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Perils of road freight market deregulation: cabotage in the European Union

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Purpose The purpose of this paper is to examine the impacts of the ongoing freight market deregulation in the European Union (EU). Specifically, this case study focuses on cabotage penetration rates in Germany, the largest logistics market in Europe. In light of the upcoming trade barriers, we intend to move this topic forward by emphasizing its interdisciplinary nature.

Design/methodology/approach Based on the analysis of Eurostat data, expert interviews and a review of related literature, we elaborate and discuss four propositions related to the factors affecting cabotage penetration, future cabotage levels and the effects on modal split and empty runs.

Findings We found that cabotage in Germany plays a more important role than officially reported and has increased drastically since 2008. Given our analysis, increased cabotage penetration seems to thwart efforts within the EU to promote a modal shift from road to rail and increased national empty runs are the future outcome of current regulations. In Germany, the cabotage share is likely to reach 16% in the next five years.

Research limitations/implications This paper highlights the need for incorporating a more contextual understanding in freight carrier selection theory development in general as well as country-specific investigations in particular.

Practical implications Logistics managers and policymakers looking at future strategies are advised to take the ongoing deregulation trend into consideration. European freight movement using cabotage operators may represent significant cost savings; however, these cost savings come at an environmental and social sustainability price as the modal shift to rail and fill rates suffer.

Originality/value This paper represents an empirical and unbiased point of view, in contrast to the reports of the European Commission (pro-deregulation) or the reports of the haulage associations and labour unions (anti-deregulation).

Keywords

cabotage, European freight market deregulation, flagging out, freight transport sustainability

Disciplines

Business Administration, Management, and Operations | International and Comparative Labor Relations | International Business | Operations and Supply Chain Management | Unions

Comments

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Paper type Research paper

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1. Introduction

Economists generally agree that the deregulation of a market, such as the road freight transport market, leads to increased efficiency and lower prices for consumers (Ying and Keeler, 1991; Vogelsang, 2002; Lafontaine and Valeri, 2009). Nevertheless, trucking deregulation in both North America (Belzer, 2000; Belman and Monaco, 2001; Belman *et al.*, 2005) and Europe (Hilal, 2008; Kummer *et al.*, 2014) have not been without negative impacts. Investigations of the European Union (EU) deregulation found negative effects on 1) social sustainability (e.g. adverse working conditions of foreign truck drivers) (Hilal, 2008; AK EUROPA, 2014; Broughton *et al.*, 2015; Mabasa, 2018) and 2) the environment (e.g. increased emissions) (Hendrickx, 2013; Sternberg *et al.*, 2015). Supply chain and sustainability managers of well-known brands such as IKEA or BRING have been negatively affected by bad publicity of adverse conditions among their freight service providers, as those have been given attention in mainstream media (BBC, 2017; Mabasa, 2018). Understanding the changing freight transport supply is important for logistics managers of international networks (Olhager *et al.*, 2015) as well as actors such as sustainability managers monitoring a firm's network (Marshall *et al.*, 2016; Nakamba *et al.*, 2017).

A focus of the European trucking deregulation has been the debate surrounding *cabotage*,¹ which is the transport of goods or passengers between two places in the same country by a transport operator from another country. For years, the discourse about cabotage has been one of the main concerns for logisticians (Mangan and Lalwani, 2016; Nakamba *et al.*, 2017; Paixão Casaca and Lyridis, 2018), numerous logistics and trucking associations, as well as unions who are working

¹ The term “cabotage” originates from the maritime industry, and specifically from the French word *caboter*, meaning to travel by the coast. The modern meaning is however referring to any mode of transport operated between two destinations domestically by a foreign operator.

to influence cabotage regulation, monitoring, and enforcement (e.g. COWI, 2015; Kummer *et al.*, 2017; Falk and Danielsson, 2018).

The EU road freight market has gradually been deregulated since 1994, when transportation between the EU countries was deregulated. In 2006, the cabotage market was opened up to certain member states and in 2009 and 2012 respectively, groups of EU12 member states² were allowed for the first time to conduct cabotage transports in the EU. In May 2010, European Commission (EC) No 1072/2009 marked an end to the country specific interpretations by coordinating all national cabotage rules. A crucial point was the replacement of the previous directive formulation “temporary basis” with an exact time limit. From that moment on, the “three-in-seven” rule was in place, i.e. every haulier is entitled to perform up to three cabotage operations within a seven-day period, starting the day after the unloading of the international transport with which they entered the domestic market. The so-called “cabotage directive”³ (Schmidt, 2006, p. 119; Falk and Danielsson, 2018), has sparked much public debate and the opinions on its current and future effects differ (e.g., Finger, 2014; Di Gianni, 2015; Lewandowski, 2016; Refslund and Thörnquist, 2016; Šimurková and Poliak, 2019).

The EC, for example, fosters further deregulation to reduce empty runs and to create a single European transport market where any haulier, regardless of the EU member state of origin, can perform transport operations across the EU (European Commission, 2013; Teleroute, 2018). A further common argument in favour of deregulation is that it strengthens competition and therefore

² The 12 countries that joined the EU in or after 2004. EU has, as of now, 27 countries, where the countries that joined before 2004 are referred to as EU15 (or “old member states”). It should be noted though, that EU15 technically are 14 countries after Brexit, however as “EU14” is not (yet) an established term, we use the term EU15 for consistency with previous literature, in particular grey literature.

³ Formal name of the directive is: “Regulation (EC) No 1072/2009 of the European Parliament and of the Council of 21 October 2009 on common rules for access to the international road haulage market”

reduces overall transport costs (Ying and Keeler, 1991; Visser and Francke, 2010). However, hauliers in EU15 are against further market opening because of the significant operations costs differences between EU12 and EU15 countries that have led to wage pressure, flagging out,⁴ and the bankruptcy of hauliers within EU15 countries (Kummer *et al.*, 2014). According to Eurostat data from 2008 to 2018 for Code “H” Transportation and Storage workers, Bulgarian, Czech, and Polish drivers earn only a fraction of what their German counterparts earn—16, 40, and 33 percent on average, respectively (Eurostat, 2020a, 2020b). Clearly, in spite of the intended positive effects of the road freight market deregulation, negative accompaniments of the current form of European freight market deregulation seem to be prevalent (Sternberg and Lantz, 2018).

In 2017, most of the goods in the EU28 were transported by road, 76.7 percent based on tonne-kilometre (TKM). According to Gleave *et al.* (2013), four different types of transportation exist: 1) national transport by domestic hauliers, i.e. national road freight transport in France undertaken by French hauliers. 2) cabotage, e.g. national road freight transport in France undertaken by an Italian haulier. 3) cross-trade, e.g. road freight transport between Poland and Italy undertaken by a haulier registered in France. 4) bilateral transport, e.g. road freight transport between Italy and France undertaken by a haulier registered either in France or in Italy (see Figure 1). It should be noted that neither these four categories nor Eurostat include transports carried out within Council Directive 92/106/EEC (1992) on common rules for certain types of combined transport of goods between Member States (Falk and Danielsson, 2018).

⁴“Flagging in” is the process of adding a vessel (or truck) to the national registry and “flagging out” is the process of removing a vessel (or a truck) from a national registry. Generally flagging out refers to the practice of switching the vessel’s (the truck’s) registration to another country to operate it under a “flag of convenience.”

