Analyses of Transport solutions based on the Swedish Commodity Flow Survey CFS 2001

Dan Andersson, Linköping University

Summary

The purpose of the report, initiated by SIKA (Swedish Institute for Transport and Communication Analysis), is to investigate how data from current and future Commodity Flow Surveys (CFS) can be used to analyse factors influencing a transport solution. This includes mode of transport (single or in combination) for domestic transports and transports abroad and choice of cargo type, and combinations of modes for entire chains of transports. A major issue is the fact that the data was originally collected for descriptive purposes and a design based inference type of analysis. The fact that the data collection was stratified has caused problems for this attempt to do an explanatory analysis (as input for modelling purposes). However, there is no simple solution to how to do explanatory/modelling analysis on this stratified data. A possible solution to handle the problem is to make analyses of individual homogenous strata. Another problem for the use of the data is the confidentiality issue. All respondents in the CFS are by law guaranteed full confidentiality. This has resulted in that a number of tables have been partially suppressed (when there are too few observations or when one respondent dominates the result). However, this does not limit the possibilities for analysis but the confidentiality makes it impossible to get access to variables missing in the database by directly linking it to other sources of information (e.g. from transport companies).

Considering the type of variables included in the database two types of analysis would have been beneficial to do: ANOVA analyses (of differences between transport modes with respect to the transport distance, the weight of a shipment and the goods value of a shipment) and cross-tabulations combined with chi-squared test for all other variables. However, since it not possible to perform these types of analysis on the stratified and thereafter adjusted data different types of descriptive data analyses have been performed instead, and it should be noted that they are descriptive analyses that give an indication of patterns that may occur in the material. The analyses have also been influenced by a large portion missing cases for outbound transports outside Sweden and also for transports within Sweden that will continue abroad. In addition there have been a large number of missing cases related to type of load unit but also for questions about infrastructure.

There is a significant difference in average transport distance between different modes of transport and all the modes are significantly different. There is also a difference in average transport distance in Sweden between transports that either will reach their destination in this country or that will continue abroad. There are also significant differences between different modes with respect to shipment weights as well as goods values. The transport modes used for all kinds of shipments (outbound as well as inbound) do also differ between the regions in Sweden. It was not possible to create new variables which described whole transport chains, but cross tabulation of transports within and outside Sweden gave some information and showed no dramatic shifts between different modes used for one shipment within and outside Sweden.
The different modes can be characterised in a descriptive way but this does not say anything about what influences the mode selection and in addition the independent variables are most likely interrelated**.** It should also be observed that only partial analyses are presented in the report, and possible interrelations between the different variables have not been accounted for. This limits the possibilities to draw conclusions about what really influences the transport mode selection. Hence, there is a need for further studies that could be directed to the areas indicated in this report

List of contents

1. Introduction

1.1. Background and purpose of the report

The purpose of the report, initiated by SIKA (Swedish Institute for Transport and Communication Analysis), is to investigate how data from current and future Commodity Flow Surveys (CFS) can be used to analyse factors influencing a transport solution. A transport solution has in the CFS context been defined in terms of:

- Mode of transport (single or in combination) for domestic transports and transports abroad
- Combinations of modes for entire chains of transports from or to a destionation in Sweden (including domestic as well transports abroad)
- Cargo type

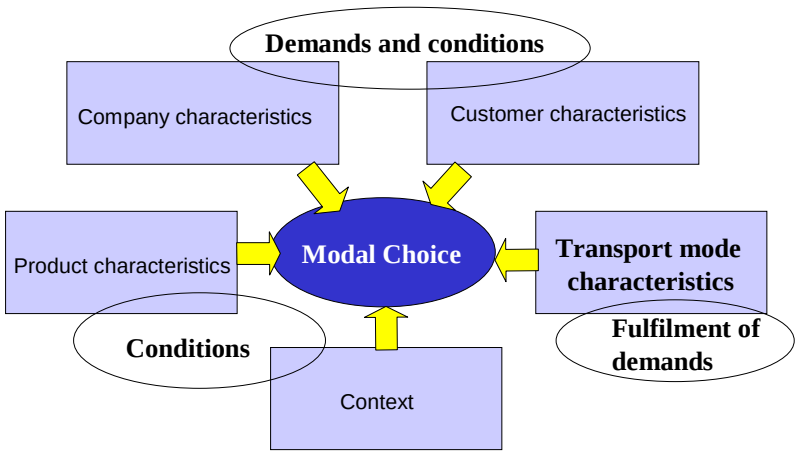
The purpose of the analysis of transport solutions is primarily a question of analyses of the interrelationships between transport mode selection and:

- Characteristics of the goods (value/kg, type of commodity and dangerous goods)
- Shipment size (weight)
- Transport distance
- Access and use of industrial rail tracks and quays
- Shipment frequency

However, the last factor will not be included in the analysis since data about shipment frequencies is not available. In addition an attempt will be made to analysis the influence of the size of local units involved in the goods flows.

1.2. Frame of reference for transport mode selection

There is a number of different factors that my influence the transport mode selection, and these represent the demands the consigner as well as the consignees put on the transport and the how the different modes of transport fulfil these demands considering the requirements and conditions posed by the products and the environment (see figure 1).



Figur 1 Factors influencing the transport mode selection

When deciding which mode of transport to use a decision maker has to take into account a number of factors, which to a certain extent can be labelled as related to external pressures or internal strategies (see e.g. Lambert and Stock, 1993). External pressures could be related to the business environment (customers, competitors, suppliers) or the transportation environment (legislation, technology, modal economics).
The mode selection could be made based on a total cost approach, considering both actual costs and costs of lost sales (i.e. customer service aspects). Lambert and Stock (1993) have identified two groups of factors that influence the mode selection (by influencing the transportation cost/price): product related factors (e.g. density, stowability, handling, liability) and market related factors (e.g. competition between modes, location of customers, imbalances of freight traffic in an area, seasonality of goods flows). The most important aspects of a transport that influence the customer service is according to Lambert and Stock (1993): dependability, time-in-transit, market coverage, flexibility, damages.

Slater (1983) proposes a mode selection based on cost variables with consideration of constraints created by the characteristics of the: customers, environment, product and company. Below these areas have been described based on Slater (1983) but some additions and changes have also been made (in brackets there is noted if the variable is included in the CFS):

Product characteristics

- Size and shape
- Weight (CFS, per shipment)
- Value (CFS per shipment)
- Fragile nature
- Obsolescence
- Toxic degree (CFS dangerous goods)

In the CFS there is also a product type classification.

Company characteristics

- Warehouse locations (could be a local unit in the CFS, but type of facility not known)
- Manufacturing location (could be a local unit in the CFS, but type of facility not known)
- Customer service policy
- Environmental policy
- Marketing strategy

Customer characteristics

- Localisation (CFS)
- Characteristics of delivery address
- Lead time requirements
- Order size (CFS: size of shipment)
- Customer service requirement

Context

- Infrastructure (CFS)
- Legal and fiscal
- Technology (e.g vehicles and equipment)
- Climate

Transport mode characteristics

- Transit time
- Reliability
- Accessability
- Security
- Supplementary Services
- Cost
- Environmental impact
- Load capacity and standardisation of equipment

In the CFS there are variables related to all but one of the categories mentioned above. The only exception is the characteristics of the mode of transport (which has to be collected from other sources if a good understanding of the modal choice is to be achieved).

1.3. Methodology

The results in this report are based on the database compiled in the CFS 2001 project. The methodological considerations behind the data collection are comprehensively described in the report "Varuflödesundersökningen 2001 Metodrapport" (SIKA Rapport 2003:4).

1.3.1. Type of analysis conducted

It must be observed that the data in CFS 2001 was originally collected for descriptive purposes and a design based inference type of analysis. The population is finite (all shipments in Sweden during one year) and the units are considered to have fixed values on the measured variables. The sum of the variable values in the population (the totals) can be estimated from a probability sample, in which the variable values can be determined and the population totals estimated as weighted sums. However, the fact that the data collected is stratified causes some problems for its use in an explanatory analysis (as input for modelling purposes), which is the purpose of this report. And it is not beneficial for this kind of analysis to make adjustments for differences in the sizes of the strata by using adjustment factors. The issue when analysing what influences the mode selection is not to calculate representative average values for the total population (in this case Sweden) instead it is a matter of handling uncertainties and variance in the observations and making statements about a general (infinite) population. There is no simple solution to how to do explanatory/modelling analysis on this stratified data. A possible solution to handle the problem is to make analyses of individual strata, which are homogenous. This approach is not possible to use for analysis of the CFS 2001, but is could be considered when the CFS 2004 is designed.

When the purpose is to establish a relationship between different variables, an analytical type of analysis, the statistical methods used are based on an important assumption: the observations must have been selected in a completely random fashion. But in the CFS the inclusion probabilities are far from constant, and analyses applied on all data can give completely wrong inferences. This is especially true, when the sample design is based on cluster sampling. This has to be observed when the analyses presented in this report are reviewed. Since, despite the observation made above, it has been concluded that the best way to handle the problem with the stratified sample is to adjust all variables in the CFS 2001, thereby their mean values offer a valid representation of Swedish shipments. However, uncertainties connected to the adjustment factor, and the related confidence intervals cannot be calculated based on publicly available information. Therefore SCB has in a second round of analysis remade all analyses and calculated confidence intervals based on how the

data collected has been stratified and variance in the responses. All descriptive data (table 11, 13, 14, 22, 25, 28, 31, 34, 36, 38, 40, 66, 69 and 71) is presented in the form of mean values supplemented with the standard error for the estimated mean and a 95% confidence interval (i.e. the likelihood is 95% that the true mean value is within this interval). The minimum and maximum value for the variable in the database are also presented.

In the first round of data analysis of the primary unadjusted data two tools were used to analyse the variables in the CFS database. The first is ANOVA, which is used to compare the sample means for two or more different samples when the real means are unknown. ANOVA analyses were used to analyse the differences between transport modes with respect to the transport distance, the weight of a shipment and the goods value of a shipment. The key statistic in ANOVA is the F-test, a comparison between the actual variation of the group averages and that expected. In order to determine not only if there is a difference between the all of the different modes but also if there is significant difference between individual groups a par wise analysis of the variation of group averages was made. However, since it not possible to perform an ANOVA on the adjusted data the following analysis has been made instead: pairwise comparisons of the mean values have been made and the standard error for the difference as well as a 95% confidence interval for the difference has been calculated (based variance in the sample but also on information about how the sample is stratified, which is not available in the CFS database). If zero is not in-between lower and upper bound in the confidence interval this is an indication that the mean values differ. This type of analysis is presented in table 12, 23, 26, 29, 32, 35, 37, 39, 41, 67, 70 and 72.

Since most of the variables are nominal there are not that many different methods of analysis available. One useful method in this kind of situation is cross tabulations of the variables to be compared. In this study cross tabulations have been used to test if there is any pattern in the answers or if the difference between observed and expected value is just due to chance variation. The most common significance test for cross-tabs is the chi-squared test. However, this type of analysis cannot be done due to the stratified sample. Instead an estimate has been made of the number of shipments in each category, which is called count, (i.e. adjusted numbers representing the whole population) and the size of the sample error (CI95, 95% confidence interval, which is +/- the value stated). The estimated expected count is based on the assumption that there are no differences between the modes and that the shipments are evenly distributed between the different alternatives. Also for this estimate a confidence interval has been calcultated (i.e +/- CI95). The number of observations in the tables represent the number of shipments based on which all the estimates are made. This kind of analysis is presented in table 15-21, 24, 27, 30, 33, 43-52, 54-65, 68, 73 and 74. In order to give a better overview of the results the cells in the tables have been colour coded. Green (light grey in a black and white printout) indicates that there are fewer shipments than expected in that cell and red (dark grey) indicates that there are more shipments than expected. This gives an indication about whether or not the differences are significant, however, it should be noted that it is mainly a descriptive analysis that gives an indication of patterns that may occur in the material.

It should also be observed that only partial analyses are presented in the report (this is mainly an effect of the type of data available for analysis), and possible interrelations between the different variables have not been accounted for. This limits the possibilities to draw conclusions about what really influences the transport mode selection. Hence, there is a need for further studies that could be directed to the areas indicated in this report

1.3.2. Variables used in the analysis

The variables used for analysis of outbound and inbound shipments are not exactly the same and therefore both groups are listed below. It should also be observed that data for inbound and outbound shipments are kept in different databases (Acess Databases). Some of the variables in the CFS 2001 database have been used in their original form but most of the variables are constructed (i.e. variables have been grouped or calculated).

Variables used original form for both outbound and inbound shipments

- Weight of shipment
- Size of the local unit
- Dangerous goods

Constructed variables used for outbound shipments

- Mode of transport in Sweden (transport modes and combinations of modes been classified into nine different categories)
- Mode of transport outside Sweden (transport modes and combinations of modes have been classified into ten different categories)
- Transport distance (has been calculated based on a STAN distances matrix and the id. number of the municipalities from/to the shipments goes. N.B this is an approximation of the actual transport distance)
- Transport distance intervals (the transport distances have been divided into eight intervals)
- Shipment weight intervals (the transport weight have been divided into eight intervals)
- Goods value per kg (the variable value per shipment divided by the weight of the shipment)
- Export country known (0/1 variable based on if an export country has been named)
- The use of industrial rail tracks (the three (0/1) variables used in the CFS to indicate the usage have been combined into one)
- The use of quays (the three (0/1) variables used in the CFS to indicate the usage have been combined into one)
- Despatching region (the number of the despatching municipalities have been aggregate into region numbers)
- Type of product (the individual product type number have been aggregated into 19 groups)
- Cargo type (the individual cargo type number have been aggregated into five groups)

Constructed variables used for inbound shipments

- Mode of transport in Sweden (transport modes have been classified into nine different categories)
- Mode of transport outside Sweden (transport modes have been classified into nine different categories)
- Shipment weight intervals (the transport weight has been divided into eight intervals)
- Goods value per kg (the variable value per shipment divided by the weight of the shipment)
- Receiving region (the number of the receiving municipalities have been aggregate into region numbers)
- Type of product (the individual product type number have been aggregated into 19 groups)
- Cargo type (the individual cargo type number have been aggregated into five groups)

1.4. Confidentiality issues

All respondents in the CFS are by law guaranteed full confidentiality. This has resulted in that a number of tables have been partially suppressed. This has to be done when there are too few observations in one single cell (three or fewer) or when one respondent dominates the result of a cell (i.e. contributes with more than 50% of the value of the variable in question). However, if only one cell per row or column has been suppressed one additional has to be suppressed in order to make it impossible to calculate the value of the originally suppressed cell by using the values of other cells and the sums for the row and the column.

