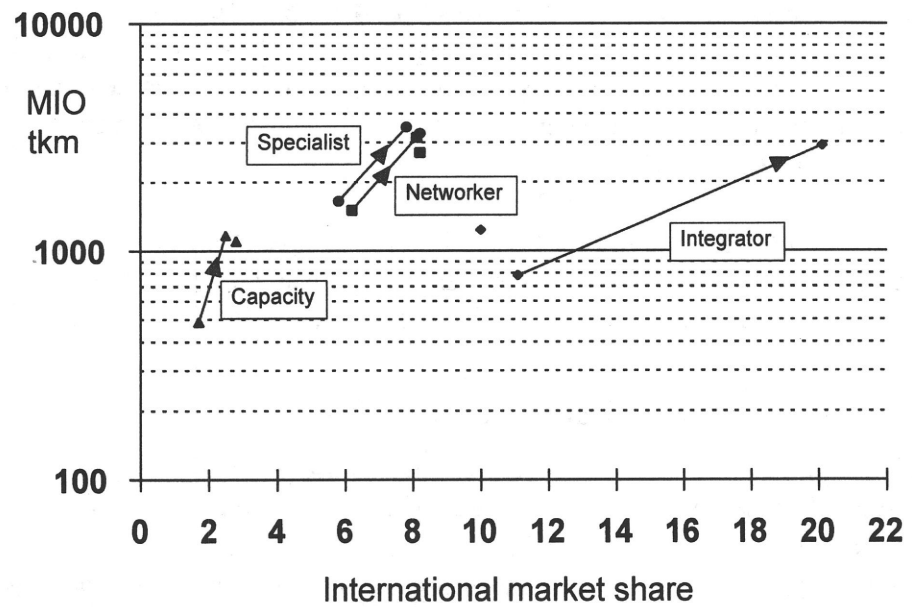
5.2.4. Development of international market shares for different segments

Internal assets and adjusted cost structure are determining factors in the strategic behaviour of transport companies. Liberalization and harmonization enabled companies fully to exploit these internal assets. As a result southern European companies seem to follow specialization strategies, competing on price, while companies originating from western Europe seem to concentrate on integration strategies, competing on quality standards.

Despite the efforts undertaken to harmonize the single market, Chapter 4 showed that costs for transport operations still differ among different countries. Companies lacking the ability to meet shippers' demands are forced to compete in a price-competitive market, while others can search for co-operation and integration with shippers competing on quality aspects. Figures 5.1, 5.2 and 5.3 show the development of international market shares within the four different transport market segments introduced in Chapter 2. In each graph, three moments in time are given for each of the four segments: 1986, 1989 and 1992. Horizontally, these moments mark the corresponding international market share of a country's typology segment, while vertically the transport performance of a country's typology segment is provided. The vertical scale is a logarithmic scale, so the same increase along the vertical axis represents the same relative increase in transport performance. Arrows indicate the direction of development and connect 1986 with 1992 (the intermediate point '1989' is not connected by arrows).

According to Chapter 4, transport companies from the United Kingdom remained price competitive in international transport.

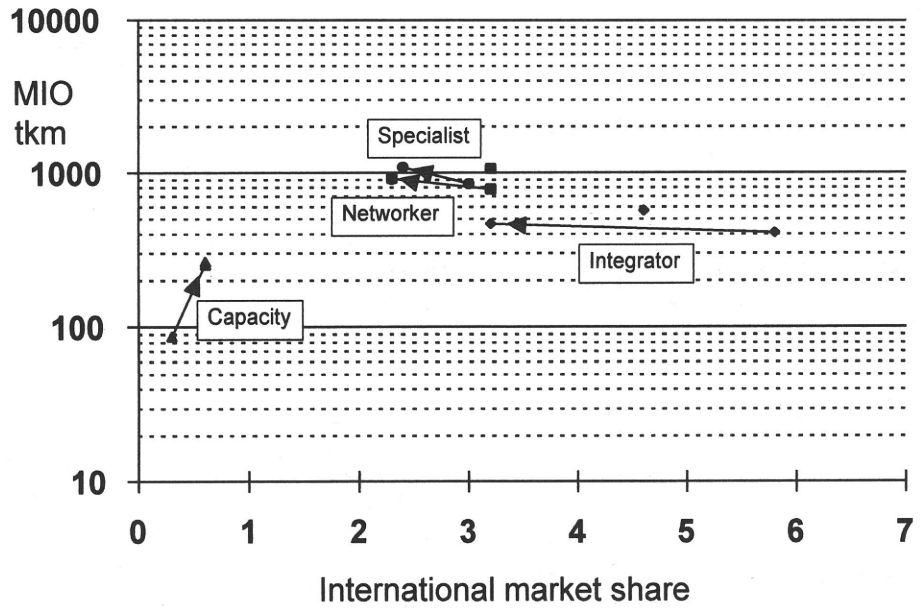
Figure 5.1. Performance of the United Kingdom, border-crossing transport development, 1986–92



The market in the United Kingdom has never been truly regulated and, therefore, the operators were already used to their 'natural environment' of fierce price competition. The developed standards were high and liberalization gave them a comparative advantage over France (France's domestic market was regulated until 1991), a country of special importance for operators from the United Kingdom as many transports enter the European continent through France. As a result all market shares increased, especially the share for the vertical integration segment. This increase in vertical integration operations has also been found for operators originating from other western European Member States.

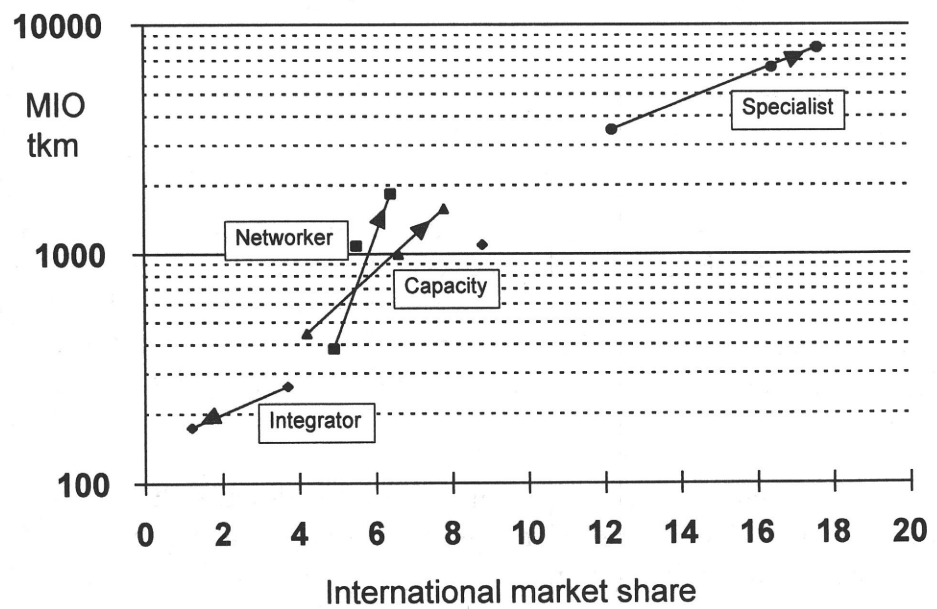
Southern European Member States show a different development. For example, Greece developed its capacity segment significantly, while other segments increased slightly in terms of total absolute performance but faced the loss of market shares.

Figure 5.2. Performance of Greece, border-crossing transport development, 1986–92



For Spain this development is even more remarkable. Spain, like Greece, a country with many low-cost operators, developed its transport capacity and the segment for dedicated transport. Moreover, the international market shares of the vertical integrators did not only drop: they also lost ground in overall transport performance.

Figure 5.3. Performance of Spain, border-crossing transport development, 1986–92

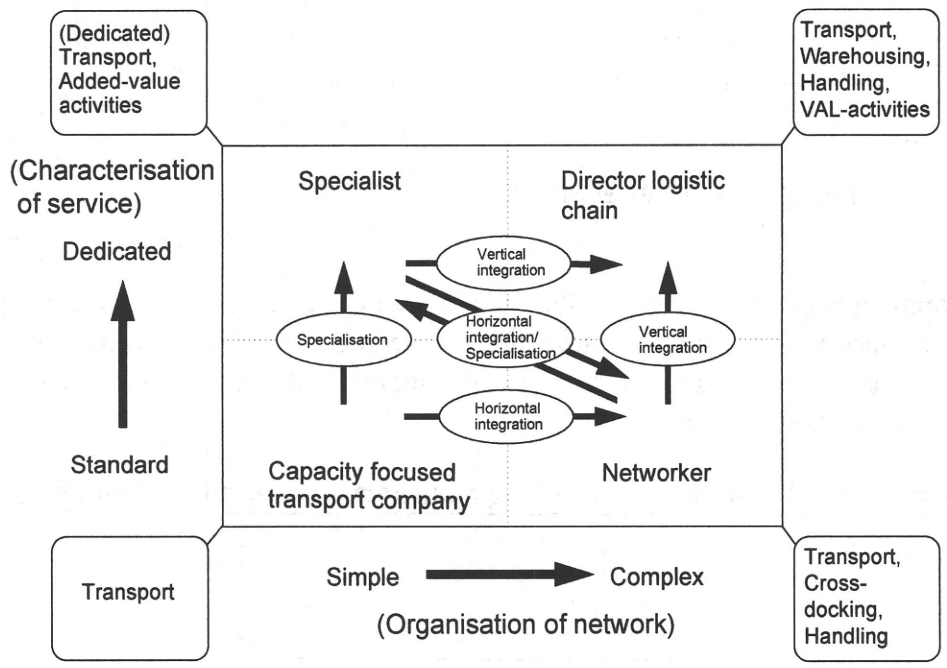


In general, a distinction between the development among EU Member States is witnessed. These findings are discussed in Section 4.4.3.

5.2.5. Mixed strategies applied by transport companies: a case study approach

In the previous sections options are described for different strategies companies can employ. In reality companies hardly rely on a single strategy, but they use mixed strategies instead. This section focuses on such mixed strategies and is based on four case studies. Figure 5.4 shows possible strategies companies can apply.

Figure 5.4. Mixed strategies applied by transport companies



Specialist

The specialist studied is a medium-sized company from the Netherlands. The company permanently owns a fleet of 80 vehicles; during peak season total fleet size increases (subcontracting) to about 250 vehicles. The company is specialized in transport of frozen and temperature-controlled commodities, such as flowers, fresh frozen vegetables and fruits. A geographical specialization has been developed on transports to and from the United Kingdom and the Russian Federation.

