

# Cabotagestudien

## A study on trucking deregulation and cabotage in Scandinavia and beyond

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REPORT

Packaging Logistics  
Lund University

# Cabotagestudien: A study on trucking deregulation and cabotage in Scandinavia and beyond

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## *Executive summary*

*This is the final report of the Scandinavian study “Cabotagestudien”, carried out between 2013 and 2014.*

An open European market for goods and services, including transport services, stimulates trade, global competitiveness and economic growth. At the same time, concerns about domestic job security, regulation compliance and the environment have sparked a debate. This report should be considered one of the first modest contributions to the mainly unexplored area of European freight deregulation. Our contribution is a review of previous research, a snapshot of the movement patterns of the foreign trucks on Scandinavian roads, statistical analyses and case investigations. Parts of the data collection presented in this report are based on an innovative smartphone app for counting trucks that registers vehicle movements with the assistance of 8 000 volunteers. Given the novelty of the methods employed one must keep in mind the underlying assumptions stated in the report when interpreting the results.

Our study offers the following indications:

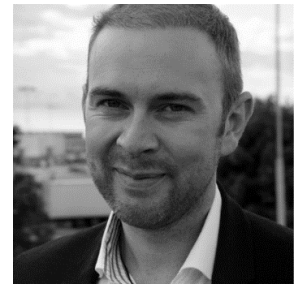
- 1) Denmark, Norway and Sweden are three different markets, with significant differences in terms of how cabotage and combined transportation are carried out.
- 2) The actors in the market are very flexible and are adapting their businesses according to the possibilities the current road freight regulations offer. The Cabotage Directive may have been introduced as a way to increase fill rate, but is in practice viewed as a tool for gaining access to low-cost drivers on Scandinavian roads.
- 3) The data for Sweden indicate that there are legal infringements of the cabotage rules, which means that trucks make more than 3 trips and/or stay longer than 7 days. There are also indications of frequent violations of tax rules regarding posted workers.
- 4) The data collected can be used to complement the Eurostat cabotage statistics, particularly since many of the most frequently occurring truck nationalities are not represented in Eurostat.

In addition to the indications outlined, our data also provide a rich picture of Bulgarian hauliers in Scandinavia.



## About the authors

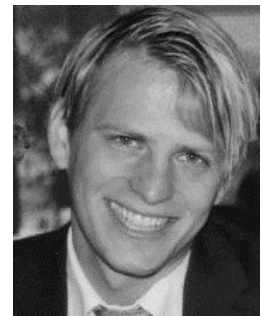
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In addition, Lund University assistants Daniel Berglund, Jonas Larsson and Stela Petkova has been working with the project and the report.

# Foreword

Scientific knowledge per definition is published in scientific, peer-reviewed journals. In research projects receiving external financing, findings typically first appear in a report (such as this one) and then later on in scientific journals. One major reason for this is that scientific journals usually have a review and publishing lead time of 1 to 4 years. Larger research projects typically generate several articles, but it is difficult to determine in advance what knowledge will stand the test of time and what will not. In addition, several types of statistics and calculations that come out of a project in practice are not considered a scientific contribution, yet can be of interest to a non-scientific audience. This popular science report presents what, in the sense of the word “science”, is a mixture of scientific and non-scientific results.

Though typically understood as one project, the Cabotagestudien is an “umbrella” for several small initiatives by a loose network of researchers and students, coordinated by Lund University and Henrik Sternberg. This report, “Scandinavian Cabotagestudien” synthesises the previously published reports and data collection from Denmark, Norway and Sweden. Some issues in this study (outside the scope of this report) are in addition analysing the German and Swiss markets.

The word *cabotage* originates from the sea domain and according to most dictionaries, applies to transport between two locations within a country, carried out by a foreign carrier. This study was named “Cabotagestudien” with the dictionary definition in mind. “Cabotage” in the name denotes the wider, original sense of the word. This roughly corresponds to many truck drivers’ understanding of the word. It is important to note, though, that the legal definition of cabotage differs and denotes a narrower (and frequently debated) concept.

The lack of reliable data on European freight transportation is a challenge. To complement existing sources, a large amount of the data collected in the “Cabotagestudien” (translated “cabotage study”) was collected using crowdsourcing and the involvement of volunteers (typically truck drivers and terminal workers). This is a novel approach that is still being developed and has only been tested in the context of the Cabotagestudien. At the time of writing this report, the approach of using volunteers and smartphones to observe trucks is being scientifically reviewed in some articles for scientific publication such as *Transportation Journal*.

This is the fifth report that the Cabotagestudien is authoring or contributing to. Most of the results in this report have been published in previous Swedish reports (Sternberg, 2013, Sternberg et al., 2014a) (both in Swedish), in the Danish Cabotagestudien (Sternberg et al., 2014b) (in English), and in the Norwegian report with FaFo and TÖI (Jensen Steen et al., 2015) (in Norwegian). What is new, is a more extensive review of existing knowledge, more discussion on existing statistics and comparisons with new cabotage calculations as well as between the Scandinavian countries (Norway, Denmark, Sweden). We have also included a short investigation of how some Bulgarian hauliers are conducting their operations and how illegal certificates have become widespread (Radio Sweden, 2014).

*“Errors using inadequate data are much less than those using no data at all.”*  
Charles Babbage

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*Henrik Sternberg, Michal Filipiak, Erik Hofmann and Daniel Hellström, February 2015*

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# *Introduction*

## Background

### **Why carry out a study on international trucks in Scandinavia?**

Former European Commission President Barroso emphasized the following statement in his State of the Union address 2013 (European Commission, 2013):

*"We have a well-functioning single market for goods, and we see the economic benefits of that. We need to extend the same formula to other areas: mobility, communications, energy, finance and e-commerce, to name but a few. We have to remove the obstacles that hold back dynamic companies and people. We have to complete connecting Europe."*

One such ongoing deregulation is that of the European road freight market. International transportation (i.e. transports between two countries) is already fully deregulated. Access to EU member states' domestic freight markets, however, is still regulated but heavily debated. Considering that 10 million Europeans work in the transport industry and that transportation is the basis for trade-enabling societal wealth, an important question for society concerns informed policy decision-making and proper regulation. It is also important for hauliers and transport workers to understand the impact of the changes currently taking place on the European transport market.

Whereas the deregulation of road freight transportation in the US (through the Motor Carrier Act of 1980) gained considerable research attention (e.g., Allen, 1990, Kling, 1990, Belman and Monaco, 2001, Corsi, 2005), the European freight deregulation has received very little academic attention (Kummer et al., 2014). That has not been the case in the media, though, where the debate about road freight deregulation in Europe has been a recurring theme in television, radio, newspapers, social media and of course trade magazines. which was the result of a Macedonian truck driver being caught with false documents (including a fake driving licence), but was acquitted in court (Radio Sweden, 2014).

On a well-functioning market, constructive competition is allocating capital and labour optimally, yet trucking is inherently competitive with strong tendencies toward under-pricing and destructive competition (Belzer, 2000, p. 13). The European Commission has outlined the benefits from the deregulation, such as increased efficiency, reduced environmental impact and reduced administration (European Commission, 2011, European Commission, 2014b). It is a well-known fact that cost effective transportation enables economic growth (for example, Woodcock et al., 2007, Mačiulis et al., 2009), as does the reduced administration resulting from deregulation. The positive environmental claim, however, has been questioned due to, for example, potential modal shift (Visser and Francke, 2010, Ministerie van Infrastructuur en Milieu, 2013) and an increased transport demand as a result of decreased transport cost (Sternberg, 2013). In addition to environmental concerns, studies show unintended social effects on truck drivers as a result of the deregulation (Hilal, 2008). Logistics and in particular transportation have a large environmental and societal impact (Wu and Dunn, 1994) and the societal costs of freight transportation are rarely internalised, causing concern among policy makers (Runhaar and Heijden, 2005, Stern, 2008).

Given both the lack of studies on the European road freight transport deregulation (hereafter referred to as "the deregulation"), and the financial, environmental and social importance of freight transportation, this study provides some insights into the European road freight transport deregulation in the case of the Scandinavian countries. This report presents the current state of knowledge on international hauliers in Scandinavia. Some of the questions this report contributes to are:

- What is the extent of cabotage in Scandinavia?
- What are the current effects of the deregulation?

In order to explore these questions, we start out by explaining the history and methodology of Cabotagestudien. The methodology is followed by a summary of existing knowledge, statistics and regulations in the field. Then the results are presented, followed by a concluding discussion.

*We would like to emphasise that this study, despite massive volunteer support, still is a small-scale initiative with small resources placing limitations on the analysis.*

# *Methodology – overview*

As confirmed by Lafontaine and Malaguzzi Valeri (2009), only a few scientific articles have addressed the European freight deregulation. Hence, we have applied a broad approach to collect data on freight deregulation in Europe. We have used the following combination of methodologies:

- Review of previous projects/research
- Manual truck counting
- Volunteer observations, mainly through the Cabotagestudien app
- Volunteer haulier GPS data
- Microeconomic modelling
- Statistical analysis
- Interviews and an expert workshop
- Field trip

This section will explain how each of the methods have been used up until now. Throughout the entire process, we have maintained a fruitful dialogue with various trade and interest organisations, mainly in Denmark and Sweden. Before elucidating each of the methodologies, we first provide a brief history of the Cabotagestudien.

## History of Cabotagestudien

The Cabotagestudien started in 2012 as a reaction to the lack of facts in the Swedish debate on the transport market. Dr Sternberg initiated the research journey by manually counting trucks and driver nationalities in the Port of Gothenburg. The results (nationalities) were different from the split of cabotage operating nationalities according to Eurostat (statistical office of the EU), so we developed an innovative smartphone app to collect a large dataset on foreign trucks in Sweden. We also developed a microeconomic model to test the effects on costs and the environmental impacts of switching from Swedish hauliers to low-cost cabotage operators. The results from these three methods were presented in the first Cabotagestudien report, released September 2013 (Sternberg).

The report received considerable attention. The domestic haulage industry and workers were very appreciative of the work carried out, whereas some organisations raised concerns regarding the quality of the collected data and the rigour of the analysis. A second Scandinavian study was initiated in October 2013 with the launch of an improved version of the Cabotagestudien app. In order to ensure the data quality and to increase the rigour of the analysis, it was necessary to validate the crowdsourcing data collection approach. A comparison between data collected by the app and the actual GPS data of the hauliers' vehicles was necessary and the Cabotagestudien researchers contacted several trade organisations, logistics service providers and hauliers. After numerous meetings and discussions, some hauliers were persuaded to share their data with the research team.

In addition to the three original methods (manual counting, app data collection, and microeconomic modelling), we expanded the study with statistical analysis, interviews, a workshop (December 2013) and a field trip (November 2013).

The first report from the Scandinavian study was released in June 2014 – the Danish Cabotagestudien (Sternberg et al., 2014b). At the end of November 2014, the Swedish Cabotagestudien was released. Some data and analysis specific to Norway was included in the report “Arbeidsforhold i gods og turbil” (Jensen Steen et al., 2015), published by FaFo. This was because the Norwegian study specialised on Swedish trucks operating in Norway, which allowed for large-scale access to data on, for instance, owner and vehicle type.

## Review of previous initiatives

A thorough review was carried out in order to find existing knowledge on road freight deregulation. The authors searched Google Scholar for “road freight deregulation”, “road cabotage”, etc. in order to gather information. As outlined in the introduction, a majority of the previous research has addressed the US trucking deregulation. Due to the limited number of available papers on the European freight deregulation, an ancestry approach was applied to the reference lists of the published papers found (e.g. Hilal, 2008, Kummer et al., 2014). Additional help was given by Philipp Rehbock, a University of St. Gallen MSc student who shared his thesis, “Economic and Ecological Impacts of the EU Cabotage Liberalization in Germany and Switzerland”, with the authors (Rehbock, 2014).

## Manual truck counting

### **Port of Gothenburg**

In December 2012 one of the authors and two student assistants manually counted truck and driver nationalities at the Port of Gothenburg. This port was selected because it is by far the largest one in Scandinavia. 30% of all international goods that Sweden trades pass the Port of Gothenburg.

The author and the assistants spent one week in the RoRo (roll on, roll off) port and one week in the container port. The nationalities of all trucks and their respective drivers that came to the ID checkpoint were counted. In total 2325 observations were made at the Port of Gothenburg.

### **E4 – Torsvik**

In the second data collection period with the Cabotagestudien app, Tommy Jonsson (Swedish Transport Workers Union, Division 20) and his colleagues counted all trucks passing road E4 outside Jönköping, Sweden. They systematically counted traffic (Swedish and international trucks) during a total of 24h and 30 minutes spread over three days (1, 3 and 10 November 2013) for a total of 1548 observations.

## Position reporting of foreign vehicles – Cabotagestudien app

Politicians, authorities and researchers all rely on Eurostat to retrieve statistics on road freight transportation. In the Eurostat data, some countries’ statistics are non-disclosed and some European countries lack routines for collecting haulage data (Eurostat, 2013). We have applied “empirical crowdsourcing”, that is, using volunteers to collect position data of foreign vehicles, in order to complement the Eurostat data with additional insights.

## Engaging volunteers in observation

Early studies on collecting GPS data have shown that, with technology, volunteers are typically positive to participating in research projects (Murakami and Wagner, 1999). In recently published research, Prockl and Sternberg (2015) showed the potential of involving drivers in research projects and the potential access to large datasets. Previous studies on truck drivers carrying out self-observation (Klaus et al., 2008) have shown that truck drivers are motivated to some extent to

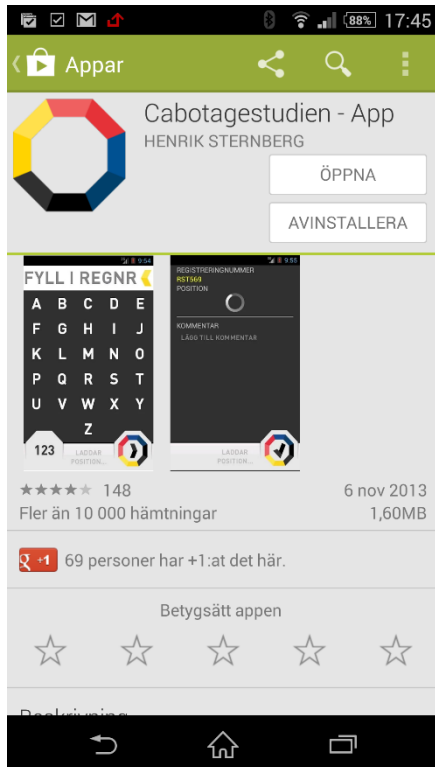


Figure 1: Screenshot from Google Play

considerable media attention, which further boosted the number of users. In addition to drivers acting out of fear of losing their jobs in the light of deregulation, we believe the visualisation component of the project played an important role. The users could continuously monitor the results of the project on the project homepage: <http://www.cabotagestudien.com/sv/rapporteringar/#/plates/>. Continuous news and updates were given on the Facebook pages (three Facebook pages, one for each language), monitored by mother tongue assistants. In addition, the *Lastbil magasin* (Danish trucking magazine) and *Trailer* (Swedish trucking magazine) offered free subscriptions as a prize to the most productive volunteers in the respective countries. In Norway, *Transport magasinet* was even more generous and rewarded the five most productive volunteers with a coffee machine. The most productive volunteer, “Krilleman\_1”, reported 6398 truck positions over the data collection period. The top list (<http://www.cabotagestudien.com/sv/topplista/>) was published in the app to give recognition to the top contributing volunteers.

## Ethics and privacy

The app contained warning texts, strongly advising against using it while driving. In the information material as well as continuously in social forums, volunteers were informed and reminded to respect the privacy of foreign drivers and individual companies. In a deregulated market, shippers' transport purchasing policies are governed by the strategy of the company. The Cabotagestudien team's advice to domestic drivers concerning job security and safety has always been to encourage informed consumption, that is, using their power as end consumers rather than stigmatising foreign truck drivers who in many cases already live under harsh social conditions.

participate in research programmes, in particular when given incentives. In addition to the potential for collecting large amounts of empirical data that might otherwise be hard to come by, early experiments on using smartphone apps with drivers by Sternberg (Prockl and Sternberg, 2015) indicated that some quality problems of the collected data needed to be taken into account.

Given this background, an initial version of the Cabotagestudien was carried out in Sweden in the spring of 2013. A simple app for Android and iOS was made freely available and promoted using social media. The user entered the licence plate number of the observed vehicle and submitted the position, using the phone's GPS coordinates. During the first round of the Cabotagestudien, the platform and quality assurance tools were continuously improved. There was great interest for the study in Denmark, and a large number of Danish volunteers used the Swedish app. Hence when the Scandinavian Cabotagestudien started, a critical mass of users was ready to use the Danish, Norwegian and Swedish versions of the app, the Facebook pages and the website.

Data were systematically collected in all of Scandinavia (and to some extent in Germany and Finland) from 8 October to 9 November 2013. The data collection method itself rendered

During the field trip (see Scandinavian field trip section) the Cabotagestudien team met with over 100 foreign drivers. The app's functionality was demonstrated to several groups of drivers and they were told how their privacy and the licence plates of their trucks were to remain confidential.