2. Factors influencing transport mode selection

2.1. Overview of modes of transport used

An overview of the modes of transport used in the analysis of factors influencing the transport mode selection will be made in this chapter. This background is provided in order to show the starting point for the following analyses of mode selection. It should be observed that the description of the modes used is limited to the frequencies of usage and no descriptive information is supplied regarding the volumes or values transported per mode. This kind of information is described in the report "Varuflödesundersökningen 2001 Metodrapport" (SIKA Rapport 2003:4).

The different transport modes used in the analyses have been aggregated and categorised according to the following:

- Road transport: lorry, car, bus, and combinations of these modes
- Railway: rail transports used as a single mode
- Rail and road: different combinations of these two modes
- Rail and sea: rail combined with cargo vessel or ferry and in some few cases also with road
- Ferry and road: different combinations of these two modes
- Cargo vessel: used as a single mode
- Cargo vessel and road: the two modes used in combination
- Air: used as a single mode or in combination with road
- Other or unknown

There is a large number of different combinations of modes (for instance more than 100 different combinations are stated just for outbound transports within Sweden) and some of the known but less frequent combinations have been classified into the group Other or unknown.

2.1.1. Modes of transport for outbound shipments

The description of the modes of transport for outbound shipments is divided into two sections: transports within and outside Sweden.

Outbound transports within Sweden

For outbound domestic transports road transport is totally dominating with respect to the number of shipments transported by this mode (96%, according to unadjusted primary data, see table 1 and 97%, according the adjusted data, see table 2). A closer look at this mode reveals that the lorry transports are dominating in this group (ca 740 000 shipments, according to the unadjusted data) and the second most frequently used individual mode in road transport is car (ca 11 000 shipments, which however only represents 1.5% of the number of shipments sent by lorry).

Of the total number of outbound shipments within Sweden, surveyed in the CFS 2001, the mode of transport could for almost 8% of the cases observed not be categorised.

Tabell 1 Mode of transport for all types of outbound shipments within Sweden (according to the unadjusted primary data in the CFS data base)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Road	762651	89,2	96,5	96,5
	Rail	7900	,9	1,0	97,5
	Cargo vessel	1285	,2	,2	97,7
	Rail and road	2599	,3	,3	98,0
	Ferry and road	7208	,8	,9	98,9
	Cargo vessel and road	1311	,2	,2	99,1
	Air or air and road	6883	,8	,9	100,0
	Rail and sea (and road)	394	,0	,0	100,0
	Total	790231	92,4	100,0	
Missing	Other or unknown	65038	7,6		
Total		855269	100,0		

Tabell 2 Mode of transport for all types of outbound shipments within Sweden (based on adjusted data representing the whole population in Sweden)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Road	63470434	92,0	97,2	97,2
	Rail	340206	,5	,5	97,7
	Cargo vessel	65538	,1	,1	97,8
	Rail and road	336710	,5	,5	98,4
	Ferry and road	572243	,8	,9	99,2
	Cargo vessel and road	57288	,1	,1	99,3
	Air or air and road	427513	,6	,7	100,0
	Rail and sea (and road)	14542	,0	,0	100,0
	Total	65284473	94,6	100,0	
Missing	Other or unknown	3718628	5,4		
Total		69003102	100,0		

In order to better understand the distribution of the use of different modes the sample of outbound shipments transported within Sweden was split into those which are going to destinations abroad and those which most likely have their final destination in Sweden (i.e. there is no known export country). When only outbound shipments with no known mode of transport outside Sweden are regarded the dominance of road transport is even bigger than for the total sample (see table 3 and 4).

Tabell 3Mode of transport for outbound shipments within Sweden with likely final destination in Sweden i.e with no stated export country (according to the unadjusted primary data in the CFS data base)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Road	703460	94,9	98,8	98,8
	Rail	4942	,7	,7	99,5
	Cargo vessel	139	,0	,0	99,5
	Rail and road	1500	,2	,2	99,7
	Ferry and road	1073	,1	,2	99,9
	Cargo vessel and road	81	,0	,0	99,9
	Air or air and road	594	,1	,1	100,0
	Rail and sea (and road)	178	,0	,0	100,0
	Total	711967	96,0	100,0	
Missing	Other or unknown	29433	4,0		
Total		741400	100,0		

Tabell 4Mode of transport for outbound shipments within Sweden with likely final destination in Sweden i.e with no stated export country (based on adjusted data representing the whole population in Sweden)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Road	58628987	94,4	98,8	98,8
	Rail	196910	,3	,3	99,1
	Cargo vessel	7153	,0	,0	99,1
	Rail and road	257225	,4	,4	99,5
	Ferry and road	119399	,2	,2	99,7
	Cargo vessel and road	1492	,0	,0	99,7
	Air or air and road	148307	,2	,2	100,0
	Rail and sea (and road)	4813	,0	,0	100,0
	Total	59364287	95,6	100,0	
Missing	Other or unknown	2760876	4,4		
Total		62125163	100,0		

When the purely domestic shipments are compared with the domestic part of export shipments a number of differences can be noted (see table 3/4 and 5/6). For those shipments that continue outside Sweden the frequency of the mode Road has decreased and the frequency of all other modes have increased. Especially the two modes air or ferry-road have a higher percentage of the outbound shipments. The increase in these two latter modes indicated that the question could have been interpreted in such a way that it is the pre-transport (i.e. from the point of departure to the airport or the ferry terminal) that is entered as air-road or ferry-road for the transport within Sweden.

Tabell 5 Mode of transport for outbound shipments within Sweden that will continue as transports abroad (according to the unadjusted primary data in the CFS data base)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Road	59191	52,0	75,6	75,6
	Rail	2958	2,6	3,8	79,4
	Cargo vessel	1146	1,0	1,5	80,9
	Rail and road	1099	1,0	1,4	82,3
	Ferry and road	6135	5,4	7,8	90,1
	Cargo vessel and road	1230	1,1	1,6	91,7
	Air or air and road	6289	5,5	8,0	99,7
	Rail and sea (and road)	216	,2	,3	100,0
	Total	78264	68,7	100,0	
Missing	Other or unknown	35605	31,3		
Total		113869	100,0		

Tabell 6 Mode of transport for outbound shipments within Sweden that will continue as transports abroad (based on adjusted data representing the whole population in Sweden)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Road	4841447	70,4	81,8	81,8
	Rail	143296	2,1	2,4	84,2
	Cargo vessel	58385	,8	1,0	85,2
	Rail and road	79484	1,2	1,3	86,5
	Ferry and road	452844	6,6	7,6	94,2
	Cargo vessel and road	55796	,8	,9	95,1
	Air or air and road	279206	4,1	4,7	99,8
	Rail and sea (and road)	9728	,1	,2	100,0
	Total	5920186	86,1	100,0	
Missing	Other or unknown	957752	13,9		
Total		6877939	100,0		

There is a much higher percentage of unknown modes for transports inside Sweden when the outbound shipments are bound for export than when they have a domestic destination. This seems to be linked to the fact that it is a matter of export shipments, since the same level of missing cases are shown for outbound transports outside Sweden (if the unadjusted primary data is used).

Outbound transports outside Sweden

The transport mode for a large part of the outbound shipments outside Sweden is unknown (see table 5 and 6). It is logical that the knowledge about transport modes decreases with the distance from the origin, and this is particularly obvious when the transport starts with road (See also chapter 2.8). The situation is more or less the same as for the missing values for the domestic part of the outbound export shipments. If shipments with known modes of transports are considered the most frequently used modes are:

- road
- ferry and road
- air
- cargo vessel

In this case road transports is not as dominating (which is natural since Sweden is a peninsula).

Tabell 7: Mode of transport outside Sweden for outbound shipments (according to the unadjusted primary data in the CFS data base)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Road	31868	28,0	37,8	37,8
	Rail	712	,6	,8	38,6
	Ferry	1168	1,0	1,4	40,0
	Cargo vessel	12701	11,2	15,1	55,1
	Rail and road	841	,7	1,0	56,1
	Ferry and road	16917	14,9	20,1	76,1
	Cargo vessel and road	3492	3,1	4,1	80,3
	Air or air-road	14990	13,2	17,8	98,1
	Rail and sea (road)	1634	1,4	1,9	100,0
	Total	84323	74,1	100,0	
Missing	Other or unknown	29546	25,9		
Total		113869	100,0		

Tabell 8 Mode of transport outside Sweden for outbound shipments (based on adjusted data representing the whole population in Sweden)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Road	2254789	32,8	37,3	37,3
	Rail	40503	,6	,7	38,0
	Ferry	77896	1,1	1,3	39,2
	Cargo vessel	418182	6,1	6,9	46,2
	Rail and road	43464	,6	,7	46,9
	Ferry and road	1813922	26,4	30,0	76,9
	Cargo vessel and road	219963	3,2	3,6	80,5
	Air or air-road	1107145	16,1	18,3	98,8
	Rail and sea (road)	71887	1,0	1,2	100,0
	Total	6047752	87,9	100,0	
Missing	Other or unknown	830187	12,1		
Total		6877939	100,0		

2.1.2. Mode of transport for inbound shipments

The mode of transport for inbound shipments within Sweden is also dominated by road transports (see table 9a,b). The most frequently used modes are:

- road
- ferry and road
- air

If inbound shipments within Sweden are compared with the domestic part of the outbound shipments bound for another country (see table 5), which is comparable in that sense that both of them are the Swedish part of an international transport chain, a similar pattern is shown with respect to mode selection.

Tabell 9a Mode of transport for inbound shipments within Sweden (according to the unadjusted primary data in the CFS data base)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Road	43634	72,6	83,4	83,4
	Rail	1211	2,0	2,3	85,7
	Cargo vessel	275	,5	,5	86,2
	Rail and road	879	1,5	1,7	87,9
	Ferry and road	3065	5,1	5,9	93,8
	Cargo vessel and road	387	,6	,7	94,5
	Air or air and road	2758	4,6	5,3	99,8
	Rail and sea (and road)	112	,2	,2	100,0
	Total	52321	87,0	100,0	
Missing	Other or unknown	7820	13,0		
Total		60141	100,0		

Tabell 9b Mode of transport for inbound shipments within Sweden (based on adjusted data representing the whole population in Sweden)

	Trp mode in Sweden	Frequency	Percent	Valid percent	Cumulative percent
Valid	Road	3 401 184	72,0	78,3	78,3
	Railway	114 382	2,4	2,6	80,9
	Cargo vessel	6 582	0,1	0,2	81,1
	Rail and road	52 091	1,1	1,2	82,3
	Ferry and road	402 286	8,5	9,3	91,6
	Cargo vessel and road	34 023	0,7	0,8	92,3
	Air or air and road	316 939	6,7	7,3	99,6
	Rail and sea (and road)	15 647	0,3	0,4	100,0
	Total	4 343 133	92,0	100,0	
Missing	Other or unknown	379 030	8,0		
Total		4 722 163	100,0		

Similar to outbound shipments road transport does not have such a dominating role for the transports outside Sweden and ferry-road as well as air transports have increased in importance in this case (see table 10a,b).

Tabell 10a Mode of transport for inbound transports outside Sweden (according to the unadjusted primary data in the CFS data base)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Road	18691	31,1	33,3	33,3
	Rail	1658	2,8	2,9	36,2
	Cargo vessel	888	1,5	1,6	37,8
	Rail and road	955	1,6	1,7	39,5
	Ferry and road	21374	35,5	38,0	77,5
	Cargo vessel and road	3081	5,1	5,5	83,0
	Air or air and road	8655	14,4	15,4	98,4
	Rail and sea (and road)	910	1,5	1,6	100,0
	Total	56212	93,5	100,0	
Missing	Other or unknown	3929	6,5		
Total		60141	100,0		

Tabell 10b Mode of transport for inbound transports outside Sweden (based on adjusted data representing the whole population in Sweden)

	Trp mode in Sweden	Frequency	Percent	Valid percent	Cumulative percent
Valid	Road	1 253 431	26,5	28,5	28,5
	Railway	70 096	1,5	1,6	30,1
	Cargo vessel	47 142	1,0	1,1	31,2
	Rail and road	54 466	1,2	1,2	32,4
	Ferry and road	1 755 223	37,2	39,9	72,3
	Cargo vessel and road	230 643	4,9	5,2	77,6
	Air or air and road	933 598	19,8	21,2	98,8
	Rail and sea (and road)	53 173	1,1	1,2	100,0
	Total	4 397 772	93,1	100,0	
Missing	Other or unknown	379 030	8,0		
Total		4 722 163	100,0		

2.2. Transport distances and point of departure linked to transport mode selection

In the CFS 2001 data there are significant differences in average transport distances between the transport modes. There are also differences in mode selection between regions. The transport distance has been calculated based on a STAN distances matrix and the identity of municipalities from/to the shipments goes, and this distance constitutes an approximation of the actual transport distance

2.2.1. Differences in transport distance between modes used for outbound shipments within Sweden

The transport distances for the different modes of transport for outbound transports within Sweden differ significantly (see table 11 and table 12). The different categories of modes for outbound transports within Sweden (that differ significantly from each other) have been listed in descending order of average transport distance based on pair wise comparisons:

- Rail and sea; Rail and road
- Railway
- Road; Ferry and road
- Cargo vessel and road

Cargo vessel has only shorter transport distances than rail-sea and rail-road but at the same time the distance doe not differ from any of the other modes of transport. Air (and air-road) does not differ significantly from any other mode.
The observed distances are in general shorter than the real distances due to the way they have been calculated. Some may argue that this also represents a special problem for the sea transports not showing the real distance travelled. However, if (as in this case) the purpose is to identify the decision parameters from a shipper's point of view, this should not be a problem.

The transport distances for the last mode in the list above (cargo vessel-road) are anomalies. The nature of this mode indicates that it is suitable for long distances and still when they are compared with the other modes it has the shortest transport distance. However, there might be a simple explanation for this and it is that the most of the calculated distances are related to the pre-transport made by road (from the consigner to the airport or the harbour). For instance, if what has been

reported as pure air transports are compared with the combination air and road the first has an average distance of 370 km and the latter an average of 180 (based on unadjusted primary data). This may support the argument about pre-transport but at the same time it is unlikely that there should be any transports just using air as a single mode. The hypothesis about pre-transport is also supported by an analysis of the sample split into transports within Sweden going to domestic or foreign destinations (see table 13 and 14).