The single market programme has affected operations. With the elimination of transport checks and controls at the internal EU borders, the customs clearance activities related to intra-EU traffic have been lost. The corresponding subsidiaries have been liquidated. On the other hand, regarding the free carriage of non-resident carriers on domestic markets, the company started operating cabotage activities in Finland.

To survive in the competitive market, from 1985 onwards, the company looked for differentiation and specialization of its logistic services and increased its number of locations in and outside Europe (horizontal integration). The company has focused on creating synergy effects between different activities (air, rail and road transport).

To develop geographical specialisms (further specialization), co-operations have been started up with Russian transport companies, which, amongst others, have resulted in the joint exploitation of a large warehouse in Moscow (vertical integration). Use of rail transport to and from Moscow and the Russian hinterland is being considered at the moment. For the same reasons, a joint venture concerning the establishment of a transport company in Finland was initiated (horizontal integration).

According to the company, the most important reason for these strategies is increased competition. The free carriage of goods by road between Member States as well as cabotage (vertical measures) and free movement of labour (horizontal measure) are identified as important enablers.

Vertical integrator

The large vertical integrator from France serving the automotive industry has facilities located in many countries throughout Europe. Despite its European presence, the organization mainly takes place on a national basis with no interaction between the national entities (no connected network).

Profits have declined considerably for several years now. Especially in France, the market for domestic distance transport has been eroded. Competition is fierce and generally speaking, most car manufacturers tend to choose services in which the price factor is the most important element. Therefore, the company is moving even more towards and searching for more value adding services (vertical integration/specialization).

The main strategy is to rationalize and integrate its nationally focused transport operations. The objective is to move away from this national approach of domestic markets and to obtain a true European company (fully to exploit opportunities). Furthermore, the scope of logistical activities is widened. The contracts with two car manufacturers include full logistics control ex works (intensified vertical integration/VAL activities). The company 'buys' cars as it were from its client. It operates as the managing agent during the period in which cars leave the factory and are transported to pre-delivery-inspection points.

According to findings of the interviewee, free quantitative access to the market, the free carriage of goods by road and the admission of cabotage have intensified competition. These legislative changes did not provide opportunities within the market. However, strategic reactions have been instigated and are still necessary to respond to the competition of other specialists. Currently, the company is examining the possibility of replacing French drivers by Spanish and consequently Spanish by Portuguese drivers in order to reduce labour costs. The free movement of labour might provide an opportunity in this respect as well as affect competition.

The Euro-vignette has affected transport rates in the Benelux. It has also imposed competitive restrictions on the company in rail transport. As rail transport and the national railways in

France are heavily subsidized (SNCF and STVA but also CAT from Renault and JEFCO from Peugeot), unfair competition is created within a seriously distorted market.

Capacity focused company

The small Spanish company studied operates with one heavy truck, three semi-heavy trucks and five delivery vans. The company was founded by five former drivers and operates as a 'joint-venture' of owners/drivers. The company is cost-competitive and no substantial competitive change has been witnessed during the last five years.

By far the most important driver for a change in strategy is the quality-driven attitude of shippers. The overall formula is to improve quality and to stay competitive. The company expects a squeeze-out of medium-sized companies. Its aim is to grow further until a co-operation of 20 autonomous owners/drivers has been reached. In the future the company will focus on domestic transport by systematically enlarging the number of clients operating on the domestic market instead of shippers operating on an international scale (weak geographical specialization, avoidance of international competition).

According to the interviewee, no substantial competition is faced from other operators and fair competition is not disturbed. The company recognizes the low entry barriers to the profession of freight transport operator and fears intensified competition in the near future.

Networker

The large German networker studied has facilities throughout the whole of Europe. Apart from road transport, rail transport, trucking of air cargo as well as sea freight forwarding and barge transport operations belong to the company's activities. The company's services include forwarding of general haulage and groupage cargo, distribution, refrigerated and temperature-controlled transport, transport of currency – art and valuables (specialization), exhibition services, warehousing (vertical integration) and transport of dangerous goods (specialization). Activities such as the handling and transport of dangerous goods are physically operated with own equipment (high revenues) under their own control as the qualifications and standards of safety are extremely high (there is always a risk involved when using third-party operators). The remaining part of its transport capacity for general haulage purposes is contracted through their partner road transport operators (subcontractors).

As physical general haulage is subcontracted to small and medium-sized road transport operators, not the networker itself but the subcontractors benefit from the free access to the market. Increased competition has not lead to direct changes in business strategy. It has, however, accelerated the creation of a European network. Opportunities to maintain competitive advantages mainly lie in operating the European network with the application of highly advanced information technology and data linking.

So far, the gradual admission of inland cabotage on the German market has not resulted in strategic changes or effects on competition of any kind. The relationship of the networker with its clients is based on long-term contracts (vertical integration) which have not been affected by competition due to inland cabotage.

However, the application of uniform safety rules for transport of dangerous goods has changed competition. As the legislation is very strict, especially large clients are relying on large international transport and/or forwarding companies. In most countries, a uniform approach has imposed higher standards and requirements on operators and therefore increased their barriers to enter or remain in the market. As a result, there is less competition. The company is experiencing new improved opportunities and has reassessed its strategy accordingly. It has improved, and increased its spending on, security qualifications and financial investment (specialization).

The main strategies, however, are realizing and operating a highly qualitative pan-European network at low costs: a network provider. Obtaining economies of scale is very important in this respect. The tendency amongst large shippers to move towards an international European logistics structure leads to a shift in transport flows from intra-regional markets towards inter-regional markets.

The nature of the business forces the company to maintain both a cost-driven and a quality-driven business strategy. Increased competition puts more pressure on obtaining improved economies of scale on the European networks. Next to obtaining a European coverage through pan-European networks will be to add and link national distribution systems (vertical integration). The company has tried to build a network with 100% own infrastructure, but shippers expect minimum transport lead times. This diminishes the opportunities to consolidate consignments (economies of scale and cost reductions) and increases the pressure to form strategic alliances.

Especially large shippers in Europe are reorganizing their European logistics structures in order to lower total production and logistical costs (reduction of stock-keeping levels) and to increase their flexibility in the market. In the supply chain as well, shippers are searching for low-cost suppliers and supply concepts. The next dimension is global sourcing. The completion of the single market is not the cause of the developments, but certainly contributes as an accelerator to these developments. From the companies' point of view, the most important barrier for shippers to change their logistical structure and patterns, however, is the cost of changing to a new situation (switch costs), the influence of unions, resistance of national/local management to changes, etc. Experience taught the company that about 80% of all plans of shippers to upgrade their business and logistics approach to an international level have not been carried through.

Competitors have shown a general tendency to sell VAL (value added logistics) and other additional activities (vertical integration). The company under study is also, for example, now more involved in quality control in their partnership with a large American computer company (vertical integration). The driving force behind this tendency is increased competition. The main barrier is the high expectations of shippers, i.e. forwarders are expected to make large, high-risk, investments in specialized/customized warehouses (specialization/vertical integration). The effect of legislative changes due to the removal of transport checks at frontiers has had an enormous impact on the company. It lost an important activity within its service package, representing over DM 800 million in revenue. Measures related to the harmonization of vehicle taxes and excise duties on diesel mainly impact the charters used. They contract these operators at competitive market prices, which include any cost increase or decrease resulting from these measures. For this reason, the interviewee viewed the measures as not relevant to the company's business.

The near future is believed to reduce the number of pan-European network providers to only a few companies or strategic alliances. The shake-out will mainly affect the medium-sized companies. Companies or strategic alliances which do not have a European coverage and networks will be shaken out of the market as well.

5.3. Innovation

Large companies innovate on a large scale to improve their competitiveness; smaller companies innovate on a small scale to remain competitive.

Competition among transport companies is strongly related to costs, productivity and quality aspects. Reduction of operational costs as well as improvement of both quality and productivity can be achieved through innovation. As innovations are expensive and appear to be beyond daily routine business, there seems to be a true relation between company size and innovation.

Studies for the Netherlands indicate that only 21% of all Dutch transport companies were involved in some kind of innovation process during the period 1990–93. For the larger companies, with more than ten employees, this figure is over 40%.[47] Many innovations were aimed at achieving quality certificates such as ISO 9002. Other types of innovation identified were new vehicles and storage capacity as well as innovations with respect to information technology, such as EDI, and the introduction of new services.

Of special interest in terms of achieving efficiency is information technology. These types of innovation were only found in large companies, while relatively inexpensive innovations, e.g. meeting certain quality requirements, dominate the innovation pattern of smaller companies. The explanation is more than just the investment capital required. First of all, there are strong indications that management skills in smaller companies remain poorly developed. A true separation between operational management, on the one hand, and management areas of interest (education, training and research and development), on the other, were only found in larger companies.

The larger the number of areas of interest, the more innovation is likely to occur. Second, the need for innovation only seems to exist for larger companies facing international competition and building up international networks. Larger companies are focusing on indirect transport activities like forwarding, warehousing or directing networks, while subcontracting smaller companies to carry out the transport. This implies more complex operations for larger companies and relatively easier transport operations for smaller companies. The more complex the transport operation, the more advantages can be expected from innovations in information technology. Smaller companies restrict themselves to meeting certain quality requirements to remain candidates for subcontracting.

Although no hard data on this subject were available for other European countries, there is no reason to believe that their situation is different. The larger Dutch companies studied were often owned by or were part of a European parent company or strategic alliance, or were owners of a number of medium-sized foreign transport companies.

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47 NEA, *Innovation in the Dutch transport and distribution sector*, 1994.

6. Conclusions

6.1. Introduction

This chapter summarizes the most important conclusions. Sections 6.2 and 6.3 contain the main findings concerning the impact of the single market programme on the demand side and supply side of the market. In Section 6.4 conclusions are drawn concerning the impact of the measures, resulting directly or indirectly from the confrontation of supply and demand in the market. With respect to the central question of the study Section 6.5 is important. In this section the following question is answered:

How effective has the single market programme been so far?

The 'effectiveness' is related to the levels of welfare (standards of living, income/profit levels etc.) as well as the competitiveness of the various groups. Therefore, this question will be approached from various viewpoints. First, from the point of view of the customers of services of the road freight transport industry; second, from the point of view of companies operating as suppliers in the road freight transport market; and finally from the point of view of society in general. Section 6.6 lists a number of remaining obstacles.