### **Error sources in the data collection**

Several sources of error needed to be taken into consideration. The following non-antagonistic errors were observed:

- Technical errors: These occur when, for example, the smartphone sends erroneous GPS coordinates (or no coordinates at all, making it look like an observation was made at 0°0 [outside the coast of Africa]).
- Double typing: Some double submissions were made. These were filtered out.
- Erroneous typing: This is an apparent weakness in the study, since there is no guarantee that the user has not entered the licence plate of a personal car, trailer or a fictive licence plate. A few users reported their errors. Since licence plates with only one observation are unlikely to have spent more than a maximum of one day in a Scandinavian country, they were not of interest for the purpose of the study anyway.

Some app users carried out impossible observations (e.g. a truck being at two different locations within an implausible time interval) or simply reported foreign trucks they had previously seen, in order to either criticise the app or to try to “over use” it to increase the presence of foreign vehicles in the statistics. Early on, the Cabotagestudien team decided not to carry out any real-time blocking of such antagonistic usage of the app, since that would potentially lead to a kind of “arms race” between the data verification functions and the antagonistic users. An example of this was that 4% of the Danish observations were discarded because of quality issues, as will be explained in the analysis section. The authors' perception is that the Danish debate is more heated, compared to the Swedish and Norwegian ones.

The final source of error, one that we have not been able to adjust for, is fake licence plates. Swedish observers (and the authors during their field trip) took several pictures of truck drivers trying to hide their licence plates, trucks driving without licence plates, etc., and sent them to the team (Sternberg et al., 2014a). No such pictures were taken or sent from Denmark (or Norway) during the time of the study (8 October to 9 November 2013).

### **Model and error sources in the analysis of movement patterns**

Transportation researchers around the world are currently experimenting with various types of smartphone-based approaches to data collection (Bohte and Maat, 2009). Collecting smartphone data for transportation research is novel, but is fast developing as an approach for amassing large datasets in a cost efficient manner. As with other probabilistic methods, the analysis of geographic movement patterns is by default very prone to errors (Bierlaire et al., 2013). The poor quality of GPS data collected from smartphones precludes the use of state-of-the-art map matching methods (ibid.), yet with complementary data on the actual characteristics of some trips, the quality of the analysis can be greatly increased (Du and Aultman-Hall, 2007, Bohte and Maat, 2009). Despite additional descriptions and templates for matching GPS data to trip purpose, trips with many stops still represent a great challenge to analyse (Du and Aultman-Hall, 2007). In practice this means that the greatest challenge is distribution traffic with frequent stops.

By cooperating with companies and with access to the results from random checks, we have been able to further develop and improve the analysis of movement patterns compared to the results presented in September 2003 (Sternberg 2013). It is extremely important here to emphasise that the analysis of movement patterns is based on the knowledge and information we have of how transports are carried out. The data we have shown only patterns – not the actual cargo, shipping documents, permits, etc. This means that illegal cabotage potentially can be identified, but it does not mean that illegal

cabotage *is* actually taking place. At the same time, police controls in Scandinavia have shown that illegal cabotage is a real problem. The updated analysis used the following logic:

### Step A: Processing of observation data

1. From the database we pulled licence plates with a minimum of 6 valid observations.
2. In the next step we processed observation data as if each observation were a stop point. We merged all observations made one after another within a 4km distance to be one single point (loading/unloading).
3. For each point we calculated the distance to the previous and the next point, and approximated the angle of a 'spike' formed by all 3 points (previous, current, next) connected by a path between them. This formed the basis for detecting changes in the movement direction of trucks.

### Step B: Processing trips

Next we detected trips. Each point was assigned an integer value, *is\_trippoint*, from range <0,3>. This value shows how likely it is that the truck was loaded or unloaded between the previous and the next point (to simplify things we assumed that the analysed point was the load/unload point [l/u-point]). The value assigned to the point was based on the distance from the previous point and the angle:

```
"filter_spike", {"spike": 150, "distance": 30, "is_trippoint": 1  
"filter_spike", {"spike": 120, "distance": 20, "is_trippoint": 2  
"filter_spike", {"spike": 90, "distance": 10, "is_trippoint": 3}
```

If the distance is greater than 30 km and the angle at the vertex is maximum 150°, then *is\_trippoint* = 1  
If the distance is greater than 20 km and the angle at the vertex is maximum 120°, then *is\_trippoint* = 2  
If the distance is greater than 10 km and the angle at the vertex is maximum 90°, then *is\_trippoint* = 3  
Defaults: only the points with *is\_trippoint* = 3 values were considered as possible l/u points; no more filters were applied.

### Step C: Finding loaded trips

We assumed that every truck that crossed the border was carrying a load (which previous studies typically show holds true, e.g. Wall,(2013). Thus, the first point after crossing the border each time was classified as the *unload point*. If no border run was observed, the first l/u-point was classified as the *unload point*.

After identifying initial loaded trips, we filled in the rest alternately (the next after loaded was empty, etc.). Detailed pattern data showed that foreign vehicles typically carried out full trailer haulage, with loading and unloading of full trailers, or that multiple unload points typically were in the vicinity of one another. The way the algorithm was designed, several stops in one region would not be counted as more than one loading or unloading point. If a given pattern after processing consisted of less than four transports, it was not classified.

### Step D: Recognising combined transportation (CT)

In Sweden many foreign trucks move within a radius of 150km from an intermodal hub, in accordance with the combined transport directive ([EC] 92/106/EEC). If some of these trucks manage to drive abroad (without being observed in that second country) and then come back and continue hauling within that range, this may also be systematic (but legal) cabotage ("big cabotage"). The third alternative is that the trucks are carrying out illegal cabotage, in other words, violating the cabotage regulation by carrying out more than three transports and staying longer than seven days ([EC] No 1072/2009). All three alternatives (*CT*, *legal cabotage*, *illegal cabotage*) are fully plausible. Danish validation data show that these types of transport often are systematic cabotage, but given the large differences in the operators present in Denmark, Norway and Sweden, we do not have enough validation data from Norway and Sweden to make an accurate estimation. Hence, we chose to design the algorithm so that it classified these transports as combined transportation.



Each trip was assigned the value *in\_day\_sequence* that tells the number of days the truck has been in the same country during the trip. If the *in\_day\_sequence*  $\geq 7$ , then the trip was considered a CT candidate. For every trip that satisfied this condition we checked:

If the length of the trip was  $\leq 150$  km, then it was classified as CT.

If the distance was  $> 150$  km but  $< 310$  km, then a set of parameters were checked. If it was plausible that the truck had been to an intermodal terminal (all larger RoRo ports and rail hubs) for trailer pick-up, then the transport was classified as CT.

Finally, a test showed that at least 98% of the trips for a truck that had been observed in more than one country were classified as CT, and that at least 92% of the trips for a truck that had been observed only in one country, were classified as CT.

### **Step E: Recognising cabotage**

For each trip a *grace\_time\_in\_country* value was calculated. This is similar to the *in\_day\_sequence* value, with the difference that *grace\_time\_in\_country* expresses the time spent in the same country with the assumption that if the truck could have left the country, it would have indeed done so (“virtual international transport”).

All loaded trips within a country that were not classified as CT, were marked as cabotage trips. Trips were counted and the 4<sup>th</sup> and following trips were classified as *illegal\_trip* if the truck did not leave the country. The same logic applied for time when we tested *in\_day\_sequence* and *grace\_time\_in\_country*. If both exceeded 7 days, the trip was classified as illegal cabotage.

## **Validation trucks**

Three out of twelve hauliers who were requested to share data with the Cabotagestudien agreed to do so. The data requested of companies were GPS logs (directly from the hauliers’ suppliers of onboard units delivered to Lund University) and, in some cases, copies of consignment notes. In return, the companies were offered anonymity and a potential certificate to show to customers that they were transparent and accepted external scrutiny. In total, we received complete data on 184 trucks, 41 of which were on the TOP 200 list of most observed trucks during the data collection period.

In addition to the above mentioned data collection, the researchers carried out a manual control of the 200 most observed trucks in Norway to investigate which Swedish hauliers were the most active in Norway. That part of the data collection is not included in this report, but can be found in Jensen et al. (2015).

We have not done any in-depth analysis on why some hauliers refrained from collaborating with the Cabotagestudien. From one haulier, we were given an oral “yes”, after one of the haulier’s customers asked for it, but despite frequent reminders, Lund University was not given access to data from that haulier. From two hauliers the authors received a “no”. One large international haulier offered to come visit and study their foreign drivers, but the haulier’s CEO stated that since they used the system *TomTom Work*, data were only saved for three months. The CEO also noted that he doubted it would be in the interest of their customer that the haulier should contribute to the Cabotagestudien. The second company declining participation stated lack of time. This was considered questionable since the haulier’s entire effort would involve one email to the system supplier, granting access to the data service of the system supplier (the haulier used the same system as Andreassons Åkeri AB, a haulier that displayed openness and a very collaborative attitude to Lund University).

## **Scandinavian field trip**

During the first period of data collection in the spring of 2013, the users sent in many reports about the international trucks regarding parking pitches, alarming social conditions, violations of Swedish laws with replaced, covered or no plates at all, and so on. We started in Sweden on 27 October 2013 and travelled the roads through Norway and Denmark, before ending up in Sweden on 3 November 2013.

The purpose of the trip was to gain a better view of the international freight market in Scandinavia and establish contacts with foreign drivers to validate the analysis.

The conditions of the drivers' facilities varied considerably. Most foreign drivers spend a majority of their time in Scandinavia relying on the shipping company's hygienic facilities that they can use when loading and/or unloading.

Polish drivers in general were very open and they seemed to have, in general, a positive attitude to their work and the salary they were paid. Typically they stayed out for 4-5 weeks followed by 2 weeks at home. Most Bulgarian drivers were very hesitant to speak to the authors. The ones who did stated that they stayed out for 3-4 months, followed by 2-4 weeks at home.



**Figure 2. Panorama picture of the Padborg toll station, 2 Nov. 2013.**

Through Facebook and Skype, we maintained contact with some of the drivers. We spent two days (a Friday and Saturday) in Padborg (Figure 2). At the toll station, the biggest challenge in driver conversations was the large number of intoxicated drivers.

Finally, one of the authors collected observational data without nationality bias in order to accumulate supporting material for the calculations.

## Interviews, workshop and expert contributions

Throughout the study period, the authors maintained discussions with several experts. The experts' comments were typically collected in a semi-structured way and are included in various parts of the reports produced.

Several volunteers and research assistants have worked with the Cabotagestudien. Some of them have been experienced experts (e.g. Martin Stjernström, former CEO of Nordana Transport) and Stela Petkovic (former freight forwarder in Bulgaria).

To collect structured qualitative data on the legal aspects of cabotage and combined transports, several experts were invited to a workshop in Helsingborg, 16 December 2013. The experts were lawyers and experts from trade organisations representing shippers, logistics service providers, road hauliers and transport worker unions. The participants from Denmark and Sweden were given the topics in advance and some were invited to give short presentations to stimulate discussions. The discussions were recorded and transcribed, but all participants were ensured anonymity. In addition, transcriptions were sent out to the participants to offer them an opportunity to revise any of their statements.

## Statistical analysis

Eurostat receives its data quarterly from the countries where the vehicles are registered. What data is collected and how is legally fixed for every EU member state by Council Regulation (EC) No 1172/98 of 25 May 1998 on statistical returns in respect to the carriage of goods by road. At the moment, the only statistical data available for European freight transportation is Eurostat. To enter correct transport volumes, empty loads, etc., is a challenge for many small and medium sized hauliers in Sweden. We can assume that the same challenge applies to the hauliers in the new member states that do not have the same tradition of collecting yearly statistics. Cabotage for several member states is marked as confidential, and combined transport is excluded from the statistics.

To exemplify future cabotage volumes in Sweden given the current state of the deregulation, we have used Eurostat data. In order to estimate cabotage in Denmark, we have added other data sources to the Eurostat data (see Appendix A).

# *Existing knowledge in the field*

This section offers a broad summary and discussion of the existing knowledge in the area of the report. Before presenting the existing research on transport regulation, a brief primer on various views on efficiency and logistics trade-offs is provided.

## Efficiency in transportation markets

The lack of a common definition of a system's efficiency, both in general and in specific scientific fields (Shaw, 2009), often makes it difficult to understand communication using the term *efficiency*. Generally efficiency relates to the input used in a process transforming it into output in order for the system's goal to be achieved.

When looking into transportation, considering *externalities* becomes very important. "Externalities are an economic concept that refers to activities of a group that have unintended consequences, positive or negative, on other groups and most importantly that those consequences, particularly if they are negative, are not assumed by those causing them. The impacts are therefore 'externalised'" (Rodrigue et al., 2013, p.260). The European Commission report, "Towards Fair and Efficient Pricing in Transport" (European Commission, 1995), is one example of many papers and investigations, all recommending transport policies that enable internalisation, such as "polluter pays" regulations and infrastructure charges (Hultkrantz et al., 1997). Road freight transportation in particular is associated with externalities, but in many transport setups, no other option is viable. Hence, the European Commission states in the "Roadmap to a Single European Transport Area – Towards competitive and resource efficient transport system" (2011): "In longer distances, options for road decarbonisation are more limited, and freight multimodality has to become economically attractive for shippers. Efficient co-modality is needed. The EU needs specially developed freight corridors optimised in terms of energy use and emissions, minimising environmental impacts, but also attractive for their reliability, limited congestion and low operating and administrative costs."

Before we start the walkthrough of existing knowledge relating to deregulation, we would like to outline how freight transport networks are planned. A central factor is *cost*. Freight transport demand is induced. This means that it is not a service consumed without a relation to geographic utility (Hesse and Rodrigue, 2004); the economic gain arises when the geographic utility is greater than the cost of the transport. As will be argued in the next section, deregulation strongly decreases cost. In the short-term that only means gains for the shipper through reduced transport costs, but in a longer perspective, transport costs are a major factor influencing decision making when locating factories, warehouses, distribution centres, etc. The network planning is always a trade-off between warehousing and transport costs. Decreasing transport costs mean that in the long-term it becomes more profitable to centralise warehouse structures, cut inventory and transport goods more frequently and over longer distances (Lumsden, 2006, Simchi-Levi et al., 2007). The incentives for advanced planning to increase the fill rate of heavy-goods vehicles decreases as freight rates decline. On the contrary, higher inventory costs enable higher fill rates and/or larger transport units. At the core of corporate economic models for network planning is a total cost minimisation under the given service levels.

## Motor Carrier Act of 1980

The Motor Carrier Regulatory Reform and Modernization Act (more commonly known as the Motor Carrier Act of 1980 [MCA]) is a United States federal law which deregulated the trucking industry. In short, before the deregulation of road haulage in the United States, each state regulated the traffic licences and hauliers were only allowed to traffic those distances they were licensed for. In addition, bureaus controlled price levels, for example, through checking if prices were, quote: "reasonable". Notably, the lessons from the Motor Carrier Act of 1980, seem to have been kept out of the discussion/debate on the European deregulation. One of the reasons for this could be that the previous US structure involved bureaus that controlled price levels.

The deregulation following the MCA resulted in several effects. First off, strong reductions of shipping costs, that have remained low after the initial adjustment to deregulation (Kling, 1990, Ying and Keeler, 1991). Service quality improved or remained constant – small communities experienced minor cost decreases, whereas dense areas faced major cost cuts. Several new firms entered the Full Truck Load (FTL) segment, whereas numerous firms in the Less than truckload (LTL) went bankrupt, without being replaced by other firms on the market, leading to fewer and larger firms (Kling, 1990).

The major technical efficiency gain was achieved by the dissolution of private fleets (operated by a shipper for the purpose of transporting that shipper's goods), which enabled hauliers to move goods from more shippers and more efficiently balance their assignments. Centralisation of transport planning is typically associated with higher fill rates (Crujssen et al., 2007, Crujssen et al., 2010).

A major effect of the US deregulation was that the transport geography changed. Trucking replaced rail as the main mode of transportation. In 1980, 70% of US freight expenditures were paid to road hauliers, compared to 87% in 2004, despite significant price reductions through the deregulation. As expected, an increased centralisation of warehouses took place.

Several researchers have addressed the effects on worker conditions when unionised carriers went out of business (Belzer, 2000). Driver salaries fell by 21% between 1973 and 1995, with deregulation accounting for roughly one third of the decrease and de-unionisation for another third (Belman and Monaco, 2001). Belzer (2000) outlines drivers such as the big losers of the deregulation in his book "Sweatshops on Wheels". According to Belzer (ibid.), truck drivers' real mileage wage rates declined by 44%. Researchers have proposed different effects on driving safety from the regulations (Corsi et al., 2012). We have found no significant evidence of an increase in accidents, but there are significant differences between the hauliers in terms of safety and accidents: unionised hauliers clearly have fewer accidents than non-unionised (Corsi et al., 2012). In the aftermath of the heated debate at the end of the 70s in the US, unions and trade organisations were wrong about service decline, but right about deteriorating drivers' conditions.

Given declining wages, drivers have been forced to extend their working hours and drive faster in order to compensate. Research in the US, shows that "laws designed to protect individual labour standards do not help either, as hours-of-service regulations conflict with underlying competitive forces and are very difficult to enforce, with half of all the over-the-road drivers exceeding legal limits (Belzer, 2000, p. 8)". "In the US, the US Congress just passed and the President will sign an 'omnibus' funding bill that funds most of the government for nine months (a major step forward for us) but at the cost of, among other things, a further extension of truck driver working hours back up to 84 per week, if they log their maximum legal amount and do not fail to log non-driving labour, which most of them do, extending their hours of work further" (Professor Belzer, personal communication, 15 December 2014).