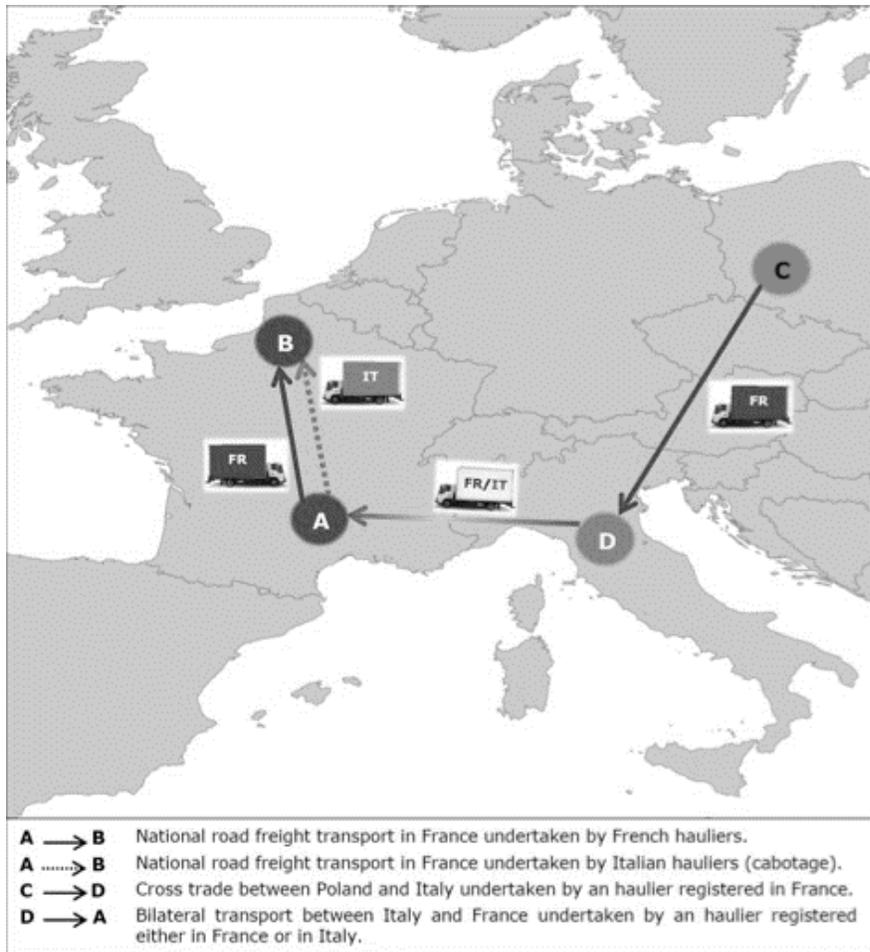


Figure 1.
National and international road haulage operations (Gleave *et al.*, 2013, p. 19)

Early logistics and supply chain papers have emphasized the importance of studying European deregulation (Pfohl, 1993; Bagchi and Skjott-Larsen, 1995), yet the research in the area of road freight is still scarce. This is astonishing, as the ongoing academic discussions on market deregulations and their consequences show in the maritime business (e.g., Miller and Deacon, 2017; Paixão Casaca and Lyridis, 2018), in the airline sector (e.g., Button, 2017; Williams, 2017; Czerny *et al.*, 2018), or the rail freight segment (e.g., Crozet, 2016; Laroche *et al.*, 2017). In general, one could currently get the impression that there is a renaissance of the discussion of

international trade regulations—examples include the current US-China trade war (Liu and Woo, 2018; Fuchs *et al.*, 2019) and Brexit (Dhingra *et al.*, 2016; Swinbank, 2017).

Given the millions of transportation workers in Europe, the economic benefits of deregulation, the social and environmental sustainability challenges of the industry, and the importance to shippers, this paper sets out to explore the scarcely researched European trucking deregulation, its role in the transport markets, and the implications for logistics (Pfohl, 1993; Baron, 1995; Koliouisis *et al.*, 2019). The effects of the ongoing deregulation and the uncertainty of future development is a major concern for policymakers and logistics managers (Mangan and Lalwani, 2016). As emphasized by researchers such as Pagell *et al.* (2018), the intersection between public policy and supply chain management (SCM) is important but under-researched. Failure to take major trends and policy directions into consideration when carrying out supply chain and logistics research creates contextual inaccuracy, particularly in sustainability research (Marcucci *et al.*, 2017). Hence, the aim of this paper is to explore European freight market deregulation using transport economics to highlight one changing and crucial facet of the logistics landscape (i.e. the shift from domestic operators to cabotage operators) and provide managerial and policy implications. Two research questions aid our exploration:

RQ1: How are cabotage penetration rates changing? As shippers and hauliers are planning the future of their freight procurement strategy and make fleet considerations, the future cabotage penetration rates are an important parameter.⁵ The development of cabotage penetration rates indicates the degree of freight deregulation and internationalization in road

⁵ Transport is partly a derived demand and partly a strategic decision. Transport decisions are made in network planning, when supply chain managers are optimizing cost, service levels, facility localization etc., typically with a planning horizon of 5–10 years (Olhager *et al.*, 2015).

freight markets and thus gives decision makers a hint where, in geographic terms, to source transportation services (Holter *et al.*, 2008).

RQ2: *What effect has increased cabotage within Germany had on the desired modal shift to rail and national empty runs?* Unlike trucking, rail transportation takes significant planning and is often a long-term strategic decision. Contracts on intermodal terminals typically run 10 to 20 years. The strategic aspect, as well as the agenda of the EC to promote modal shift from road to rail (Ambra *et al.*, 2019; European Commission, 2019), makes this question important to address.

Our aim is to aid future theory development on road transportation and regulation as well as to provide direction for supply chain and logistics managers, public authorities, and policymakers by elaborating on empirically derived propositions. For logistics managers, we provide important transport considerations for international freight transportation (Olhager *et al.*, 2015). As a unit of analysis, we are using the European road freight transport deregulation and the case of Germany, the largest logistics market in Europe. We do so by formulating propositions, discussing the influencing factors, and conducting scenario analysis of the current and future implications of freight deregulation for the German transport sector to elaborate on the suggested propositions and answer the research questions. This paper sets the stage for future theorizing on an under-researched topic of utmost relevance to both researchers and policymakers (Pfohl, 1993). The contextual perspective we present is important in aiding future research based on empirical data from the world's largest market, the EU.

The remainder of the paper is structured as follows: Section 2 provides a review of the relevant literature. Section 3 contains the research methodology. Section 4 presents the research propositions. In Section 5 the propositions are elaborated on and discussed. Finally, in Section 6,

we conclude with future research directions as well as important implications for managers and policymakers.

2. Literature review

2.1 Research on road freight cabotage

Unlike the European freight market deregulation, the deregulation following the U.S. Motor Carrier Act (MCA) of 1980 has been examined in numerous papers and reports. Researchers are generally positive about the effects of deregulation on operational measures and the significant reductions of shipping costs that have remained low after the initial adjustment to deregulation (Ying and Keeler, 1991; Vogelsang, 2002; Loeb and Clarke, 2007; Cantor *et al.*, 2017). New firms entered the full truck load (FTL) segment whereas the less than truckload (LTL) saw fewer and larger firms (Kling, 1990). Efficiency gains were achieved by the dissolution of private fleets, enabling hauliers to move goods from more shippers and achieve economies of scale (Ying, 1990). While the shippers were profiting from lower transport costs, rail transport decreased its share of the total transportation (Moore, 1986) and driver working conditions deteriorated for some sectors of the industry (Belzer, 2000; Belman and Monaco, 2001; Belman *et al.*, 2005; Broughton *et al.*, 2015).

While the U.S. MCA of 1980 was a domestic affair, EU deregulation (which is still ongoing) is significantly more complex, as it has been going on for several decades (starting in the 1960s) and covers 27 sovereign countries that each have applicable domestic regulation. Due to the difference, it is difficult to assess how much of previous literature on U.S. MCA of 1980 actually applies to EU deregulation and in particular cabotage. The majority of peer reviewed papers on market deregulation and cabotage focus on the maritime business (e.g., Miller and

Deacon, 2017; Paixão Casaca and Lyridis, 2018), the airline sector (e.g., Button, 2017; Williams, 2017; Czerny *et al.*, 2018), or the rail freight segment (e.g., Crozet, 2016; Laroche *et al.*, 2017).