6.2. Demand side

During the last decade, the demand for road freight transport services continued to grow, both in terms of tonnes and tonnes-kilometres. The growth rate was significantly higher than the growth rate of GDP. The growth in demand for border-crossing transport was higher than the demand for domestic transport. Moreover, cargo is transported over greater distances and in less bulky quantities. Transport demand for hire and reward increased at the expense of own-account transport. Shippers increasingly relied on contracting out transport services and frequently on logistics services as well. This last development was primarily caused by changes in logistics management, which, in turn, were caused by changes in consumer preferences and the changing relations between capital costs and transport costs. Centralization of activities, reductions in the number of production and distribution sites as well as in stocks were some of the most characteristic features of this change in logistics management. Smaller, less bulky consignments and short transit time as well as higher frequencies of supply are required by the customers of road freight transport services.

Although primarily other – autonomous – factors determined this new approach in logistics management, the implementation of certain logistics systems (for example, relying on centralized European distribution) has been stimulated by the liberalization of the single European market.

Concentration and centralization trends on the demand side of the market may also explain the observed substitution of own-account transport by hire and reward services as well as the relative increase of border-crossing transport compared to domestic transport. As distances became greater, the costs for own-account operations on such relations became greater as well. They lack the opportunities to optimize fleet utilization. Furthermore, these own-account operators are not well equipped to obtain sufficient back-haul cargo.

The developments on the demand side of the market, in particular, favoured large logistics service providers. They are able to dominate the market for border-crossing transport and control international networks.

6.3. Supply side

The cost prices of road freight transport services have increased significantly in the last decade. To a large extent (at least 50%) the increase in cost prices could be explained by the effects of several measures to complete the single market.

In border-crossing transport, there is not much difference (increase/decrease expressed in percentages) in the impact of EC measures on costs between the EU Member States. In domestic transport, the differences are much greater.

Generally, liberalization measures have improved productivity and have had a decreasing effect on costs. Harmonization measures, on the contrary, increased costs.

The most important factor which contributes to increasing costs is excise duties. This effect also includes some influence from national policy objectives and this cannot be completely disentangled. When excluding the effects of harmonization of excise duties from calculations only a moderate increase of costs in domestic transport and even a decrease of costs in border-crossing transport has been found (all calculations are in German marks).

Cabotage provides an interesting opportunity for transport operators to improve productivity. Although not fully implemented yet, its role is important and continues to increase.

Standards for the emission by engines have stimulated automotive industries to produce more environmentally friendly vehicles. The total effect on emissions will be substantial but will only be witnessed in the next decade. Until now, the effect remains modest.

6.4. Confrontation of demand with supply

Although the costs of road freight transport services have increased over the last decade, data of at least four countries (Germany, Belgium, the Netherlands and France) indicate declining price levels. When expressed in ECU a small increase in prices was found.

Profitability (defined as the quotient of profits and turnover) showed a decreasing tendency. Competition in the market has clearly become more intensive. Easy access to the profession of road transport operator as well as to the market did not impose any barriers to slow down this process. Countries that have been regulated for some time experienced the sharpest decline in prices.

Surveys indicate that customer satisfaction improved slightly in the last years. This suggests, in combination with the development of the price level of services, that customers now get better value for money.

Two types of strategic responses can be distinguished: businesses which follow a competitive strategy based on costs and those which pursue a differentiation strategy. In the first group a further subdivision can be made between businesses that try to build or expand networks (so-

called 'networkers') and businesses that simply try to improve the utilization of the fleet as much as possible ('capacity focused transport businesses'). In the second group one can also distinguish two subgroups, namely businesses which specialize in a specific market segment ('specialists') and businesses closely linked to shippers, also often providing services other than transport ('vertical integrators'). Large businesses are mostly networkers or vertical integrators; small and medium-sized businesses can be found in the other two groups.

The single market programme was particularly relevant for the price competitive segments of the market. It significantly enhanced the opportunities of networkers. These businesses could pass on increases in operational costs to subcontractors, while at the same time improving their flexibility. As a consequence the subcontractors (often owners/drivers) were affected the most by the increased competition in the market. There are indications from various sources that at present the profitability rates of small businesses are significantly lower than those of the large transport firms.

At present the market for road freight transport is tending towards a structure in which the cost competing segments consist of some very large companies and a large number of very small companies, the latter being subcontracted by the first group. For medium-sized companies there are two possible strategies of survival: forming alliances with other medium-sized businesses or specialization. In some countries such developments are indeed taking place.

6.4.1. Competitive position of the sector

As in today's transport quality, flexibility and lead times have become more important (road transport is still by far the most flexible mode of transportation) while at the same time prices for transport services have declined, the competitive position of the sector has improved. This has also been stimulated by the single market programme by means of improved labour flexibility, reduced border times and improved efficiency through cabotage which resulted in improved vehicle utilization.

6.5. The effectiveness of the measures

6.5.1. Customers

From the point of view of the customers of road freight transport services there is not much reason for complaint. The market has become more competitive, amongst others as a result of the EC measures. In the last decade the price level of road freight transport services did not increase. The range of services broadened and there are various indications that the overall quality of the services improved. The level of satisfaction improved as well. Moreover, the single market programme enabled them to implement new logistics strategies.

There is not much doubt about the effectiveness of the single market programme from the perspective of customers: it definitely raised their level of welfare.

6.5.2. Operators

The judgement on the effectiveness of the single market programme by hauliers will depend on the type of company. Businesses operating in formerly sheltered markets will have

experienced an increase of competition which may have led to a decrease in profitability compared to the highly comfortable years in the past.

Businesses familiar with liberal markets experienced an increase of opportunities apart from an increase in competition. Large companies in particular seized the opportunity to build extensive international networks or expand already existing networks. Large businesses are also less vulnerable to pressures on profit margins because, through flexible use of subcontracting, they are capable of shifting the burden to other companies to a certain extent. So generally, large businesses have benefited from the single market programme.

The competitive 'burden', mentioned earlier, was shifted to small and medium-sized businesses, which subsequently experienced a hard time during the past decade. The decline in profits in this segment has been significantly more pronounced than the fall in profits of larger companies. It is questionable whether the single market programme raised the level of welfare of these companies as well.

Owners/drivers kept themselves going by operating on the edge of what might still be called 'socially acceptable', for example violating maximum driving times. As a result, total supply remained high.

6.5.3. Society

From society's point of view the effectiveness of the measures to complete the single market in the road freight sector has a dual nature. On the one hand, benefits experienced by the customers of the road freight sector also (to the extent that they again were passed on to the consumer) benefited society. On the other hand, society experienced some negative side effects of transport activities. In this respect elements like congestion, air pollution, noise, accidents and safety in general, are worrying a growing number of people. Policies to improve the functioning of the market did not sufficiently include such externalities.

6.6. Remaining obstacles

In Section 6.5 two types of obstacle are described that prevent the market from functioning as a perfectly competitive market, namely:[48]

(a) (negative) externalities;
(b) poor compliance with rules and regulations.

In case of externalities, prices do not reflect the real cost of the services. Poor compliance with rules and regulations may be the cause of unfair competition and a possible over-supply of services.

Many other market imperfections can be mentioned:

(a) state aids;
(b) bilateral agreements between Member States and non-member states

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48 Transport economists refer to transport markets as contestable markets. The key point in this theory concerns the threat of competition, as distinct from actual competition.

(c) diverging excise duties on fuel;
(d) exchange-rate fluctuations in the EMS;
(e) different fiscal regimes with respect to wages and salaries.

State aids may lead to the same adverse effects as poor compliance with rules and regulations; they may cause an over-supply of services and unfair competition. Bilateral agreements may lead to discriminatory market conditions between operators of different nationalities, which is the case with the lack of a Community transit agreement. Diverging excise duties and other forms of taxation may cause unequal costs for transport services and may be the cause of unfair competition. Finally, substantial exchange-rate fluctuations affect both costs and tariffs.

In addition, in the period studied (1985–95) a number of structural distortions influenced market outcomes. The most important in the road freight transport market are:

(a) lack of transparency/complexity of the market;
(b) increasing returns to scale;
(c) the behaviour of small businesses.

Transparency of information is an important issue. Traditional market theories are all based on the assumption that complete information is available to the actors in the 'market game'. In road freight transport this postulate contradicts reality. In most cases, even individual companies have only a vague notion of their possible strategies. The so-called 'travelling salesman problem', the 'vehicle routing problem', etc. are all well-known problems, notorious for their complexity.[49] It is practically impossible for operators to process all the relevant information, and a major advance in information technology will be required if computers are to be able to do so. The result is, amongst others, that in liberal markets pricing of transport services is extremely complex and that the economic behaviour of operators will practically always be sub-optimal.

'Increasing returns to scale' is a familiar market distortion which may prevent market equilibrium. In the long run, in a completely liberal market it may even (theoretically) lead to monopolistic or oligopolistic situations. The number and spatial density of client locations determine the costs for companies like networkers. If the number of clients increases, the possibilities of combining clients in trips increases exponentially, and the average cost per client decreases. The strategic formation of networks is also a well-known topic in other modes of transport (for example, in the airline industry). The single market programme increased the opportunities of networkers in particular.

Small businesses form a substantial and important part of the road freight transport sector. Their strength is their flexibility. However, the frequently irrational economic behaviour of small businesses makes them unpredictable. They 'optimize' both private and business objectives and mix up market with non-market objectives. This may lead to the same type of market distortions mentioned in the case of state aids, and poor compliance with rules and regulations. In all these cases, non-market forces influence the supply side of the market and may cause an over-supply of transport services. However, small businesses are a natural

49 It is perhaps interesting to observe that road freight transport is one of the few sectors in which economic models are frequently used in daily operations.

component of the sector and their behaviour must be accepted, whether or not it defies standard economic theory.