In North America, the US, Canada and Mexico have signed the North America Free Trade Agreement (NAFTA) which facilitates cross-border movement of goods and services between the countries (NAFTA, 2014). The agreement has efficiently facilitated cross-border movement between Canada and the US, thanks to similar safety regulations (Webster, 2010). However, the border with Mexico has remained closed due to pressure from safety and labour organisations in the US. Consequently, a new accord was signed in 2011 opening up the US-Mexican border for Mexican trucks (Black, 2011), though with strict restrictions and control mechanisms:

*"Mexican trucks must comply with all Federal Motor Vehicle Safety Standards and have monitoring systems to track hours on the road, the Transportation Department said. Also, truck drivers must take drug tests that are analyzed in the U.S., hand over complete driving records and prove their English-language skills ... Mexican trucks will be allowed to carry loads to a U.S. destination and bring cargo back to Mexico. They won't be able to deliver goods between two U.S. cities. U.S. trucks will be allowed to circulate in Mexico under the same guidelines."*

In order to ensure that no domestic runs are carried out and to track compliance with US hours-of-service laws, the Mexican trucks are enforced to carry electronic recorders (Williamson, 2011).

Belzer states the following the US trucking deregulation: "...economic deregulation has had one effect its proponents never imagined: It has actually compelled the government to enact extensive and intrusive new regulations – social regulations – which create a complex new regulatory structure that places substantial burdens on trucking firms and enforcement agencies. Paradoxically, economic regulation led to increased social regulation, as policymakers sought to cope with negative externalities created by intense competition (Belzer, 2000, p. 17).

## Road freight deregulation in Europe since the 1990's

In the beginning of the 1990s, some of the first logistics researchers to address European deregulation were the Americans, Cooper et al. (1990), with a conceptual outline of "Europe 1992: Benefits and Challenges for International Transportation". Pfohl (1993) followed with a study on the logistics implications of the unified European market and found that the decreasing costs from low-level road hauliers would enable a centralisation of companies' manufacturing and distribution sites. From a German perspective, Pfohl also predicted that logistics managers would increasingly want to rely on outsourcing logistics and in particular outsourcing transport operations.

From other scientific fields, transport deregulation has gained significant interest from law and political sciences, studying how national authorities have met the deregulation (for example, Heritier, 1997). Several economic policy researchers have praised the deregulation. Boylaud and Nicoletti (2001, p.244) state: "The available empirical evidence suggests that liberalisation has promoted efficiency and consumer welfare in the countries that have implemented reforms". Lafontaine and Malaguzzi Valeri (2009) analysed data series of international transportation and cabotage. They found that the increase of tonne-kms was due to increased tonnes transported, not an increased transport length, implying positive trade effects. That fill rates have remained somewhat constant over time is supported by minor investigations. One such study is the longitudinal Swedish-Norwegian border fill rate study by Ramböll (Wall, 2013), that show a very low decrease in fill rate between 1989 and 2013 (measured 1989, 1994, 1999, 2004 and 2013).

Hilal (2008) investigated, from a sociological perspective, the worsening social conditions (also referred to as "social dumping") of European truck drivers. She explains how unscrupulous companies use legal vacuums occurring when deregulation is operational faster than national police forces can carry out inspections. According to Hilal, the intensified use of subcontracting leads to dodging of national tax laws and labour and welfare regulations, with worsens working conditions. In Sweden, this has also been investigated by Thörnquist (2013).



**Figure 3. “Dynamic people” to paraphrase former EC president Barroso. Bulgarian truck drivers trying to shelter from heavy rain (Photo sent to Cabotagestudien by Mario).**

The competitive international long-haul segment is characterised by low operating margins. Fuel prices do have an effect on competitiveness of international hauliers, as shown by the case of the UK (McKinnon, 2007). Kummer et al. (2014) carried out a longitudinal study in Austria, showing the dynamics of transport services and the ease of both flagging out and the extent of heavy goods vehicles (HGVs) being flagged out. They found that over a period of 10 years, 50% of the Austrian vehicles (belonging to haulier fleets, fleet defined as minimum 20 trucks) had been flagged out to East Europe. The price differences between a Western/Northern European (EU15) haulier and an Eastern European (from now on referred to as new member states) haulier is typically around 20-40%, depending on the type of haulage and countries compared (European Commission, 2013, Kummer et al., 2014). The cost difference is to a large extent an effect of lower wages, but also due to lower fixed costs, for example vehicle tax and inspection costs.

Changing the structure of transportation inevitably has large effects on the environment. Previous studies show both positive environmental impacts from cabotage (Visser and Francke, 2010) and negative ones (Ministerie van Infrastructuur en Milieu, 2013, Rehbock, 2014). All three studies were small-scale and conducted using different data and different calculation methods.

In 2012, national transport by domestic hauliers accounted for 67% and therefore was the most dominant type of transport, followed by international bilateral transport with 25% (Figure 4). Goods transported internationally by a third party (cross-trade) accounted for 7% while the remaining 1% was transported nationally by a foreign haulier (cabotage) (Eurostat, 2014).

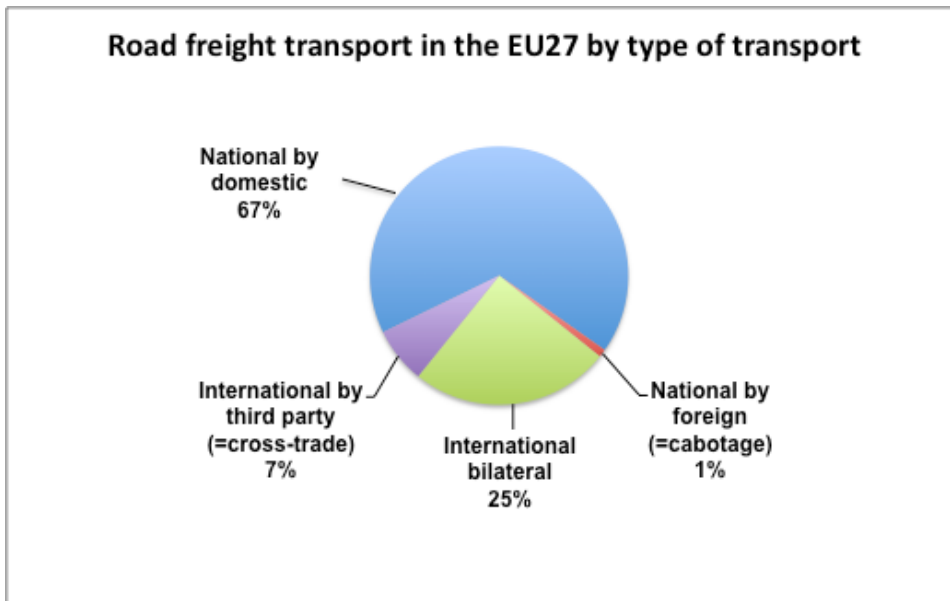


Figure 4: Road freight transport in the EU27 by type of transport (Source: Eurostat)

While national empty runs are slightly above average with 25%, empty runs of national road freight transport undertaken by a foreign haulier (= cabotage) are almost twice as much (about 50%). What might be reasons for these inefficiencies? One could argue that these empty runs exist because some transports are by definition only one-way like a milk truck or a waste collection truck.

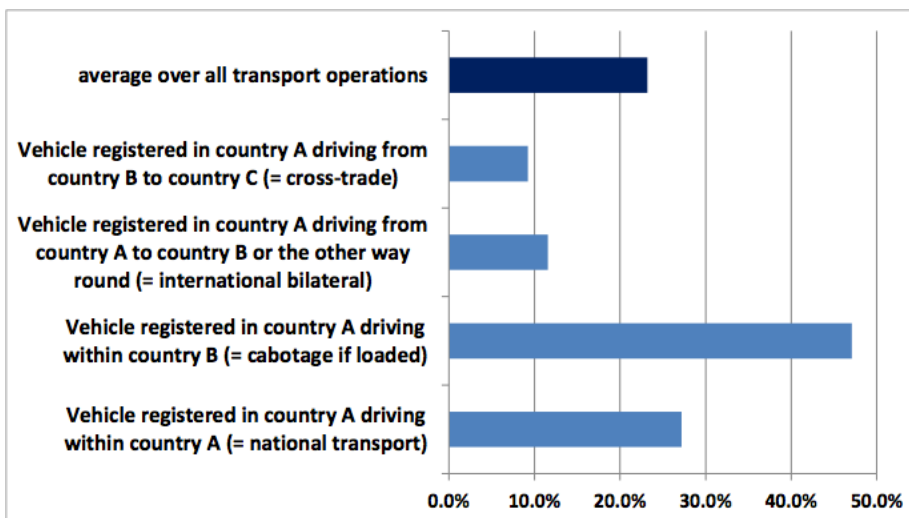


Figure 5. Share of empty vehicle-km in total vehicle-km by type of transport in 2012. Based on data from 21 of the 27 EU countries in 2012 (no data available from BE, IT, CY, MT, RO and UK) (European Commission, 2014, p. 8. Original source: Eurostat, DG MOVE).

At present, there is no direct link between cabotage empty runs and national empty runs, because cabotage only accounts for a small percentage (about 4%, but with large differences among the countries) of the entire market. Considering geographic imbalances and closed vehicles (e.g. the types of trucks used are specialized for one type of goods), we do not know if deregulation can actually increase fill rates (Sternberg, 2013).

Looking at the cost development, no large consolidation of the operating costs appears to be happening. If the price of oil continues to decline, an effect will be that the relative price difference between EU 15 and EU 12 will increase.



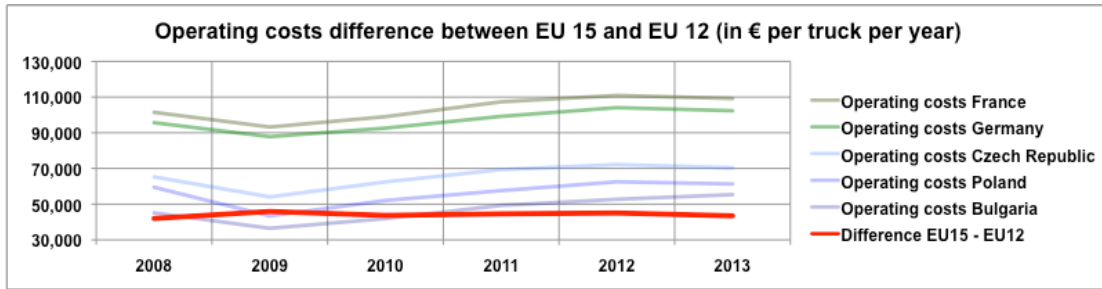


Figure 6. Operating costs difference between EU 15 and EU 13 in EUR per truck per year (Eurostat)

Total hourly labor costs (in €)	2008	2009	2010	2011	2012	2013
Germany	23,6	24,2	24,3	24,4	24,9	25,1
France	29,2	30,0	30,5	31,3	32,0	32,0
Bulgaria	3,2	3,3	3,5	3,8	3,8	3,9
CZ	9,3	8,9	9,2	9,5	9,8	9,9
Poland	7,8	6,6	7,2	7,2	7,3	7,5

Fuel price (in € per litre) incl. of duties and taxes	2008	2009	2010	2011	2012	2013
Germany	1,33	1,07	1,20	1,38	1,49	1,43
France	1,28	1,00	1,14	1,33	1,40	1,35
Bulgaria	1,09	0,84	0,98	1,17	1,27	1,33
CZ	1,29	0,99	1,21	1,39	1,45	1,39
Poland	1,23	0,84	1,05	1,22	1,35	1,31

Figure 7. Labour costs and fuel prices of EU 15 and EU 12 member states (Eurostat)

As will be discussed further on in this report, liberal immigration laws in the new member states, will continue to keep driver wages at a lower level.

Finally, we conclude this section by presenting an outline of truck standards on European roads. We lack this type of statistics for Scandinavia, but the German statistics provide an indication of the age of the vehicles belonging to the different nationalities. As can be drawn from the diagram (Figure 8), Romanian, Lithuanian and Bulgarian trucks are the oldest. In the German road pricing system, trucks with EURO3 or lower environment classification pay about 25% more tax per km, compared to EURO5 and higher environment classified trucks.

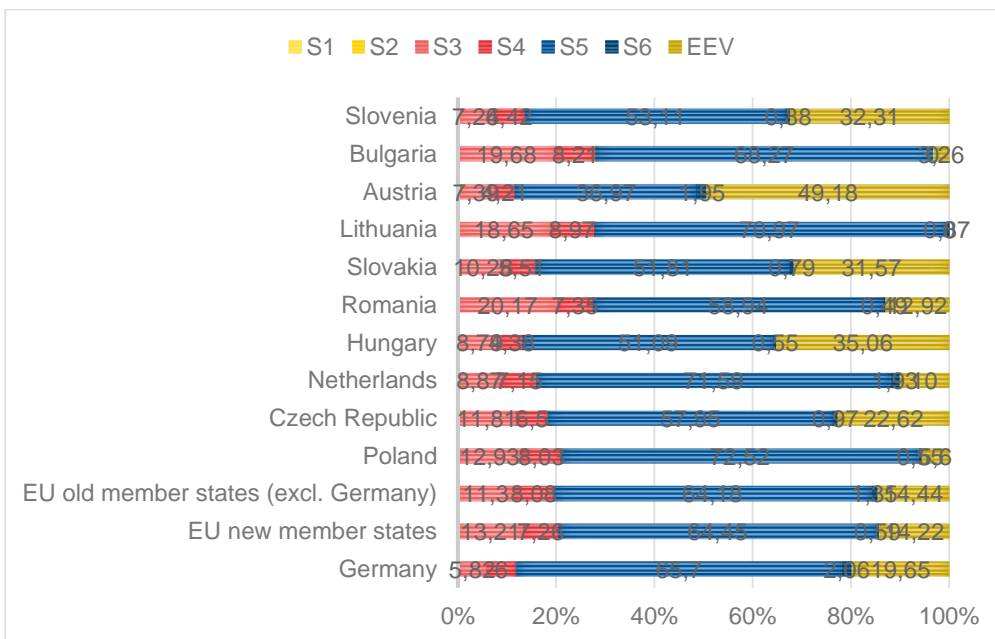


Figure 8. Share of toll journeys by emission class and origin of vehicle in 2013 (BAG Jahresbericht 2013, p. 20, own translation)

The differences in emissions between EURO3 and EURO5 can be viewed in Table 1.

**Table 1. EU emissions standards for heavy-duty diesel engines: steady-state testing**  
<http://www.dieselnet.com/standards/eu/hd.php>

Stage	Date	Test	CO g/kWh	HC	NOx	PM	PN 1/kWh	Smoke 1/m
Euro I	1992, ≤ 85 kW	ECE R-49	4.5	1.1	8.0	0.612		
	1992, > 85 kW		4.5	1.1	8.0	0.36		
Euro II	1996.10		4.0	1.1	7.0	0.25		
	1998.10		4.0	1.1	7.0	0.15		
Euro III	1999.10 <i>EEV only</i>	ESC & ELR	1.5	0.25	2.0	0.02		0.15
	2000.10		2.1	0.66	5.0	0.10a		0.8
Euro IV	2005.10		1.5	0.46	3.5	0.02		0.5
Euro V	2008.10		1.5	0.46	2.0	0.02		0.5
Euro VI	2013.01	WHSC	1.5	0.13	0.40	0.01	8.0×10 <sup>11</sup>	

a - PM = 0.13 g/kWh for engines < 0.75 dm<sup>3</sup> swept volume per cylinder and a rated power speed > 3000 min<sup>-1</sup>

# *Brief discussion of applicable rules*

This section is based on the results of the Cabotagestudien workshop held in Helsingborg 16 December 2013. It has been complemented by commission reports, newspaper articles, interviews and discussions with lawyers, police, trade organizations, etc. *The authors are not lawyers, which means that our perspective relies on the expert input retrieved during the process of this study. For detailed questions, please refer to the experts quoted.*

The international traffic between EU countries is completely deregulated, whereas the domestic freight transport markets are still regulated, currently through Regulation (EC) 1072/2009 (2009). The Regulation states:

*“Hauliers who are holders of Community licences provided for in this Regulation and hauliers authorised to operate certain categories of international haulage service should be permitted to carry out national transport services within a member state on a temporary basis in conformity with this Regulation, without having a registered office or other establishment therein”.*

The word *cabotage* originates from the sea domain and according to most dictionaries, applies to transport between two locations within a country, carried out by a foreign carrier. A foreign haulier carrying out national transports is generally referred to as cabotage. “Temporary” in the Regulation is defined as three cabotage transports in another country within 7 days, upon the completion of an international trip. Notably, the Regulation’s definition of temporary cabotage does not exclude systematic cabotage, which means that in practice a foreign haulier eventually could spend 365 days in another EU country, as long as the haulier ensures having an international trip every week. Schramm (2012) suggests the conceptual definition of “big cabotage”, meaning that large-scale international hauliers with a critical mass of international trips, can act as domestic hauliers and continually rotate their trucks between two countries with three domestic trips in one of or in each of the countries. We do not comment on whether big cabotage was intended by the cabotage regulation.