The EU road freight market deregulation is widely covered in newspapers and magazines (so-called grey literature), but it is rarely discussed in academic research, as noted by Lafontaine and Valeri (2009). The few studies (see Table I) that have been published are often influenced by a principal sponsor or the study is not peer-reviewed.

Table I.
A selection of studies of road freight cabotage in the EU

Author(s)	Year	Title	Principal
Baybliss	2012	Report of the High Level Group on the Development of the EU Road Haulage Market	European Commission
Gleave <i>et al.</i>	2013	Development and implementation of EU road cabotage	European Commission
Bundesamt für Güterverkehr	2013	Marktbeobachtung Güterverkehr. Bericht Herbst 2013	German Federal Ministry of Transport
Hendrickx <i>et al.</i>	2013	The impact of untightening of cabotage: executive summary	Dutch Ministry of Infrastructure and Environment
AECOM (Kelleher <i>et al.</i>)	2014	Report on the State of the EU Road Haulage Market	European Commission
European Commission	2014	Report from the Commission to the European Parliament and the Council on the State of the Union Road Transport Market	European Commission
AK EUROPA	2014	AK position paper on the European Commission Report on the State of the EU Road Transport Market	Austrian Federal Chamber of Labour
Sternberg <i>et al.</i>	2014	A study on the movement of international vehicles in Denmark	Authors
Sternberg <i>et al.</i>	2015	Cabotagestudien: A study on trucking deregulation in Scandinavia and beyond	Authors
Broughton <i>et al.</i>	2015	Employment conditions in the International Road Haulage Sector	European parliament
Kummer <i>et al.</i>	2017	Quantitative analysis of cabotage in Austria	Austrian Federal Economic Chamber, Austrian Road Haulage Association and Trade union vida
De Wispelaere and Pacolet	2018	Economic Analysis of the Road Freight Transport Sector in Belgium Within a European Context: Employees and Employers in 'Survival Mode'?	European Centre for Workers' Questions EZA
Falk and Danielsson	2018	Intention and reality of "Combined transportation" – insights from Sweden	The Swedish Trade Union Confederation & The

			Swedish Transport Workers' Union
Sternberg and Lantz	2018	Using crowdsourced data to analyze patterns in transport crime	Authors

Out of these reports and investigations, only Sternberg and Lantz (2018) have addressed the logistics implications of deregulation, by looking at the increasing risks for freight transportation caused by adverse conditions following EU deregulation. Despite the deficit of current research, a preliminary synthesis of the literature content led us to three factors that will influence the expansion of cabotage: 1) EU-regulations set the framework of cabotage, 2) differences in operating costs and labour wages between EU15 and EU12 countries will foster cabotage growth, and 3) the availability of truck drivers, especially low cost truck drivers, favours cabotage.

2.2 EU-regulations as an influencing factor of cabotage

Regarding relevant EU-regulations, two different types have to be distinguished: the linked and the non-linked cabotage. The main goal of the “*linked cabotage*” regulation is to reduce empty runs. Therefore, the “three-in-seven” rule is foreseen to be replaced by a “five-day flat rate” (Teleroute, 2018). As a result, cabotage is limited to five days from the moment of crossing the border of the cabotage host country, but there would be no limit on the number of trips that can be executed during the five-day time period. Additionally, the prerequisite to fully unload the truck prior to cabotage ceases to apply. Compared to the current rule (a limit of three cabotage trips in seven days), this rule grants the hauliers more flexibility to reduce their empty runs, but also creates opportunity for using cabotage as a business model to maximize the utilization of low-wage drivers.

The “*non-linked cabotage*” regulation results in the total deregulation of the cabotage market and only limits the allowed cabotage days per year. That is, any haulier can be active in a foreign

domestic market for 50 days per driver per year. Therefore, in contrast to the current law, no preceding international travel is required. However, there are two obstacles. First, the core conditions of the Posted Workers' Directive, EC No 1072/2009 (2009), apply. This directive ensures strict insurance and social requirements are fulfilled by all cabotage operators. Second, the driver has to complete a registration in a web-based database and complete an online schedule prior to conducting cabotage operations. Setting up this EU-wide registration tool might take some time and delay the market opening. A potential advantage of this regulation is that the restriction of 50 days per year can be adjusted to the quality standard (emission classification) of the vehicle (e.g. trucks with higher emission engines are only allowed 30 days) and to the desired pace of market opening. Hendrickx (2013) gave a comprehensive review of the High Level Group Report and calculated the maximum possible cabotage penetration rates for three scenarios: current regulation, linked cabotage, and non-linked cabotage. He estimated that under current restrictions, the maximum possible cabotage penetration rate in the EU15 market would be 21 percent. His calculation was based on the assumption that after each international transport trip three cabotage journeys take place by EU12 operators. In the case of a linked cabotage regulation becoming applicable, the 21 percent estimate could rise as high as 29 percent. An even higher rate is conceivable if one adds "fake" trips, i.e. international trips (loaded or empty) that operators solely undertake to have the right to conduct cabotage later on.⁶ Cheu *et al.* (2019) empirically investigated to what extent logistics firms are "neutralizing" freight documents, as in creating fake trips. They found that 66 percent of the firms would do it if requested by their customers.

⁶ This phenomenon was described by [two of the industry experts interviewed](#).

2.3 Operating costs as an influencing factor of cabotage

According to Kummer *et al.* (2014) operating costs and especially labour costs and motor vehicle taxes are the prime reasons for adopting flagging out strategies (i.e. moving operations from Western to Eastern European countries to take advantage of lower costs). Subsequently, the flagged out trucks will be active in the origin country and thereby conducting cabotage and increasing the penetration rate. The European Commission (2014) argues that the cost difference has been constantly decreasing and will most likely continue to do so in the future, whereas, others like Sternberg *et al.* (2015) and Sitran and Pastori (2013) suggest that the gap will slowly (or never) narrow due to liberal labour immigration rules and the large number of non-EU citizens willing to work for low wages. Evidence found by de Wispelaere and Pacolet (2018) indicated that many hauliers operating in Belgium were so called “letter-box companies”, i.e. companies registering a mailbox (without any actual operations at that address) in an EU12 country in order to hire crews of convenience or evade taxes.

2.4 Truck drivers as an influencing factor of cabotage

Forecasting the speed of diffusion of low-cost freight services in the European transport market is inherently difficult (Hazen *et al.*, 2012). Market adoption can be generally modelled as a sigmoid function (i.e. S-curve) (Majahan *et al.*, 1991; Rogers, 2003). The flexibility of hauliers in terms of flagging out to achieve cost advantages has been shown by Kummer *et al.* (2014), who considered the low margins of the industry that are often a survival measure to maintain competitiveness.

In contrast to the rigorous work immigration rules of countries like the U.S. and Japan, each country in the EU handles work immigration differently. While some EU countries have strict requirements for guest workers, other EU countries have generous policies allowing for a virtually

unlimited number of drivers from outside the EU. The driver shortages of EU12 countries are addressed by generous work immigration policies with several companies employing drivers from countries such as Ukraine, Russia, Macedonia, or the Philippines (Hilal, 2008; Mabasa, 2018). One of the experts interviewed, a CEO of a 1,300-truck haulier firm, confirmed this: “The more you go east, the easier it is to find drivers. We are not facing any driver shortages in East Europe.”