The mode road contains several different modes, which have a relatively large span in average distance. In the group road transport the average distance for outbound transports within Sweden (for the unadjusted data) for the following individual modes: lorry 270 km, bus 220 and car 50 km. However, it must be observed that these distances do not correctly represent the average distances for all transports in Sweden, since they are based on the unadjusted data.

Tabell 11 Average transport distances (in km) for different modes of outbound transports within Sweden (according to the adjusted data in the CFS data base)

	Number of			95 % Confidence Interval			
Trp mode in Sweden	observations	Mean	Std Error	Lower bound	Upper bound	Min	Max
Other or unknown	22 775	294,4	24,5	246,4	342,4	5,3	1 730,2
Road	654 729	276,6	4,4	268,0	285,2	5,3	1 718,8
Railway	6 510	386,2	11,5	363,7	408,7	9,4	1 706,1
Cargo vessel	190	260,3	90,2	83,5	437,1	32,1	1 371,8
Rail and road	2 434	453,2	29,4	395,6	510,8	12,7	1 708,9
Ferry and road	4 946	290,8	7,8	275,5	306,1	15,4	1 157,6
Cargo vessel and road	762	247,4	14,7	218,6	276,2	18,9	1 289,7
Air or air and road	5 712	473,3	176,9	126,6	820,0	12,7	1 706,8
Rail and sea (and road)	366	601,7	102,5	400,8	802,6	26,6	1 405,2
Total	698 424	280,1	4,5	271,3	288,9	5,3	1730,2

Tabell 12: Pairwise comparisons of transport distances (in km) for outbound shipments within Sweden for different modes of transport (according to the adjusted data in the CFS data base)

			95 % Confidence Interval		
Trp mode in Sweden	**Trp mode in Sweden**	**Mean Difference**	**Std Error**	**Lower bound**	**Upper bound**
Other or unknown	Road	17,8	24,9	-31,0	66,7
	Railway	-91,9	27,1	-144,9	-38,8
	Cargo vessel	34,1	93,5	-149,1	217,3
	Rail and road	-158,8	38,4	-234,0	-83,6
	Ferry and road	3,6	25,8	-47,0	54,1
	Cargo vessel and road	47,0	28,6	-9,1	103,1
	Air or air and road	-178,9	178,6	-528,9	171,1
	Rail and sea (and road)	-307,3	105,4	-513,9	-100,8
Road	Other or unknown	-17,8	24,9	-66,7	31,0
	Railway	-109,7	12,3	-133,9	-85,5
	Cargo vessel	16,3	90,3	-160,6	193,2
	Rail and road	-176,6	29,9	-235,2	-118,1
	Ferry and road	-14,3	9,0	-31,9	3,3
	Cargo vessel and road	29,2	15,4	-1,1	59,4
	Air or air and road	-196,7	176,8	-543,3	149,8
	Rail and sea (and road)	-325,1	102,6	-526,2	-124,1
Railway	Other or unknown	91,9	27,1	38,8	144,9
	Road	109,7	12,3	85,5	133,9
	Cargo vessel	126,0	90,9	-52,2	304,1
	Rail and road	-67,0	31,6	-128,8	-5,1
	Ferry and road	95,4	13,9	68,2	122,6
	Cargo vessel and road	138,8	18,7	102,2	175,5
	Air or air and road	-87,0	177,2	-434,4	260,4
	Rail and sea (and road)	-215,4	103,1	-417,5	-13,4
Cargo vessel	Other or unknown	-34,1	93,5	-217,3	149,1
	Road	-16,3	90,3	-193,2	160,6
	Railway	-126,0	90,9	-304,1	52,2
	Rail and road	-192,9	92,2	-373,7	-12,1
	Ferry and road	-30,6	90,5	-208,0	146,8
	Cargo vessel and road	12,9	91,4	-166,2	192,0
	Air or air and road	-213,0	198,5	-602,1	176,1
	Rail and sea (and road)	-341,4	136,5	-609,1	-73,8
Rail and road	Other or unknown	158,8	38,4	83,6	234,0
	Road	176,6	29,9	118,1	235,2
	Railway	67,0	31,6	5,1	128,8
	Cargo vessel	192,9	92,2	12,1	373,7
	Ferry and road	162,4	30,4	102,7	222,0
	Cargo vessel and road	205,8	32,4	142,3	269,3
	Air or air and road	-20,1	179,1	-371,2	331,0
	Rail and sea (and road)	-148,5	106,6	-357,5	60,5
Ferry and road	Other or unknown	-3,6	25,8	-54,1	47,0
	Road	14,3	9,0	-3,3	31,9
	Railway	-95,4	13,9	-122,6	-68,2
	Cargo vessel	30,6	90,5	-146,8	208,0
	Rail and road	-162,4	30,4	-222,0	-102,7
	Cargo vessel and road	43,4	16,5	11,1	75,7
	Air or air and road	-182,4	176,9	-529,1	164,2
	Rail and sea (and road)	-310,9	102,8	-512,3	-109,4
Cargo vessel and road	Other or unknown	-47,0	28,6	-103,1	9,1
	Road	-29,2	15,4	-59,4	1,1
	Railway	-138,8	18,7	-175,5	-102,2
	Cargo vessel	-12,9	91,4	-192,0	166,2
	Rail and road	-205,8	32,4	-269,3	-142,3
	Ferry and road	-43,4	16,5	-75,7	-11,1
	Air or air and road	-225,9	177,4	-573,6	121,9
	Rail and sea (and road)	-354,3	102,8	-555,8	-152,8
Air or air and road	Other or unknown	178,9	178,6	-171,1	528,9
	Road	196,7	176,8	-149,8	543,3
	Railway	87,0	177,2	-260,4	434,4
	Cargo vessel	213,0	198,5	-176,1	602,1
	Rail and road	20,1	179,1	-331,0	371,2
	Ferry and road	182,4	176,9	-164,2	529,1
	Cargo vessel and road	225,9	177,4	-121,9	573,6
	Rail and sea (and road)	-128,4	204,4	-529,1	272,2
Rail and sea (and road)	Other or unknown	307,3	105,4	100,8	513,9
	Road	325,1	102,6	124,1	526,2
	Railway	215,4	103,1	13,4	417,5
	Cargo vessel	341,4	136,5	73,8	609,1
	Rail and road	148,5	106,6	-60,5	357,5
	Ferry and road	310,9	102,8	109,4	512,3
	Cargo vessel and road	354,3	102,8	152,8	555,8
	Air or air and road	128,4	204,4	-272,2	529,1

In order to better understand the distribution of different modes, the sample of outbound shipments within Sweden was split into those going to destinations abroad and those most likely having their final destination in Sweden[1].

Tabell 13: Average transport distances (in km) for outbound transports within Sweden with likely final destination in Sweden, i.e. no stated export country (according to the adjusted data in the CFS data base)

	Number of			95 % Confidence Interval			
Trp mode in Sweden	observations	Mean	Std Error	Lower bound	Upper bound	Min	Max
Other or unknown	22 007	295,9	25,7	245,5	346,3	5,3	1 730,2
Road	620 066	274,2	4,3	265,8	282,6	5,3	1 718,8
Railway	4 560	381,5	16,0	350,1	412,9	9,4	1 706,1
Cargo vessel	134	220,4	100,2	24,0	416,8	32,1	1 371,8
Rail and road	1 407	430,3	34,9	361,9	498,7	12,7	1 708,9
Ferry and road	1 037	281,4	10,1	261,6	301,2	15,4	1 157,6
Cargo vessel and road	17	88,7	40,7	8,9	168,5	18,9	1 289,7
Air or air and road	592	993,7	178,1	644,6	1 342,8	12,7	1 706,8
Rail and sea (and road)	175	468,2	225,7	25,8	910,6	26,6	1 405,2
Total	649 995	278,1	4,5	269,3	286,9	5,3	1730,2

When the transport distances for a domestic transport with the final destination in Sweden is compared with a transport that has the final destination outside Sweden the general pattern is the same in both cases. Rail combinations representing the longer distances and road combinations the shorter. In general the transport distances are longer for export shipment, which is logical since no short local transports are included. However, one striking difference can be noted. The air transport distances are much shorter for export shipments (air transport has the shortest transport distance for export shipments and the longest for domestics shipments), which could be explained by the fact that they are pre-transports in the export case. However, no information is available about the actual air transport distances since the point of arrival is (per definition) not included in the data for transports within Sweden.

[1] In this case the shipments have no known mode of transport outside Sweden, which however is not the same as that they will their final destination in Sweden but it is used as a proxy due to technical reasons.

Tabell 14: Average transport distances (in km) for outbound transports within Sweden with final destination outside the country (i.e. the domestic part of an export shipment) (according to the adjusted data in the CFS data base)

Trp mode in Sweden	Number of observations	Mean	Std Error	95 % Confidence Interval		Min	Max
				Lower bound	Upper bound		
Other or unknown	768	261,9	17,2	228,2	295,6	15,0	1 141,2
Road	34 663	309,1	20,7	268,5	349,7	12,7	1 668,5
Railway	1 950	394,4	14,3	366,4	422,4	33,8	1 445,0
Cargo vessel	56	380,1	18,8	343,3	416,9	84,1	881,6
Rail and road	1 027	532,3	31,2	471,1	593,5	29,1	1 414,3
Ferry and road	3 909	293,8	9,9	274,4	313,2	17,4	1 157,6
Cargo vessel and road	745	250,0	14,9	220,8	279,2	18,9	1 289,7
Air or air and road	5 120	124,7	14,4	96,5	152,9	12,7	825,0
Rail and sea (and road)	191	669,0	38,1	594,3	743,7	36,4	1 405,2
Total	48 429	303,8	17,1	270,3	337,3	12,7	1668,5

2.2.2. Differences in transport distance intervals and transport modes for outbound shipments within Sweden

There is a significant difference between the different distance intervals and the transport modes used. When reviewing the characteristics of different modes regarding in which transport distance interval they are used more than expected[2], the following pattern emerges:

- Road: no pattern visible.
- Railway: overrepresentation for the two longest intervals, i.e. above 400 km and underrepresented for distances below 100 km
- Rail and road: overrepresentation for distances above 500 km
- Cargo vessel: underrepresentated for distances below 25 km
- Ferry and road: overrepresentated in the interval 200-300 km
- Cargo vessel and road: underrepresented above 400 km
- Air or air and road: overrepresented for short distances, 25-50 km
- Rail and sea (and road): overrepresented for the longest distances, above 500 km

The transport distance intervals for outbound shipments within Sweden could not be calculated in 19% of the cases observed.

The modes with the longest average transport distances are also overrepresented in the long distance intervals. Ferry-road, which has among the shortest transport distances, is overrepresented in the medium intervals. Cargo vessel –road that had the shortest average transport distance (an anomaly in itself) is underrepresented in the longest distance intervals.

[2] If all modes are equally distributed among the intervals with regards to the size of the different groups

Tabell 15: Cross tabulation of transport distance intervals for outbound shipments within Sweden and transport modes (according to the adjusted data in the CFS data base)

Trp mode in Sweden		Distance interval																Total	
		]0 , 25] km		]25 , 50] km		]50 , 100] km		]100 , 200] km		]200 , 300] km		]300 , 400] km		]400 , 500] km		> 500 km			
		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Other or unknown	Count	120 993	44 702	244 801	171 709	279 237	173 875	351 962	147 380	344 138	156 541	268 357	116 402	229 016	75 991	389 526	123 054	2 228 031	695 895
	Exp Count	130 551	46 856	212 744	71 146	258 571	84 437	403 364	126 970	378 448	120 441	267 171	88 708	238 023	74 653	339 159	108 053	2 228 031	695 895
	Observations	2 569		1 945		2 151		3 408		2 931		2 311		2 746		4 714		22 775	
Road	Count	3 282 624	792 186	5 210 754	652 749	6 393 096	591 255	10 059 555	1 057 024	9 327 569	1 123 786	6 620 010	1 112 306	5 822 119	558 975	8 143 868	811 555	54 859 596	4 998 212
	Exp Count	3 214 493	755 796	5 238 270	646 413	6 366 662	593 055	9 931 821	1 045 766	9 318 324	1 104 183	6 578 398	1 073 355	5 860 709	556 079	8 350 920	807 616	54 859 596	4 998 212
	Observations	39 029		53 582		75 017		136 593		115 880		85 778		65 521		83 329		654 729	
Railway	Count	1 161	759	8 021	4 641	13 507	6 507	65 543	12 209	50 775	16 419	23 909	9 864	58 166	16 355	69 627	9 747	290 707	53 211
	Exp Count	17 034	4 441	27 758	5 841	33 738	6 665	52 630	9 878	49 379	9 456	34 860	7 405	31 057	6 037	44 252	8 844	290 707	53 211
	Observations	45		179		228		902		865		620		1 591		2 080		6 510	
Cargo vessel	Count					221	160	335	163	1 242	525	1 231	309			1 808	592	9 383	7 507
	Exp Count					1 089	875	1 699	1 361	1 594	1 278	1 125	908			1 428	1 148	9 383	7 507
	Observations					9		14		36		51				51		190	
Rail and road	Count	7 456	5 832	10 217	4 862	11 752	5 847	38 476	26 218	46 850	32 946	27 322	24 044	64 570	36 958	113 977	40 157	320 619	132 268
	Exp Count	18 787	8 481	30 614	12 961	37 209	15 536	58 045	24 006	54 460	22 669	38 447	16 390	34 252	14 377	48 806	20 653	320 619	132 268
	Observations	83		89		93		204		288		204		346		1 127		2 434	
Ferry and road	Count	5 735	3 830	27 129	14 093	46 534	22 997	50 169	12 891	140 831	31 724	62 210	20 199	66 780	21 236	58 426	12 688	457 814	73 608
	Exp Count	26 826	6 544	43 714	8 255	53 131	9 554	82 883	13 661	77 763	13 385	54 898	10 711	48 909	8 496	69 690	12 421	457 814	73 608
	Observations	25		148		380		630		1 190		752		907		914		4 946	
Cargo vessel	Count			2 817	2 683	3 525	1 030	7 717	1 913	6 383	2 049	6 578	3 904			3 022	898	34 786	6 339
and road	Exp Count			3 322	696	4 037	794	6 298	1 178	5 909	1 129	4 171	890			5 295	1 049	34 786	6 339
	Observations			27		105		214		206		111				48		762	
Air or	Count	11 526	5 564	83 502	29 500	50 032	25 928	32 031	8 757	31 792	14 940	13 951	8 939	15 228	8 028	130 729	153 682	368 790	162 338
air and road	Exp Count	21 609	10 265	35 214	15 839	42 799	18 937	66 766	29 267	62 642	27 743	44 223	20 036	39 398	17 435	56 139	25 835	368 790	162 338
	Observations	128		3 034		292		643		738		96		232		549		5 712	
Rail and sea	Count	0	0			923	588	196	100	1 264	459	1 366	452			6 790	1 359	13 693	5 112
(and road)	Exp Count	802	335			1 589	606	2 479	932	2 326	877	1 642	638			2 084	795	13 693	5 112
	Observations	0				22		9		23		17				243		366	
Total	Count	3 432 690	793 643	5 593 840	678 026	6 798 826	616 915	10 605 984	1 065 853	9 950 844	1 135 200	7 024 934	1 118 643	6 258 529	567 063	8 917 773	836 484	58 583 420	5 045 328
	Exp Count	3 432 690	793 643	5 593 840	678 026	6 798 826	616 915	10 605 984	1 065 853	9 950 844	1 135 200	7 024 934	1 118 643	6 258 529	567 063	8 917 773	836 484	58 583 420	5 045 328
	Observations	41 911		59 049		78 297		142 617		122 157		89 940		71 398		93 055		698 424	

Significantly overrepresented | Significantly underrepresented | Classified information

By comparing domestic shipments that reach their final destination within Sweden and those that continue abroad a potential problem with the formulation of the question about the transport modes used within Sweden[3] has been identified. For instance air or air/road is rarely used for short distances if it is a purely domestic transport, however, if it is an export shipment there is a high number of shipments in the short distance intervals, indicating that distance for air/air road has been calculated for the pre-transport (See table 11). The same argument can be used for cargo vessel – road.