Combined transport is under certain conditions promoted within the European Union (EU) through the Combined Transport Directive (Council Directive 92/106/EEC, hereafter referred to as “the CT Directive”). The CT Directive seeks to promote combined transport operations through liberalisation of road cabotage, the elimination of authorisation procedures for combined transport operations, as well as financial support through fiscal incentives for certain combined transport operations. In order to be eligible for the provisions within the CT Directive, the movement of goods must meet a number of criteria, including:

1. Goods must be moved in a load unit which is more than 20’ (6m) long; and
2. Goods must be moved by rail or inland waterway or maritime transport, where this section exceeds 100 km as the crow flies; and
3. Goods must be moved by road transport on the initial and/or final leg of the journey either:
  - between the point where the goods are loaded and/or unloaded and the nearest suitable rail loading station; or
  - within a radius of 150 km as the crow flies, from the inland waterway port or seaport of loading or unloading.
4. Requirements on transport documents according to Council regulation No 11 of 27<sup>th</sup> June 1960.

The CT Directive is supported by other EU policies, such as the Weights and Dimensions Directive (Council Directive 96/53/EC) which currently provides for member states to permit movement of heavier intermodal load units by road when used in combined transport operations (European Union, 2014).

Eurostat only give data on cabotage traffic, but does not have any figures on combined transports. As of today, there is hardly anything written on the numbers of trucks regularly involved in CT. The

Danish experts in the workshop noted that trucking under the combined transport regulation is relatively rare in Denmark and none of the three validation fleets carried out any combined transports. Actually, none of the trucks on which the team retrieved detailed data (either by fleet data or by discussion with the drivers) had carried out combined transports.

## Illegal cabotage

The cabotage regulations are interpreted in different ways in the EU member states. In the Cabotagestudien workshop it was clear that the Danish representatives (unions, hauliers' and shippers' trade organizations) shared a view on how the police and the Danish court system interpret the cabotage directive, based on existing court decisions. According to the "Danish interpretation" of the directive, the vehicle (truck) licence plate is given access to carry out three cabotage transports within seven days (the same interpretation is made in several other EU countries, for example, Germany). Hence in Denmark, it is illegal cabotage if a foreign haulier on a daily basis (without leaving the country within the period of seven days and given it is not carrying out combined transportation) pulls trailers between two Danish cities (N.B. We have not observed any such movement patterns in Denmark).

In Sweden, the interpretation of when an international transport ends is being debated and a lack of cabotage court cases has created uncertainty as to where the border should be drawn between an international transport and a cabotage transport. The Swedish Transport Group, based on the interpretations made in the Winterkrantz court case (Pilarp, 2013, Transportindustriförbundet, 2014), argues that as long as the trailer is transporting goods from one EU Member State to another, it counts as an international transport. Lawyers for the Swedish haulier industry question this, and are arguing for the same interpretation as in Denmark and Germany {Swedish Association of Road Haulage Companies, 2015 #861}. Their interpretation means that an international transport, as far as permissions to operate the road transport is concerned, can not be performed if the truck tractor is not loading and unloading its cargo in different countries.

Both interpretations are according to Rune Noack, transport regulation expert at Danish Industry (representing the large Danish logistics and transport companies), legally plausible. The authors' assumption (based on our discussions with legal experts) is that eventually the "Danish interpretation" will be applied in Sweden. Hence the Danish interpretation is used as a baseline in our discussion.

## Permanent stays

Several Scandinavian hauliers have adopted the practice of self-employed Eastern European drivers. In the case of, for example, Danish haulier Kim Johansen, foreign drivers are used for international transportation in Danish trucks. A large number of Swedish hauliers are using self-employed drivers in Swedish trucks, for both international and domestic haulage. This practice (foreign self-employed drivers in domestic trucks carrying out domestic haulage) has been controversial, since firstly legal processes have indicated that several of the self-employed drivers might be false self-employment, as outlined by Thörnquist (2013). Secondly, the question of residency has proved to be a legal challenge, though this is seldom investigated.

If a foreign haulier wants to operate combined transports in Denmark, the drivers have to be reported to the so called "RUT-registret" for workers stationed in Denmark. In Sweden, similar rules apply and Swedish tax authority states:

*"Mot denna bakgrund finner skattemyndigheten att en vistelse i Sverige som pågår under sex månader eller mer, räknat från första till sista övernattningen, och som innefattar i genomsnitt minst tre övernattningar per vecka, dvs. 78 övernattningar per sexmånadersperiod, bör anses stadigvarande – om det inte i denna vistelse finns avbrott av betydande längd. Det är en nödvändig förutsättning att vistelsen här i landet pågår i minst ett halvt år (Skatteverket, 2005)."*

Translation by authors: Given this background, the [Swedish] tax authority has found that a stay in Sweden with a duration longer than six months or more, counted from first to last overnight stay, and that contains at least three overnight stays per week, that is to say 78 overnight stays per six month period, is to be considered permanent – if no breaks of notable length in the stay have been taken (Skatteverket, 2005).

# Results – Freight transportation in Scandinavia

This section elaborates on the results of Cabotagestudien. First we draw a general picture of the trucks driving on Scandinavian roads and compare these findings with Eurostat. The Scandinavian picture is complemented with summarized findings from the three case countries, Denmark, Norway and Sweden. For Denmark and Norway, the results have been refined from previous reports, whereas the Swedish results are the same as in the recently published report on Sweden (Sternberg et al., 2014a).

## Trucks on Scandinavian roads

If all trucks, regardless of observation frequency or time duration of their stay, the observation data gives the following split between the different truck nationalities. Polish trucks' share of the international vehicles are consistent over the different countries.

**Table 2. Nationalities of trucks in the Nordic countries**

DENMARK			SWEDEN			NORWAY		
Country	%	# trucks	Country	%	# trucks	Country	%	# trucks
PL	19%	744	PL	19%	2031	PL	18%	861
BG	18%	718	BG	12%	1287	LT	17%	824
LT	15%	601	EE	12%	1258	EE	13%	602
DE	12%	467	LT	12%	1257	DE	8%	368
RO	9%	362	DE	9%	904	LV	8%	357
EE	4%	165	LV	6%	662	SE	7%	355
LV	4%	156	DK	4%	397	DK	6%	263
SK	3%	125	RO	4%	379	BG	5%	241

Most of the trucks accounted for in # trucks have only been sighted 1-2 times, which means that they have most likely been carrying out an international transport.

Looking at the nationalities and frequency of observation, a similar image presents itself:

**Table 3. Number of sightings in the Nordic countries**

DENMARK			SWEDEN			NORWAY		
Country	%	# sights	Country	%	# sights	Country	%	# sights
PL	22%	4739	BG	21%	14575	LT	24%	4760
RO	20%	4204	PL	17%	11723	EE	14%	2868
BG	17%	3663	EE	14%	9326	PL	14%	2846
LT	12%	2554	LT	9%	5915	SE	10%	2074
DE	10%	2139	LV	8%	5174	LV	8%	1634
LV	3%	611	DE	7%	4989	DE	6%	1273
EE	2%	462	RO	4%	2837	DK	5%	972
SK	2%	432	NL	3%	2097	BG	3%	564

When a country has a significantly higher representation in the frequency of observation (lower tables), compared to the number of trucks observed (above tables), this indicates that these trucks spend longer time in the respective country. This holds in particular for one nationality in each of the Scandinavian countries:

- *Romanian trucks in Denmark*: Romanian trucks are frequently observed in Denmark. This is due to the systematic cabotage of some hauliers, using Romanian trucks based in Denmark. These trucks do 1 to 3 weekly trips, mainly to Germany.

- *Bulgarian trucks in Sweden*: Bulgarian trucks are common on parking lots in many areas of Sweden. The authors do have some questions regarding the type of traffic these trucks are carrying out, as a large number of them, according to our data, do not appear to leave the country.
- *Lithuanian trucks in Norway*: One large logistics service provider (LSP) is very active in Norway and this LSP is frequently subcontracting Lithuanian hauliers. Those trucks made up a major portion of the TOP25 most observed trucks in Norway. Our data show clearly that these trucks do weekly trips to Sweden.

It should be noted that we know from the Danish report (Sternberg et al., 2014b), that observers have a bias towards trucks from the new member states (i.e., report these trucks more than others), in particular Romanian and Bulgarian trucks, though we do not know the exact bias. Between 7 and 10% of the trucks were not assigned a nationality. These non-assigned trucks predominantly are Bulgarian, Polish, Romanian and German.

An older EURO1 truck (lowest environmental class), but yet fully operational for trailer hauling can be purchased for about 10 000€ on, for example, the Swedish second-hand sales site, [www.blocket.se](http://www.blocket.se). Comparing the age of the trucks from the German statistics, we see that Romanian, Bulgarian and Lithuanian trucks are the oldest on German roads. Lower truck purchasing costs mean the small hauliers have a low barrier of entry.

As trucks carrying out cabotage and combined transportation for obvious reasons will be observed far more than trucks carrying out international transportation, a comparison with Eurostat becomes interesting:

**Table 4. Comparison between Eurostat and Danish sightings**

<b>DENMARK</b>				
<b>Country</b>	<b>%</b>	<b>#sights</b>	<b>Eurostat ttkm</b>	<b>Eurostat %c</b>
PL	22%	4739	106314 ttkm	30%
RO	20%	4204	16060 ttkm	5%
BG	17%	3663	<i>Confidential</i>	?%
LT	12%	2554	6095 ttkm	2%
DE	10%	2139	169353 ttkm	48%
LV	3%	611	<i>Confidential</i>	?%
EE	2%	462	4632 ttkm	1%
SK	2%	432	<i>Confidential</i>	?%

In Denmark, both the Cabotagestudien observers and Eurostat stated that Polish vehicles should be the most frequently observed. Given that the trucks of new member states are more frequently observed than EU15 trucks, it is interesting that Polish trucks were observed by the Cabotagestudien observers relatively fewer times than they should have been according to the Eurostat share.

For Denmark, it is particularly notable that several of the most observed countries have confidential statistics.

**Table 5. Comparison between Eurostat and Swedish sightings**

<b>SWEDEN</b>				
<b>Country</b>	<b>%</b>	<b>#sights</b>	<b>Eurostat ttkm</b>	<b>Eurostat %cabotage</b>
BG	21%	14575	132021 ttkm	11%
PL	17%	11723	407003 ttkm	34%
EE	14%	9326	71732 ttkm	6%
LT	9%	5915	<i>Confidential</i>	?%
LV	8%	5174	74030 ttkm	6%
DE	7%	4989	242045 ttkm	20%
RO	4%	2837	4443 ttkm	0%
NL	3%	2097	91846 ttkm	8%

**Table 6. Comparison between Eurostat and Norwegian sightings**

<b>NORWAY</b>				
<b>Country</b>	<b>%</b>	<b>#sights</b>	<b>Eurostat ttkm</b>	<b>Eurostat %c</b>
LT	24%	4760	<i>Confidential</i>	?%
EE	14%	2868	38639 ttkm	7%
PL	14%	2846	165923 ttkm	30%
SE	10%	2074	19531 ttkm	4%
LV	8%	1634	13907 ttkm	3%
DE	6%	1273	30802 ttkm	6%
DK	5%	972	73082 ttkm	13%
BG	3%	564	0 ttkm	0%

Looking at the type of movements carried out, there are large differences between the countries, as will be discussed in each country's subsection. But first a note on available statistics.

## Notes on statistics and cabotage

A large share of domestic freight transports carried out in Scandinavia do not have access to international vehicles, but instead have specific vehicle combinations that do not render themselves useful for the international transport of goods. This means in practice that they cannot be granted the right to carry out cabotage within the framework of the current regulations (e.g., forest products, agriculture bulk transports, etc.).

The sample of Denmark illustrates this. In Table 7 the national transports in 2012 are displayed by product category and are marked with a "Yes" in the column "Cabotage Feasible" if it was feasible for the category to be handled out by international drivers within the current regulations. The total national market that is exposed to international drivers is thus only 6 737.7<sup>1</sup> mtkm. When comparing the cabotage with the exposed national freight market the share is instead *estimated* to a minimum of 5.1% based on current statistics.

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<sup>1</sup> 6 394.7 + 343 = 6 737.7



**Table 7. National freight market in Denmark divided into product category and if the category can be transported by cabotage transports.<sup>2</sup>**

<b>Product Category</b>	<b>Amount mtkm</b>	<b>Cabotage Feasible</b>
Food, feed, beverages, tobacco	2 656.7	Yes
General cargo, mixed goods	1 963.0	Yes
Agriculture, forestry and fishery products	1 868.2	No
Gravel, stone, sand, clay, salt, asphalt	1 444.6	No
Building materials, minerals	1 017.0	No
Gasoline and other petroleum products	520.6	No
Soil and waste	472.1	No
Metal products	390.7	Yes
Processed wood, paper, and paper products	386.9	Yes
Unknown type of goods (e.g. in containers)	371.2	Yes
Chemical products, fertilizers, plastics, rubber	254.4	No
Machinery, appliances, electrical appliances, etc.	179.3	Yes
Vehicles and associated parts	161.6	Yes
Ores, iron, and other metal	152.4	No
Letters and parcels	142.0	No
Furniture and other manufactured goods	102.4	Yes
Empty containers and swap bodies	89.0	Yes
Textiles and clothing	53.6	Yes
Moving goods	40.4	Yes
Charcoal	25.9	No
<b>Total</b>	<b>12 291.9</b>	<b>6 394.7</b>

Regarding cabotage in Germany, we can carefully conclude that no one knows the real (exact) cabotage penetration rate. We estimate a cabotage rate in Germany significantly higher (above 5.5%) than officially reported (3.8%). Rehbock (2014) interviewed Osama Romhi (Vice President of Management International Overland) at Kühne Nagel. According to their company internal estimations of the German market, cabotage in Germany should be around 12.5%.

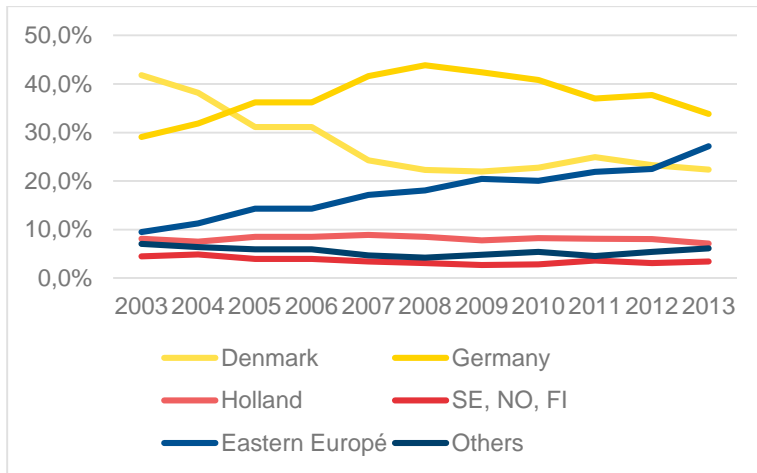
## Denmark

Several of the world's largest and most famous transport companies are Danish and Denmark has a long tradition of international freight transportation. According to Eurostat (2014b), the Danish domestic freight market was 12 292 million tonne-kilometres (mtkm) in 2012. The same year the total amount of cabotage transports was 343 mtkm (Eurostat, 2014a). The total market national market was 12 635<sup>3</sup> mtkm and the share of cabotage transports was 2.7%.

Every year the ITD (Danish road transport trade organisation) counts vehicles passing the main Danish border crossings (Figure 9). The counting is carried out using hired assistants and done in a systematic manner. Padborg dominates as the road freight centre of Denmark.

<sup>2</sup> The "Cabotage Feasibility" has been assessed by trade organization experts. In the assessment, we decided to include rather than exclude, so the actual figure of the "cabotage feasible" market is likely to be considerably lower.

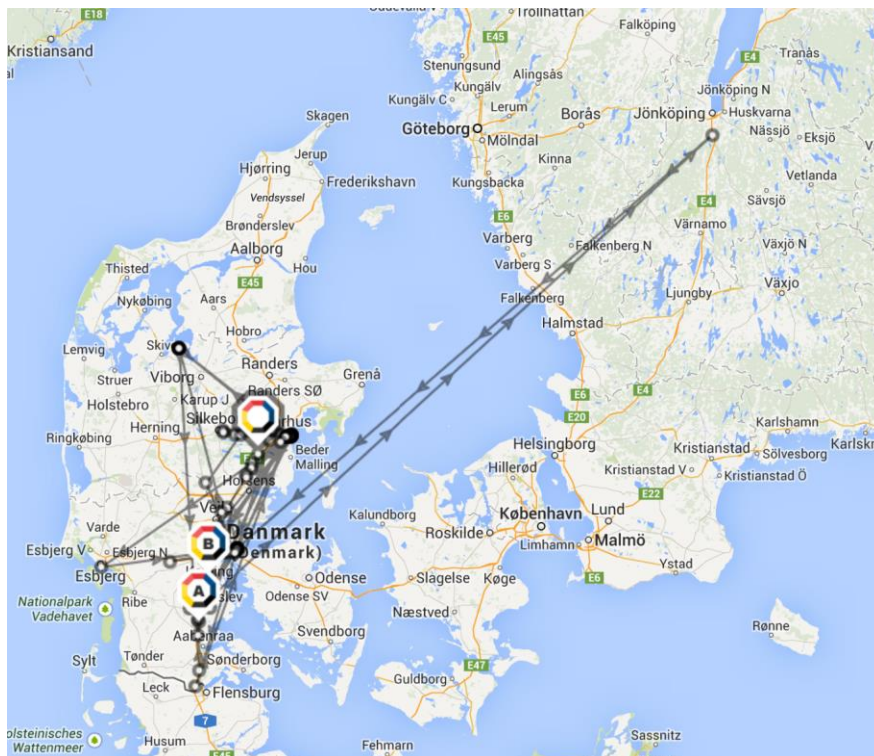
<sup>3</sup> This figure includes domestic national transports carried out by Danish registered vehicles (12 292 mtkm) and by international vehicles – cabotage (343 mtkm). As we have seen from several other figures (e.g. 2.6%: <http://itd.dk/en/InternationalItem.aspx?NewsID=3669>), there seems to be a lack of consensus on the figures.