3. Research methodology

3.1 Research approach

To close the knowledge gap and to answer the questions in the field of study, multiple research methods were used (i.e. statistical analysis, literature review, and complementary interviews). This approach to researching contemporary supply chain issues has been recommended by numerous researchers (e.g. Sanders and Wagner, 2011; Wieland *et al.*, 2016). We chose Germany, which is Europe’s largest economy, as the focal logistics market.

First, calculations based on Eurostat data were conducted to examine the impact of freight deregulation until present (e.g. it is calculated how the share of East European operators changes in Germany over time). The Eurostat data sources that we used are listed in Table II. To calculate the adjusted cabotage share, for example, the *own account* TKM has to be deducted from *national* TKM to ensure that some of the “non-feasible” cabotage journeys are not included. Future potential cabotage penetration rates are calculated by applying regression analysis. Specifically, the existing trendline is extended beyond the actual data (2008–2018) in two different scenarios (using linear and S-curve trend lines, as will be rationalized further on) to predict future cabotage shares. We chose to start from 2008, which was the first year with EC No 1072/2009 (2009). Our analysis goes through the most recent data available via Eurostat.

Table II.

Eurostat data used in the analysis

Labour cost index by NACE Rev. 2 activity - nominal value, annual data	(2020a)
Labour cost, wages and salaries, direct remuneration by NACE Rev. 1.1 activity - LCS survey 2008	(2020b)
Modal split of freight transport	(2020c)
Road cabotage by reporting country and country in which cabotage takes place	(2020d)
Road cabotage transport by country in which cabotage takes place	(2020e)
Summary of annual road freight transport by type of operation and type of transport	(2020f)
Weekly oil bulletin	(2020g)

Second, we performed a review of a variety of related documents (articles, reports, magazines, newspapers, etc.) to estimate the likelihood of scenarios and determine what requirements and assumptions need to be fulfilled.

Third, in addition to the Eurostat analysis and the narrative review of related documents, we consulted with renowned EU transportation experts who represent various stakeholders. These experts were identified from scholarly and practitioner articles, government reports, and Eurostat. In total, 25 experts were consulted with a variety of questions related to their expertise (see Table III). Interviews were carried out as short conversations over the phone and, when necessary, by email. We asked open-ended questions to obtain their perception of the current state of cabotage and future market developments. Please note that their views and thoughts loosely informed our propositions and were mainly used for ideation on the area. Their opinions were not considered as facts, but rather representing their organizations' stance on the European road transport deregulation. Hence, no formal textual coding of the conversations were undertaken.

Table III.

Experts interviewed

Senior transport researchers/university professors from Poland, Austria, Italy and France	6
EC transport experts	3
Eurostat managers and experts	3
German Transport Authority Representatives	3

Representatives of various logistics and transport industry associations	3
German National Bureau of Statistics experts	2
Journalists	2
Chairman of the board of a major German logistics service provider	1
Consultant	1
Senior manager of road transportation from a major German logistics service provider	1

3.2 Data collection

According to Eurostat’s official statistics for Germany, the cabotage penetration rate increased by 195 percent from 2008 to 2018, indicating a compound annual growth rate of 10.4 percent. The *own account* journeys (i.e. companies carrying their own goods) are deducted from the total national road transport journeys. Therefore, the denominator only includes national *hire* or *reward* journeys (carried out by professional providers of road haulage services). In Germany, the *own account* journeys make up approximately 17 percent of the total national journeys (Eurostat, 2020f). This first adjustment is consistent with the approach by Baybliss (2012).

Several of the experts interviewed who represented independent research and industries, journalism, and trade organizations, stated that the cabotage statistics are underestimated. Other sources such as reports, indicate that the figures might be incorrect (e.g. de Wispelaere and Pacolet, 2018). It is well-established that long-distance trucking represents a “statistical vacuum” because many countries do not even try to collect information about cabotage operations from their national hauliers (McKinnon and Leonardi, 2009). Some interviewees believed cabotage to be 50 to 100 percent higher than stated by Eurostat. Sternberg *et al.* (2014) and Sternberg *et al.* (2015) confirmed the underestimation of EU12 haulier activities. According to the Eurostat officials interviewed, some of the new member states also have insufficient routines (both on the authority and haulier levels) to collect adequate data. Hence, a second adjustment of the underlying data consists of adding a conservative 25 percent to the officially reported cabotage journeys to include

those by countries that are not part of the EU (e.g. Ukraine or Turkey) as their cabotage trips are not reported officially.

An important distinction to make is the actual extent in percentage of the domestic freight market that is penetrable by cabotage. Because the current regulation stipulates that a foreign haulier needs to have an international transport coming into the country, shipments of domestic construction material or forestry produce are unsuitable for cabotage. That applies to local distribution, for example, where only cities bordering on a low-cost country are feasible cabotage targets. Hence, this paper applies the logic and selection criteria of Sternberg *et al.* (2014), which makes 53 percent of the total German freight market the maximum theoretically feasible penetration rate of cabotage (given the current regulation).

The costs include the two biggest components, fuel and labour, as well as vehicle taxes. As claimed by Guihery (2009), it becomes apparent that there remains a large gap between EU15 and EU12 member states. Moreover, the gap has been consistent over the last eleven years. Data indicates that this spread is mainly attributable to different labour costs and social protection systems (AK EUROPA, 2014).

Table IV shows that the EU road haulage market deals with diverse labour costs, but relatively aligned fuel prices. We illustrate this using Bulgaria and Germany data. While the average labour cost in Germany is more than 6.4 times higher than that of Bulgaria (25.8 € vs. 4.0 €), the average fuel price including duties and taxes are relatively similar (1.28 € vs. 1.12 € per liter of diesel) (Eurostat, 2020a, 2020b, 2020g). In contrast to the European Commission (2013) and Kelleher (2014), research shows that there is still little convergence between the labour costs of old and new EU member states within the road haulage market (AK EUROPA, 2014; Kummer *et al.*, 2014; Sternberg *et al.*, 2015).

Table IV.

Labour costs and fuel prices comparison

Total labour cost (in €perhour)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Germany	24.0	24.8	25.5	24.7	25.9	25.5	25.5	26.2	27.3	27.1	27.5
Bulgaria (BG)	3.1	3.3	3.7	3.8	3.8	3.9	4.0	4.2	4.3	4.8	5.3
Czech Republic (CZ)	9.3	9.8	10.0	9.9	10.0	10.1	10.2	10.5	10.9	11.8	12.6
Poland (PL)	7.4	7.5	7.7	7.9	8.0	8.3	8.6	8.8	9.0	9.4	10.0
Fuel price including duties/taxes (in €per litre)											
Germany	1.33	1.07	1.20	1.38	1.57	1.46	1.38	1.14	1.14	1.17	1.33
Bulgaria (BG)	1.09	.84	.99	1.16	1.33	1.36	1.33	1.10	.96	1.00	1.14
Czech Republic (CZ)	1.29	1.05	1.24	1.41	1.52	1.42	1.33	1.12	1.04	1.10	1.27
Poland (PL)	1.23	0.88	1.08	1.16	1.39	1.31	1.24	1.03	1.02	1.03	1.16

4. Research propositions*4.1 Impact of the rise of East European operators*

A cabotage host is the country where the cabotage takes place. Germany is one of the primary cabotage hosts in Europe and the cabotage share of national transports has increased significantly since 2008. The penetration rate has increased by more than 377 percent between 2008 and 2018, indicating a compound annual growth rate of 15.3 percent. The East European member states (EU12) were first allowed to engage in the cabotage market in 2009.