[3] I.e. if an export country has been stated.

Tabell 16: **Transport distance intervals for different modes of transport for outbound shipments with likely final destination in Sweden (according to the unadjusted primary data in the CFS data base)**

Trp mode in Sweden		Distance interval																Total	
		]0 , 25] km		]25 , 50] km		]50 , 100] km		]100 , 200] km		]200 , 300] km		]300 , 400] km		]400 , 500] km		> 500 km			
		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Other or unknown	Count	112 238	44 385	233 182	170 326	260 049	173 598	347 217	147 366	327 664	155 871	261 750	116 067	220 716	75 767	365 840	119 192	2 128 657	686 013
	Exp Count	132 109	48 631	198 340	68 755	250 002	84 411	390 793	126 864	364 557	119 654	253 358	87 307	223 517	72 237	315 980	103 098	2 128 657	686 013
	Observations	2 510		1 898		2 001		3 323		2 792		2 251		2 702		4 530		22 007	
Road	Count	3 227 636	792 127	4 776 472	636 873	6 056 175	586 085	9 489 416	1 050 373	8 770 472	1 112 835	6 095 989	1 107 780	5 336 691	511 677	7 399 927	658 197	51 152 779	4 932 965
	Exp Count	3 174 660	763 004	4 766 227	632 958	6 007 694	588 389	9 390 959	1 042 749	8 760 502	1 097 522	6 088 332	1 075 771	5 371 229	512 308	7 593 176	670 558	51 152 779	4 932 965
	Observations	38 467		51 245		72 306		128 521		111 133		77 863		62 831		77 700		620 066	
Railway	Count	1 161	759	6 848	4 623	12 643	6 485	31 443	8 809	33 026	15 816	21 370	9 699	31 504	15 270	46 268	9 048	184 263	50 819
	Exp Count	11 436	3 813	17 169	5 105	21 641	6 197	33 828	9 425	31 557	8 890	21 931	6 571	19 348	5 495	27 352	7 820	184 263	50 819
	Observations	45		168		205		733		694		573		775		1 367		4 560	
Cargo vessel	Count	0	0	4 191	7 439	192	159	193	63	375	62					876	495	7 042	7 474
	Exp Count	437	471	656	701	827	880	1 293	1 373	1 206	1 282					1 045	1 112	7 042	7 474
	Observations	0		9		8		10		20						32		134	
Rail and road	Count	7 456	5 832	5 023	3 158			32 334	25 776	43 615	32 919					71 868	38 544	248 661	131 467
	Exp Count	15 432	8 640	23 169	12 462			45 651	24 158	42 586	22 644					36 911	19 831	248 661	131 467
	Observations	83		28				153		177						515		1 407	
Ferry and road	Count			1 505	870	1 417	828	9 392	5 946	63 433	17 740	11 991	6 785	16 516	9 125	3 808	2 043	109 469	33 256
	Exp Count			10 200	3 296	12 857	4 020	20 097	6 150	18 748	5 810	13 029	4 251	11 495	3 578	16 250	5 079	109 469	33 256
	Observations			9		17		129		409		197		227		44		1 037	
Cargo vessel	Count									0	0	0	0	0	0			556	503
and road	Exp Count									95	86	66	60	58	53			556	503
	Observations									0		0		0				17	
Air or	Count			285	400			682	1 041	6 789	5 365	7 944	7 767	8 435	7 309	123 243	153 074	147 937	155 591
air and road	Exp Count			13 784	14 503			27 159	28 494	25 336	26 673	17 608	18 620	15 534	16 335	21 960	23 506	147 937	155 591
	Observations			3				8		38		40		49		450		592	
Rail and sea	Count	0	0							0	0	0	0	42	76			4 590	4 808
(and road)	Exp Count	285	303							786	824	546	576	482	506			4 590	4 808
	Observations	0								0		0		1				175	
Total	Count	3 350 369	793 493	5 030 026	658 786	6 340 204	608 427	9 910 724	1 059 114	9 245 373	1 122 701	6 425 305	1 113 382	5 668 512	518 971	8 013 439	687 279	53 983 953	4 975 213
	Exp Count	3 350 369	793 493	5 030 026	658 786	6 340 204	608 427	9 910 724	1 059 114	9 245 373	1 122 701	6 425 305	1 113 382	5 668 512	518 971	8 013 439	687 279	53 983 953	4 975 213
	Observations	41 113		53 404		74 596		132 879		115 263		81 134		66 846		84 760		649 995	

Significantly overrepresented | Significantly underrepresented | Classified information

When comparing the outbound shipments that either have their final destination in Sweden or have it in another country the following the following observations must be made. Shipments that end up outside Sweden are missing information about distances in 45% of the cases observed.

Tabell 17: Transport distance intervals for different modes of transport for the domestic part of export shipments (according to the adjusted data in the CFS data base)

Trp mode in Sweden		Distance interval																Total	
		]0 , 25] km		]25 , 50] km		]50 , 100] km		]100 , 200] km		]200 , 300] km		]300 , 400] km		]400 , 500] km		> 500 km			
		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Other or unknown	Count	8 755	5 109	11 619	19 198	19 188	8 512	4 745	1 103	16 474	14 508	6 607	8 657					99 374	46 084
	Exp Count	1 779	911	12 182	6 645	9 909	5 100	15 022	7 314	15 242	7 750	12 955	6 389					99 374	46 084
	Observations	59		47		150		85		139		60						768	
Road	Count	54 988	10 547	434 283	142 723	336 920	76 812	570 139	87 437	557 097	130 086	524 021	83 497	485 428	213 957	743 941	416 315	3 706 817	673 367
	Exp Count	66 344	11 618	454 391	124 771	369 613	78 920	560 326	78 619	568 556	116 477	483 255	72 843	475 508	187 895	728 824	359 004	3 706 817	673 367
	Observations	562		2 337		2 711		8 072		4 747		7 915		2 690		5 629		34 663	
Railway	Count	0	0	1 173	408	863	457	34 100	8 394	17 749	4 167	2 538	1 002	26 661	5 844	23 359	3 396	106 444	13 464
	Exp Count	1 905	482	13 048	3 730	10 614	2 811	16 090	3 570	16 327	4 020	13 877	3 073	13 655	3 868	20 929	7 590	106 444	13 464
	Observations	0		11		23		169		171		47		816		713		1 950	
Cargo vessel	Count	0	0					142	149	868	522	342	278					2 341	695
	Exp Count	42	16					354	122	359	131	305	106					2 341	695
	Observations	0						4		16		14						56	
Rail and road	Count			5 194	3 551	3 040	3 855	6 141	4 805			1 951	1 158	10 288	4 101	42 109	10 826	71 959	13 964
	Exp Count			8 821	2 836	7 175	2 178	10 877	2 867			9 381	2 482	9 231	2 927	14 148	5 598	71 959	13 964
	Observations			61		58		51				31		103		612		1 027	
Ferry and road	Count	4 328	3 753	25 625	14 067	45 117	22 982	40 777	11 454	77 398	26 279	50 219	19 041	50 264	19 248	54 618	12 525	348 345	65 808
	Exp Count	6 235	1 741	42 701	13 141	34 734	11 704	52 656	12 896	53 430	15 862	45 413	12 067	44 685	14 007	68 491	26 038	348 345	65 808
	Observations	20		139		363		501		781		555		680		870		3 909	
Cargo vessel	Count			2 636	2 683	3 494	1 030	7 687	1 913			6 578	3 904	1 549	1 122	2 974	896	34 230	6 318
and road	Exp Count			4 196	1 331	3 413	1 010	5 174	1 312			4 463	1 174	4 391	1 367	6 730	2 608	34 230	6 318
	Observations			17		103		213				111		19		46		745	
Air or	Count	11 321	5 550	83 217	29 475	49 679	25 887	31 349	8 695	25 003	13 944	6 006	4 425	6 792	3 197	7 486	10 897	220 854	45 317
air and road	Exp Count	3 953	1 156	27 073	9 164	22 022	7 492	33 384	8 392	33 875	10 047	28 793	8 389	28 331	8 967	43 424	16 812	220 854	45 317
	Observations	127		3 031		289		635		700		56		183		99		5 120	
Rail and sea	Count	0	0					179	99	1 264	459	1 366	452	705	269	5 230	1 359	9 103	1 738
(and road)	Exp Count	163	48					1 376	358	1 396	397	1 187	314	1 168	369	1 790	701	9 103	1 738
	Observations	0						8		23		17		15		123		191	
Total	Count	82 321	14 089	563 814	148 646	458 621	98 033	695 260	89 478	705 472	139 112	599 629	86 963	590 017	215 572	904 335	417 515	4 599 467	688 294
	Exp Count	82 321	14 089	563 814	148 646	458 621	98 033	695 260	89 478	705 472	139 112	599 629	86 963	590 017	215 572	904 335	417 515	4 599 467	688 294
	Observations	798		5 645		3 701		9 738		6 894		8 806		4 552		8 295		48 429	

Significantly overrepresented | Significantly underrepresented | Classified information

2.2.3. Origin of outbound shipments

The dominating mode of transport (in absolute numbers) is road transport, regardless from which region a shipment originates. If the mode of transport for each region is viewed relatively the expected number of shipments per mode, the following modes of transport for outbound shipments have been used more frequently than expected in the stated regions (NB this is not the same as being the most frequently used mode).:

- Rail:Östergötland, Kronoberg, Halland, Dalarna, Gävleborgs, Norrbotten
- Cargo vessel: Gotland, Värmland, Gävleborg, Västernorrland
- Cargo vessel and road: Södermanland, Gävleborg, Västernorrland
- Rail and road: Värmland, Gävleborg
- Ferry and road: Kronoberg, Gotland
- Air: Uppsala, Södermanland, Östergötland, Västernorrland, Västerbotten
- Rail-sea: Södermanland, Östergötland, Dalarna, Gävleborg, Norrbotten.

Tabell 18 Origin of outbound shipments and mode of transport within Sweden (according to the adjusted data in the CFS data base)