APPENDIX A

Road freight transport: typology, market segments and data description

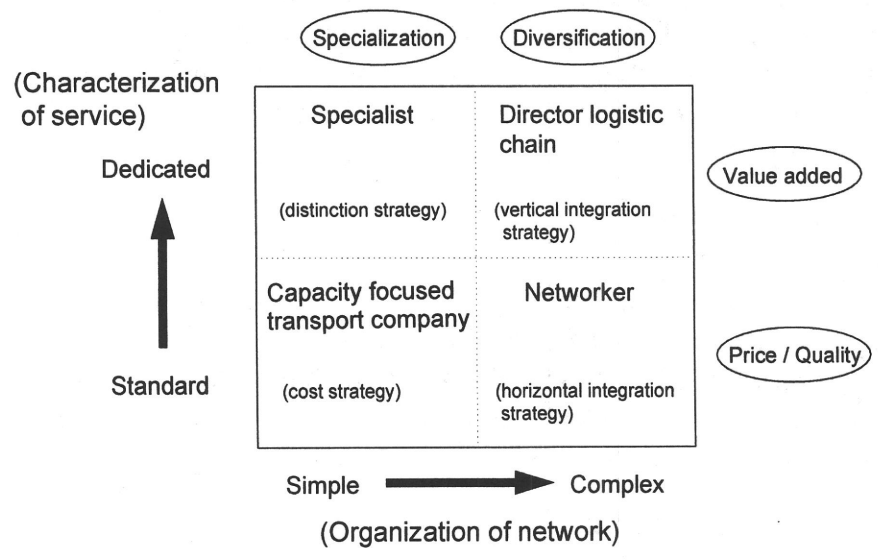
A.1. Typology of road freight transport

The market for road freight transport has become increasingly complex. This complexity not only exists due to the rapidly changing consumer and shipper demands and corresponding larger variety of conditions under which transport should be carried out, but can also be explained by the different strategic reactions employed by transport companies. Studying the market for road freight transport, therefore, needs a simple but distinctive typology. Apart from these criteria, the typology should not remain theoretical. Eurostat data, available for several years, must be applied in a meaningful way. Taking these considerations into account, the following requirements should be met:

(a) the typology must incorporate the various aspects of the study, e.g. strategic actions to complete the single market (specialist versus generalist, cost leadership versus distinction strategies, transport company versus logistics services provider, etc.);
(b) the typology should be validated by hard data. Furthermore, it must remain simple and understandable.

Figure A.1 provides a typology which meets the criteria sufficiently. The four market segments (quadrants) are built upon combinations of elements of service ranging from rather standard to highly dedicated elements of organizations, ranging from simple point-to-point transports to complex networks. The four market segments also implicitly define the strategies of the transport companies concerned which belong to a specific segment.

Figure A.1. Typology of road freight transport



The top two market segments in Figure A.1 leave space for co-operation between transport company and shipper, while the bottom two market segments might lead to co-operation among transport companies themselves.

A.2. Detailed description of the four market segments

The typology of Figure A.1 implicitly defines four types of transport company, representing the four market segments.

A.2.1. Market segment 1: the specialist

The market segment of the specialist can best be described as point-to-point transport of large amounts of cargo over relatively great distances. The frequencies demanded are usually high. Specialization can be pursued with respect to geographical relation, type of shipping industry, commodity, technology or dedication. The market on which the specialist operates is relatively difficult to enter. Becoming a specialist takes time and specialized know-how. Often a strong co-operation between the specialist and shipper exists. In some cases and countries, special requirements have to be met (e.g. related to transport of dangerous goods etc.). Quality aspects are dominant. Examples of this market are companies specialized in transporting frozen and/or refrigerated goods.

A.2.2. Market segment 2: vertical logistics chain director

The market for the logistics chain director is strongly influenced by shipping industries. The company is closely located to 'its' shipper. Cross-trade transports or cabotage hardly exist in this market segment. The service provided goes far beyond transport only. Well-known examples are value added logistics as well as warehousing and physical distribution. Transport itself is often contracted out to charters, while the contractor concentrates on forwarding, control and management.

A.2.3. Market segment 3: capacity focused transport

The business of capacity focused companies consists of full-truck-load transport (FTL transport), mainly general cargo. Core business is transport itself, sometimes according to predefined schedules, sometimes on an *ad hoc* basis. The representatives belonging to this market segment are relatively small and often contracted by larger transport companies. Access to this market is relatively easy.

A.2.4. Market segment 4: the networker

The market for network transport is a combination of international point-to-point transport linked with national or regional networks for the collection and final distribution. Services are provided with an extremely high frequency. Within the network, shipments are consolidated and transported on a door-to-door base, often less-than-truck-load (LTL-transport). The networker is a very large company with subsidiaries in several countries.

A.2.5. Relation to internationalization of activities

The specialist is facing relatively little international competition. Due to the rather strong relationship with the shipper, foreign markets are hard to access. Internationalization is achieved by taking over foreign companies or building up a strong co-operation with likewise oriented companies.

The vertical integrator faces hardly any international competition. The activities go far beyond transport only and the location near to the shipper is of extreme importance. Internationalization of activities is rare.

The capacity focused transport company faces very strong international competition. Market access is easy and many smaller transport companies are contracted by a limited number of larger companies. This subcontracting is as easy on the domestic market as abroad. There are practically no special requirements for these types of transport, so cost-driven policies play a dominant role. Internationalization is achieved by establishing foreign agencies to obtain cargo or to subcontract local companies.

The horizontal integrator needs to be present in several countries. The complexity of operations, together with the high degree of information technology required, implies that the larger companies acquire the 'better' smaller companies in other countries. By doing this, it is possible to achieve 'economies of scale'.

A.3. Applying the data

Up to this point the analysis of the typology in Figure A.1 is still theoretical. To apply the Eurostat data, however, several clustering exercises were made. Eurostat data, available for all EU Member States, are based on the NST commodity classification. This classification consists of 24 different commodity groups. Studying the effects of completing the single market for road haulage companies does not require such a detailed commodity classification. It is not interesting to know which commodity is transported by which company. It is much more interesting to know what type of company is mostly affected by the single market programme.

Starting with 24 commodities, clustering took place according to a six-level commodity segmentation which differentiates between bulk, general cargo and refrigerated goods. The outcome is a 13-level classification which could be brought into the analysis. Table A.1 gives an overview of the clustering as well as a description of the commodities.

Table A.1. Overview of commodity clusters

Commodity segmentation	Typology classification	Eurostat classification	Description
Bulk, low value	1	14, 15	Cement, lime, manufactured building materials, crude, manufactured minerals.
	2	11, 12	Iron ore, iron/steel waste, blast furnace dust, non-ferrous ores and waste.
	3	1, 4, 8, 16, 17, 19	Cereals, wood and cork, solid mineral fuels, natural and chemical fertilizers, coal chemicals, tar, paper pulp and paper waste.
Bulk, high value	4	13	Metal products.
	5	18	Chemicals other than coal or tar.
	6	7, 9, 10	Oil seeds, oleaginous fruits, fats, crude petroleum, petroleum products.
General goods, low value	7	5	Textiles, man-made fibres, various raw animal and vegetable materials.
General goods, high value	8	24	Miscellaneous articles.
	9	6	Foodstuff and animal fodders.
	10	22, 23	Glass, ceramic products, leather, clothing, various manufactured articles.
	11	20, 21	Transport equipment, machinery, apparatus, engines both assembled, not assembled or parts thereof, manufactures of metal.
Refrigerated products	12	2	Potatoes, fresh or frozen fruits and vegetables.
Other specialized goods	13	3	Live animals, sugar beet.

Source: NEA.

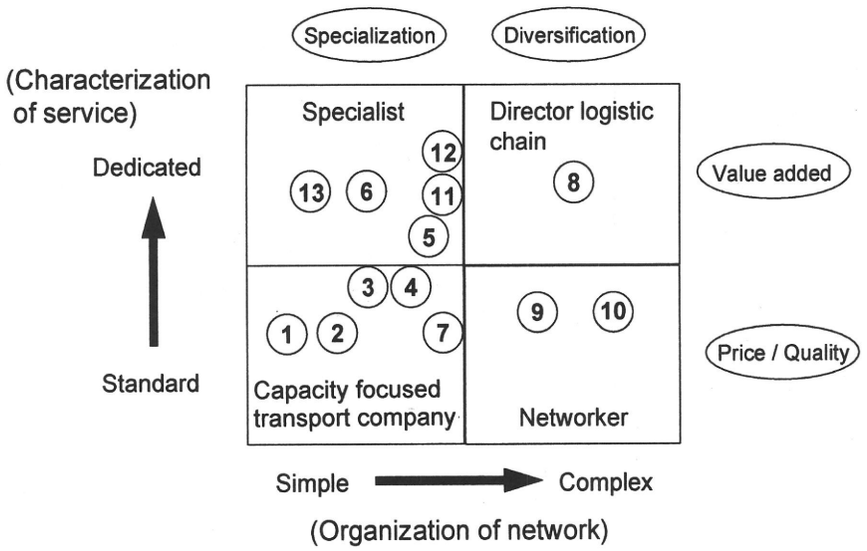
The next step was to find out how the 13-level typology classification fits into the typology of Figure A.1.

A.3.1. Methodology

A large sample of domestic as well as international trips (more than 100,000) by hauliers throughout Europe is available at NEA, providing information on the type of commodity transported (which provides the connection to the Eurostat classification), trip length and transport costs. For the corresponding transport companies, data are available on variables, like number of employees, number of trucks, annual turnover, costs according to different cost categories, prices as well as some less detailed qualitative information, like client information and organization of network.

Calculations of gross value added per trip/tonne for specific commodities made it possible (*inter alia* by using cluster analyses) to quantify the relation between organization of network and characterization of service. The result of this operation is presented in Figure A.2. It illustrates the position of the 13-level classification according to the typology given in Figure A.1. The results in Figure A.2 have been validated for all Member States and the findings were promising. Moreover, Figure A.2 reflects more or less the European average. Only small adjustments in the position of the clusters should be made for individual EU Member States.

Figure A.2. Typology of road freight transport, commodity segmentation included



The vertical line separating simple organization from complex organization of networks should not be taken literally. Differences according to the organization of the network for standard services (lower half of Figure A.2) are much greater than they are for dedicated services (upper half of Figure A.2).[50] In fact a large number of specialists (such as specialists in refrigerated products as well as machinery and engines (commodity clusters 11 and 12)) operate within the vertical segment as well.

50 A trapezium shape of Figure A.2 would allow for such refinements.

APPENDIX B

General description of the NEA cost model

B.1. Introduction

The model differentiates for different hauliers belonging to different countries as well as for different geographical relations (country of loading and unloading). Unless stated otherwise, the separate functions are validated by real data.

B.2. Variables related to vehicle performances

Variables 1 to 10 relate to vehicle performances. Variables 1 to 8 are calculated per trip.

1 **Kilometres driven empty = f (kilometres driven loaded)**
A distinction can be made for trips lacking return cargo and trips with only a certain amount of empty kilometres. When the proportion loaded-loaded / loaded-empty trips is known, the average empty kilometres can be calculated for a given trip with given loaded kilometres. The function itself shows a logarithmic correlation between loaded and empty kilometres.

2 **Total kilometres driven = kilometres driven loaded + kilometres driven empty**

3 **Time used for loading and unloading = f (weight of load, number of loading and unloading places, type of goods)**
The time used for loading and unloading has a positive correlation with the size of the load, the number of shipments (or the number of loading and unloading places) and the type of goods transported (small packages need more time than large ones, or containers).