The top line in Figure 2 illustrates the adjusted cabotage share in Germany. In contrast to the bottom line, there are two adjustments. First, the journeys on *own account* are deducted from the total national journeys. Therefore, the denominator only includes national *hire or reward* journeys. The journeys on *own account* make up 16.8 percent of total national journeys on average (Eurostat, 2020f). This adjustment is consistent with the approach by Baybliss (2012). The second adjustment consists of adding 25 percent to the officially reported cabotage journeys to include cabotage journeys by countries which are not part of the EU (e.g. Ukraine or Turkey) and cabotage journeys

which are not reported (AK EUROPA, 2014). According to interviewed Eurostat officials, some of the new member states also have insufficient routines (both on authority and haulier levels) to collect adequate data, as confirmed by previous investigations. This is roughly based on a “Maut statistic” and in line with investigations conducted in Denmark (Sternberg *et al.*, 2014).

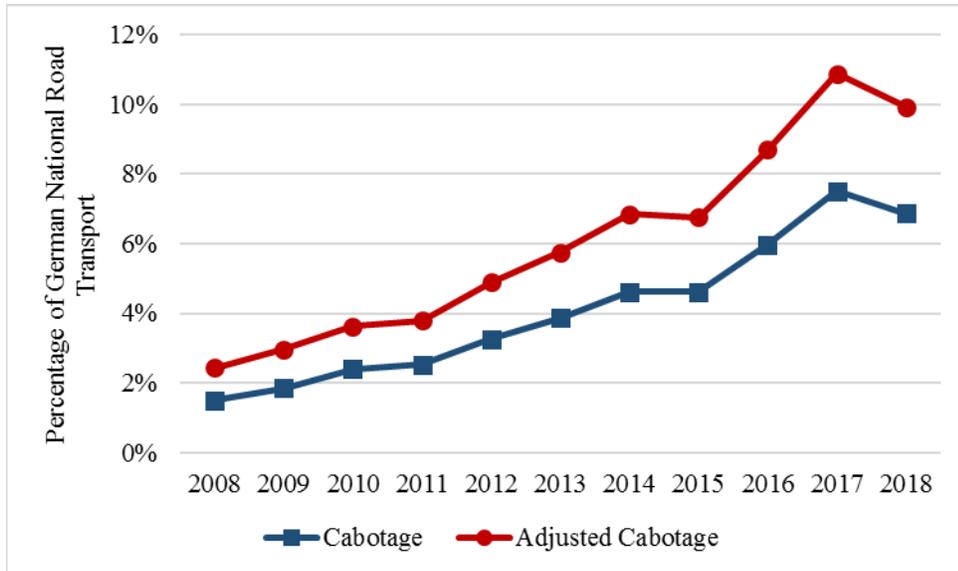


Figure 2. Cabotage share of national transport in Germany (Eurostat, 2020d, 2020e, 2020f)

The adjustments result in significant higher absolute values of cabotage shares. In Germany, the gap is 4,744 million TKMs in 2018 (9.9 percent [adjusted] vs. 6.9 percent). The fact that the compound annual growth rate from 2008 to 2018 for *own account* on *national* TKM is - 4.6 percent implies that the trend of increased use of EU-12 cabotage hauliers is likely to continue (Eurostat, 2020d, 2020e, 2020f). Given this analysis, Proposition 1 is:

P1: The cabotage penetration by EU-12 hauliers will continue to increase in Germany.

The surge of total generated cabotage TKM since 2008 is due to the drastic increase of cabotage TKM hauled by BG, CZ, and PL (see Figure 3). The CAGR of the total cabotage TKM from 2008 to 2018 was 15.3 percent. BG, CZ, and PL represented the largest increase with a CAGR of 39.1 percent. During the same period, the EU15 CAGR was -4.1 percent. Consequently, this can be regarded as an early sign that cabotage deregulation results in a surge of East European operators in Germany (Eurostat, 2020d, 2020e, 2020f). Regarding the development of East European operators, we formulate Proposition 2:

P2: The ongoing cabotage deregulation will result in more East European operators in Germany.

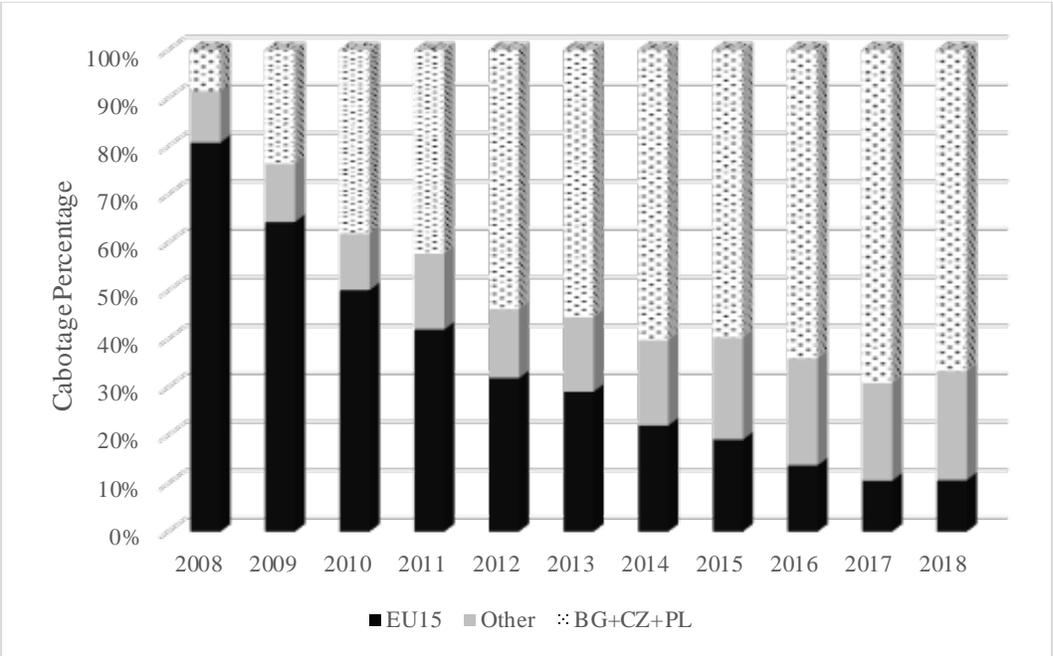


Figure 3. Percentage of cabotage in Germany (Eurostat, 2020d, 2020e, 2020f).

4.2 Impact on the EU modal split

Assuming Proposition 2 holds valid, the freight market deregulation (i.e. increased cabotage penetration rates) in the EU will result in a surge of East European operators within Germany. This shift will intensify the competition in the European road haulage market and force the old EU member states to reduce their operating costs. Thus, as road haulage becomes cheaper, rail freight transport with its country-specific technical and organizational challenges will become less attractive thwarting EC efforts to promote a modal shift from road to rail (Ambra *et al.*, 2019; European Commission, 2019). Similar results were seen in the U.S. after the MCA of 1980 (Moore, 1986). Table V shows that the modal split in the EU27 has been stable. Therefore, we present Proposition 3:

P3: The cabotage deregulation has thwarted EC efforts to promote a modal shift from road to rail.

Table V.

Modal split development in the EU28 (Eurostat, 2020c)

Modes	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Road	75.5	77.0	75.7	75.0	74.6	74.8	74.8	75.3	76.2	76.7
Rail	18.1	16.9	17.4	18.7	18.5	18.3	18.4	18.2	17.6	17.3
Inland waterways	6.5	6.2	6.9	6.3	6.8	6.9	6.8	6.5	6.3	6.0
Change of road share (Base is 2008)		1.5%	0.3%	-0.4%	-0.7%	-0.6%	-0.6%	-0.1%	0.7%	1.3%

4.3 Impact on the development of empty runs

The surge of East European operators intensifies the competition in the German road haulage market and forces the local hauliers to reduce their operating costs. Thus, the overall road haulage operating costs will decline. As highlighted by Sternberg *et al.* (2015), empty runs increase with decreasing costs, because the haulier will breakeven earlier and thus is able to operate with less loaded trucks.