Despatching region		Transport mode in Sweden																Total	
		Road		Railway		Cargo vessel		Rail and road		Ferry and road		Cargo vsl and road		Air or air and road		Rail and sea			
		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Stockholms län	Count	18 793 202	4 519 199			4 497	7 440	49 770	17 820	94 221	21 889	5 484	3 133	127 996	39 824			19 125 561	4 521 970
	Exp Count	18 594 039	4 432 717			19 203	5 522	98 672	43 141	167 681	42 509	16 789	4 008	125 210	52 849			19 125 561	4 521 970
	Observations	226 466				28		624		536		91		3 428				233 821	
Uppsala län	Count	894 112	401 668							1 735	494	0	0					920 791	402 100
	Exp Count	895 201	391 066							8 073	3 843	808	379					920 791	402 100
	Observations	5 228								35		0						5 367	
Södermanlands län	Count	1 308 375	289 304	594	374			422	177	12 315	3 378			13 974	8 931	962	421	1 342 861	292 879
	Exp Count	1 305 542	284 854	7 001	2 010			6 928	3 198	11 773	3 469			8 791	3 955	299	133	1 342 861	292 879
	Observations	13 313		11				6		323				511		30		14 539	
Östergötlands län	Count	2 086 123	635 109	26 113	8 457			1 462	974	43 409	18 541	3 285	977	23 899	14 713			2 189 601	638 777
	Exp Count	2 128 749	621 474	11 415	3 902			11 296	5 611	19 197	6 723	1 922	648	14 335	6 970			2 189 601	638 777
	Observations	12 563		182				29		1 171		81		777				14 910	
Jönköpings län	Count	5 126 783	3 164 178			0	0	2 917	2 612	42 832	27 879	2 467	2 983	17 072	16 416			5 194 934	3 168 120
	Exp Count	5 050 561	3 086 819			5 216	3 182	26 801	18 570	45 546	27 185	4 560	2 691	34 010	23 396			5 194 934	3 168 120
	Observations	62 355				0		11		384		20		88				62 895	
Kronobergs län	Count	1 707 221	385 464	29 012	10 095			12 365	5 443	46 129	16 838	4 401	2 994	3 677	5 151			1 803 167	388 612
	Exp Count	1 753 055	378 100	9 401	2 679			9 303	4 283	15 809	4 611	1 583	446	11 805	5 247			1 803 167	388 612
	Observations	21 862		119				56		178		112		9				22 338	
Kalmar län	Count	1 071 408	406 651	3 974	3 955					23 648	16 305	929	645					1 102 239	411 387
	Exp Count	1 071 606	400 083	5 746	2 381					9 664	4 113	968	397					1 102 239	411 387
	Observations	8 602		78						220		29						8 973	
Gotlands län	Count	85 918	85 647	0	0	988	292	0	0	36 719	34 332					0	0	126 037	93 648
	Exp Count	122 534	91 021	657	503	127	99	650	551	1 105	874					28	24	126 037	93 648
	Observations	799		0		61		0		420						0		1 283	
Blekinge län	Count	593 626	178 882	406	140	0	0	685	214	3 532	4 214	1 224	995					600 319	179 145
	Exp Count	583 635	174 232	3 130	1 098	603	231	3 097	1 563	5 263	1 884	527	183					600 319	179 145
	Observations	18 811		17		0		25		41		35						18 972	
Skåne län	Count	8 087 503	1 148 883	31 491	15 454			26 619	15 440	64 232	58 978	2 484	1 546	117 631	154 713			8 333 926	1 158 577
	Exp Count	8 102 316	1 128 003	43 448	9 802			42 996	18 336	73 067	17 577	7 316	1 603	54 560	23 067			8 333 926	1 158 577
	Observations	84 144		477				366		584		54		224				85 906	
Hallands län	Count	1 945 325	501 568	41 284	13 889			6 545	8 534	14 706	14 614	429	224	4 138	5 045			2 012 653	503 647
	Exp Count	1 956 719	490 124	10 493	3 258			10 384	4 893	17 646	5 607	1 767	538	13 176	6 078			2 012 653	503 647
	Observations	15 532		542				38		200		22		55				16 403	
Västra Götalands	Count	10 429 348	1 293 092	29 939	22 454			113 734	127 470	126 445	52 739	4 039	1 770	28 075	10 515			10 740 999	1 310 284
län	Exp Count	10 442 494	1 276 592	55 997	12 155			55 414	24 005	94 170	21 855	9 429	1 966	70 318	28 472			10 740 999	1 310 284
	Observations	113 246		164				280		2 179		102		457				116 904	
Värmlands län	Count	923 147	236 008	7 540	2 852					8 208	3 089	2 839	2 375	3 365	4 540			984 407	238 506
	Exp Count	957 049	231 945	5 132	1 573					8 631	2 698	864	261	6 445	2 968			984 407	238 506
	Observations	14 027		315						242		92		38				15 033	
Örebro län	Count	2 707 208	649 325	8 997	10 507					22 835	33 391	2 364	1 274	5 568	2 720			2 752 947	652 364
	Exp Count	2 676 439	634 811	14 352	4 288					24 136	7 448	2 417	709	18 023	8 178			2 752 947	652 364
	Observations	76 201		105						103		60		163				76 957	
Västmanlands län	Count	2 187 710	1 093 418			0	0	12 825	16 548	7 454	4 761	733	495			157	79	2 237 298	1 093 996
	Exp Count	2 175 121	1 064 589			2 246	1 195	11 543	7 226	19 615	10 082	1 964	996			498	305	2 237 298	1 093 996
	Observations	34 338				0		105		167		28				9		34 916	
Dalarnas län	Count	1 301 965	351 420	51 043	5 326	0	0	9 713	4 741	7 873	2 305			2 870	4 108			1 375 194	351 755
	Exp Count	1 336 976	342 221	7 169	2 259	1 381	482	7 095	3 405	12 057	3 877			9 003	4 182			1 375 194	351 755
	Observations	8 493		1 078		0		76		191				31				9 909	
Gävleborgs län	Count	745 154	166 720	11 283	2 832					10 747	9 083	3 947	1 215	3 399	3 912			836 685	169 488
	Exp Count	813 432	164 816	4 362	1 208					7 336	2 091	734	200	5 478	2 410			836 685	169 488
	Observations	7 193		181						101		69		12				7 869	
Västernorrlands	Count	1 093 315	296 842	16 279	13 431	5 437	1 564	14 982	18 403	2 509	1 138			5 855	1 634			1 150 503	299 991
län	Exp Count	1 118 529	291 753	5 998	1 949	1 155	408	5 936	2 882	10 087	3 287			7 532	3 528			1 150 503	299 991
	Observations	19 421		445		96		86		78				214				20 457	
Jämtlands län	Count	554 984	241 828	1 531	1 968	0	0	3 446	5 022	818	1 028	648	835					562 302	241 724
	Exp Count	546 675	235 068	2 932	1 375	565	277	2 901	1 713	4 930	2 324	494	228					562 302	241 724
	Observations	3 784		17		0		43		13		6						3 875	
Västerbottens län	Count	1 073 054	429 317	2 761	654			2 892	877	1 428	883	2 530	1 257	17 134	15 327			1 100 727	428 768
	Exp Count	1 070 137	417 078	5 739	2 455			5 679	3 182	9 650	4 174	966	410	7 206	3 945			1 100 727	428 768
	Observations	8 052		147				80		35		53		517				8 925	
Norrbottens län	Count	701 690	362 130	18 626	3 122	486	697	9 420	10 252			2 435	1 889			3 132	653	736 838	362 780
	Exp Count	716 360	352 811	3 841	2 010	740	403	3 801	2 424			647	337			164	102	736 838	362 780
	Observations	8 021		1 279		18		211				90				147		9 779	
Totalt	Count	63 417 169	5 985 709	340 071	56 929	65 495	14 734	336 531	134 788	571 895	104 573	57 261	9 062	427 044	163 912	14 521	5 496	65 229 987	5 994 728
	Exp Count	63 417 169	5 985 709	340 071	56 929	65 495	14 734	336 531	134 788	571 895	104 573	57 261	9 062	427 044	163 912	14 521	5 496	65 229 987	5 994 728
	Observations	762 451		7 900		1 285		2 599		7 208		1 311		6 883		394		790 031	

Significantly overrepresented | Significantly underrepresented | Classified information

For outbound shipments within Sweden, with domestics destinations, the following modes of transport have been more frequently used than expected in the stated regions:

- Rail: Halland, Dalarna, Norrbotten
- Cargo vessel: Gotland
- Cargo vessel and road: Stockholm
- Rail and road: Värmland
- Ferry and road: Östergötland, Gotland
- Rail and sea: Norrbotten

Specific for outbound shipments with domestic destinations, if they are compared with those with foreign, is that despatching units in Stockholm use cargo vessel-road more than expected and in Östergötland and Gotland ferry-road is overrepresented, and in Värmland rail-road is also overrepresented.

Tabell 19 Despatching region and mode of transport within Sweden for outbound shipments with domestic destinations (according to the adjusted data in the CFS data base)

Despatching region		Transport mode in Sweden															
		Road		Railway		Cargo vessel		Rail and road		Ferry and road		Cargo vsl and road		Air or air and road		Rail and sea		Total	
		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Stockholms län	Count	17 734 957	4 462 771			4 264	7 440	38 566	14 337	45 967	13 336			20 954	23 742	0	0	17 895 924	4 464 105
	Exp Count	17 674 264	4 425 427			2 156	2 295	77 561	42 736	36 006	12 926			44 657	47 577	1 447	1 594	17 895 924	4 464 105
	Observations	217 691				12		534		182				88		0		221 217	
Uppsala län	Count	685 067	381 730			0	0	0	0	0	0	0	0			0	0	685 688	381 732
	Exp Count	677 195	377 058			83	98	2 972	2 267	1 380	880	17	11			55	68	685 688	381 732
	Observations	4 606				0		0		0		0				0		4 615	
Södermanlands län	Count	1 163 143	267 982			0	0			3 244	2 071	0	0	5 155	8 020			1 172 785	270 199
	Exp Count	1 158 259	266 890			141	152			2 360	931	29	12	2 927	3 162			1 172 785	270 199
	Observations	11 235				0				17		0		46				11 326	
Östergötlands län	Count	1 956 081	626 472	11 268	6 439			1 282	880	9 864	3 767	0	0			0	0	1 979 024	626 865
	Exp Count	1 954 512	619 370	6 567	2 795			8 577	5 227	3 982	1 771	50	23			160	181	1 979 024	626 865
	Observations	11 041		75				23		303		0				0		11 446	
Jönköpings län	Count	4 843 047	3 158 100	1 217	1 451	0	0	2 570	2 565	3 551	3 257	0	0	9 448	15 239	0	0	4 859 833	3 160 563
	Exp Count	4 799 639	3 124 468	16 126	10 699	585	707	21 063	16 741	9 778	6 603	122	84	12 127	14 775	393	488	4 859 833	3 160 563
	Observations	60 592		11		0		8		15		0		9		0		60 635	
Kronobergs län	Count	1 536 210	372 857	6 368	1 943					1 888	1 127	0	0	0	0	0	0	1 549 420	373 331
	Exp Count	1 530 229	368 879	5 141	1 935					3 117	1 221	39	17	3 866	4 172	125	140	1 549 420	373 331
	Observations	20 555		42						5		0		0		0		20 611	
Kalmar län	Count	924 179	383 762	3 338	3 941					3 055	4 657	0	0	0	0	0	0	931 440	385 211
	Exp Count	919 903	380 506	3 091	1 555					1 874	984	23	13	2 324	2 624	75	88	931 440	385 211
	Observations	6 882		64						21		0		0		0		6 990	
Gotlands län	Count	85 474	85 632	0	0			0	0	35 656	32 893	0	0			0	0	123 264	92 495
	Exp Count	121 737	91 324	409	329			534	489	248	224	3	3			10	13	123 264	92 495
	Observations	781		0				0		415		0				0		1 232	
Blekinge län	Count	376 627	120 729			0	0					0	0			0	0	377 358	120 865
	Exp Count	372 684	119 387			45	50					9	5			31	35	377 358	120 865
	Observations	9 280				0						0				0		9 310	
Skåne län	Count	7 393 080	1 130 595	28 183	15 305	0	0	23 682	14 747	5 050	2 228			98 284	152 626			7 551 013	1 134 559
	Exp Count	7 457 486	1 120 744	25 056	8 062	910	963	32 726	17 777	15 192	5 247			18 842	20 254			7 551 013	1 134 559
	Observations	77 723		437		0		330		40				138				78 709	
Hallands län	Count	1 865 398	495 408	20 383	11 606	0	0			499	504	0	0			0	0	1 892 812	495 796
	Exp Count	1 869 368	489 955	6 281	2 451	228	246			3 808	1 556	48	21			153	171	1 892 812	495 796
	Observations	14 728		411		0				6		0				0		15 179	
Västra Götalands	Count	9 510 379	1 261 804	25 903	22 186			109 699	127 457	6 515	3 508	0	0	503	497			9 654 481	1 271 749
län	Exp Count	9 534 901	1 256 395	32 036	10 111			41 843	23 103	19 424	6 576	243	89	24 091	25 512			9 654 481	1 271 749
	Observations	100 963		131				194		25		0		6				101 395	
Värmlands län	Count	841 384	227 541	2 979	2 452					0	0					0	0	879 124	229 937
	Exp Count	868 235	227 096	2 917	1 144					1 769	727					71	80	879 124	229 937
	Observations	12 582		78						0						0		12 678	
Örebro län	Count	2 549 156	630 952	6 911	9 296	0	0			2 582	1 403	0	0			0	0	2 560 266	631 425
	Exp Count	2 528 555	623 933	8 496	3 222	308	332			5 151	2 057	64	27			207	231	2 560 266	631 425
	Observations	72 441		56		0				28		0				0		72 618	
Västmanlands län	Count	2 007 488	1 078 703	5 021	5 101	0	0	11 728	16 545			0	0			0	0	2 024 500	1 078 987
	Exp Count	1 999 424	1 066 061	6 718	3 992	244	285	8 774	6 478			51	32			164	197	2 024 500	1 078 987
	Observations	31 945		37		0		33				0				0		32 018	
Dalarnas län	Count	1 217 445	345 156			0	0					0	0			0	0	1 231 596	345 208
	Exp Count	1 216 341	341 054			148	161					31	14			100	112	1 231 596	345 208
	Observations	7 038				0						0				0		7 241	
Gävleborgs län	Count	657 980	162 058					1 582	1 160	0	0	0	0			0	0	662 696	162 103
	Exp Count	654 488	160 132					2 872	1 667	1 333	535	17	7			54	60	662 696	162 103
	Observations	5 981						10		0		0				0		6 054	
Västernorrlands	Count	1 042 620	292 915	12 074	13 343			9 975	17 305	217	244	0	0			0	0	1 065 522	295 879
län	Exp Count	1 052 324	292 228	3 536	1 445			4 618	2 757	2 144	901	27	12			86	97	1 065 522	295 879
	Observations	18 754		238				44		4		0				0		19 044	
Jämtlands län	Count	528 963	237 322	1 046	1 887	0	0	2 205	3 896			0	0			0	0	532 326	237 458
	Exp Count	525 732	234 543	1 766	944	64	73	2 307	1 588			13	8			43	51	532 326	237 458
	Observations	3 580		3		0		32				0				0		3 617	
Västerbottens län	Count	969 884	377 966							784	782	0	0	7 350	4 666	0	0	979 740	377 832
	Exp Count	967 605	373 246							1 971	978	25	13	2 445	2 737	79	91	979 740	377 832
	Observations	7 149								6		0		275		0		7 503	
Norrbottens län	Count	689 808	361 389	5 769	845	428	697	6 584	10 199	0	0							704 213	361 878
	Exp Count	695 491	357 449	2 337	1 372	85	99	3 052	2 240	1 417	849							704 213	361 878
	Observations	7 713		409		9		76		0								8 329	
Total	Count	58 578 373	5 922 328	196 815	54 582	7 145	7 476	257 064	133 664	119 335	36 397	1 492	503	148 007	155 591	4 797	5 206	59 313 027	5 926 856
	Exp Count	58 578 373	5 922 328	196 815	54 582	7 145	7 476	257 064	133 664	119 335	36 397	1 492	503	148 007	155 591	4 797	5 206	59 313 027	5 926 856
	Observations	703 260		4 942		139		1 500		1 073		81		594		178		711 767	

Significantly overrepresented | Significantly underrepresented | Classified information

For outbound shipments within Sweden with foreign destinations, the following modes of transport have been more freqently used than expected in the stated regions:

- Rail: Östergötland, Kronoberg, Halland, Dalarna, Gävleborgs, Västernorrlands, Norrbotten
- Cargo vessel: Gotland, Värmland
- Cargo vessel and road: Gävleborg, Västernorrland, Norrbotten
- Rail and road: Dalarna, Gävleborg, Norrbotten
- Ferry and road: Kronoberg
- Rail and sea: Östergötland, Dalarna, Gävleborg, Norrbotten
- Air: Västmanland

Specific for outbound shipments transported within Sweden with a foreign country as it final destination is that despatching units in Västernorrland use rail or cargo vessel more than expected and Norrbotten is overrepresented for cargo vessel-road. Finally the fact that Västmanland is overrepresented for air transport is also specific.