4 **Driving time loaded = f (kilometres driven loaded)**
This function is fairly straightforward, and uses the average driving speed when the vehicle is driven loaded. The average speed is lower if more than two loading/unloading places are handled.

5 **Driving time empty = f (kilometres driven empty)**
See 4. The average speed is usually slightly higher for a vehicle driven empty.

6 **Time at borders = f (type of goods)**
This function is also fairly straightforward. It depends highly on the geographic transport relation.

7 **Other time**
This is time which cannot be attributed to one of the previous categories (3–6), but is important for the calculation of the transport costs, e.g. time involved in cleaning tanker vehicles.

8 **Total time = (3) + (4) + (5) + (6) + (7)**

9 **Number of trips per year = f (hours per year, total trip time)**
Based on the number of available hours per year (normally 2,500 to 3,000), and the total trip time, the annual number of trips can be calculated.

10 **Kilometres per year = f (number of trips per year, total trip kilometres)**
Based on the annual number of trips (9) and the total trip kilometres, the annual total number of kilometres can be calculated.

B.3. Variables related to costs

The fixed cost variables and the costs of the driver are calculated as annual costs. The variable cost variables are calculated as costs per kilometre. From available data, originating from transport companies in the EU Member States, functions for the costs are estimated. Although there are differences (due, for instance, to a high degree of fragmentation of markets), for example for different branches, estimating these costs with the loading capacity as the dependent variable provides a representative picture for the average costs.

Fixed vehicle costs

11 **Vehicle tax costs = f (loading capacity)**

12 **Interest costs = f (loading capacity)**

13 **Insurance costs = f (loading capacity)**

14 **Fixed depreciation costs = f (loading capacity)**

15 **Total fixed vehicle costs = (11) + (12) + (13) + (14)**

Variable vehicle costs

16 **Variable depreciation costs = f (loading capacity)**

17 **Costs of tyres = f (loading capacity)**

18 **Costs of oil and lubricants = f (loading capacity)**

19 **Costs of repair and maintenance = f (loading capacity)**

20 **Fuel costs = f (loading capacity)**

21 **Total variable vehicle costs = (16) + (17) + (18) + (19) + (20)**

For fuel, lubricants and oil, the costs are not directly estimated: the consumption of fuel and oil is instead.

Costs related to the driver

22 **Driver's wages per hour**
Given the type of work – international transport, type of vehicle (specialized, non-specialized), general transport – average driver's wages can be calculated, including social security, pay for overtime, etc.

23 **Driver's expenses = f (total kilometres of the trip)**
Longer trips normally result in more driver's expenses.

24 **Driver's costs = hours per year x [(22) + (23)]**

Total direct costs; general operating expenses; total costs per year

25 **Total direct costs = (15) + [kilometres per year x (21)] + (24)**

26 **General operating expenses**
The general operating expenses include costs like garaging, housing, administration, selling costs, etc. They can be estimated individually or taken together as a lump sum. In some cases, they are calculated as a percentage of the total direct costs. For international transport, these general operating costs usually represent about 12 to 15%.

27 **Total costs = (25) + (26)**

28 **Total costs per trip = (27)/(10)**

APPENDIX C

Translation of the EC measures into the NEA cost model

In the following, the impact of EC measures on the costs of an individual transport in EU Member States is described.

C.1. Introduction

The purpose of this study is to explore, quantify and analyse effects of measures, regarding deregulation and harmonization, on the road transport industry. The impact of these liberalization and harmonization measures must be assessed in a wide and complete approach. Elimination of restrictions with respect to access to the market and qualitative measures must be studied thoroughly. A study approach is to attempt to quantify the impact of EC measures in terms of the effects on transport costs for an individual transport by hauliers from all EU Member States. This approach yields results on the absolute level of the rise or fall in transport costs and makes it possible to analyse differences between the EU Member States. It provides a picture of the relative competitive positions of different transport operators from different Member States. A basic requirement for this type of analysis is a minimum level of detail in the micro-economic cost models which is extensive enough to implement the variables representing the EC measures being studied. NEA has developed such detailed cost models.

This appendix includes the analysis for nine EU Member States, making use of the models developed by NEA. A general description of the cost model is enclosed in Appendix B. The relevant EC measures have been translated into variables for the model. The effects of measures are quantified by the cost model and results are available for both international and national transport.

C.1.1. The cost model

To be able to assess the impact of the measures for the EU Member States, the model must satisfy a number of minimum requirements:

(a) a minimum level of detail in the model, sufficient to translate and quantify the measures into variables in order to make the analysis possible. The NEA cost model fulfils this requirement;
(b) the model must be supported by the required data for each EU Member State in order to assess the effects for the different nationalities of operators.

The latter requirement is also met: basic data have been obtained from various research institutions. Apart from figures on costs, performance data on vehicles and drivers were gathered from transport companies in the relevant countries. Figures are available for the following countries: Germany, France, the Netherlands, Belgium, the United Kingdom, Denmark, Spain, Italy and Greece. For Portugal, Ireland and Luxembourg, no figures are available. These countries belong to the group of smaller EU Member States which are influenced by Spain, the United Kingdom and Belgium respectively. Therefore, this does not seem of great importance for the complete picture.

However, the following considerations and restrictions with respect to the cost models and data collection must be taken into account when assessing the results:

(a) the collection of data on cost prices and performances was limited. Nevertheless, the level of reliability is sufficient to compare the total costs for a type and size of vehicle (which was used as a base in the collection of the required data);
(b) some inconsistencies in data and definitions between different countries occur, which complicates the construction of a uniform applicable cost model. This problem has been solved by taking real life figures and data from the administration of transport companies, and not data from profit and loss accounts. Furthermore, specific analytical and statistical methods were used to make the basic figures comparable.

Bearing these aspects in mind, it can be concluded that the level of detail and the reliability of the underlying data are sufficient to provide representative reflections of the costs involved in an individual transport.

C.1.2. Calculation of costs for individual transport

The cost-price calculations for individual transport between two specific countries provided by hauliers originating from these countries are comparable as the same specifications are used. For this analysis, the specifications of an articulated truck (truck and trailer) with a loading capacity of 25 tonnes and a weight of train of about 38 tonnes is chosen. The tractor is assumed to have two axles and six tyres; the number of axles for the trailer is three with six tyres. For the calculations, non-specialized or general transport is assumed to be the modal type of transport in all countries.

In addition to this approach, it is possible to calculate cost differences between two countries over a number of relevant transport distances between these two countries. A single transport distance for each combination of two countries implies a total of 72 cost calculations needed. To keep the cost-price comparison surveyable and comparable, this was consciously restricted. Instead one relation is chosen, i.e. the Netherlands–France, with a loaded trip distance of 1,000 kilometres representing a modal transport in international road haulage for most nationalities. The trip distance is set somewhat above the average for the smaller EU Member States, to give a better view of the consequences of the measures taken.

The average distance for domestic transport is set at 400 kilometres. A second analysis of cost-price comparisons between domestic transport, gives additional information as some of the measures (such as restrictions on import of diesel, Euro-vignette, and others) typically affect the competitive position (i.e. the cost price per trip) in different ways in national and international transport.

The comparison consists of the following criteria:

(a) the model calculates the costs per trip in the base situation;
(b) the reference or base date is 1 July 1986 (due to the availability of data starting from the reference date).

Subsequently all measures are quantified in variables which in turn are used in the model. In this way, the effects of measures are isolated.

C.2 Translation of the measures into variables for the cost model

C.2.1. Introduction

In this section, the EC measures, relevant for the liberalization and harmonization of the single European market affecting transport operations, are being translated into variables which are used in the cost model.

In the analysis, an attempt has been made to indicate the changes in variables due to the EU regulations. Consequently, the base situation can then be compared with the reference date. The base situation represents the costs per trip on 1 July 1986 excluding any effects due to implemented EC measures. The reference date refers to trip costs including the effects which are the result of implemented EC measures.

In some cases, it is impossible to isolate effects resulting from national regulations from those which appear to be due to EU regulations. For example in the case of the level of vehicle tax: in the time period studied, the level of vehicle tax in general changed in all EU Member States and is now partially harmonized towards a more average level. However, it is impossible to indicate what share of the change is due solely to national regulation and which part of the change is caused by national regulation amended directly or indirectly by EU regulations. As the respective cause-and-effect relationships cannot be isolated on the basis of the available data at present, the assumption is made that the entire change in (for example) the vehicle tax is caused by EC measures. This also applies to changes in the levels of excise duties on diesel.

The tables reflect the total effect of EC measures on the cost price in international and national transport. The figures are shown with and without the effect of the measures on vehicle taxes and excise duties. If it is possible to discern the individual effect of the EC measures, this will be carried through in the cost model.

C.2.2. The effect of increasing cabotage and increasing cross-trade transport

Concerning cabotage transport operations, Council Regulation (EEC) No 3118/93 (which replaced Council Regulation (EEC) No 4059/89) lays down the conditions under which non-resident carriers may operate national road haulage services within a Member State. This regulation allows the gradual introduction of the freedom to provide cabotage services by 30 June 1998. During this transitional period, each Member State may, temporarily, allow non-resident carriers to undertake national road haulage services without making them subject to quantitative national market access restrictions, provided they have a Community cabotage authorization.

Concerning international road transport operations, Council Regulation (EEC) No 881/92 (on access to the EU transport market to or from the territory of a Member State or passing across the territory of one or more Member States) has opened up the international transport market by replacing the restrictive quota system with a system of Community licences based only on qualitative criteria.

Both measures have a considerable effect on the possibilities for hauliers to extend the size of the transport flows for each EU country. It is easier for the transport company to find a return load. However, for each country different outcomes on different trade relations exist. Small countries,

lacking a large domestic market, with corresponding large international market shares (e.g. the Netherlands), have the most to gain.

In the cost model this is translated into a higher ratio loaded/driven kilometres, thus reducing the empty kilometres driven. Because of saturation aspects, this increase will be smaller for relations where the ratio is already on a high level. The level varies for different nationalities of haulier and is, amongst others, dependent on the distance (example: for a Dutch haulier the ratio loaded/total kilometres is higher for Italy than, say, for Belgium or Germany).

For the Netherlands–France relation this ratio may increase by 3 to 5%, depending on the nationality of the haulier. The figures were obtained from interviews with transport companies and research institutes in the countries under study.