The distinction between cabotage empty runs and overall domestic empty runs is important. A certain amount of empty runs is inevitable due to geographic imbalances and specific characteristics of goods (McKinnon and Ge, 2006). According to the latest Eurostat figures, 23 percent of all transports are empty runs (excluding partially empty runs). Figure 4 includes the share of empty vehicle-km in total vehicle-km, but it neglects the many vehicle-km that are driven with only partially loaded trucks. Consequently, the average utilization rate of trucks is low.

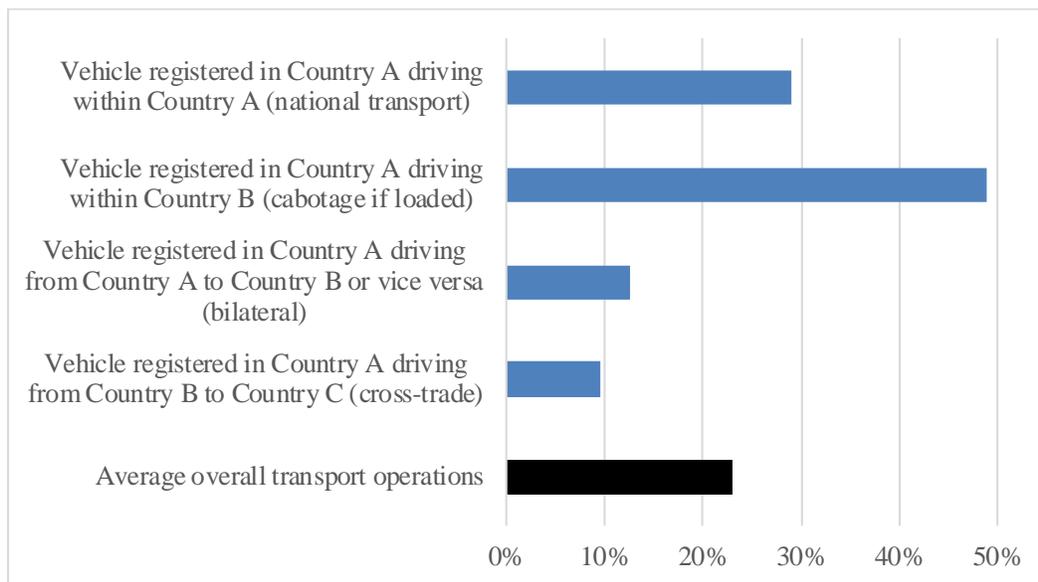


Figure 4. Share of empty vehicle-km in total vehicle-km by type of transport in 2012, based on data from 21 of the 27 EU countries in 2012 (no data available from BE, IT, CY, MT, RO and UK). Source: European Commission (2014, p. 8)

While national empty runs are slightly above average with 25 percent, empty runs of national road freight transport undertaken by a foreign haulier (= cabotage) are almost twice as high (about 50 percent). Given the previous propositions, we put forward Proposition 4:

P4: The cabotage deregulation results in increased national empty runs in Germany.

5. Discussion

In this section, we will address the propositions presented in the previous section. By using a simple regression analysis, the existing trendline is extended until 2025 beyond the actual data (2008–2018). We define two different scenarios to predict future cabotage shares. The “steady-state growth” of Scenario 1 is extrapolating the future cabotage development with a linear function. Within the “realistic growth” Scenario 2, we assume an exponential function. We will forecast the cabotage penetration rate for ten years and present the corresponding trendline equations and R-squared values. In order to discuss the robustness of the two scenarios examined, we will follow the argumentation of the factors introduced in Section 4 and the outcome of the interviews.

5.1 Cabotage and the rise of East European operators

In Scenario 1, we assume simple linear growth as is often done in reports. Figure 5 shows that the adjusted cabotage share has risen 2.4 percent in 2008 to 9.9 percent in 2018 and is estimated to top 16 percent in 2025. Fitting a line to the Eurostat data collected yields an intercept of -16.845 and a regression coefficient of .008. As demonstrated by the R^2 of 97.4 percent, time accounts for almost all of the variance in the range of data analysed.

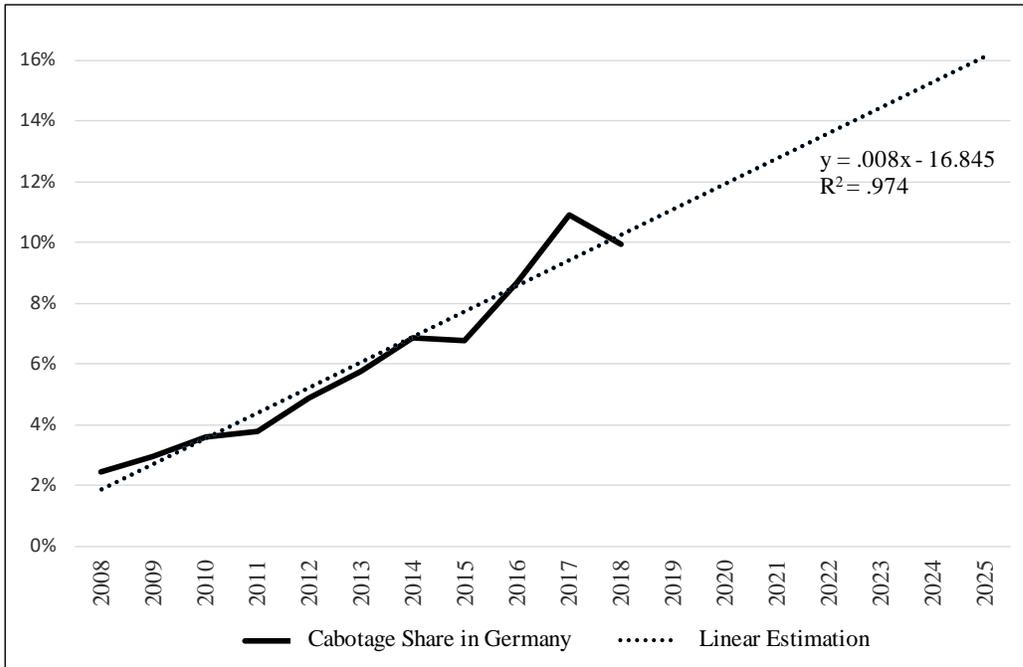


Figure 5. Linear increase of the cabotage share in Germany (2008–2025) (Eurostat, 2020d, 2020e, 2020f)

The cabotage share exhibits a predicted value of 16.1 percent in 2025. The combination of stricter regulations, a lack of German, Eastern European, and English-speaking, non-EU drivers (or stricter immigration policies in EU12 countries) could potentially set the conditions for the linear scenario in Figure 5. As already explained, Scenario 1—the steady state case—contradicts current research and coverage. Nevertheless, it could occur if transport workers’ unions and other deregulation opponents overrule political institutions. In this regard, we would also like to mention that even a decrease of cabotage in Germany is possible if, for example, the EU releases a law that prohibits EU12 operators from large-scale use of low-wage drivers in EU15 countries (such as was attempted recently through trying to enforce minimum wages on international truck drivers) (Bosch and Weinkopf, 2013).