**Figure 9. Market share in Denmark by country of registered vehicles going in to Denmark (source: <http://itd.dk/Default.aspx?ID=593>).**

Given the importance of the Danish transport industry for the national economy, cabotage transportation in Denmark sparked political debate resulting in action. The Danish police have received considerable resources for controlling heavy goods vehicles, making Denmark well-known for extensive controls. The latest statistics from the Danish police indicate illegal cabotage at 0.5% (Br ndum, 2014).

38 0861 observations were made by volunteers in Denmark. Based on this, individual truck moving patterns could be established, see Figure 10 for a sample:



**Figure 10. A sample moving pattern ([http://www.cabotagestudien.com/sv/rapporteringar/#!/plates/2031/I\\_H/](http://www.cabotagestudien.com/sv/rapporteringar/#!/plates/2031/I_H/)), based on 103 observations.**

As outlined in the methodology section, the trip analysis is based on assumptions that even though they hold true for a major part of the dataset, are not valid for each trip. While still more validation data are necessary to ensure stronger validity, the preliminary findings are likely to apply.

2652 verified trucks were observed at least one time in Denmark. A majority of these were carrying out an international transport to/from or through Denmark. According to our analysis, 422 trucks were observed carrying out cabotage<sup>4</sup>. According to our model, the cabotage trips per truck doing cabotage is at the very lowest, 1.23 per international transport to Denmark. It should be noted that cabotage transports for back-haul are not captured by the model (i.e. several trucks doing one cabotage transport are not included in the model). If we limit the set to 227 of the trucks operating cabotage, the average number of cabotage trips becomes 2.62 per international transport.

The trips generated from our data show no indications of violations of the cabotage rules (i.e. no instance of a fourth domestic trip after an initial international trip), nor did the trips analysed from the validation sets<sup>5</sup>. The authors had access to complete legal documentation of one of the hauliers in the dataset. The haulier had received several fines for cabotage violations, all of them being due to documentation errors (e.g. the driver picked up the wrong consignments, failed to get a signature on a consignment note, etc.). This does not mean there is no illegal cabotage in Denmark, it only means our data does not support the existence of anything but administrative infringements. We have requested access to further copies of court documentation from three more international hauliers operating in Denmark, but have not received it so far.

Figure 11 illustrates the basics of the model used to analyse the number of tours carried out domestically.

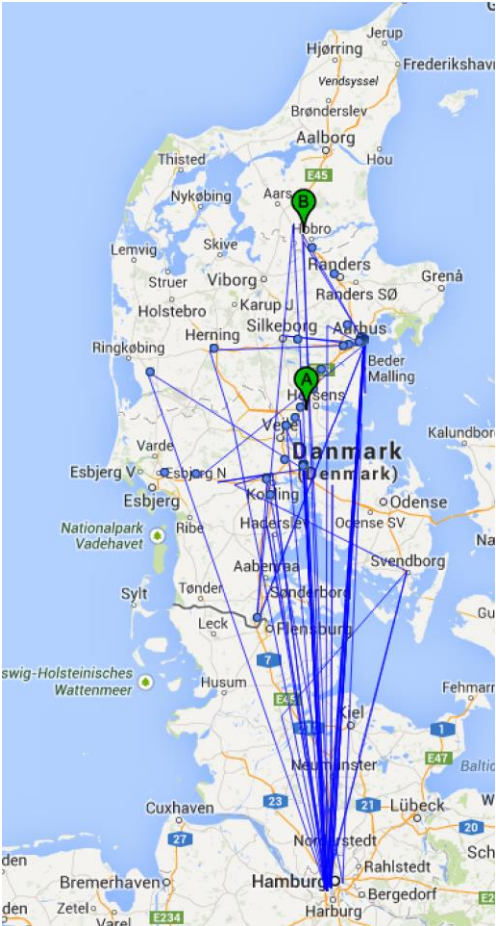


Figure 11. A Romanian truck in Denmark and Germany, graphically illustrating the route analysis model.

<sup>4</sup> In our dialogue with trade organizations, one representative claimed it is possible that an international transport is routed around in Denmark (following a pattern of “negative” route optimization). It is highly unlikely that even one truck operates according to such a pattern, as our validation data and years of research on haulier operations show that the hauliers are trying to earn money.

<sup>5</sup> Our initial assumption that a haulier following the rules will have no issues sharing their data proved to be true.

## Sweden

2652 verified trucks were observed at least one time in Denmark. A majority of these were carrying out an international transport to/from or through Denmark. According to our analysis, 227 trucks were observed carrying out cabotage and 195 trucks combined transport. As has been discussed before, several trucks classified as combined transport according to the classification algorithm, are actually cabotage transports.

During the autumn 2013 data collection, 7641 license plates were observed in Sweden. According to the classification algorithm, the following results were obtained:

- International transport: 2181
- Unclassified (very likely international transportation): 3484
- Combined transport: 386
- Trucks operating cabotage: 1590
  - Legal 1211
  - Potential illegal cabotage: 379

Again, we would like to remind the reader about the meaning of “potential illegal cabotage”. It denotes trucks observed for a longer time period than 7 days (not observed to leave the country) or moving in a pattern indicating that a 4<sup>th</sup> cabotage transport was loaded. It also assumes that an international transport ends when the hauling vehicle stated in the CMR documentation unloads either the goods or the trailer.

According to our model, the cabotage trips per truck doing cabotage is 1.20 per international transport to Sweden, but this number is not validated. Validation data in Sweden are limited to a handful of international transports and illegal cabotage transports, but the Swedish part of the dataset is by far the one with the highest observation density, due to the study’s strong support by the transport union, magazines, the national haulage association and various trucker forums. Our data indicates that a majority of trucks doing cabotage in Sweden, only make 1 cabotage trip per visit to Sweden – on the other hand, a significant number of trucks do not, according to the data we have available, leave the country.

According to an unconfirmed information, in the latest large scale control of trucks on Swedish roads, only five cabotage transports were controlled. Three out of those were fined for illegal cabotage. An interviewed police officer specialized on control of truck transportation states: “In 1985 Sweden had 1600 policemen in the heavy units in Sweden. Today we are 450, with only 160 having specialist competence”. Starting 1 January 2015, new higher fines for illegal cabotage apply in Sweden. As Sweden does not have any automated control system (e.g. such as the German Maut system) for licence plates and with a relatively sparse number of police controls, it remains to be seen if the new policy will have the same effect as in Denmark. The legal vacuum based on the different interpretations need to be resolved first.

In Sweden, data has been collected over two periods. Over these periods, frequent manipulation of licence plates were photo-documented. During the data collection periods, trucks from the new member states tended to leave their regular places for overnight and weekend rests. The authors frequently found trucks “hiding” in the forest, to later return after the data collection finished. Overall, these observations strengthen an image of a Swedish market hosting unfair competition.

## Norway

In Norway, 28 984 observations were made by a total of 1213 volunteers. Every day, approximately 2400 trucks pass the border between Norway and Sweden (Wall, 2013). As illustrated by Figure 12 below, the regions of southern Norway and Oslo are the ones receiving 72% of the imported goods. As given by Wall (2013), a majority of the trucks in Norway are not driving further than southern Norway.

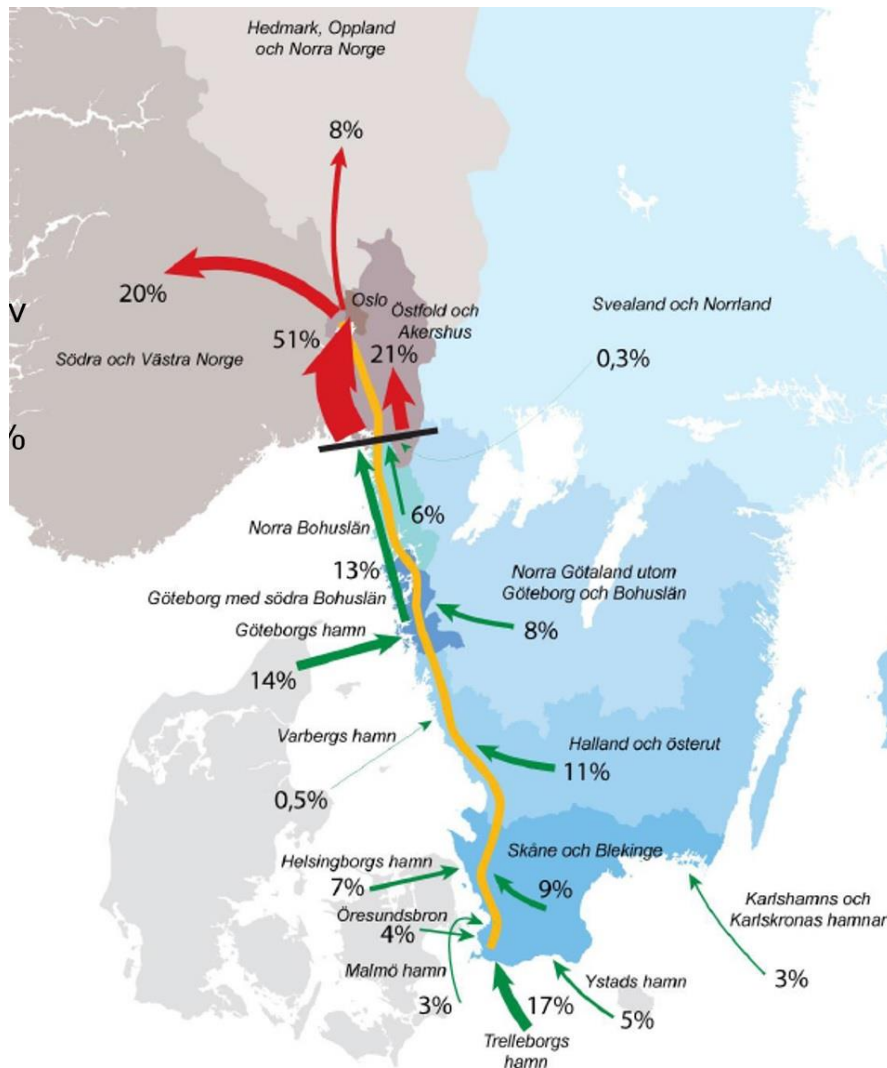


Figure 12, Freight flows to Norway (Wall, 2013)

All the frequently observed international trucks (except the ones with Swedish licence plates) in Norway, were also observed in Sweden. Frequent controls (e.g. NLF, 2013) and often harsh weather conditions make the Norwegian market harder to access for foreign operators.

Compared to Denmark and in particular Sweden, the Norwegian data have a much lower density of observations, which means that it is very difficult to draw any conclusions. The observations by Norwegian volunteers indicates that 842 trucks were observed outside southern Norway. Out of these, 346 were classified as doing both international transportation and cabotage transport. Only 17 trucks were classified as carrying out combined transport. We have contacted several hauliers operating in Norway and we were unable of finding any operator who was carrying out combined transportation in Norway. Since the number of observations was rather low, it is difficult to discern if this number corresponds to reality. Again, considering the limitations of the Norwegian dataset, the limited data we have, indicate that international trucks in Norway do carry out 0.62 cabotage trips per truck operating cabotage. A few Lithuanian trucks seem to be engaged in systematic cabotage between southern and western Norway.

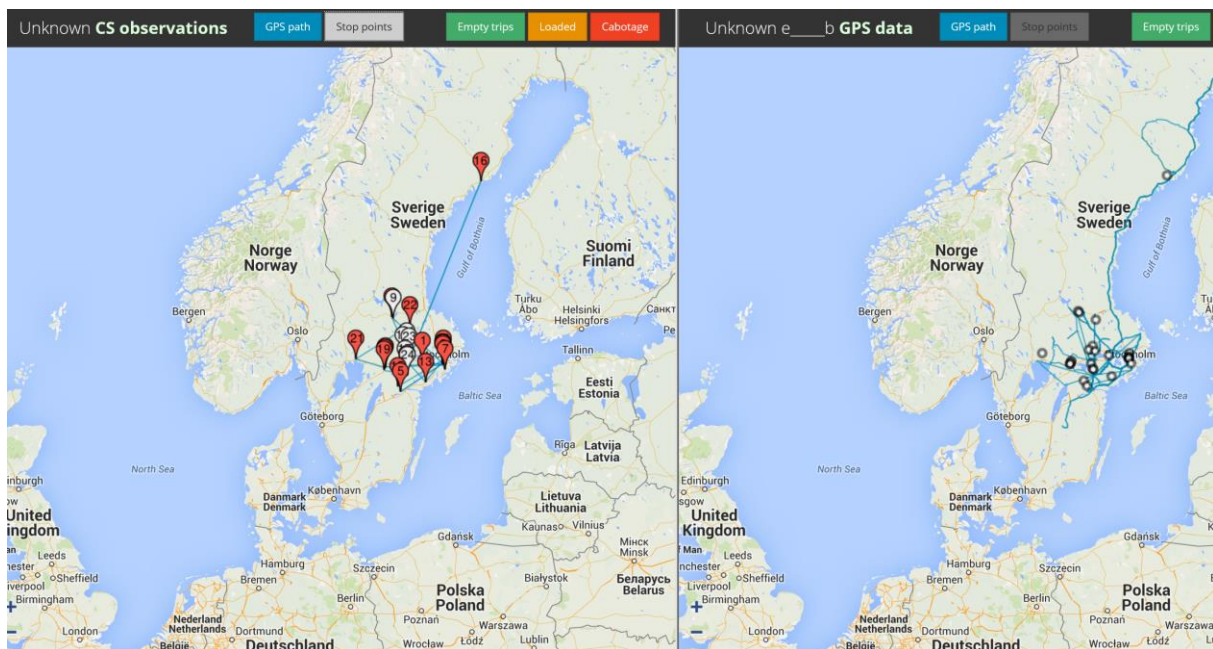
### Validation sample – Bulgarian “Haulier X”

*Note: This case was added late in the writing process. Hence it is not fully integrated in the analysis, yet we deemed it to be of crucial importance, since it allowed previously undocumented access to explore illegal transport operations.*

Given the amount of illegal cabotage identified in Sweden, what is the nature of such operations? We illustrate this with the example of the Bulgarian “Haulier X”. We were given the GPS log records of Haulier X’s fleet; we checked customers, registrations in Bulgaria, checked for registered workers in Sweden ([http://www.av.se/teman/utstationering/Annal\\_utstationering/sok/](http://www.av.se/teman/utstationering/Annal_utstationering/sok/)) and asked key informants about the operations of the haulier. We examined the data of Haulier X for three periods:

- Cabotagestudien data collection period 1: 15 April 2013 to the 31 May 2013
- Cabotagestudien data collection period 2: 6 Oct. 2013 to the 5 Nov. 2013
- December 2014 (to determine if similar activities were still being carried out)

Haulier X had six trucks.



**Figure 13. Cabotagestudien observations – in this case the observations revealed a 100% match with the GPS data.**

Five trucks were observed in Cabotagestudien data collection period 1. Based both on our analysis model and on the GPS data, the movement pattern was classified as illegal cabotage for three of the trucks, as combined transport for one, and as legal cabotage for the other. Two of the trucks drove occasionally to Norway during period 1.

All six trucks were observed in Cabotagestudien data collection period 2. Based on the actual (GPS) movements, five of the six were classified as illegal cabotage and one as combined transportation. The analysis of the corresponding Cabotagestudien observations indicated one illegal cabotage, four legal cabotage and one combined transportation.

For some reason the hauliers’ trucks managed to avoid frequent observation in the second period. This is consistent in our observations during the autumn of 2013 – if foreign hauliers are aware of the data collection, they avoid their usual resting places. As previously explained, whenever the analysis model detects gaps in the time between observations, it automatically assumes that the truck has been out of the country (even though our validation data show that for Sweden this often is not the case).

What if these transports could be classified as combined transportation, despite the distances, instead of (allegedly illegal) cabotage? If that were the case, the haulier would then be obligated to report stationed workers (workers that are stationed more than 6 months in Sweden must be reported) and a domestic business premise (Pia Bergman, personal communication 28 Jan. 2015). We deemed the likelihood of the haulier having access to a huge pool of drivers continuously being rotated.

The owner of this Bulgarian haulage company lives in Sweden. The company – registered in Blagoevgrad, Bulgaria – has no workers stationed in Sweden, no business premise there and an equity of 2500€. The owner is currently being investigated by the Swedish tax authority.

We will continue the discourse of Bulgarian hauliers in the next section.

# Discussion and reflections

In a scientific report, the discussion chapter is the section where the authors are more freely able to interpret the data and discuss the indications of the study.

## The illustrative case of Bulgaria

According to a recent Bulgarian survey, it is estimated that 158 000 bribes are paid out each month in Bulgaria (Day, 2014), with a trend of increasing. The European Commission has several times urged Bulgaria to increase anti-corruption efforts, because it is currently perceived as being the most corrupt country in the European Union (European Commission, 2014a). This represents a challenge for the European Union, where the member countries are obliged to recognize one another by means of certification, for example. Fake licenses are increasingly being reported by the Scandinavian media (e.g. Radio Sweden, 2014). Bulgarian trucks are openly sold on Swedish websites, see Figure 14.