C.2.3. Customs controls and formalities: elimination of border times

The measures taken to eliminate customs controls and formalities will have a considerable impact on international road haulage. This directly results in a decrease of the time spent at the internal borders. As this aspect is introduced as a separate variable in the cost model, the impact of the reductions can be calculated.

It is important to consider that the reduction of customs controls and formalities not only applies to the physical situation at the borders, but also to all related administrative processes.

For the transport relation concerned, the maximum reduction in border times is estimated to be 60 to 70%. The variations by nationality of haulier appear to be small, which is supported by the figures obtained from transport companies in the EU Member States.

C.2.4. Harmonization of vehicle taxes

Council Directive 93/89/EEC, harmonizes the level of vehicle taxes to ECU 700 per vehicle per year (for the type of vehicle under study). This level of vehicle tax has not yet been reached in all EU Member States.

In Table C.1 the level of annual vehicle taxes (ECU), for both 1986 and 1994, are presented by nationality of haulier.

Table C.1 illustrates that not all EU Member States meet the minimum requirement at the reference date. Nevertheless, apart from the United Kingdom all levels of vehicle tax indicate a tendency towards harmonization. The average road tax level changed from ECU 1,854 in 1986 to ECU 1,236 in 1994. Standard deviation decreased from ECU 1,765 to ECU 1,055. This means that road taxes are somewhat harmonized. Table C.1 also indicates that more expensive countries lowered their levels towards those applied in other EU Member States.

Table C.1. Vehicle taxes in ECU

Country of haulier	Base date (1986)	Reference date (1994)
B	995	1,107
D	4,400	1,872[1]
DK	3,457	994
E	301	407
F	59[2]	625
GR	737	347
I	350	765
NL	1,537	1,043
UK	4,852	3,964

Source: NEA.
[1] This is for a Euro-1 vehicle. Euro-2 vehicle=ECU 1,531, 'Altfahrzeug' ECU 4,934.
[2] Road tax subscription excluded.

Moreover, the level of vehicle tax is in some cases connected to the level of excise duties and the introduction of infrastructural taxes (Euro-vignette). For example, Germany shows a considerable reduction in vehicle taxes, which is mainly due to compensation measures following the introduction of the Euro-vignette. On the other hand it is obvious that these measures can both be considered as national regulations and as (the beginning of) EU regulation.

C.2.5. Harmonization of excise duties on diesel fuel

The excise duties on diesel fuel show a tendency towards harmonization, but on a much higher level than the excise duties valid on the base date. On the one hand, this is related to the minimum requirement of ECU 245 per 1,000 litres, but it is, on the other hand, also a consequence of national regulations, i.e. price setting by national governments. In Table C.2, the excise duties for the base date and for the reference date are shown.

The table illustrates that all countries have increased their excise duties and satisfy the minimum requirements. The amount applicable in Greece is slightly under the minimum of 245. This is due to fluctuations in the exchange rates.

The average excise duty rose from ECU 140 to ECU 303 with the standard deviation decreasing from ECU 63 to ECU 41, clearly indicating the rise in the level of excise duties and the harmonizing effect.

Table C.2. Excise duties on diesel fuel in ECU/1,000 litre

Country of haulier	Base date (1986)	Reference date (1994)
B	121	299
D	208	326
DK	78	259
E	125	256
F	189	327
GR	59	236
I	144	355
NL	77	316
UK	257	355

Source: NEA.

For a comparison of the costs in international road transport, a different approach has been made. Normally, hauliers fill up their tank in order to minimize their fuel costs, i.e. they compare national fuel prices in the countries in which they drive (including the country of loading and the

country of unloading). Regarding the relation chosen in our model (base date), Dutch fuel would be used as much as possible, taking into account the restrictions on the import of diesel fuel and the maximum amount of diesel in the tank (normally this is about 600 litres; with extra tanks the absolute maximum volume is about 1,000 litres). Normally, the charges for taking extra litres of diesel would exceed the price difference between the countries, so a transport company would look at the relative price levels in the EU Member States. (In this period restrictions existed on the free import of diesel. Later on, these restrictions were abolished and there were no longer extra charges.)

Relevant at the base date regarding the transport relation with France, the maximum volume of diesel fuel to be imported free of charge was 200 litres. On 1 October 1985, this was increased to 300 litres. As from 1 January 1993, no import restrictions on the import of diesel apply any more (the tank volume is considered to be the maximum).

In the cost calculations, the lowest level of (diesel) fuel prices and the restrictions on the free import of fuel are taken into account. The rise in the excise duties on diesel is considered to be the estimate of the EC measures taken.

C.2.6. Introduction of the speed-limiting device

With Council Directive 92/6/EEC of 10 February 1992 the installation and use of speed-limiting devices for motor vehicles in the EU was regulated. The directive provides for the speed of freight vehicles to be set at a maximum speed of 90 kilometres per hour, bearing in mind the technical tolerance between the regulating value and the actual speed of traffic. At the present state of technology, the maximum speed on the device shall be set between 85 and 89 kilometres per hour. Furthermore, individual Member States are authorized to have national legislation on speed-limiting devices which are more strict than the EU regulation. For example, regulations in the Netherlands exist for heavy vehicles with a maximum of 85 kilometres per hour.

The consequences of the speed-limiting devices have not fully been tested and researched until now. In the Netherlands, most research has been conducted by organizations representing the employers, which have strong objections towards the (85 kilometres per hour tuning of the) speed-limiting devices. These organizations state that the installation not only gives them economic disadvantages, but also makes the traffic situation on the roads less safe (heavy vehicles are not able to overtake slow vehicles, creating long tailbacks).

Objective studies indicate that a reduction in fuel consumption should be possible. A recent study, carried out under the authorization of the Dutch employers' organization, Transport en Logistiek Nederland, suggests that even this is not true: they report to the Minister for the Environment that the use of the speed-limiting device (85 kilometres per hour) results in an extra fuel consumption of 5% to 7.5%. However, these results do not correspond with the (few) scientific and practical research exercises that have been carried out to date.

The results of this research are used as an input for the cost model. Restriction of the maximum speed to 90 kilometres per hour leads to:

(a) a reduction in fuel consumption of about 6%;
(b) an increase in the driving time (loaded and unloaded) of about 8%;

(c) an increase in the allowances for expenses of the drivers of 4 to 8% (depending on the level of wages and expenses in the different EU Member States).

C.2.7. Introduction of infrastructure taxes

Council Directive 93/89/EEC not only regulates the minimum level of vehicle taxes, but also sets the conditions under which Member States may introduce user charges for the use of infrastructure. The following EU Member States introduced a collective system of road user charges (Euro-vignette system) for heavy vehicles as of 1 January 1995: Germany, Denmark, Belgium, Luxembourg and the Netherlands (the Netherlands postponed the introduction of the system to 1 July 1995 for technical reasons; a further postponement was made to 1 January 1996, changing the system of collecting contributions to the more flexible German system). The amount of the tax is set at ECU 1,250 per year. It is important to remember that this is a territorial tax system, i.e. each haulier crossing a country which applies the Euro-vignette system has to pay that amount.

Although the Netherlands had not yet implemented the Euro-vignette system at the time of this study, in the cost model it is assumed that the system is in use in this country as well.

C.2.8. Consequences of technical regulations

With the introduction of Council Directive 85/3/EEC, a harmonization of maximum vehicle weights and dimensions within the EU is achieved.

With respect to the situation in the cost model (trailer + truck), for most EU Member States this means that the maximum vehicle length has increased from 15.50 m to 16.50 m.

The maximum vehicle weight increased from 38 tonnes to 40 tonnes for most EU Member States. Some countries already had less restrictive regulations and, therefore, no positive impact can be calculated for these countries in comparison with the national situation (Italy: 40 tonnes, Denmark: 48 tonnes, Netherlands: 50 tonnes).

The relaxation of rules on the weights and dimensions of vehicles has a decreasing effect on the cost price: the load can be larger for the same type of vehicle, or, having the same effect, a larger vehicle can be taken. From data obtained from research institutes and transport companies in the nine EU Member States under study, estimates are made of the effects on the costs. Relaxation of the rules on weights and dimensions of vehicles would have a minor decreasing effect on the loading capacity of the vehicle, which is an important variable in the cost functions. Calculations were conducted for each nationality of haulier, resulting in effects on the cost prices between 0 and -1%.

C.2.9. Introduction of regulations on driving and resting hours

With the introduction of Council Regulation (EEC) No 3820/85, new minimum requirements with respect to the time of resting and maximum requirements with respect to driving time are introduced.

All EU Member States have adopted this regulation with respect to international transport. This means that there is no effect on the cost price in international transport.

Some EU Member States still have national regulations which are stricter than the EU rules (e.g. in the Netherlands: 'Rijtijdenbesluit'). Most EU Member States have adapted their national regulations in order to comply with the EU regulations or are planning to do so.

Countries with national regulations that deviate from the EU regulation and for which there is an effect on the cost price are the Netherlands, Greece and Spain. The strictest regulations are to be found in the Netherlands where, apart from driving and resting hours, the so-called 'hours of duty' are also restricted. This has a strong cost-increasing effect because it implicitly restricts the number of effective hours for the driver.

As Regulation (EEC) No 3820/85 completely harmonized regulations on driving and resting hours in international transport, measures taken at a national level focus on qualitative improvements, e.g. improving the quality of the vehicle checks, harmonizing the daily procedures on vehicle checks of authorities in different countries, harmonizing the level of fines for the same type of offence and working towards a system which concentrates more on changing the mentality within the road haulage companies than on maximizing the amount of money to be paid by the transport companies.

Additional activities concentrate on special segments of the market which are more inclined towards infringing the law (e.g. the transport of perishable goods), and shift the attention more towards prevention and education.

C.2.10. Harmonization of value added tax (VAT)

In the period 1985–95, a certain degree of harmonization of VAT has been achieved. In Table C.3, the VAT percentages are given for both years. In 1985, some countries applied one rate, but others applied three. In 1995, all countries applied one or two rates.

Table C.3. VAT percentages

Country of haulier	% VAT (1985)	% VAT (1995)
B	6, 19, 25	6, 20.5
D	7, 14	7, 15
DK	22	25
E	12 (as of 1-1-1986)	15
F	18.6	18.6
GR	6, 18, 36 (as of 1-1-1987)	8, 18
I	10, 15, 18, 20	19
NL	4, 19	6, 17.5
UK	15	17.5

Source: NEA.

Through harmonization, the number and the level of the tariffs are more uniformly distributed and closer to each other. However, for (road haulage) companies it has always been possible to get a refund for most of the VAT paid in other countries. This is true for both 1985 and 1995.