Tabell 20 Despatching region and mode of transport in Sweden for outbound shipments with foreign destinations (according to the unadjusted primary data in the CFS data base)

Despatching region		Transport mode in Sweden																Total	
		Road		Railway		Cargo vessel		Rail and road		Ferry and road		Cargo vsl and road		Air or air and road		Rail and sea			
		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Stockholms län	Count	1 058 245	598 321	507	596			11 204	10 153	48 254	17 220	4 085	3 093	107 216	31 930			1 229 811	601 887
	Exp Count	1 005 491	514 519	29 768	12 016			16 513	7 375	94 041	41 122	11 762	4 993	58 019	25 452			1 229 811	601 887
	Observations	8 775		13				90		354		14		3 345				12 609	
Uppsala län	Count									1 735	494							235 672	123 084
	Exp Count									18 021	9 886							235 672	123 084
	Observations									35								760	
Södermanlands län	Count	145 231	47 219							9 071	2 668							170 076	48 123
	Exp Count	139 054	39 812							13 005	4 611							170 076	48 123
	Observations	2 078								306								3 213	
Östergötlands län	Count	130 042	53 061					180	181	33 545	17 401	3 285	977	23 522	14 708			210 667	78 787
	Exp Count	172 241	64 175					2 829	1 222	16 109	7 277	2 015	829	9 939	4 477			210 667	78 787
	Observations	1 522						6		868		81		774				3 465	
Jönköpings län	Count	283 736	63 769			0	0			39 281	27 699	2 467	2 983	7 624	6 840			335 101	73 583
	Exp Count	273 978	60 716			3 304	1 067			25 624	8 348	3 205	925	15 809	4 556			335 101	73 583
	Observations	1 763				0				369		20		79				2 260	
Kronobergs län	Count	171 011	49 160			0	0			44 241	16 804	4 401	2 994					253 747	58 722
	Exp Count	207 463	48 394			2 502	831			19 403	6 359	2 427	734					253 747	58 722
	Observations	1 307				0				173		112						1 727	
Kalmar län	Count	147 229	89 892					0	0	20 593	15 632	929	645					170 799	91 374
	Exp Count	139 645	75 225					2 293	1 312	13 061	7 463	1 634	909					170 799	91 374
	Observations	1 720						0		199		29						1 983	
Gotlands län	Count			0	0			0	0	1 063	1 617	0	0			0	0	2 772	3 205
	Exp Count			67	78			37	44	212	250	27	31			5	6	2 772	3 205
	Observations			0				0		5		0				0		51	
Blekinge län	Count					0	0			3 297	4 197	1 224	995					222 961	90 694
	Exp Count					2 198	1 017			17 049	7 689	2 132	936					222 961	90 694
	Observations					0				39		35						9 662	
Skåne län	Count	694 422	139 972	3 308	1 149			2 937	4 425	59 182	58 927	2 435	1 542	19 347	25 097			782 913	175 191
	Exp Count	640 108	142 177	18 951	4 647			10 512	3 224	59 868	20 939	7 488	2 067	36 936	11 695			782 913	175 191
	Observations	6 421		40				36		544		52		86				7 197	
Hallands län	Count	79 927	26 061							14 207	14 605	429	224	3 790	5 022			119 841	33 898
	Exp Count	97 982	27 800							9 164	3 399	1 146	390	5 654	1 936			119 841	33 898
	Observations	804								194		22		53				1 224	
Västra Götalands	Count	918 969	168 931	4 036	1 674	7 790	1 168	4 035	2 251			4 039	1 770	27 571	10 386			1 086 551	183 385
län	Exp Count	888 361	154 664	26 301	5 342	10 713	3 013	14 590	3 989			10 392	2 490	51 261	12 431			1 086 551	183 385
	Observations	12 283		33		390		86				102		451				15 511	
Värmlands län	Count	81 763	33 737	4 560	1 134	3 073	1 192			8 208	3 089	2 809	2 374	1 077	504			105 283	34 469
	Exp Count	86 079	28 445	2 548	904	1 038	420			8 051	3 148	1 007	384	4 967	1 864			105 283	34 469
	Observations	1 445		237		202				242		91		34				2 355	
Örebro län	Count	158 051	47 251	2 086	1 872					20 253	33 362	2 364	1 274	5 512	2 720			192 681	62 659
	Exp Count	157 535	51 069	4 664	1 636					14 734	6 254	1 843	695	9 090	3 421			192 681	62 659
	Observations	3 760		49						75		60		159				4 339	
Västmanlands län	Count	180 221	75 331			0	0			7 419	4 761	733	495			157	79	212 798	76 623
	Exp Count	173 983	63 325			2 098	894			16 272	6 745	2 035	814			362	148	212 798	76 623
	Observations	2 393				0				166		28				9		2 898	
Dalarnas län	Count	84 519	18 791			0	0	7 690	4 097	7 693	2 301	759	833	2 683	3 742			143 705	21 451
	Exp Count	117 493	17 962			1 417	404	1 930	557	10 989	2 934	1 374	338	6 780	1 674			143 705	21 451
	Observations	1 455				0		57		189		21		30				2 669	
Gävleborgs län	Count	87 174	22 172	8 247	2 184					10 747	9 083	3 962	1 215	3 316	3 908			174 114	33 560
	Exp Count	142 355	27 560	4 215	1 027					13 314	3 942	1 665	459	8 214	2 248			174 114	33 560
	Observations	1 212		120						101		70		11				1 820	
Västernorrlands	Count	50 694	17 658	4 204	1 405	5 279	1 528	5 007	6 206	2 293	1 112							84 981	20 239
län	Exp Count	69 480	16 686	2 057	577	838	286	1 141	404	6 498	2 108							84 981	20 239
	Observations	667		207		94		42		74								1 413	
Jämtlands län	Count	26 020	20 821	485	559	0	0					648	835					29 976	21 501
	Exp Count	24 509	17 609	726	530	296	223					287	214					29 976	21 501
	Observations	204		14		0						6						258	
Västerbottens län	Count	103 170	147 754	1 892	586			2 089	564	644	409	2 530	1 257	9 784	10 946			120 987	148 201
	Exp Count	98 919	121 746	2 929	3 541			1 625	1 987	9 252	11 289	1 157	1 407	5 708	6 956			120 987	148 201
	Observations	903		90				66		29		53		242				1 422	
Norrbottens län	Count	11 882	6 556	12 857	2 407			2 836	1 025			2 671	1 896					32 874	8 143
	Exp Count	26 877	6 711	796	234			441	152			314	102					32 874	8 143
	Observations	308		870				135				106						1 467	
Total	Count	4 838 796	690 419	143 256	13 640	58 350	12 694	79 468	16 671	452 560	97 625	56 603	9 049	279 211	50 414	10 066	1 785	5 918 309	710 596
	Exp Count	4 838 796	690 419	143 256	13 640	58 350	12 694	79 468	16 671	452 560	97 625	56 603	9 049	279 211	50 414	10 066	1 785	5 918 309	710 596
	Observations	59 191		2 958		1 146		1 099		6 135		1 256		6 294		224		78 303	

Significantly overrepresented | Significantly underrepresented | Classified information

2.2.4. Destinations for inbound shipments and mode of transport within Sweden

In the CFS data there is a significant differences between the regions, with respect to transport modes used. If the mode for inbound transports within Sweden is reviewed in each region relatively the expected number of shipments per mode the following modes that are overrepresented (i.e. the frequency is higher than it would have been if the use of the different modes is distributed equally between the regions) in each region see table 21:

- Rail: Södermanland, Kronoberg, Örebro
- Cargo vessel: Gävleborg, Västernorrland
- Rail and road: No significant differences
- Ferry and road: Gotland, Värmland, Jämtland
- Cargo vessel and road: Västmanland
- Air or air and road: Gävleborg
- Rail and sea (and road): Norrbotten

The following modes of transport are overrepresented in the same regions for both inbound and outbound shipments:

- Rail: Kronoberg
- Cargo vessel: Gävleborg and Västernorrland
- Ferry-road: Gotland
- Rail-sea: Norrbotten

Tabell 21: Transport mode for inbound shipments within Sweden for different regions (län) (according to the unadjusted primary data in the CFS data base)

Receiving region		Transport mode in Sweden																	
		Road		Railway		Cargo vessel		Rail and road		Ferry and road		Cargo vsl and road		Air or air and road		Rail and sea		Total	
		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Stockholms län	Count	956 725	169 963	4 703	1 553			27 786	12 046	132 160	58 407	11 828	7 343	86 157	31 333			1 225 065	183 966
	Exp Count	957 916	152 773	32 109	4 686			14 623	4 512	115 073	28 086	9 551	3 645	89 554	38 963			1 225 065	183 966
	Observations	10 594		149				286		600		69		1 295				13 061	
Uppsala län	Count	35 342	15 026	0	0	0	0					0	0	5 741	4 231	0	0	43 341	15 713
	Exp Count	33 890	12 396	1 136	396	65	25					338	165	3 168	1 851	155	83	43 341	15 713
	Observations	513		0		0						0		89		0		631	
Södermanlands län	Count	66 214	14 272	12 769	6 056	0	0			9 212	3 080	463	683	5 379	4 443			95 630	16 611
	Exp Count	74 776	12 827	2 506	542	144	38			8 983	2 311	746	296	6 991	3 339			95 630	16 611
	Observations	985		226		0				166		16		108				1 544	
Östergötlands län	Count	152 347	40 067	2 415	1 303					16 748	6 345	5 308	7 718	27 701	22 483	2 744	3 439	210 150	55 067
	Exp Count	164 323	43 023	5 508	1 481					19 740	6 232	1 638	842	15 362	7 910	753	373	210 150	55 067
	Observations	1 844		63						136		33		281		35		2 453	
Jönköpings län	Count	76 622	19 715	1 074	1 374	0	0	2 082	1 907	11 734	9 352			4 561	4 586			96 303	22 855
	Exp Count	75 302	17 966	2 524	623	145	43	1 150	416	9 046	2 721			7 040	3 511			96 303	22 855
	Observations	1 508		25		0		81		210				41				1 873	
Kronobergs län	Count	71 646	13 202			0	0	1 337	376	6 751	2 592			5 175	8 215	0	0	153 933	15 852
	Exp Count	120 365	12 311			232	50	1 837	542	14 459	3 000			11 253	5 173	552	234	153 933	15 852
	Observations	1 282				0		23		116				5		0		1 618	
Kalmar län	Count	79 643	19 239	1 373	2 082			2 012	1 094	3 320	3 592			4 677	6 683			91 659	21 127
	Exp Count	71 671	16 941	2 402	567			1 094	387	8 610	2 487			6 700	3 208			91 659	21 127
	Observations	1 430		46				90		45				12				1 658	
Gotlands län	Count	254	105	0	0			0	0			0	0			0	0	9 995	3 881
	Exp Count	7 815	3 048	262	106			119	58			78	41			36	20	9 995	3 881
	Observations	15		0				0				0				0		135	
Blekinge län	Count	21 509	7 113			0	0	732	322	1 064	431			2 378	4 037	0	0	25 876	8 226
	Exp Count	20 233	6 308			39	14	309	127	2 431	849			1 892	1 140	93	47	25 876	8 226
	Observations	349				0		30		29				8		0		423	
Skåne län	Count	503 160	90 623	5 796	4 518	404	218	3 024	1 496	21 501	15 574	1 922	2 438	18 130	17 652	750	487	554 688	96 257
	Exp Count	433 727	78 618	14 538	2 693	837	206	6 621	2 113	52 103	12 706	4 325	1 679	40 548	18 431	1 989	878	554 688	96 257
	Observations	6 143		101		17		65		226		31		92		12		6 687	
Hallands län	Count	117 853	73 491							4 632	2 077			3 578	4 404			131 314	73 730
	Exp Count	102 679	58 274							12 335	7 026			9 599	6 672			131 314	73 730
	Observations	989								110				7				1 222	
Västra Götalands	Count	1 028 370	225 518	6 891	2 928	2 168	1 107	3 294	1 370	88 749	29 510			59 664	42 319			1 199 965	233 966
län	Exp Count	938 290	196 003	31 451	5 284	1 810	430	14 323	4 465	112 715	26 714			87 719	39 953			1 199 965	233 966
	Observations	12 480		206		110		79		956				256				14 182	
Värmlands län	Count	47 780	16 929					457	244									168 700	68 169
	Exp Count	131 912	52 066					2 014	965									168 700	68 169
	Observations	732						8										947	
Örebro län	Count	61 290	14 729					4 033	4 950	4 246	1 203			7 571	5 572			83 431	17 390
	Exp Count	65 237	13 773					996	352	7 837	2 082			6 099	2 984			83 431	17 390
	Observations	1 329						22		60				100				1 597	
Västmanlands län	Count	59 009	11 743			0	0	491	123	6 078	2 111			5 229	3 440			74 205	12 887
	Exp Count	58 023	10 322			112	29	886	292	6 970	1 804			5 424	2 461			74 205	12 887
	Observations	976				0		30		101				137				1 312	
Dalarnas län	Count	26 874	7 241			0	0	570	285	5 387	4 586	758	909	1 042	1 633			35 133	8 823
	Exp Count	27 471	7 049			53	16	419	155	3 300	1 026	274	118	2 568	1 240			35 133	8 823
	Observations	595				0		17		58		16		10				705	
Gävleborgs län	Count	16 172	7 241	505	682	1 704	190									0	0	40 221	13 374
	Exp Count	31 450	10 272	1 054	350	61	23									144	75	40 221	13 374
	Observations	485		10		23										0		643	
Västernorrlands	Count	43 514	20 082					236	99					4 287	4 102	132	150	52 070	20 544
län	Exp Count	40 715	16 067					622	296					3 806	2 303	187	106	52 070	20 544
	Observations	562						13						92		3		763	
Jämtlands län	Count	3 792	4 729	0	0	0	0									0	0	5 810	4 754
	Exp Count	4 543	3 754	152	122	9	7									21	19	5 810	4 754
	Observations	20		0		0										0		32	
Västerbottens län	Count	26 482	6 264			163	105			3 395	1 987	0	0	6 111	5 538			36 783	9 287
	Exp Count	28 762	6 833			55	17			3 455	1 084	287	123	2 689	1 571			36 783	9 287
	Observations	645				8				27		0		79				799	
Norrbottens län	Count	17 797	9 623			0	0					0	0	9 690	13 046			29 790	16 236
	Exp Count	23 294	12 261			45	25					232	144	2 178	1 909			29 790	16 236
	Observations	201				0						0		25				318	
Total	Count	3 412 394	351 873	114 382	8 965	6 582	1 215	52 091	14 399	409 925	80 666	34 023	12 223	319 017	138 464	15 647	6 435	4 364 062	393 042
	Exp Count	3 412 394	351 873	114 382	8 965	6 582	1 215	52 091	14 399	409 925	80 666	34 023	12 223	319 017	138 464	15 647	6 435	4 364 062	393 042
	Observations	43 677		1 211		267		879		3 161		387		2 773		248		52 603	

Significantly overrepresented | Significantly underrepresented | Classified information

2.3. Shipment size and transport mode selection

2.3.1. Differences in shipment sizes between different transport modes used for outbound shipments within Sweden

There is a significant difference in shipment size between the different transport modes. If the average size of the shipment (in kg) is compared between the different modes of outbound shipments transported within Sweden the following modes differ significantly; weight of the shipments in descending order:

- Cargo vessel
- Rail-sea
- Rail
- Cargo vessel-road
- Rail-road
- Road; Ferry-road
- Air

The combination ferry-road does not differ significantly from road transports.