In Scenario 2, we look into a plausible increase of cabotage (see Figure 6), according to the following assumptions:

- *Assumption 2.1 “New regulations will fully deregulate and open the market.”* The scenario assumes a complete deregulation of the market. The EC is a strong proponent of a Single European Transport Area and has already elaborated detailed options to deregulate the market, making this option a highly likely one.
- *Assumption 2.2 “Operating cost gap between EU15 and EU12 remains.”* Concerning costs, it can be assumed that the gap between EU15 and EU12 member states remains constantly high. As discussed, the two main costs are fuel and labour. Fuel prices are, however, already today more or less the same, as they are linked to the global economy (Baybliss, 2012; Eurostat, 2020g) and are harmonized by Council Directive 2003/96/EC (European Commission, 2003). Labour costs, on the other hand, have not converged over the last decade (European Commission, 2019; Eurostat, 2020a, 2020b). Thus, it is assumed that this trend will continue.
- *Assumption 2.3 “Lack of ‘German’ drivers and continuous surplus of EU12 drivers.”* The EU15 driver shortage seems to be perpetual. This is not going to change with the increasing usage of autonomous driving (Michigan State University, 2018). Quite the contrary, just for 2017, there was a shortage of more than 45,000 truck drivers in Germany alone (Birger, 2017). Driving a truck is considered an unattractive occupation (Prockl *et al.*, 2017) and the salary is relatively low compared to other professions. Thus, we can assume that there will be a lack of drivers in Germany and a continued supply of non-EU drivers into the EU12 countries.

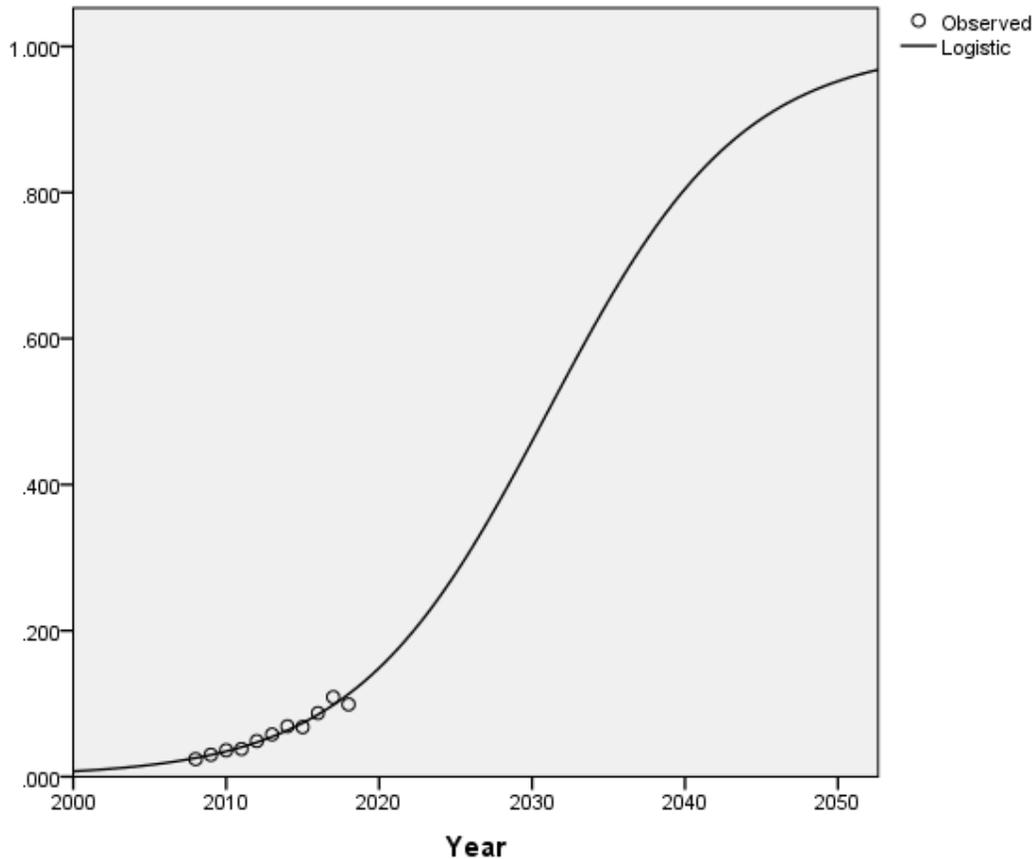


Figure 6. Estimated S-curve for cabotage share in Germany (2000–2050) (Eurostat, 2020d, 2020e, 2020f)

As of 2018, the current cabotage share of 9.9 percent was calculated by dividing the adjusted cabotage TKM (23.7 billion) by the *total* German TKM (276.2 billion) minus the *own account* TKM (37.4 billion). Assuming an annual growth rate of 2 percent (as expected in most Western countries) for the national *hire and reward* TKM in Germany would add up to nearly 300 billion TKM in 2025. A cabotage rate of 25 percent would thus assume 75 billion TKM of cabotage.

Poland increased its cabotage TKM in Germany from approximately 0.95 billion TKM in 2008 to 16.6 billion TKM in 2018; this equals a CAGR of 30 percent. Looking at Poland’s adjusted cabotage TKM and assuming a modest 25 percent growth rate over the next five years suggests

that Poland alone (without the other EU12 countries or other East European countries) could account for 79 billion TKM of cabotage in Germany by 2025.

By 2025, we argue that a cabotage share of 25 percent is possible in some of the EU15 member states, particularly in Germany. Our findings are consistent with the study by the Policy Research Corporation (Hendrickx, 2013).

A final reason for the strong increase of cabotage share is that most of the big German companies support this change by contracting foreign hauliers instead of German hauliers; one interviewed logistics service provider stated they currently use cabotage for 25 percent of their German domestic hauls. Thus, the procurement of German companies is fostering cabotage in Germany. Available data, previous studies, and expert opinion supports Proposition 1: *The cabotage penetration will continue to increase in Germany*, as well as Proposition 2: *The cabotage deregulation results in a surge of East European operators in Germany*.

5.2 Cabotage and the changes of modal splits

We investigated whether cabotage deregulation has had any effect on modal shift. Looking at the data in Table VI, the EC efforts to expand rail transportation has not yielded a significant change in the modal split in Germany (European Commission, 2011; Islam *et al.*, 2015; European Commission, 2019).

Table VI.
Modal split in Germany (Eurostat, 2020c)

Modes	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Road	70.0	71.8	70.5	71.3	70.8	70.7	71.3	71.6	72.4	73.4
Rail	19.3	17.9	18.7	19.3	19.1	19.1	18.8	19.3	18.8	17.8
Inland waterways	10.7	10.4	10.8	9.4	10.1	10.2	9.9	9.1	8.8	8.8
Change of road share (Base is 2008)		2.6%	0.7%	1.9%	1.1%	1.0%	1.9%	2.3%	3.4%	4.9%

Recent studies (Visser and Francke, 2010; Hendrickx, 2013) indicate that decreasing road transport prices may trigger a modal shift from rail to road, which is contrary to EC efforts to encourage rail usage. In the next few years, however, a backwards modal shift initiated through cabotage is unlikely, because a cabotage share of 6.5 percent is too little to affect the entire transport market (Bundesamt für Güterverkehr, 2010). When cabotage will affect the entire market is uncertain, but it seems likely that a BG, CZ, and PL cabotage share of over 16 percent in 2025 would have an effect.

As cabotage penetration rates increase and road transport prices fall, EC efforts to promote a shift to rail transportation has been and will likely continue to be unsuccessful (European Commission, 2019). Hence, we find support for Proposition 3: *The cabotage deregulation has thwarted EC efforts to promote a modal shift from road to rail.*

5.3 Cabotage and the development of empty runs

At the present time, there is no direct link between cabotage empty runs and national empty runs, because cabotage only accounts for a relatively small percentage (about 6.5 percent) of the entire market. Therefore, the two segments are first analysed individually and afterwards assessed together (see Table VII).

Table VII.