For the countries in the table, the VAT on diesel could be reclaimed, both in 1985 and in 1995. The only exception in 1985 was France, where only 65% of the VAT was reclaimable. This percentage increased from 30% in 1983, 40% in 1984, 65% in 1985, 85% in 1986 to 100% in 1987.

For all other costs, VAT can be reclaimed for all EU Member States in the table, with the exception of VAT on accommodation expenses for the driver, which can only be reclaimed in the Netherlands and Belgium. For our cost model the realistic assumption is made that VAT (on diesel fuel) is reclaimable. In general, cost models used in road transport studies exclude VAT from the computations.

C.2.11. Other measures considered not to have an effect on costs

Other EU regulations in the area of liberalization and harmonization can be mentioned which are assumed to have no immediate impact on the cost prices, or for which it is impossible to measure or to estimate these (possible) impacts.

Measures to be mentioned are:

(a) relaxation of barriers with respect to entry to the market;
(b) other regulations with respect to capacity restrictions (e.g. permits);
(c) relaxation of price regulations;
(d) national aid measures;
(e) social regulations, not mentioned previously;
(f) other measures and/or regulations, not mentioned previously.

All measures mentioned above will have an effect with respect to the competition on the transport market. However, most of the measures have more effect on the number of companies on the market, thus influencing tariffs, profitability margins, and quality of service without having a direct effect on transport costs. Therefore, the overview of the relative competitive position of the hauliers within the EU, expressed in terms of transport costs, should only be considered as part of the total picture (not without importance).

The measures (d) and (e) will have an effect on the cost price, but the information available is not detailed enough or the measures cannot be quantified in such detail in order to translate and express them in the cost model.

APPENDIX D

Other statistics on road freight transport

Table D.1. 1992 indexes on growth with respect to the typology (1,000 tonnes) (1986=100)

	Specialist	Vertical integrator	Capacity focused	Networker	Total
Germany	123	132	125	123	124
France	168	181	163	184	171
Italy[1]	90	76	114	93	94
Netherlands	136	198	155	140	149
Belgium[2]	123	180	153	142	144
United Kingdom	188	350	242	175	214
Ireland[3]	75	102	115	135	108
Denmark	143	-	130	145	147
Greece	141	108	310	123	137
Spain	123	39	170	117	128
Portugal	300	271	310	424	324
EU[4]	133	188	146	144	144

Source: Eurostat.
[1] 1990–92 (1990=100).
[2] 1986–91 (1986=100).
[3] 1986–91 (1986=100).
[4] 1986–92.

Table D.2. Input and output statistics, hire and reward segment

	1987			1990		
	Vehicles[1]	Employees	Turnover[2]	Vehicles[3]	Employees	Turnover
Germany	165,729	145,370	16,000[7]	160,710	171,647	22,637
France		196,170	13,599		230,579	17,863
Belgium	37,049	31,567	4,132	42,720	41,118	5,563
United Kingdom	160,729		12,431	184,884		15,524
Ireland[4]	3,795		233			
Denmark	19,615	35,976	2,804[8]	22,706	35,492	3,022[10]
Greece				36,403		
Spain				239,687		
Portugal	11,684	14,695[6]	502[9]	14,714	17,777	663
Italy[5]		170,207	12,392		171,243	14,053[11]
Netherlands	11,684	75,770	14,640	55,650	89,920	5,690

Source: Eurostat, national statistics.
[1] Lorries (pick-ups excluded) and road tractors.
[2] In million ECU.
[3] Lorries (pick-ups excluded) and road tractors.
[4] 1988 figures.
[5] 1988 and 1989 figures.
[6] 1988 figure.
[7] Estimated figure.
[8] 1988 figure.
[9] 1988 figure.
[10] 1989 figure.
[11] 1989 figure.

Table D.3. Transport performance in 1,000 tonnes, 1992

	Domestic (1,000 t)	International (1,000 t)	Share international transports (%)	Market share international transports (%)
Germany	3,491,852	51,708	1.4	17.3
France	1,322,708	52,259	3.8	17.4
Italy	921,563	17,189	1.8	5.7
Netherlands	401,351	80,111	16.6	26.7
Belgium	288,791	60,000[1]	17.2	20.0
United Kingdom	1,505,274	10,072	0.6	3.4
Ireland	81,703	1,800[1]	2.1	0.6
Denmark	190,118	7,847	3.9	2.6
Greece	158,314	1,314	0.8	0.4
Spain	673,318	13,649	1.9	4.6
Portugal	235,176	3,754	1.6	1.3
EU total/average	9,270,168	299,703	3.1	100

Source: Eurostat.
[1] Estimated figure.

Table D.4. Transport performance in million tonnes-kilometres, 1992

	Domestic (million t-km)	International (million t-km)	Share international transports (%)	Market share international transports (%)
Germany	158,816	24,206	13.2	14.9
France	101,794	31,147	23.4	19.2
Italy	122,284	17,769	12.7	10.9
Netherlands	25,270	30,468	54.6	18.8
Belgium	13,954	17,994	56.3	11.1
United Kingdom	123,565	10,695	7.9	6.6
Ireland	4,676	405	7.9	0.2
Denmark	9,407	6,384	40.4	3.9
Greece	9,756	2,733	21.8	1.6
Spain	75,226	14,188	15.8	8.8
Portugal	10,663	6,027	36.1	3.7
EU total/average	655,409	162,015	19.8	100

Source: Eurostat.

Table D.5. 1992 growth indexes with respect to the value of goods (million tonnes-kilometres) (1986=100)

	Low value	High value	Total
Germany	123	121	122
France	179	176	177
Italy[1]	128	90	94
Netherlands	161	157	158
Belgium[2]	166	157	160
United Kingdom	190	244	241
Ireland[3]	112	96	98
Denmark	137	149	146
Greece	338	123	129
Spain	233	230	230
Portugal	437	326	345
EU average[4]	160	163	162

Source: Eurostat.
[1] 1990–92 (1990=100).
[2] 1986–91 (1986=100).
[3] 1986–91 (1986=100).
[4] 1986–92.

Table D.6. Total factor productivity, hire and reward segment

	1987		1990	
	Vehicles	Employees	Vehicles	Employees
Germany	0.09	0.11	0.14	0.13
France		0.07		0.08
Belgium	0.11	0.13	0.13	0.13
United Kingdom	0.08		0.08	
Ireland	0.06			
Denmark	0.14	0.08	0.13	0.13
Portugal	0.04	0.03	0.04	0.04
Italy		0.07		0.08

Source: NEA.

APPENDIX E

Transfer of subsidiaries abroad in relation with sea-trade

In the sea-trade, the outsourcing of activities ('flags of convenience') is dominated by four characteristics.[51]

Sea-trade is dominated by point-to-point international transport.
Relevant trade is limited to point-to-point transports of large volumes. When there is a need for collection or distribution activities, a transhipment to other modalities must be made. These transhipments are not being exercised by the shipping-line itself. Therefore, the interrelationship with the consignor and consignee is very weak.

Sea-trade is almost entirely 'footloose'.
There is hardly any sustainable relationship between shipping-line and the home country. Under relatively easy conditions, a shipping-line can be transferred from one country to another without the loss of investments, social legislation or other outsourcing barriers.

Management in sea-trade is located on-shore.
A certain number of corporate activities have their anchorage on-shore. Especially strategic, commercial and logistical operations are located in specific countries. These create indirect effects on other sectors of the economy. The on-shore activities are largely determined by management of the logistical chain needed to control the world-wide operating fleet.

Sea-trade is dominated by cross-trade transports.
As a result of 'footloose' activities combined with great distances and long transit times, there is a clear dominance of cross-trade transports in international sea-trade. Percentages of more than 70% are no exception in this respect. This demonstrates again the lacking interrelationship between the shipping-line and the culture of countries of origin and destination.

Given this characterization, it is clear that the majority of international road transport companies do not fit this profile. Road transport companies are not 'footloose', as the transported commodities strongly relate to consignor and consignee, and cultural aspects remain very important.

An exception can be made for point-to-point capacity transports. These types of transport have a rather limited relationship with shippers. This is one of the main reasons why this type of company is often contracted by other companies.

Those contracting companies can be identified in the same capacity segment or within the network segment (acquisition of companies).

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51 *Concurrerend op Weg*, Knight Wendling, NEA, 1994.

Internationalization of activities in the segment of the specialist is quality driven. There are some well-known examples, such as specialists in a certain geographical relation, or international movers taking over or co-operating with transport companies abroad. The rate of internationalization, however, is far less than in the segment of capacity focused companies or networkers. Within the segment of the vertical integrators internationalization of activities is not very common. The relationship with the shipper located nearby is too strong to start activities abroad.

APPENDIX F

State of affairs regarding the implementation/ application of EC measures in national legislation (situation at 1.1.1993)

Country/measures		1. B	2. DK	3. D	4. GR	5. E	6. F	7. IRL	8. I	9. L	10. NL	11. P	12. UK	TOTAL (per measure)		
														I	NI	PI
V.1	Free quantitative access/admission to the occupation of road transport operator	I	I	I	I	I	I	I	I	I	I	I	I	12	-	-
V.2	Free carriage of goods by road between Member States	I	I	I	I	I	I	I	I	I	I	I	I	12	-	-
V.3	Free carriage by non-resident carriers on domestic markets/admission of inland cabotage	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	-	-	12
V.4.1	Harmonization of vehicle taxes	I	I	I	I	I	NI	I	I	I	I	I	I	11	-	1
V.4.2	Harmonization of excise duties on diesel	I	I	I	I	I	I	I	I	I	I	I	I	12	-	-
V.4.3	Harmonization of user charges for infrastructure ('Euro-vignette' system)	I	I	I	NI	NI	NI	NI	NI	I	I	NI	NI	5	7	-
V.6	Social regulation: harmonization of driving and resting times	I	I	I	I	I	I	I	I	I	I	I	I	12	-	-
V.9	Elimination of transport checks at borders	I	I	I	I	I	I	I	I	I	I	I	I	12	-	-
V.10	Abolition of certain internal border checks and transfer to Community's external borders	I	I	I	I	I	I	I	I	I	I	I	I	12	-	-
V.12	Emissions from diesel engines: new standards	I	I	I	I	I	I	I	I	I	I	I	I	12	-	-
V.13	Road vehicles: weights and dimensions	I	I	I	I	I	I	PI*	I	I	I	I	PI*	10	-	2
V.14	Speed limitation devices for heavy vehicles and coaches	I	I	I	I	I	I	I	I	I	I	I	I	12	-	-
H.6	Free movement of labour	I	I	I	I	I	I	I	I	I	I	I	I	12	-	-
H.7	Indirect taxation: common VAT scheme: uniform base of assessment	I	I	I	I	I	I	I	I	I	I	I	I	12	-	-
H.8	Common system of taxation for parent companies and their subsidiaries	I	I	I	I	I	I	I	I	I	I	I	I	12	-	-
TOTAL (per country)																
Implemented		14	14	14	13	13	12	12	13	14	14	13	12	158	-	-
Not implemented		0	0	0	1	1	2	1	1	0	0	1	1	-	7	-
Partly implemented		1	1	1	1	1	1	2	1	1	1	1	2	-	-	15

Notes:

I measure implemented in national legislation

NI measure not implemented in national legislation

PI measure partially implemented/implementation taking place in national legislation

* measure is (partially) implemented into national legislation: Ireland and the United Kingdom have deviations, which should end on 31 December 1998, from the majority of the EU weight limits for trucks and buses.