Tabell 22: Average weight for outbound transports within Sweden (according to the adjusted data in the CFS data base)

Trp mode in Sweden	Number of observations	Mean	Std Error	95 % Confidence Interval Lower bound	Upper bound	Min	Max
Road	762 605	2 718	140	2 443	2 993	0	601 000 000
Railway	7 900	82 495	6 488	69 777	95 212	0	13 322 541
Cargo vessel	1 285	514 592	51 949	412 772	616 412	0	39 109 000
Rail and road	2 599	7 671	1 629	4 478	10 865	0	42 786 000
Ferry and road	7 208	3 239	311	2 630	3 848	0	189 000 000
Cargo vessel and road	1 311	33 985	6 986	20 291	47 678	0	3 389 000
Air or air and road	6 883	495	129	243	747	0	170 954
Rail and sea (and road)	394	202 391	37 927	128 055	276 727	0	2 511 767
Total	790 185	3 736	183	3 378	4 094	0	601 000 000

Tabell 23: Pair wise comparisons of the average weight for different modes for outbound transports within Sweden (according to the adjusted data in the CFS data base)

				95 % Confidence Interval	
Transport mode in Sweden	Trp mode in Sweden	Mean Difference	Std Error	Lower bound	Upper bound
Road	Railway	-79 777	6 492	-92 502	-67 052
	Cargo vessel	-511 875	51 950	-613 697	-410 052
	Rail and road	-4 953	1 633	-8 154	-1 753
	Ferry and road	-521	338	-1 184	141
	Cargo vessel and road	-31 267	6 988	-44 964	-17 570
	Air or air and road	2 223	190	1 851	2 594
	Rail and sea (and road)	-199 673	37 927	-274 010	-125 336
Railway	Road	79 777	6 492	67 052	92 502
	Cargo vessel	-432 098	52 256	-534 519	-329 677
	Rail and road	74 823	6 695	61 701	87 946
	Ferry and road	79 256	6 497	66 522	91 989
	Cargo vessel and road	48 510	9 537	29 817	67 202
	Air or air and road	81 999	6 490	69 280	94 719
	Rail and sea (and road)	-119 896	38 380	-195 121	-44 672
Cargo vessel	Road	511 875	51 950	410 052	613 697
	Railway	432 098	52 256	329 677	534 519
	Rail and road	506 921	51 973	405 055	608 787
	Ferry and road	511 353	51 950	409 532	613 175
	Cargo vessel and road	480 607	52 383	377 937	583 278
	Air or air and road	514 097	51 949	412 277	615 917
	Rail and sea (and road)	312 201	64 336	186 103	438 300
Rail and road	Road	4 953	1 633	1 753	8 154
	Railway	-74 823	6 695	-87 946	-61 701
	Cargo vessel	-506 921	51 973	-608 787	-405 055
	Ferry and road	4 432	1 657	1 185	7 680
	Cargo vessel and road	-26 314	7 163	-40 353	-12 274
	Air or air and road	7 176	1 634	3 973	10 379
	Rail and sea (and road)	-194 720	37 972	-269 146	-120 294
Ferry and road	Road	521	338	-141	1 184
	Railway	-79 256	6 497	-91 989	-66 522
	Cargo vessel	-511 353	51 950	-613 175	-409 532
	Rail and road	-4 432	1 657	-7 680	-1 185
	Cargo vessel and road	-30 746	6 994	-44 453	-17 038
	Air or air and road	2 744	327	2 104	3 384
	Rail and sea (and road)	-199 152	37 932	-273 499	-124 805
Cargo vessel and road	Road	31 267	6 988	17 570	44 964
	Railway	-48 510	9 537	-67 202	-29 817
	Cargo vessel	-480 607	52 383	-583 278	-377 937
	Rail and road	26 314	7 163	12 274	40 353
	Ferry and road	30 746	6 994	17 038	44 453
	Air or air and road	33 490	6 988	19 794	47 185
	Rail and sea (and road)	-168 406	38 557	-243 978	-92 835
Air or air and road	Road	-2 223	190	-2 594	-1 851
	Railway	-81 999	6 490	-94 719	-69 280
	Cargo vessel	-514 097	51 949	-615 917	-412 277
	Rail and road	-7 176	1 634	-10 379	-3 973
	Ferry and road	-2 744	327	-3 384	-2 104
	Cargo vessel and road	-33 490	6 988	-47 185	-19 794
	Rail and sea (and road)	-201 896	37 927	-276 232	-127 559
Rail and sea (and road)	Road	199 673	37 927	125 336	274 010
	Railway	119 896	38 380	44 672	195 121
	Cargo vessel	-312 201	64 336	-438 300	-186 103
	Rail and road	194 720	37 972	120 294	269 146
	Ferry and road	199 152	37 932	124 805	273 499
	Cargo vessel and road	168 406	38 557	92 835	243 978
	Air or air and road	201 896	37 927	127 559	276 232

There is also a significant difference between the shipment size intervals for different modes of transport for outbound shipments within Sweden. When the shipment sizes are categorised into different intervals the following pattern emerges:

- Road: underrepresented for the shipments above 50 ton
- Rail: overrepresented for shipments above 5 ton
- Cargo vessel: overrepresented for shipments above 1
- Rail and road: overrepresented for shipments between 10-25 ton and above 50 ton
- Ferry and road: overrepresented in segment between 1 - 25 ton
- Air: underrepresented above 10 ton.
- Rail and sea: overrepresented for shipments above 5 ton

Tabell 24: Intervals[4] of shipments sizes for outbound transports within Sweden (according to the adjusted data in the CFS data base)

Trp mode		Weight intervals																Total	
		]0 , 30] kg		]30 , 100] kg		]100 , 1 000] kg		]1 000 , 5 000] kg		]5 000 , 10 000] kg		]10 000 , 25 000] kg		]25 000 , 50 000] kg		> 50 000 kg			
in Sweden		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Road	Count	32 372 976	5 182 171	9 665 657	927 758	12 890 744	1 019 327	4 505 459	332 101	1 384 923	234 200	1 417 350	170 981	952 508	117 500	189 561	17 598	63 379 179	5 985 654
	Exp Count	32 122 109	5 120 512	9 575 878	918 376	12 827 819	1 013 230	4 556 195	326 270	1 424 960	228 550	1 546 765	167 910	1 028 222	123 130	297 232	21 481	63 379 179	5 985 654
	Observations	333 267		118 607		168 096		62 415		20 925		24 322		17 375		17 598		762 605	
Railway	Count	72 657	44 750	13 015	5 676	24 338	11 883	26 467	6 676	19 602	3 010	51 425	8 331	50 677	14 587	81 889	8 791	340 071	56 929
	Exp Count	172 356	31 645	51 381	9 583	68 830	13 046	24 447	4 867	7 646	1 873	8 299	1 835	5 517	1 312	1 595	336	340 071	56 929
	Observations	2 633		191		277		476		371		730		988		2 234		7 900	
Cargo vessel	Count	554	263			2 502	623									19 740	7 582	65 495	14 734
	Exp Count	33 194	7 857			13 256	3 211									307	81	65 495	14 734
	Observations	23				43										633		1 285	
Rail and road	Count	121 901	83 878	22 937	8 651	74 014	83 414	33 983	17 150	10 279	2 777	42 765	9 072	25 501	18 580	5 152	1 958	336 531	134 788
	Exp Count	170 562	69 343	50 846	20 672	68 113	28 291	24 193	10 043	7 566	3 306	8 213	3 476	5 460	2 344	1 578	657	336 531	134 788
	Observations	823		139		240		281		143		590		254		129		2 599	
Ferry and road	Count	198 367	58 629	66 864	21 718	135 590	33 509	83 940	13 839	32 013	13 561	43 757	7 631	10 531	2 595	833	199	571 895	104 573
	Exp Count	289 850	57 510	86 407	17 498	115 750	23 579	41 112	8 666	12 858	3 271	13 957	3 163	9 278	2 159	2 682	570	571 895	104 573
	Observations	1 766		627		1 517		1 411		527		1 047		283		30		7 208	
Cargo vessel	Count	5 391	2 990	1 020	409	8 998	3 759	6 780	1 633	3 513	944	19 365	3 678	8 932	2 239	3 260	686	57 261	9 062
and road	Exp Count	29 021	5 092	8 652	1 547	11 590	2 111	4 116	788	1 287	308	1 397	297	929	206	269	53	57 261	9 062
	Observations	121		49		170		165		77		410		198		121		1 311	
Air or	Count	268 236	88 876	78 778	78 375	56 689	15 485											427 044	163 912
air and road	Exp Count	216 436	84 762	64 521	25 637	86 433	33 880											427 044	163 912
	Observations	3 290		621		1 880												6 883	
Rail and sea	Count	807	686			1 854	3 073			707	221	3 227	913	1 021	420	4 652	518	14 521	5 496
(and road)	Exp Count	7 360	2 839			2 939	1 145			326	137	354	143	236	96	68	27	14 521	5 496
	Observations	21				27				15		76		25		186		394	
Total	Count	33 040 889	5 187 174	9 849 774	931 158	13 194 730	1 029 080	4 686 515	333 898	1 465 718	234 780	1 591 007	172 545	1 057 632	126 754	305 733	22 107	65 191 997	5 994 677
	Exp Count	33 040 889	5 187 174	9 849 774	931 158	13 194 730	1 029 080	4 686 515	333 898	1 465 718	234 780	1 591 007	172 545	1 057 632	126 754	305 733	22 107	65 191 997	5 994 677
	Observations	341 944		120 269		172 250		65 640		22 392		27 444		19 291		20 955		790 185	

Significantly overrepresented | Significantly underrepresented | Classified information

The shipment weights for cargo vessel as well as ferry-road may have been influenced in a positive way (i.e. increased) when the cargo type is bulk goods and the situation is the same for road transports for pre-slung goods.

[4] The lower end of the intervals is based on the classification of parcel size made by the following companies: Posten 20kg, Schenker 30 kg/kolli 99kg/shipment, Danzas/DHL 31,5 kg

2.3.2. Differences in shipment sizes between different transport modes used for outbound shipments outside Sweden

There is a significant difference between different transport modes with the respect to shipment sizes. The modes of transport have been listed in listed in descending order of shipment weight, based on pair wise comparisons of averages shipment weights for different modes see table 25 and 26:

- Cargo vessel
- Rail; Rail-sea
- Rail-road; Cargo vessel-road
- Ferry-road
- Road
- Air

The average weight for ferry transports varies so much that it cannot be separated from road, ferry-road or air.

Tabell 25 Average weight (in kg) for outbound transports outside Sweden (according to the adjusted data in the CFS data base)

Trp mode outside Sweden	Number of observations	Mean	Std Error	95 % Confidence Interval Lower bound	Upper bound	Min	Max
Road	31 854	2 537	181	2 183	2 891	0	2 875 000
Railway	712	34 933	5 475	24 203	45 663	1	920 000
Ferry	1 168	4 049	1 660	796	7 302	0	114 210
Cargo vessel	12 701	83 038	8 032	67 295	98 781	0	39 109 000
Rail and road	841	22 260	2 614	17 136	27 383	1	448 000
Ferry and road	16 917	3 724	474	2 795	4 653	0	1 122 000
Cargo vessel and road	3 492	19 928	2 343	15 336	24 519	1	6 260 644
Air or air and road	14 990	1 189	149	897	1 480	0	13 322 541
Rail and sea (and road)	1 634	43 630	4 674	34 468	52 792	1	887 734
Total	84 309	9 709	603	8 527	10 892	1	39 109 000

Tabell 26 Pair wise comparisons of the average weight for different modes for outbound transports outside Sweden (according to the unadjusted primary data in the CFS data base)