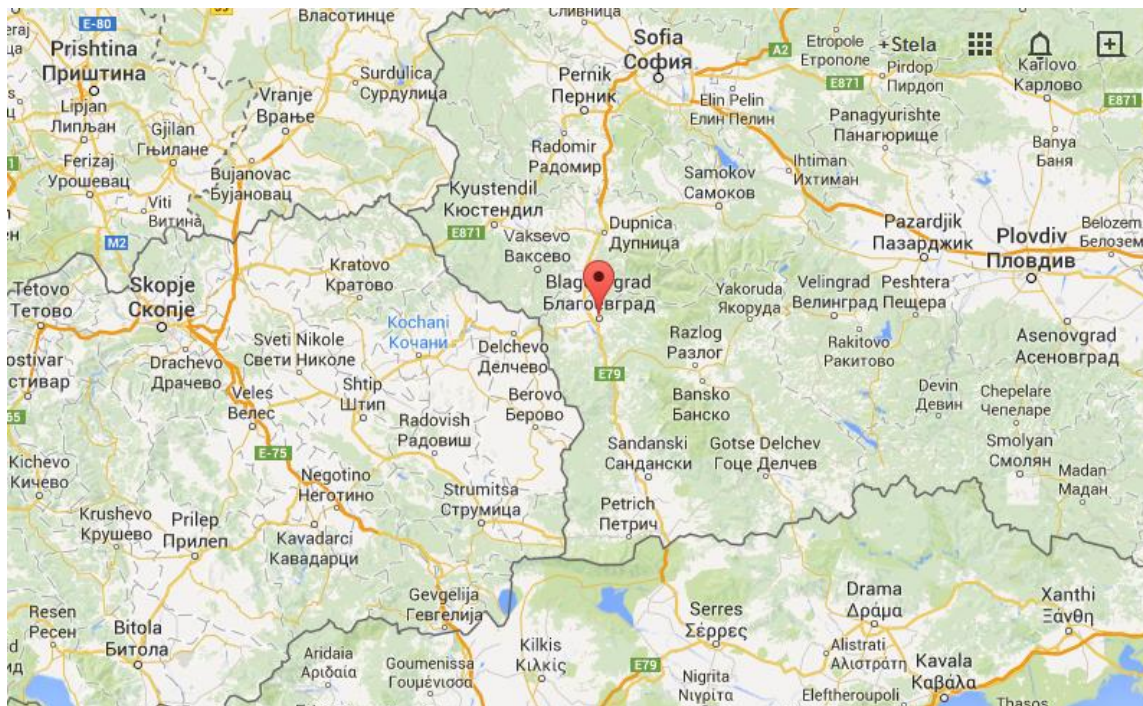


Figure 14. Sale of a Bulgarian truck on [www.blocket.se](http://www.blocket.se), with an offer for assistance in registering a Bulgarian company.

## Macedonian hauliers and drivers in the European Union

According to Bulgarian legislation, if a foreigner is an associate in a company he/she has the right to have a permanent residence in that country (The Law for Foreigners in the Republic of Bulgaria, valid from 5 Aug. 1999). There are Macedonian companies that usually have strong relations with Bulgarian ones (mostly in the Blagoevgrad area, near the Bulgarian-Macedonian border, see Figure 15).





**Figure 15. Blagoevgrad area – near the Bulgarian-Macedonian border, home of the Bulgarian trucks with the initial letter “E” in their license plates. Google maps.**

The Bulgarian company manager/founder/owner usually is a Macedonian who has dual citizenship. The two companies are strongly connected. The first one moves a small number of trucks between Macedonia and Bulgaria with the aim to “deliver” Macedonian drivers to the Bulgarian partner who then uses them to drive trucks with Bulgarian registration within EU borders. Bulgarian drivers are paid per kilometer. So, because the driver as a Macedonia citizen is limited in the amount of kilometers he or she can drive during a specific period of time, the drivers prefer to work for Bulgarian companies at a lower price per kilometer. This is then compensated by a larger amount of kilometers driven.

The “imported” Macedonian drivers have Bulgarian driving licenses. They use them when they are asked for documents in the EU. In the most common scenario, the drivers are associates in the Bulgarian company, which is in partnership with the Macedonian company. According to Bulgarian legislation (Law of Trade Register of Republic of Bulgaria, 1 Jan. 2008), the payment of 1 BGN (0.5 EUR) is enough to be a partner. The additional requirement that every new partner should hire 10 new workers for at least one year is covered as well.

The unemployment level in Blagoevgrad municipality is high. Thus, it is easy for the main manager to hire 10 low-educated workers from the Labor Exchange for each new associate as a way to comply with the law. He pays them the minimum salary required by Bulgarian law and in that way avoids all additional state taxes for the employees.

Once registered as a partner in a Bulgarian company, the Macedonian citizen has the legal right to apply for a type D visa that allows him/her a permanent residence in Bulgaria. The visa is issued for a 35 working day period. As long as the Macedonian citizen is in possession of that visa, he can apply for 15 days and be eligible for permanent residency in Bulgaria (The Law of Bulgarian Citizenship, valid from 1 April 1999). When the application is approved, the Macedonian can receive an ID card for 8 hours using the express service (Law for Bulgarian Personal Documents, valid from 1 April 1999).

The last step is the driving license. Every owner of such ID is legally eligible to apply for a Bulgarian driving license as well. By using the express service he/she can get it in *8 hours*. In total, it takes each Macedonian *2 months* to receive a Bulgarian driving license and ID card.

## General reasoning to predict future cabotage

We see at least four major factors – namely, regulation, costs, drivers and location – that influence future activity of East European cabotage operators and hence the penetration rates, not only in Scandinavia but also in central Europe like Germany.

### **Regulation as a future reasoning for cabotage**

The European Commission formulated two separate regulations on how to liberalize the market (“linked” and “non-linked”) and plans to implement those as soon as possible; however, not before the socio-economic consequences have been evaluated (Bayliss, 2012; European Parliament, 1996).

The single goal of the “linked cabotage” regulation is to reduce empty runs. Therefore, the “3 in 7” rule will be replaced by a “4 day flat rate”. As a result, cabotage is limited to four 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 this time. Additionally, the prerequisite to fully unload the truck prior to cabotage ceases to apply. Compared to the current rule (only three cabotage trips in seven days), the “4 day flat rate” rule grants the hauliers full flexibility to reduce their empty runs.

The “non-linked cabotage” regulation equals a total liberalization of the cabotage market and only limits the allowed cabotage days per year, i.e. any haulier can be active in a foreign domestic market for 50 days per driver per year. Therefore, no preceding international travel is required (as opposed to current law). However, there are two obstacles. First, the core conditions of the Posted Workers' Directive (Directive 96/71/EC of the European Parliament and of the Council of 16 December 1996 concerning the posting of workers in the framework of the provision of services) apply, i.e. strict insurance and social requirements need to be fulfilled by all cabotage operators. Second, the driver has to complete a registration in a web-based database and fill in an online schedule prior to any cabotage operation. Setting up this EU wide registration tool might take some time and delay the market opening. Nevertheless, the beauty of this regulation is that the restriction of 50 days per year can be adjusted to the quality standard of the vehicle (e.g. vehicles less than Euro V are only allowed 30 days) and to the optimal pace of market opening.

According to Hendrickx (2013) the new regulations can have a major impact on the penetration rate and enable cabotage shares of up to 25% to 30%. We think that these figures might be much higher in some specific transport market sectors (like international full-truck loads).

### **Operating cost differences as a future reasoning for cabotage**

According to Kummer et al. (2014, p. 145), operating costs and especially labor costs and motor vehicle taxes are the prime reasons for perceiving 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. Likewise, Hendrickx (2013, p. 5) affirms that lower operating costs in East Europe are the number one reason for increasing cabotage in EU 15 member states.

The opinions about future cost developments are split. On the one hand, the European Commission (2014, p. 26) postulates that the cost difference has been constantly decreasing and will most likely also do so in the future. Whereas on the other hand, others like Sternberg et al. (2014) or Sitran and Pastori (2013) suggest that the gap will only slowly narrow due to liberal labor immigration rules and a large number of non-EU citizens willing to work for low wages. By no meaning – as happened in some countries – an introduction of statutory minimum wages in the EU 12 member states could accelerate the adjustment of wages, if such wages are enforced and not circumvented by innovative self-employment schemes (Thörnquist, 2013). Nevertheless, concerning the trend of the overall prices

in the road haulage market there is common agreement that the transport prices will decline in the next couple of years. As the differences of operating costs between Eastern and “old” EU 15 states still remain, the pressure on the cabotage rate will hold on or will even increase.

**Availability of drivers as a future reasoning for cabotage**

The number of available drivers is a key influence factor, since a lack of Scandinavian drivers would force domestic hauliers to downsize their fleets, with forwarders increasingly hiring foreign hauliers and hence increase the cabotage penetration rate.

Lohre et al. (2012, p. 4) point out that the average age of European road haulage workers is constantly increasing. Moreover, about 250’000 German drivers (that is 40% of all drivers) are expected to retire over the next ten years. As not as many new drivers will enter the market, due to worsening working conditions (European Commission, 2014, p. 19), an additional deficit of available drivers is pre-programmed. A further aggravation of the situation will be caused by the recovery of the road haulage market, because then the higher pre-crisis levels need to be processed. Is the number of cheap drivers limited? The question is raised for how long cheap drivers are limited, because hauliers come up with new business models, such as hiring truck drivers from the Philippines (<http://dinotrans.de>). Duvenbeck (Rathmann, 2014, May 2), CEO of a 1300 trucks haulier, confirms this possibility and says: “The more you go east, the easier it is to find drivers. We do not face any driver shortages in East Europe”. To sum it up, the cabotage penetration rate increases in case of a deficit of drivers (people prepared to accept the working conditions in the trucking industry) in the “old” EU 15 and a surplus of international drivers in “new” EU 12 countries.

The Scandinavian countries have inflexible salary structures. E.g. the minimum wage in Sweden is, contrary to popular belief, 0€. Wages are generally decided on a national level by negotiations between unions and employer organizations, i.e. employers (hauliers) are bound by the national agreements to pay the salaries collectively agreed upon. Whereas many drivers in other countries (e.g. Germany and Great Britain) have seen salary differences between long-haul and short-haul drivers and declining salaries for long-haul drivers, Swedish salaries are fixed on the agreed upon levels. Self-employed drivers fall outside the scope of these agreements. In forthcoming research Thörnqvist and Sternberg will elaborate more on this particular Scandinavian issue.

**Location of cabotage host country as a future reasoning for cabotage**

The fourth cabotage penetration rate influence factor is the location of the cabotage host country in Europe. In other words, the penetration rate is linked to the proximity of the cabotage host country to the most active cabotage operators. For example, Poland, Czech Republic and Bulgaria are the most active cabotage countries in Germany in 2012. Figure 16 shows their cabotage share in Germany and France. Moreover, Figure 16 exhibits Spain’s cabotage share in Germany and France (right chart).

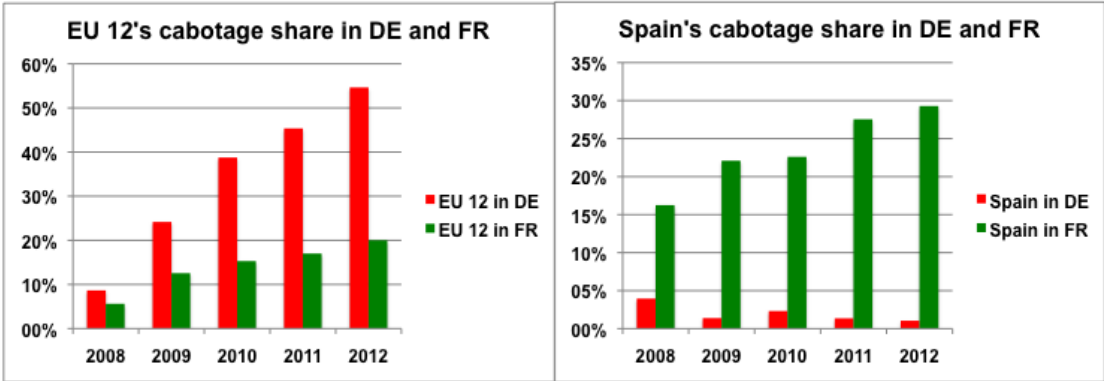


Figure 16. EU 12’s and Spain’s cabotage share in Germany vs. in France (Eurostat)

The two insights are: First, the cabotage operators (EU 12 member states and Spain) are much more active in their bordering country than in countries further away. In 2012, the EU 12’s cabotage share

in Germany is 55% vs. 20% in France. However, Spain's share is about 30% in France and only 1% in Germany. Second, Spain has hardly any share in Germany. This is likely due to the dominance of East European operators.

### Environment

Recent studies (Hendrickx, 2013; Visser and Francke, 2010) show that decreasing road transport prices can trigger a backwards modal shift, i.e. a shift from rail to road. This has also been confirmed in the calculation study presented in an earlier Cabotagestudien report (Sternberg, 2013). Primarily combined transportation should be investigated for modal shift, since transport running partly on rail typically do so for cost reasons. If the road transport prices continues to decline, it is likely that several countries will politically interfere and subsidize rail transportation.

To increase fill rates is something of a holy grail for many policy makers. Yet, both the industry and academia seem to be more sceptic about the potential of decreasing fill rates through liberalizing the market. Bernold Berndt (personal communication, August 5, 2014), Head of Freight Traffic at the UVEK, sees no reasons for a liberalization, because national empty runs have already been significantly reduced by introducing tolls (LSVA) on trucks whether they are loaded or empty (Bundesamt für Raumentwicklung, 2007). This statement is consistent with findings by Nyffenegger (2013). In the Swedish Starfish study, Holmberg et al. (2014) found high fill rates on trucks of Swedish retailers. This is plausible, since large volumes enable individual actors to balance their networks and plan for full truck loads. Certain imbalances are unavoidable due to geographical imbalances.

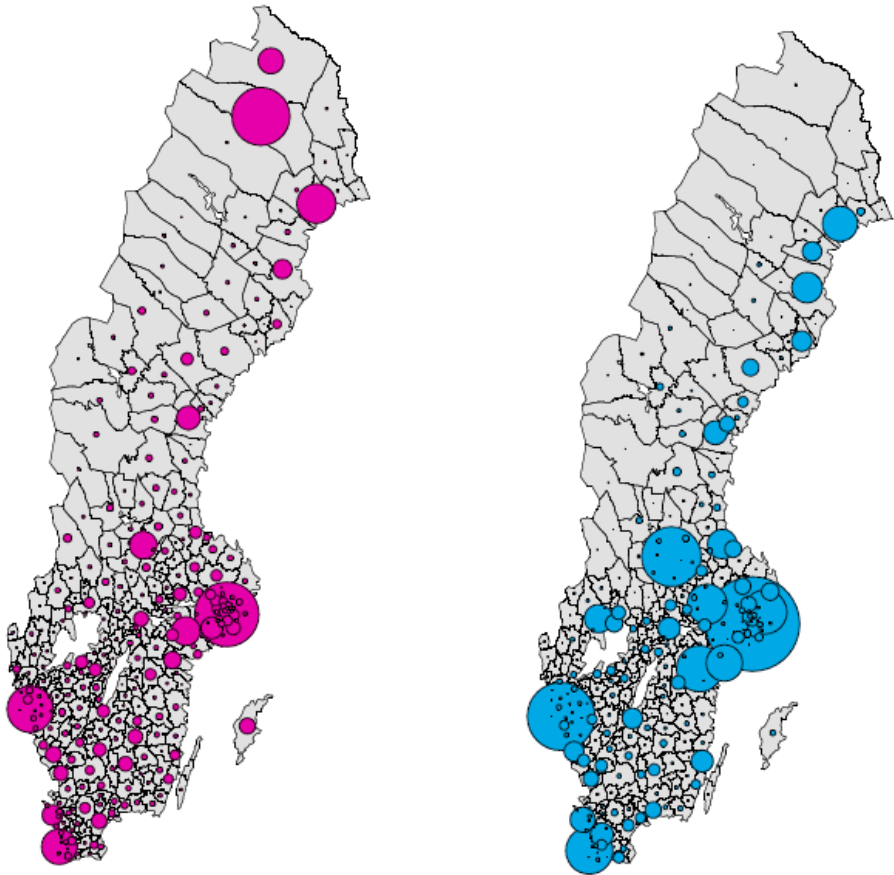


Figure 17. The left image depicts Swedish production and right image depicts Swedish consumption of domestic trade (Vierth et al., 2012).

## What is the cost of flagging out?

Flagging out has unfavourable impacts for the state budget where the company is located. It has a variety of economic effects, such as an impact on fiscal policy, income and employment. Inspired by Kummel et al (2014), *Flagging out in road freight transport: a strategy to reduce corporate costs in a competitive environment – Results from a longitudinal study in Austria*, we calculate a basic and conservative estimation of the altered cash-flows to and from the Swedish state caused by flagging out. It must be emphasised that we do acknowledge that there are additional effects and that the calculations made using considerable assumptions and simplifications.