Effects in the cabotage and national market, assuming cabotage reaches a tipping point

	Cabotage market	National market (without cabotage)	Entire market
Cost	Constant or marginally increasing	Decreasing due to foreign competition	Decreasing
Empty runs	Slightly decreasing	Increasing due to decreasing costs (shipper stronger than haulier)	Increasing since effect of “national” is stronger than “cabotage”

Cabotage deregulation has contributed to a decrease of empty runs in the cabotage market. According to Hendrickx (2013), a further deregulation of the cabotage rules will not result in a further decrease in empty runs, as the current “three-in-seven” rule already grants an efficient possibility to reduce empty runs. We assume that a slight decrease will take place, because the cabotage empty runs are at a relatively high level compared to national empty runs (about 50 percent vs. 25 percent) and therefore, offer huge potential to improve average utilization. With regard to costs, it can be assumed that they will remain constant or marginally increase due to their low level as compared to the higher costs in Germany.

Assuming that cabotage reaches a share of 20–25 percent, lower transport costs will increase empty runs in the national market (without cabotage). We believe that if 25 percent of all national trips are driven by East European low-wage drivers, then German drivers will have to lower their costs to stay competitive. As a result, overall transport costs in Germany will decrease. Shippers will increase empty runs, because they can afford less efficient trips due to the lower costs. Hauliers have incentives to decrease empty runs as a result of cost pressure, but due to their small size and limited network, consolidation of freight is not always possible (McKinnon and Ge, 2006). Clearly, shippers have the power (Pålsson and Kovács, 2014).

Hence, we summarize there are some indications supporting Proposition 4 “*The cabotage deregulation results in increased national empty runs in Germany*”. Transport costs in the entire market will likely decrease and empty runs will increase, since the “domestic” effect is stronger than the “cabotage” effect.

6. Conclusion

Over ten million people in the EU work with logistics and freight transportation and it is critical for freight transport and logistics researchers and policymakers alike to understand fully the dynamics of the trucking market. This paper contributes to the still insufficiently explored field of road freight cabotage in the EU. Further research is highly encouraged in order to determine adequate policies for financial, environmental, and social sustainability. A major share of previous investigations have not been published in scholarly journals, have often been presented in languages not spoken by the larger scientific community (e.g. German, Swedish, Danish and Dutch), or have been carried out by non-independent investigators. This paper has systemized and amplified existing knowledge on the European deregulation by providing support concerning the impacts of the cabotage deregulation until now. This paper represents an empirical and unbiased point of view, in contrast to the reports of the EC (pro-deregulation) or reports of the haulage associations and labour unions (anti-deregulation). The study at hand has addressed some of the research void in the intersection between public policy and SCM (Pagell *et al.*, 2018).

Cabotage plays a more important role than officially reported. If one adjusts the official value by deducting *own account* TKM and adjusting for both non-EU trips and “shadow trips,” cabotage by BG, CZ, and PL reached approximately 10 percent share of Germany’s national transport in 2018. Cabotage penetration has increased significantly since 2009 because of the removal of access restrictions from EU12 to EU15 countries. Between 2008 and 2018, the cabotage share transported by BG, CZ, and PL within Germany has risen from 8 percent to 67 percent while the cabotage share transported by EU15 countries within Germany has decreased from 81 percent to 11 percent (Eurostat, 2020d).

To answer our two research questions (RQs), we elaborated on four research propositions. Cabotage in Germany will most likely represent a significant share of national transport five years

from now. Assuming the adoption of low-cost carriers follows an S-shaped curve, an EU12 cabotage share in Germany as high as 25 percent would be possible by 2025. The same may be true for other EU15 member states (Kummer *et al.*, 2014).

6.1 Future research directions

We found sparse academic research on EU trucking deregulation and scholars of transport economics and SCM alike are encouraged to investigate further the road transport deregulation. Thereby, EU deregulation is relatively more complex than the North American trucking deregulation due to the multitude of countries and legislations involved. Subsequent endeavours in this field could focus on analysing the variety of cabotage business models and their impact on the markets as well as their impact on the configuration of supply chains. Furthermore, we suggest researching how geographical proximity in Europe affects cabotage and conducting comparative studies between the U.S. MCA of 1980 and EU road freight deregulation.

We also call for future research into how managerial practice can ensure environmental and social sustainability along the supply chain, amplifying the call by Nakamba *et al.* (2017). This research need has been further motivated by ample anecdotal evidence of exploited drivers (Hilal, 2008; Mabasa, 2018). The haulier selection literature (e.g. Meixell and Norbis, 2008) has mainly applied a U.S. perspective, but this paper highlights the need for incorporating a more contextual understanding in haulier selection theory development in general as well as country specific investigations in particular.

Our analysis is based on Eurostat data, due to a lack of other data sources. Future research on methods to acquire complementary data for analysis is needed. According to Eurostat data, previous research, and interviews with experts, cabotage is clearly affecting the entire market and

has thwarted the EC effort to shift transport from road to rail and has increased national empty runs. Our projections based on existing data and theory are contrary to what several policymakers are stating, i.e. that further European deregulation will decrease empty-runs.

Given our elaboration on Eurostat data, further freight market deregulation, will most likely fail to have a positive impact on the environment, as it triggers a higher amount of empty runs, thwarts EC efforts to encourage the use of rail, and increases the number of inefficient vehicles through the increasing share of the East European fleets (Visser and Francke, 2010; Hendrickx, 2013).

An increasing number of recent reports and papers are addressing misconduct in the transport industry, such as document fraud (Cheu *et al.*, 2019), theft (Sternberg and Lantz, 2018), violation of cabotage regulations (Kummer *et al.*, 2017) and fake corporations (letterbox companies) (de Wispelaere and Pacolet, 2018). Hence, future research is advised to create a research agenda for addressing misconduct in the transport industry, by applying supply chain theories (e.g. principal-agent theory (Ouchi, 1979)) or criminology theory (e.g. strain theory (Agnew, 1992)).

6.2 Implications for management

The paper at hand provides logistics managers with insight into the deregulation of the European road freight market. We emphasised that regulations, operating costs, and truck drivers form the main influencing factors of the road freight market. Thus, logistics managers looking at future strategy are advised to take the trends addressed in this paper into consideration, especially while addressing strategic themes in the haulier business (Borgström *et al.*, 2017). Such a strategic theme should be an important decision criteria for carrier selection. EU12 hauliers represent significant cost savings; however, these cost savings come at an environmental price as modal shift

and fill rates suffer (Hendrickx, 2013). As the access to low-cost hauliers increases through gradual deregulation of European road transportation, logistics managers looking at minimizing cost are advised caution when investing in intermodal transportation projects. The reason is that, while the trend towards low-cost hauliers is clear, negative externalities (Sternberg and Lantz, 2018) can harm social sustainability efforts. The trade-off between cost and sustainability merits serious consideration. Additionally, as foreign hauliers and cabotage operations become more common and increasingly replace domestic hauliers, the operational implications (e.g., ensuring security regulations such as language requirements when handling dangerous goods) will become increasingly important.

6.3 Implications for policy

The increase in cabotage will cause an increased environmental impact and put pressure on working conditions for drivers working in Germany. Salary differences are decreasing, but will likely remain significant over the next decades. The negative impact on the environment is a result of older and more polluting trucks (Bundesamt für Güterverkehr, 2010), decreasing fill-rates, and an increase of road freight transportation in general. Hence, policymakers are advised that further deregulation is likely to counter EC efforts to promote a shift from road to rail. Furthermore, our research implies that infrastructure planning needs to take into consideration the surge of East European trucks. This surge means that tens of thousands of truck drivers will be living in their trucks and will need additional infrastructure (e.g., rest areas). Policymakers also need to consider how the increasing externalities of cabotage can be internalized. That is, how can the companies benefiting most from low-cost East European hauliers be made responsible for the negative effects? Finally, we would like to conclude with a quote from an interviewee, a manager at one of

Germany's largest logistics service providers: "Liberalizing the cabotage market has created new business models rather than less empty runs. But, never mind the markets..."

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