APPENDIX G

Community legislation, etc.

G.1. Regulations

Council Regulation (EEC) No 3820/85 of 20 December 1985 on the harmonization of certain social legislation relating to road transport (OJ L 370, 31.12.1985, p. 1).

Council Regulation (EEC) No 3821/85 of 20 December 1985 on recording equipment in road transport (OJ L 370, 31.12.1985, p. 8).

Council Regulation (EEC) No 4060/89 of 21 December 1989 on the elimination of controls performed at the frontiers of Member States in the field of road and inland waterway transport (OJ L 390, 30.12.1989, p. 18).

Council Regulation (EEC) No 3916/90 of 21 December 1990 on measures to be taken in the event of a crisis in the market in the carriage of goods by road (OJ L 375, 31.12.1990, p. 10).

Council Regulation (EEC) No 719/91 of 21 March 1991 on the use in the Community of TIR carnets and ATA carnets as transit documents (OJ L 78, 26.3.1991, p. 6).

Commission Regulation (EEC) No 1593/91 of 12 June 1991 providing for the implementation of Council Regulation (EEC) No 719/91 of 21 March 1991 on the use in the Community of TIR carnets and ATA carnets as transit documents (OJ L 148, 13.6.1991, p. 11).

Council Regulation (EEC) No 3356/91 of 7 November 1991 amending Regulation (EEC) No 4060/89 on the elimination of controls performed at the frontiers of Member States in the field of road and inland waterway transport (OJ L 318, 20.11.1991, p. 1).

Council Regulation (EEC) No 218/92 of 27 January 1992 on administrative co-operation in the field of indirect taxation (VAT) (OJ L 24, 1.2.1992, p. 1).

Council Regulation (EEC) No 881/92 of 26 March 1992 on access to the market in the carriage of goods by road within the Community to or from the territory of a Member State or passing across the territory of one or more Member States (OJ L 95, 9.4.1992, p. 1).

Commission Regulation (EEC) Nos 3689/92 of 21 December 1992 laying down detailed rules for the application of Council Regulation (EEC) No 719/91 on the use in the Community of TIR carnets and ATA carnets as transit documents and of Council Regulation (EEC) No 3599/82 on temporary importation arrangements (OJ L 374, 22.12.1992, p. 14).

Commission Regulation (EEC) No 3691/92 of 21 December 1992 laying down provisions for the implementation of Council Regulation (EEC) No 719/91 on the use in the Community of TIR carnets and ATA carnets as transit documents and of Council Regulation (EEC) No 3599/82 on temporary importation arrangements (OJ L 374, 22.12.1992, p. 25).

Council Regulation (EEC) No 3912/92 of 17 December 1992 on controls carried out within the Community in the field of road and inland waterway transport in respect of means of transport registered or put into circulation in a third country (OJ L 395, 31.12.1992, p. 6).

Council Regulation (EEC) No 3118/93 of 25 October 1993 laying down the conditions under which non-resident carriers may operate national road haulage services within a Member State (OJ L 279, 12.11.1993, p. 1).

G.2. Directives

70/157/EEC: Council Directive of 6 February 1970 on the approximation of the laws of the Member States relating to the permissible sound level and the exhaust system of motor vehicles (OJ L 42, 23.2.1970, p. 16).

77/212/EEC: Council Directive of 8 March 1977 amending Directive 70/157/EEC relating to the permissible sound level and the exhaust system of motor vehicles (OJ L 66, 12.3.1977, p. 33).

77/388/EEC: Sixth Council Directive of 17 May 1977 on the harmonization of the laws of the Member States relating to turnover taxes – Common system of value added tax: uniform basis of assessment (OJ L 145, 13.6.1977, p. 1).

84/424/EEC: Council Directive of 3 September 1984 amending Directive 70/157/EEC on the approximation of the laws of the Member States relating to the permissible sound level and the exhaust system of motor vehicles (OJ L 238, 6.9.1984, p. 31).

85/3/EEC: Council Directive of 19 December 1984 on the weights, dimensions and certain other technical characteristics of certain road vehicles (OJ L 2, 3.1.1985, p. 14).

86/360/EEC: Council Directive of 24 July 1986 amending Directive 86/3/EEC on the weights, dimensions and certain other technical characteristics of certain road vehicles (OJ L 217, 5.8.1986, p. 19).

86/364/EEC: Council Directive of 24 July 1986 relating to proof of compliance of vehicles with Directive 86/3/EEC on the weights, dimensions and certain other technical characteristics of certain road vehicles (OJ L 221, 7.8.1986, p. 48).

88/77/EEC: Council Directive of 3 December 1987 on the approximation of the laws of the Member States relating to the measures to be taken against the emission of gaseous pollutants from diesel engines for use in vehicles (OJ L 36, 9.2.1988, p. 33).

88/218/EEC: Council Directive of 11 April 1988 amending Directive 85/3/EEC on the weights, dimensions and certain other technical characteristics of certain road vehicles (OJ L 98, 15.4.1988, p. 48).

89/338/EEC: Council Directive of 27 April 1989 amending Directive 85/3/EEC on the weights, dimensions and certain other technical characteristics of certain road vehicles (OJ L 142, 25.5.1989, p. 3).

89/460/EEC: Council Directive of 18 July 1989 amending, with a view to fixing an expiry date for the derogations accorded to Ireland and the United Kingdom, Directive 85/3/EEC on the weights, dimensions and certain other technical characteristics of certain road vehicles (OJ L 226, 3.8.1989, p. 5).

89/461/EEC: Council Directive of 18 July 1989 amending, with a view to fixing certain maximum authorized dimensions for articulated vehicles, Directive 85/3/EEC on the weights, dimensions and certain other technical characteristics of certain road vehicles (OJ L 226, 3.8.1989, p. 7).

90/435/EEC: Council Directive of 23 July 1990 on the common system of taxation applicable in the case of parent companies and subsidiaries of different Member States (OJ L 225, 20.8.1990, p. 6).

91/60/EEC: Council Directive of 4 February 1991 amending, with a view to fixing certain maximum authorized dimensions for road trains, Directive 85/3/EEC (OJ L 37, 9.2.1991, p. 37).

91/542/EEC: Council Directive of 1 October 1991 amending Directive 88/77/EEC on the approximation of the laws of the Member States relating to the measures to be taken against the emission of gaseous pollutants from diesel engines for use in vehicles (OJ L 295, 25.10.1991, p. 1).

91/680/EEC: Council Directive of 16 December 1991 supplementing the common system of value added tax and amending Directive 77/388/EEC with a view to the abolition of fiscal frontiers (OJ L 376, 31.12.1991, p. 1).

92/6/EEC: Council Directive of 10 February 1992 on the installation and use of speed limitation devices for certain categories of motor vehicles in the Community (OJ L 57, 2.3.1992, p. 27).

92/7/EEC: Council Directive of 10 February 1992 amending Directive 85/3/EEC on the weights, dimensions and certain other technical characteristics of certain road vehicles (OJ L 57, 2.3.1992, p. 29).

92/24/EEC Council Directive of 31 March 1992 relating to speed limitation devices or similar speed limitation on-board systems of certain categories of motor vehicles (OJ L 129, 14.5.1992, p. 154).

92/77/EEC: Council Directive of 19 October 1992 supplementing the common system of value added tax and amending Directive 77/388/EEC (approximation of VAT rates) (OJ L 316, 31.10.1992, p. 1).

92/81/EEC: Council Directive of 19 October 1992 on the harmonization of the structures of excise duties on mineral oils (OJ L 316, 31.10.1992, p. 12).

92/82/EEC: Council Directive of 19 October 1992 on the approximation of the rates of excise duties on mineral oils (OJ L 316, 31.10.1992, p. 19).

92/97/EEC: Council Directive of 10 November 1992 amending Directive 70/157/EEC on the approximation of the laws of the Member States relating to the permissible sound level and the exhaust system of motor vehicles (OJ L 372, 19.12.1992, p. 1).

92/108/EEC: Council Directive of 14 December 1992 amending Directive 92/12/EEC on the general arrangements for products subject to excise duty and on the holding, movement and monitoring of such products and amending Directive 92/81/EEC (OJ L 390, 31.12.1992, p. 124).

92/111/EEC of 14 December 1992 amending Directive 77/388/EEC and introducing simplification measures with regard to value added tax (OJ L 384, 30.12.1992, p. 47),

93/89/EEC: Council Directive of 25 October 1993 on the application by Member States of taxes on certain vehicles used for the carriage of goods by road and tolls and charges for the use of certain infrastructures (OJ L 279, 12.11.1993, p. 32).

94/55/EC: Council Directive of 21 November 1994 on the approximation of the laws of the Member States with regard to the transport of dangerous goods by road (OJ L 319, 12.12.1994, p. 7).

95/50/EC: Council Directive of 6 October 1995 on uniform procedures for checks on the transport of dangerous goods by road (OJ L 249, 17.10.1995, p. 35).

96/1/EC: Directive of the European Parliament and of the Council of 22 January 1996 amending Directive 88/77/EEC on the approximation of the laws of the Member States relating to the measures to be taken against the emission of gaseous pollutants from diesel engines for use in vehicles (OJ L 40, 17.2.1996, p. 1).

G.3. Other

Re-examined proposal for a Council Directive laying down for certain road vehicles circulating within the Community the maximum authorized dimensions in national and international traffic and the maximum authorized weights in international traffic (COM(96) 208 final, 14.5.1996).

Proposal for a Council Directive amending Directive 90/435/EEC of 23 July 1990 on the common system of taxation applicable in the case of parent companies and subsidiaries of different Member States (COM(93) 293 final, 26.7.1993).

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