The fiscal losses in Sweden are related to vehicle and labour. The vehicle-related fiscal losses can be estimated to be the sum of loss of vehicle, corporate income, and fuel tax. The loss of vehicle tax in accordance with the Swedish regulations of gross vehicle weight rating (GVWR) taxation for HDV over 32000 kg<sup>6</sup>. The loss of corporate income tax can be calculated from the gross turnover per truck per year (N/A), multiplied with the average margin of the transport business in Sweden (2.4%)<sup>7</sup> and finally multiplied with the Swedish corporate income tax, 22%<sup>8</sup>. The loss of fuel tax is derived from an assumed average driving distance of 41560km per year by a HDV in Sweden divided by an average fuel consumption of 5l per 10 km<sup>9</sup>. The fuel consumption per year per HDV is then multiplied with the average price per litre of diesel in Sweden 2013<sup>10</sup> (13 SEK) and lastly multiplied with a fuel tax of 57%<sup>11</sup>. The calculation of lost fuel tax is a difficult one since many of the flagged out HDV are driven by foreign drivers with the possibility to refuel abroad, given Sweden's relatively high diesel prices. Table displays a collective overview of the annual vehicle-related fiscal loss per vehicle for flagged out HDV in Sweden.

**Table 8. Vehicle-related fiscal losses – the case of Sweden.**

<b>Vehicle-related fiscal losses</b>	<b>Annual loss in Euro per vehicle</b>
Loss of vehicle tax	2465
Loss of corporate income tax	N/A
Loss of fuel tax	3300
<b>Sum of vehicle-related fiscal losses</b>	<b>5765</b>

The labour-related fiscal losses of flagged out HDV in Sweden can be estimated to the sum of unemployment compensation, loss of municipal income tax, loss of payroll tax, and loss of tax on purchased goods. The unemployment compensation per year for an unemployed fulltime Swedish driver, member of the Swedish transportation union, is maximum 73 Euro (680 SEK) per day<sup>12</sup>. Next is the loss of municipal income tax from the unemployed driver, calculated by multiplying the average monthly wage (2600 Euro, which equals 24300 SEK)<sup>13</sup> with the average municipal income tax (30%)<sup>14</sup>. Another large loss in income is the missing payroll tax from the employer, roughly depending on the age of the employee, the majority of the Swedish employers pay 31.42% of the gross salary in

<sup>6</sup>[https://www.skatteverket.se/download/18.76a43be412206334b89800019775/1359707135423/fordonsskattetabeller080101\\_tempor%C3%A4r+till+%C3%A5rsskiftet+2010\\_2011.pdf](https://www.skatteverket.se/download/18.76a43be412206334b89800019775/1359707135423/fordonsskattetabeller080101_tempor%C3%A4r+till+%C3%A5rsskiftet+2010_2011.pdf)

<sup>7</sup> [http://www.trafa.se/sv/Statistik/Ovrig-statistik/Transportbranschen/Transportbranschen 1997-2013](http://www.trafa.se/sv/Statistik/Ovrig-statistik/Transportbranschen/Transportbranschen%201997-2013)

<sup>8</sup> <http://www.ekonomifakta.se/sv/Fakta/Skatter/Skatt-pa-foretagande-och-kapital/Bolagsskatt/>

<sup>9</sup> <http://www.vti.se/sv/publikationer/pdf/representativa-branslefaktorer-for-tunga-lastbilar-uppskattade-genom-intervjuundersokning.pdf>

<sup>10</sup> <http://spbi.se/statistik/priser/diesel/>

<sup>11</sup> <http://www.ekonomifakta.se/sv/Fakta/Energi/Styrmedel/Konsumtionsskatter-pa-diesel/>

<sup>12</sup> <http://www.transport.se/Medlemskapet/fragor-och-svar/A-kassa-och-inkomstforsakring/>

<sup>13</sup> <http://www.lonestatistik.se/loner.asp/yrke/Lastbilschauffor--lastbilsforare-1267>

<sup>14</sup><https://www.skatteverket.se/privat/skatter/arbeteinkomst/vadblirskattenskattetabellermm/skattetabeller/kommunalaskattesatsermmunder2014/skattesatserdetaljniv4.8dcbbe4142d38302d710c9.html>

payroll tax<sup>15</sup>. Finally the last labour-related effect is the decrease in buying power, an unemployed driver earns less and should logically spend less and therefore the income of tax of purchased goods will decrease. A reduction of income for the driver by nearly 965 Euro (9000 SEK) per month will result in just under 11 800 Euro (110 000 SEK) annually. Further there are three major groups in taxation of purchased goods, the biggest one is 25%, the second 12% and the third 6%, rendering an average of 14.3 %<sup>16</sup>. This average has then been multiplied with the yearly loss in income for the driver. Table displays an overview of the estimated annual labour-related fiscal losses per driver for flagged out HDV in Sweden.

**Table 9. Labour-related fiscal losses – the case of Sweden.**

<b>Position</b>	<b>Labour-related fiscal losses</b>	<b>Annual loss in Euro per driver</b>
4	Unemployment compensation	19 300
5	Loss of municipal income tax	9 400
6	Loss of payroll tax	9700
7	Loss of tax on purchased goods	1700
	<b>Sum of labour-related fiscal losses</b>	<b>40100</b>

Between 2011 and 2013, the number of registered truck (tractor model for pulling trailers), decreased from 8810 to 8380 trucks, i.e. a decrease of 430 trucks (compare with 379 trucks likely operating illegal cabotage). We assume that demand for freight transportation has not decreased, which means that the loss for Sweden is at least 19,7 Million Euros per year.

## Future vision

Previous studies (e.g. Hilal, 2008, Kummer et al., 2014) and our data show that hauliers and logistics service providers are taking full advantage of all opportunities given within (and often outside) the existing regulations to cut costs (i.e. pay as little tax as possible and use as cheap drivers as possible while maintain minimum service requirements).

This “Race to efficiency” or “Race to the bottom” (depending on perspective taken), is given the fact that we are in the European Union, an economic union, will be difficult to control given existing policy instruments. In retail standards such as, e.g. “Fair trade” have been relatively successful in some countries and several domestic food producers have been successful in creating consumer awareness of how certain food is produced. In economic theory, transparency is related to fair competition and “good markets” (Akerlof, 1970).

Hence the project HITS (Sternberg et al., 2015) by Security Arena Lindholmen suggested transport transparency, i.e. a concept of how bilateral transparency between the various actors could potentially improve transportation (Figure 188). We do believe that the only way Scandinavian hauliers with Scandinavian drivers can survive in long-haul freight transportation, is by transparency. For many products, transportation represents a small share of the prize and a large share of the end consumers are concerned about the lack of environmental and social sustainability displayed by several actors.

<sup>15</sup><https://www.skatteverket.se/foretagorganisationer/arbetsgivare/socialavgifter/arbetsgivaravgifter.4.233f91f71260075abe8800020817.html>

<sup>16</sup> <https://www.skatteverket.se/foretagorganisationer/moms.4.18e1b10334ebe8bc80002497.html>

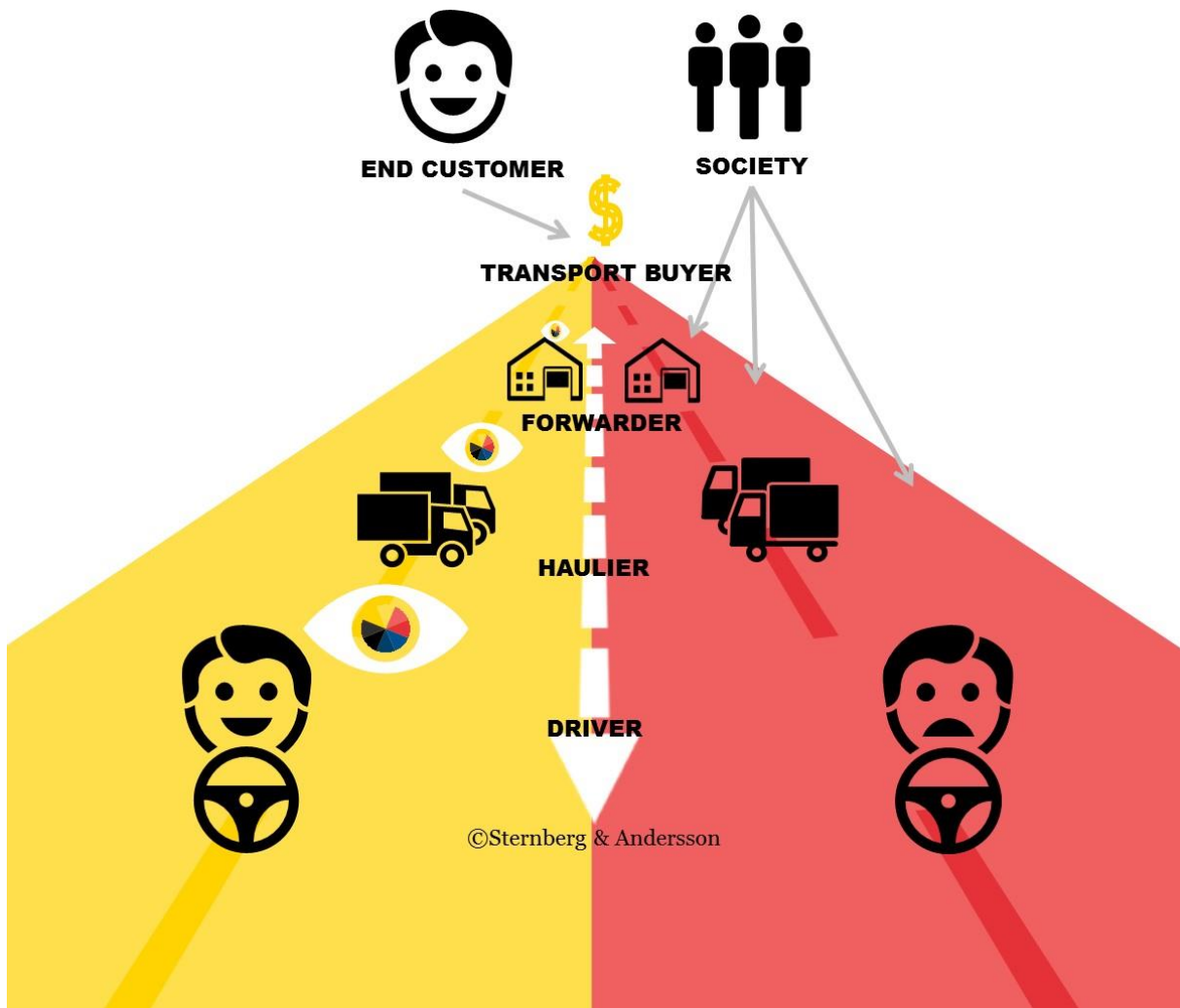


Figure 18. Transparency (Sternberg et al., 2015).

# *Concluding discussion and reflections*

The current road freight regulations (the cabotage and combined transportation regulations) enable cost efficiency by creating opportunities for hauliers to cut salary costs. Our data indicate that transport buyers make frequent use of cabotage in Scandinavia.

Based on previous research, in particular from the American trucking deregulation experience, and the data collected for the purpose of this study, we conclude that the European trucking deregulation from a policy point of view is a trade-off between cost efficiency and environmental and social sustainability.

We found significant differences when studying Denmark, Sweden and Norway. It is particularly notable in Denmark that several of the countries most observed have confidential statistics. Our study raises the question why data on cabotage is confidential, particularly for countries with many foreign hauliers active in a given domestic market. This also goes for Norway, where the most frequently observed foreign nationality (Lithuanian, 24% of our Norwegian dataset) is listed as confidential in Eurostat. Regarding Romanian cabotage in Denmark, we strongly suggest that the official cabotage figures should be revised or set at “unknown”, as our validation case alone exceeded the amount of cabotage stated in Eurostat.

Comparing the countries, we do not find any evidence of Scandinavian “big cabotage”, such as hauliers performing cabotage in Norway followed by an international transport and then cabotage in Sweden. Hundreds of trucks carry out systematic cabotage (particularly in Denmark), but these trucks tend to carry out cabotage in one country, make one international trip (or more often two), and then return to cabotage in Denmark (this has also been observed to a small extent in Norway).

The data collected from Sweden indicates that several hauliers carry out domestic transportation, without leaving the country. Although Council Directive 92/106/EEC outlines how combined transportation can be carried out, it still has to be in line with the Posted Workers Directives. Since data on posted workers is public information in Sweden, available from the Swedish Work Environment Authority, it is hard to comprehend how 386 trucks carrying out combined transportation can be legally staffed. The in-depth data on the possibly illegal activities of “Haulier X” illustrate one of many foreign hauliers in Sweden with questionable operations. Based on our data from Sweden, we are particularly concerned about the 379 foreign trucks operating domestic transportation.

Fighting corruption and safeguarding social and environmental sustainability need to be top priorities for the European Union. Seen from a societal perspective, do we want the actors to compete by means of resource efficiency or in terms of how far driver conditions can deteriorate and still be within the legal boundaries? We suggest that improving transparency of the business in general is one factor that can contribute to more socially and environmentally sustainable competition.

Finally, but without taking a stand, we would like to conclude this report with a statement from the CEO of a large German carrier:

*“Liberalizing the cabotage market has created new business models rather than less empty runs. But, never mind the markets ...”*



# *Appendix A: Estimating cabotage in Denmark*

The statistics on cabotage presented by Eurostat are based on reports submitted by the country where the vehicles are registered. However, the reports from the volunteers, the observations by the authors, and the statistics of vehicles crossing the border (ITD data) indicate that some reports from member states to Eurostat on cabotage are too low. *Based on the assumption* that the Eurostat statistics of cabotage transports carried out in Denmark by vehicles from countries in EU15 (B in the formulas below) are correct, it is possible to make an estimation of the magnitude of cabotage in Denmark by new member states vehicles. Drivers have the right to carrying out cabotage following an international trip. *A second assumption* is that all cabotage in Denmark is equally distributed over all international vehicles.

If the number of observations of EU15 vehicles ( $\beta$ ) is put in relation to  $\alpha$ , then it is possible to calculate an estimation of cabotage carried out by new member states vehicles in Denmark. The number of sightings of EU15 and new member states vehicles are both biased and have a margin of error that needs to be taken into consideration. Also, since the latest statistics available from Eurostat on cabotage carried out in Denmark are from 2012, and the collected observations from the study are from 2013, the observed difference in border crossings (ITD border counting) is assumed as a baseline for projecting change between the years ( $\theta$ ). In mathematical terms this can be described by the formula below, based on common standard deviation calculations, resulting in a 95% confidence interval.

We have constructed a model in order to estimate the amount of cabotage carried out in Denmark based on the data collected in this study. This model is the result of some key assumptions made by the authors and will be presented and discussed in this section and in the discussion section.

The first key element is that we define the information on cabotage carried out by EU15 vehicles from Eurostat to be correct:

$$B = \text{Cabotage in Denmark by EU15 – vehicles (Eurostat)}$$

Secondly, we define:

$$\text{Foreign transports} = \text{Cabotage transports} + \text{international transports}$$

This is separated for EU15 vehicles and new member state vehicles.

Thirdly, we assume that the observations<sup>[1]</sup> from volunteers represent how many transports they carry out. The observations are connected to the number of days they are in Denmark and this is thus seen as an indicator of how many tkm they travel. As mentioned in the *Antagonistic observations* section, the distribution of observations between EU15 and new member state vehicles is skewed when compared to the validation case, and this has therefore been taken into consideration by the factor  $c$ .

$$c = \text{factor considering the antagonistic behaviour of volunteers} \\ \text{Foreign transports} = \text{Volunteer observations} \times c$$

Fourthly, since we cannot separate if the observations made are cabotage or international transports being carried out, we assume that the ratio between cabotage and international transports are the same disregarding if it concerns EU15 vehicles or new member state vehicles. This assumption is

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<sup>[1]</sup> From here on *observations*, if nothing else is stated, refers to the observations made by the volunteers.

considered to be realistic or to be biased to underestimate new member states cabotage, since the new member states can offer cabotage transports at a lower rate, making them a primary choice on the spot market. This can be stated as:

$$\frac{Cabotage_{new\ member\ states}}{International_{new\ member\ states}} = \frac{Cabotage_{EU15}}{International_{EU15}}$$

Since the above ratio is assumed to be the same for new member states and EU15 countries, this implies that this ratio also is valid:

$$\frac{Cabotage_{new\ member\ states}}{Observations_{new\ member\ states}} = \frac{Cabotage_{EU15}}{Observations_{EU15}}$$

$$\beta = \frac{Observations_{EU15}}{Observations_{new\ member\ states}}$$

$$\gamma = \frac{Observations_{new\ member\ states}}{Observations_{EU15}}$$

Lastly, since the latest available statistics from Eurostat on cabotage carried out in Denmark are from 2012 and the observations were made during 2013, we have a factor that takes this into consideration. We have chosen to take the observed difference in number of vehicles crossing the Danish borders by ITD ( $\theta$ ).

$$\theta = \text{Change in international traffic in Denmark by EU15 – vehicles (ITD)}$$

So consequently, assuming:

1) that Eurostat's statistics on EU15 cabotage (B) are valid, 2) that they have changed by factor  $\theta$ , 3) that the ratios between cabotage and international transports are equal for either type of cabotage, 4) that the observations of both EU15 and new member state cabotage are related to the amount of cabotage carried out, then the following model can be concluded for cabotage by new member state vehicles:

$$Cabotage\ by\ new\ member\ state\ vehicles\ in\ Denmark = \frac{B \times \theta}{\beta \times c_{\beta} \times \pi_{\beta}} \times \gamma \times c_{\gamma} \times \pi_{\gamma}$$

where the function  $\pi$  represents the standard error of the difference between the observations and the validation case.

The *estimation* of total cabotage in Denmark is calculated as follows:

$$\alpha + \frac{\alpha * \theta}{\beta * \pm \sqrt{\frac{1}{n_{\beta} - 1} * \sum_{i=1}^{n_{\beta}} (\beta_i - \bar{\beta})^2 * \frac{(N_{\beta} - n_{\beta})}{n_{\beta} * N_{\beta}} * \frac{1.96}{\beta}}} * \gamma * \pm \sqrt{\frac{1}{n_{\gamma} - 1} * \sum_{i=1}^{n_{\gamma}} (\gamma_i - \bar{\gamma})^2 * \frac{(N_{\gamma} - n_{\gamma})}{n_{\gamma} * N_{\gamma}} * \frac{1.96}{\bar{\gamma}}}$$

Before adjusting for volunteer observation bias, the number of vehicle observations from the EU15 countries was 5 456 and from the new member state vehicles was 22 916. As included in the formula above, the data set has been divided and the bias has been calculated separately for the two figures. The bias for new member states observations is calculated to 14% whilst the standard error for EU15 observations is significantly higher, due to a smaller portion of the data set, at 38.5%. The calculated 95% confidence interval for  $\beta$  is 6 915±50% and for  $\gamma$  it is 17 441±50%

We have calculated the “one sample t-test” giving us a t-value (t) of the samples:

$$t_x = \frac{\bar{x}}{\frac{s_x}{\sqrt{n_x}}}$$

$$t_\beta = 5.085$$

$$t_\gamma = 13.968$$

The cabotage carried out with vehicles from EU15 countries was 251 mtkm in 2012 (Eurostat) and the new member states cabotage was 93 mtkm in 2012 (Eurostat). The change between the years (2012 to 2013) was a decrease of vehicles from EU15 by 7.2% and an increase of new member states vehicles by 20.9%. Taking these changes into consideration results in an *estimated* figure of 233 mtkm of cabotage in Denmark in 2013 by vehicles from EU15 countries, and of 112 mtkm by vehicles from new member states.

With these figures, an estimation of the total cabotage in Denmark can be calculated according to the formula above. This results in an estimation that new member states cabotage in Denmark should at least be 364 mtkm, but we want to highlight that this involves a high standard error factor. Also, this figure is based on configured statistics from 2012 (Eurostat) which could potentially make the actual figure either higher or lower. Given the above assumptions and our dataset, the calculated total cabotage should at least correspond to 597 mtkm. This would mean that the total cabotage carried out in Denmark accounts for at least 4.6 % of the total domestic market, if the Danish domestic statistics are correct. It must be stated again that this figure is an absolute minimum and our calculations, based on the given assumptions, support a larger cabotage share.

# Appendix B: Estimating future cabotage in Sweden

Based on data from Eurostat we have investigated the potential development of cabotage in Sweden. By using regression analysis we made two different line of trend helping us to indicate the future level of cabotage.

The following figures (2un3) display two different scenarios. The figures describe the level of cabotage up until 2013 (Eurostat) and show the corresponding equation including a line of prognosis 10 years ahead and its coefficient of determination ( $r^2$ ).

In scenario 1 a linear development of cabotage is assumed. The trend in Figure 1 show an ascending line where the proportion of cabotage in 2023 could be 6%, an increase of 50% compared to today's level of 4%. The coefficient of determination is 0.907 which means that a 90.7% variation in the share of cabotage can be explained by the data in Eurostat's yearly reporting. The remaining 9.3% is unexplained, in other words dependent on something that the linear equation cannot explain.

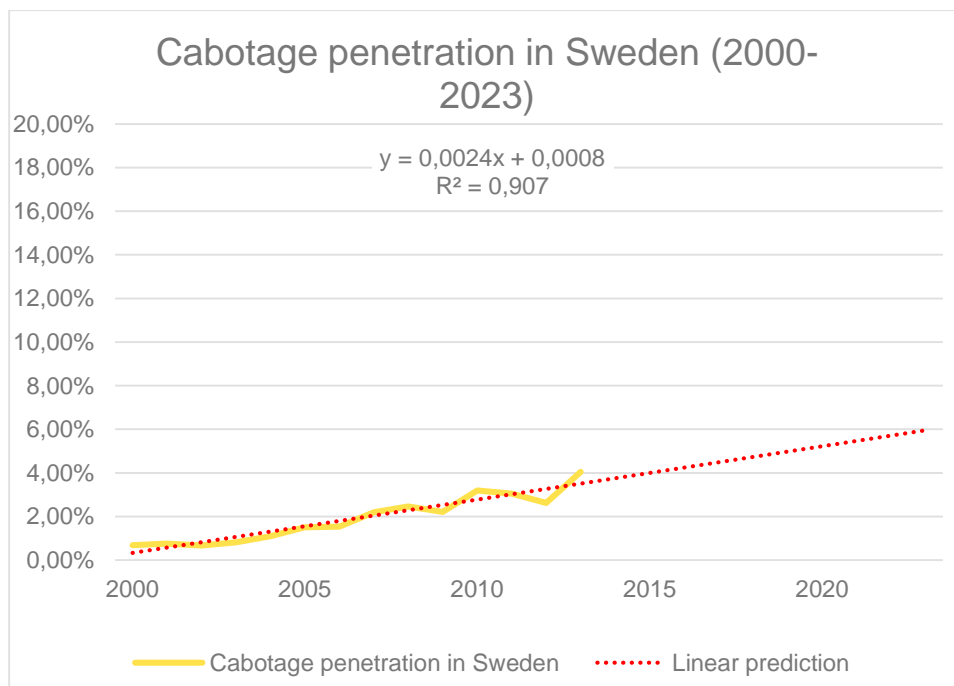
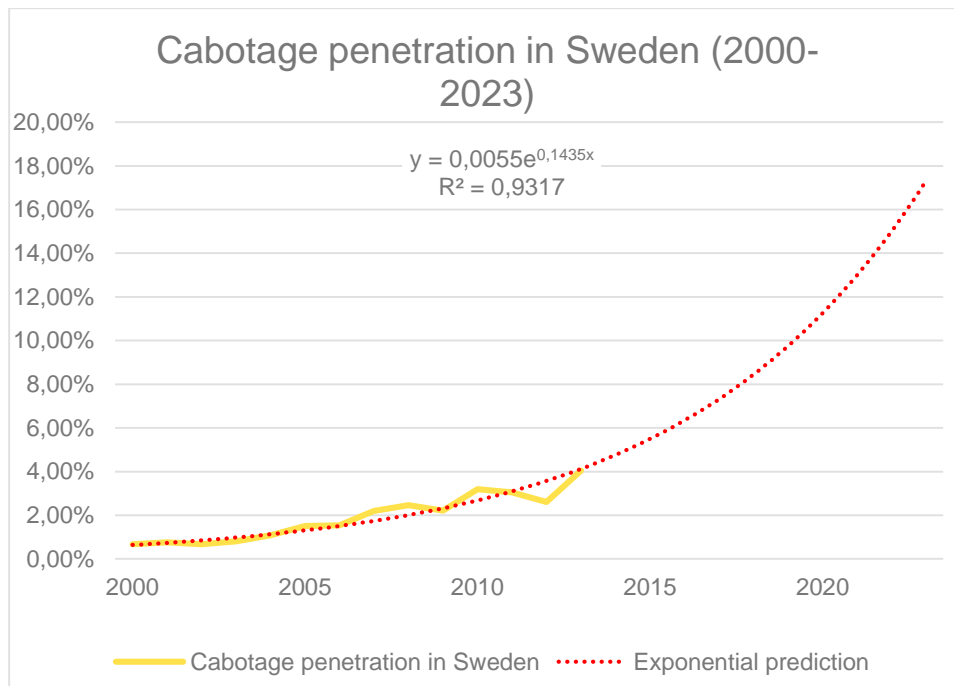


Figure 19: A linear development of the proportion of cabotage in Sweden is assumed.

In scenario 2 an exponential development of cabotage is assumed. The trend show an even steeper rise where the share of cabotage in 2023 could be on levels around 17%. Figure 2 shows that the share of cabotage would increase from 4% 2013 to 11% during 2018 and reach approximately 17% during 2023. That fact that the coefficient of determination is somewhat higher in the exponential equation doesn't mean that it is more probable, only that the equation better suits the data from Eurostat.



**Figure 20. An exponential development of the proportion of cabotage in Sweden is assumed.**

The two scenarios works as different perspectives on our intention to gain insight in the future share of cabotage in Sweden. Each scenario is based on own assumptions, but together they constitute an outcome area based on a real trend of cabotage in Sweden.

As previously mentioned in the report, a number of factors influence the development of cabotage. Laws, costs, availability of drivers, and geographic placement in relation to other European transportmarkets are a number of factors having a major impact. The trends in the figures above should only be considered as a current state showing as to where the trend is heading. To perform a more detailed study with regards to the change of cabotage over time, a deeper study of the surrounding factors and its implications is needed. Regardless, no matter the level of detail, the trend displays an ascending line.

If the trend of 2000-2013 continues, the share of cabotage in Sweden ten years from now, will be around 6% based on scenario 1 (linear growth) and around 17% based on scenario 2 (exponential growth).

## *Appendix C: Bulgarian haulier economics*

There are no existing surveys regarding payment rates in the Bulgaria transport market. All the collected data regarding the average salary level is a result of research based on articles, drivers' forum, personal experience<sup>17</sup> and the offers on the labour market.

Every carrier has to pay allowance of 27 €/day per driver or 21 €/day per driver when there are two men driving the same truck. Usually the allowance is included in the job offers when the salary is mentioned.

Our survey is based on the biggest Bulgarian webpage for job offers ([www.jobs.bg](http://www.jobs.bg)) which clearly shows that the average offered payment is approximately 1500 € per driver (including 700 to 800€ allowance).

Based on numerous conversations with different drivers, we found that the job offers do seem attractive (in terms of the amount of money in relations to the Bulgarian life standard), but most drivers know that the reality is a bit different. It is important to clarify that it is not a fixed salary because most of the hauliers pay their drivers per kilometre driven. To be more specific, it means that at the payment date the driver receives allowance for being abroad (which is fixed by Bulgarian law) as well as payment per each driven kilometre. The typical distance driven is 10 000-12 000 km or in rare cases, even up to 14 000 km on a monthly basis. Respectively, the average paid amount per kilometre is close to 0.12 BGN (0.06 EUR).

Much like other hauliers, Bulgarians plan their routes based on cost efficiency. That means that Switzerland is avoided (due to km tax) as well as Hungary. Other expensive and avoided facilities are the Mont Blanc and the Fréjus road tunnels between France and Italy.

When facing a choice between ferry and road, Bulgarian hauliers typically opt for the road alternative. The main reason is to avoid a conflict with the drivers, since they are paid based on kilometres driven. The following two pictures illustrates how a Bulgarian haulier would plan his trip to Copenhagen or Marseille.

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<sup>17</sup> Lund University assistant Stela Petkova worked one year as a freight forwarder in Bulgaria.

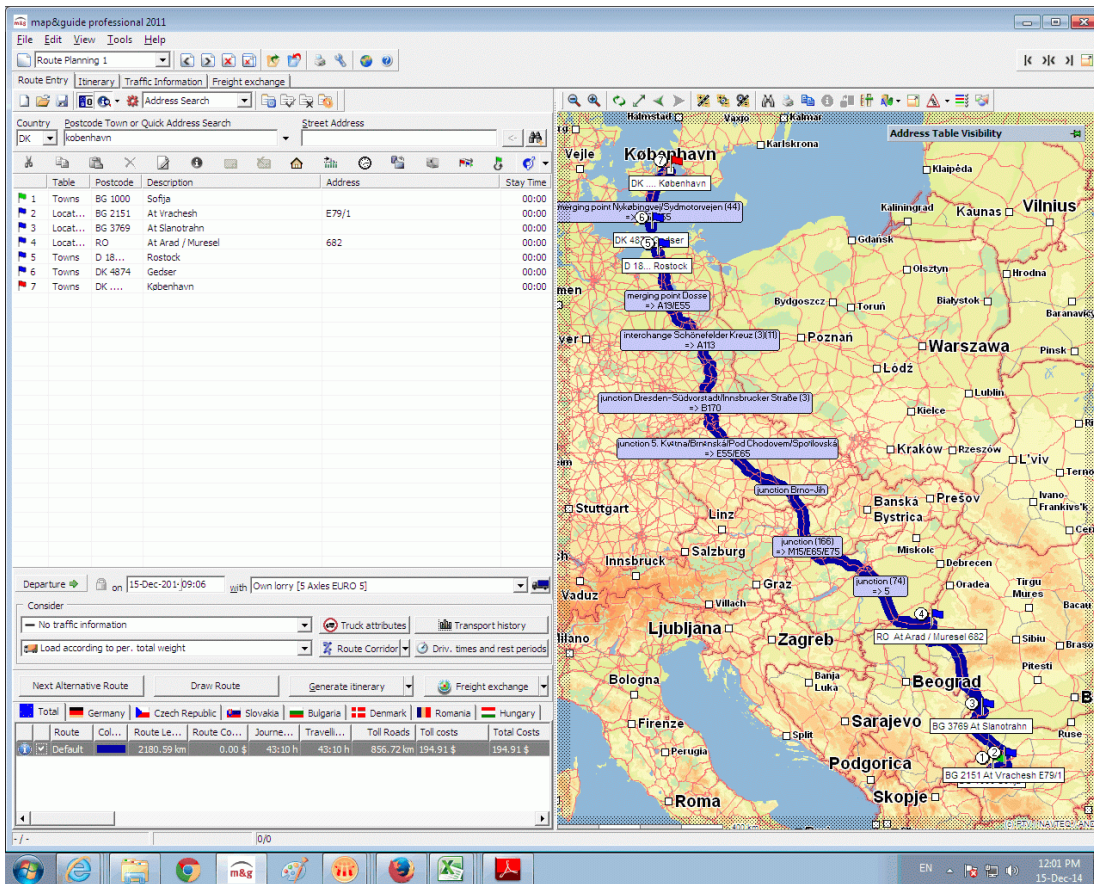


Figure 21. Transport route from Sofia to Copenhagen

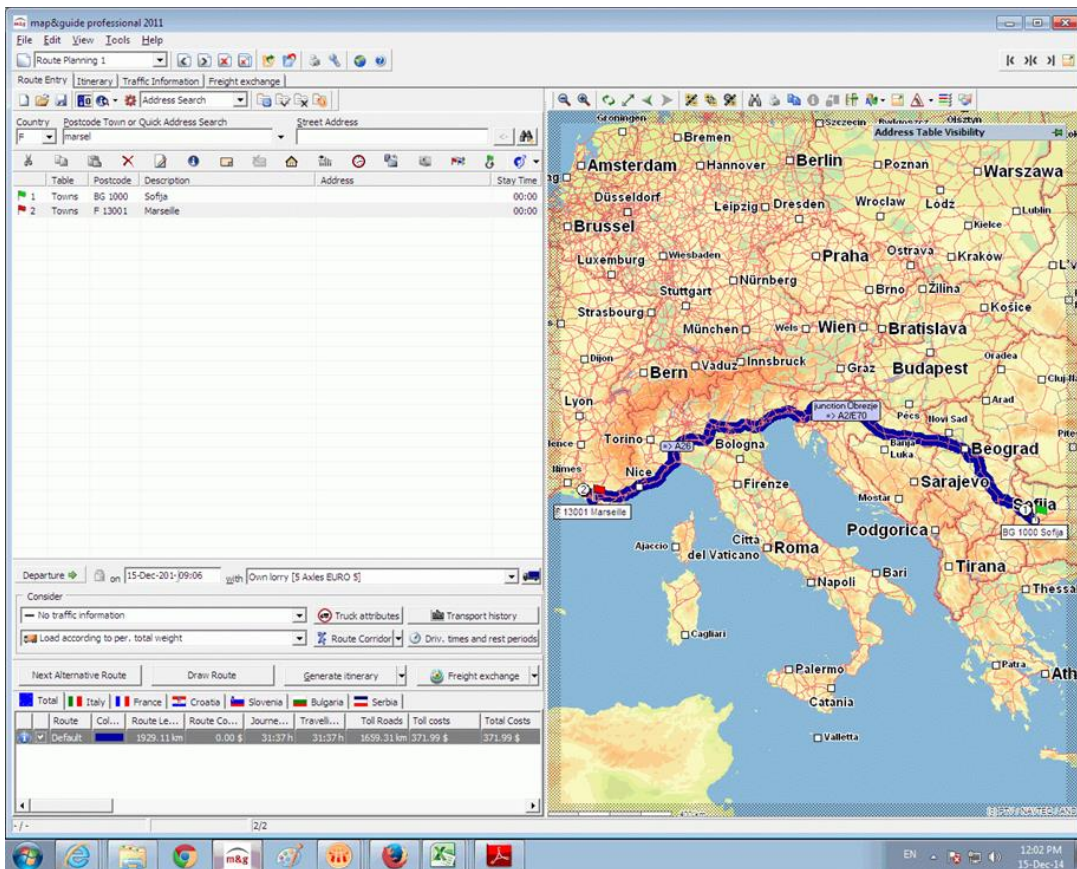


Figure 22. Transport route from Sofia to Marseille.

Due to a small export from Bulgaria to the rest of EU, export transport prices have plummeted. For Bulgarian hauliers, typically getting a truck load out of the country is considered the biggest challenge.

Driving with two driver tachograph cards enables a substantial salary increase, i.e. one driver could cover two shifts. Another popular trick is the magnet. It is put under the gearbox and makes the tachograph count the time as a break. This fraud is, in difference to double driver cards, relatively easy to detect on a detailed inspection of the truck.

Sources:

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