Trp mode outside Sweden	Trp mode outside Sweden	Mean Difference	Std Error	95 % Confidence Interval Lower bound	Upper bound
Road	Railway	-32 396	5 477	-43 132	-21 661
	Ferry	-1 512	1 644	-4 735	1 710
	Cargo vessel	-80 502	8 026	-96 233	-64 771
	Rail and road	-19 723	2 618	-24 854	-14 592
	Ferry and road	-1 187	403	-1 977	-397
	Cargo vessel and road	-17 391	2 346	-21 990	-12 792
	Air or air and road	1 348	227	903	1 793
	Rail and sea (and road)	-41 093	4 676	-50 258	-31 928
Railway	Road	32 396	5 477	21 661	43 132
	Ferry	30 884	5 720	19 672	42 096
	Cargo vessel	-48 105	9 698	-67 114	-29 097
	Rail and road	12 674	6 027	861	24 486
	Ferry and road	31 209	5 493	20 443	41 976
	Cargo vessel and road	15 005	5 941	3 361	26 650
	Air or air and road	33 744	5 477	23 010	44 479
	Rail and sea (and road)	-8 697	6 443	-21 324	3 931
Ferry	Road	1 512	1 644	-1 710	4 735
	Railway	-30 884	5 720	-42 096	-19 672
	Cargo vessel	-78 989	8 206	-95 073	-62 906
	Rail and road	-18 210	3 100	-24 287	-12 134
	Ferry and road	325	1 721	-3 048	3 699
	Cargo vessel and road	-15 879	2 875	-21 513	-10 245
	Air or air and road	2 860	1 654	-381	6 102
	Rail and sea (and road)	-39 581	4 956	-49 294	-29 867
Cargo vessel	Road	80 502	8 026	64 771	96 233
	Railway	48 105	9 698	29 097	67 114
	Ferry	78 989	8 206	62 906	95 073
	Rail and road	60 779	8 411	44 292	77 265
	Ferry and road	79 315	8 028	63 579	95 050
	Cargo vessel and road	63 111	8 215	47 008	79 213
	Air or air and road	81 850	8 014	66 143	97 557
	Rail and sea (and road)	39 409	9 281	21 217	57 600
Rail and road	Road	19 723	2 618	14 592	24 854
	Railway	-12 674	6 027	-24 486	-861
	Ferry	18 210	3 100	12 134	24 287
	Cargo vessel	-60 779	8 411	-77 265	-44 292
	Ferry and road	18 536	2 656	13 329	23 742
	Cargo vessel and road	2 332	3 493	-4 514	9 177
	Air or air and road	21 071	2 618	15 939	26 203
	Rail and sea (and road)	-21 370	5 357	-31 871	-10 870
Ferry and road	Road	1 187	403	397	1 977
	Railway	-31 209	5 493	-41 976	-20 443
	Ferry	-325	1 721	-3 699	3 048
	Cargo vessel	-79 315	8 028	-95 050	-63 579
	Rail and road	-18 536	2 656	-23 742	-13 329
	Cargo vessel and road	-16 204	2 361	-20 831	-11 577
	Air or air and road	2 535	491	1 572	3 498
	Rail and sea (and road)	-39 906	4 679	-49 077	-30 734
Cargo vessel and road	Road	17 391	2 346	12 792	21 990
	Railway	-15 005	5 941	-26 650	-3 361
	Ferry	15 879	2 875	10 245	21 513
	Cargo vessel	-63 111	8 215	-79 213	-47 008
	Rail and road	-2 332	3 493	-9 177	4 514
	Ferry and road	16 204	2 361	11 577	20 831
	Air or air and road	18 739	2 344	14 145	23 333
	Rail and sea (and road)	-23 702	5 243	-33 978	-13 426
Air or air and road	Road	-1 348	227	-1 793	-903
	Railway	-33 744	5 477	-44 479	-23 010
	Ferry	-2 860	1 654	-6 102	381
	Cargo vessel	-81 850	8 014	-97 557	-66 143
	Rail and road	-21 071	2 618	-26 203	-15 939
	Ferry and road	-2 535	491	-3 498	-1 572
	Cargo vessel and road	-18 739	2 344	-23 333	-14 145
	Rail and sea (and road)	-42 441	4 678	-51 609	-33 273
Rail and sea (and road)	Road	41 093	4 676	31 928	50 258
	Railway	8 697	6 443	-3 931	21 324
	Ferry	39 581	4 956	29 867	49 294
	Cargo vessel	-39 409	9 281	-57 600	-21 217
	Rail and road	21 370	5 357	10 870	31 871
	Ferry and road	39 906	4 679	30 734	49 077
	Cargo vessel and road	23 702	5 243	13 426	33 978
	Air or air and road	42 441	4 678	33 273	51 609

There is a difference between the modes of transport and the weight intervals. When the shipment sizes are categorised into different intervals the following pattern emerges:

- Road: underrepresented in the shipments intervals above 10 ton
- Rail: overrepresented for shipments above 10 ton
- Cargo vessel: overrepresented for shipments above 10 ton
- Rail and road: overrepresented for shipments above 1 ton
- Ferry and road: underrepresented in segment above 50 ton
- Air: overrepresented for the smallest shipments below 30kg
- Rail and sea: overrepresented for shipments above 10 ton

In general the outbound shipments outside Sweden have a similar weight interval pattern as the outbound shipments within Sweden. However, in several cases the outbound transports outside Sweden are only overrepresented in the highest weight intervals. The only exception is air which is overrepresented in the lowest interval for outbound transports outside Sweden.

Tabell 27: Intervals[5] of shipments sizes (kg) for outbound transports outside Sweden (according to the adjusted data in the CFS data base)

		Weight intervals																	
Trp mode		]0 , 30] kg		]30 , 100] kg		]100 , 1 000] kg		]1 000 , 5 000] kg		]5 000 , 10 000] kg		]10 000 , 25 000] kg		]25 000 , 50 000] kg		> 50 000 kg		Total	
outside Sweden		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Road	Count	968 045	242 866	299 895	66 647	499 401	68 741	231 404	31 637	79 569	10 605	121 205	11 490	45 411	8 019	8 052	1 168	2 252 982	305 418
	Exp Count	965 560	219 216	271 523	47 999	424 873	57 729	223 534	25 838	96 907	11 746	171 950	16 607	63 930	6 756	34 706	3 902	2 252 982	305 418
	Observations	9 674		3 347		9 440		4 144		1 573		2 292		1 196		188		31 854	
Railway	Count							1 862	1 014	2 179	631	7 520	2 059	5 158	1 017	10 998	2 063	40 489	12 953
	Exp Count							4 017	1 380	1 742	605	3 090	1 065	1 149	402	624	222	40 489	12 953
	Observations							31		46		193		134		260		712	
Ferry	Count	16 843	23 100	6 697	8 762	37 386	38 757	2 832	1 593	2 222	1 656	9 281	7 601	2 336	702	252	333	77 849	56 797
	Exp Count	33 364	24 470	9 382	7 221	14 681	11 146	7 724	5 549	3 348	2 407	5 941	4 281	2 209	1 591	1 199	865	77 849	56 797
	Observations	468		174		224		53		46		136		62		5		1 168	
Cargo vessel	Count	123 677	54 318	29 551	11 421	67 418	17 038	37 881	7 648	24 862	3 951	73 623	9 768	35 055	3 992	25 615	1 867	417 682	78 366
	Exp Count	179 006	40 909	50 338	10 525	78 768	17 619	41 441	9 096	17 966	4 019	31 878	6 679	11 852	2 501	6 434	1 380	417 682	78 366
	Observations	5 022		1 217		1 958		766		394		1 287		861		1 196		12 701	
Rail and road	Count							7 203	1 536	4 170	1 014	10 202	1 658	6 747	1 198	5 248	827	43 451	10 310
	Exp Count							4 311	1 166	1 869	517	3 316	898	1 233	339	669	188	43 451	10 310
	Observations							94		65		143		257		189		841	
Ferry and road	Count	677 435	339 094	239 613	76 491	364 767	48 395	228 910	28 487	97 798	18 646	156 780	14 548	40 915	4 784	6 666	2 249	1 812 885	422 369
	Exp Count	776 948	261 987	218 484	54 442	341 879	56 893	179 869	29 887	77 977	13 718	138 361	21 279	51 442	8 088	27 926	4 555	1 812 885	422 369
	Observations	3 534		1 566		3 802		3 091		1 275		2 812		764		73		16 917	
Cargo vessel	Count	21 935	12 939	10 433	8 859	27 174	5 666	48 427	11 022	28 813	8 271	50 203	5 488	21 049	2 826	11 815	1 967	219 850	34 595
and road	Exp Count	94 221	18 523	26 496	4 797	41 460	8 188	21 813	4 590	9 456	2 004	16 779	3 288	6 238	1 254	3 387	687	219 850	34 595
	Observations	207		126		517		613		344		933		460		292		3 492	
Air or	Count	767 587	145 758	135 223	22 267	128 780	15 780	33 586	5 071	15 111	4 492	20 985	4 784	3 782	867	1 389	611	1 106 443	163 928
air and road	Exp Count	474 188	100 322	133 345	23 255	208 656	37 095	109 778	18 119	47 591	8 222	84 445	13 771	31 396	5 278	17 044	2 965	1 106 443	163 928
	Observations	9 619		2 250		2 203		482		142		187		78		29		14 990	
Rail and sea	Count	2 484	2 887	4 380	5 551	6 724	5 320	7 512	1 419	5 224	2 013	11 447	1 989	11 036	1 667	23 060	4 805	71 866	16 420
(and road)	Exp Count	30 800	7 835	8 661	2 139	13 553	3 516	7 130	1 869	3 091	832	5 485	1 444	2 039	548	1 107	321	71 866	16 420
	Observations	67		83		130		189		123		314		255		473		1 634	
Total	Count	2 590 060	582 630	728 344	114 446	1 139 699	116 560	599 617	50 387	259 948	25 045	461 245	28 416	171 488	12 474	93 096	7 851	6 043 497	718 679
	Exp Count	2 590 060	582 630	728 344	114 446	1 139 699	116 560	599 617	50 387	259 948	25 045	461 245	28 416	171 488	12 474	93 096	7 851	6 043 497	718 679
	Observations	28 645		8 782		18 342		9 463		4 008		8 297		4 067		2 705		84 309	

Significantly overrepresented | Significantly underrepresented | Classified information

[5] The lower end of the intervals is based on the classification of parcel size made by the following companies: Posten 20kg, Schenker 30 kg/kolli 99kg/shipment, Danzas/DHL 31,5 kg

2.3.3. Differences in shipment sizes between modes of transport used for inbound shipments within Sweden

There is a significant weight difference between the different modes of transport for inbound transports within Sweden. The modes of transport have been listed in descending order of shipment weight, based on pair wise comparisons of average shipment weights (see table 28 and 29):

- Cargo vessel
- Cargo vessel - road
- Rail-sea
- Rail
- Rail-road
- Road
- Ferry - road
- Air transport

The order of the modes in the list above is with one exception (cargo vessel-road), the same as for outbound shipments within Sweden.

Tabell 28: Table: Average shipment weight (kg) for inbound transports within Sweden (according to the adjusted data in the CFS data base)

Trp mode in Sweden	Number of observations	Mean	Std Error	95 % Confidence Interval Lower bound	Upper bound	Min	Max
Road	43 624	5 513	359	4 809	6 216	0	65 608 346
Railway	1 211	14 065	763	12 569	15 561	1	781 000
Cargo vessel	267	4 471 340	398 874	3 689 547	5 253 133	3	320 590 000
Rail and road	879	9 983	1 402	7 235	12 730	0	276 476
Ferry and road	3 065	2 735	379	1 991	3 478	1	2 368 000
Cargo vessel and road	387	131 333	26 725	78 952	183 714	1	5 271 000
Air or air and road	2 758	34	7	20	48	0	33 622
Rail and sea (and road)	248	31 603	5 125	21 558	41 647	4	3 200 000
Total	52 439	12 982	631	11 744	14 219	0	320 590 000

Tabell 29: **Pair wise comparisons of the shipment weight of different modes used for inbound transports within Sweden (according to the unadjusted primary data in the CFS data base)**

Trp mode in Sweden	Trp mode in Sweden	Mean Difference	Std Error	95 % Confidence Interval	
				Lower bound	Upper bound
Road	Railway	-8 552	835	-10 189	-6 915
	Cargo vessel	-4 465 828	398 875	-5 247 623	-3 684 032
	Rail and road	-4 470	1 446	-7 303	-1 637
	Ferry and road	2 778	521	1 757	3 798
	Cargo vessel and road	-125 820	26 727	-178 205	-73 436
	Air or air and road	5 478	359	4 775	6 182
	Rail and sea (and road)	-26 090	5 138	-36 161	-16 020
Railway	Road	8 552	835	6 915	10 189
	Cargo vessel	-4 457 275	398 868	-5 239 057	-3 675 493
	Rail and road	4 082	1 593	959	7 205
	Ferry and road	11 330	846	9 672	12 988
	Cargo vessel and road	-117 268	26 737	-169 673	-64 864
	Air or air and road	14 031	763	12 534	15 527
	Rail and sea (and road)	-17 538	5 194	-27 717	-7 358
Cargo vessel	Road	4 465 828	398 875	3 684 032	5 247 623
	Railway	4 457 275	398 868	3 675 493	5 239 057
	Rail and road	4 461 358	398 877	3 679 559	5 243 156
	Ferry and road	4 468 605	398 874	3 686 812	5 250 398
	Cargo vessel and road	4 340 007	399 781	3 556 437	5 123 578
	Air or air and road	4 471 306	398 874	3 689 513	5 253 099
	Rail and sea (and road)	4 439 737	398 908	3 657 878	5 221 597
Rail and road	Road	4 470	1 446	1 637	7 303
	Railway	-4 082	1 593	-7 205	-959
	Cargo vessel	-4 461 358	398 877	-5 243 156	-3 679 559
	Ferry and road	7 248	1 453	4 400	10 095
	Cargo vessel and road	-121 351	26 766	-173 811	-68 890
	Air or air and road	9 948	1 402	7 200	12 696
	Rail and sea (and road)	-21 620	5 308	-32 025	-11 216
Ferry and road	Road	-2 778	521	-3 798	-1 757
	Railway	-11 330	846	-12 988	-9 672
	Cargo vessel	-4 468 605	398 874	-5 250 398	-3 686 812
	Rail and road	-7 248	1 453	-10 095	-4 400
	Cargo vessel and road	-128 598	26 798	-181 122	-76 074
	Air or air and road	2 701	379	1 958	3 444
	Rail and sea (and road)	-28 868	5 126	-38 915	-18 821
Cargo vessel and road	Road	125 820	26 727	73 436	178 205
	Railway	117 268	26 737	64 864	169 673
	Cargo vessel	-4 340 007	399 781	-5 123 578	-3 556 437
	Rail and road	121 351	26 766	68 890	173 811
	Ferry and road	128 598	26 798	76 074	181 122
	Air or air and road	131 299	26 725	78 918	183 680
	Rail and sea (and road)	99 730	27 205	46 408	153 053
Air or air and road	Road	-5 478	359	-6 182	-4 775
	Railway	-14 031	763	-15 527	-12 534
	Cargo vessel	-4 471 306	398 874	-5 253 099	-3 689 513
	Rail and road	-9 948	1 402	-12 696	-7 200
	Ferry and road	-2 701	379	-3 444	-1 958
	Cargo vessel and road	-131 299	26 725	-183 680	-78 918
	Rail and sea (and road)	-31 569	5 125	-41 613	-21 524
Rail and sea (and road)	Road	26 090	5 138	16 020	36 161
	Railway	17 538	5 194	7 358	27 717
	Cargo vessel	-4 439 737	398 908	-5 221 597	-3 657 878
	Rail and road	21 620	5 308	11 216	32 025
	Ferry and road	28 868	5 126	18 821	38 915
	Cargo vessel and road	-99 730	27 205	-153 053	-46 408
	Air or air and road	31 569	5 125	21 524	41 613

There are significant differences between the modes of transport and the weight intervals (shown in table 30). When the shipment sizes are categorised into different intervals the following pattern emerges:

- Road: underrepresented in the shipment sizes above 50 tons
- Rail: this mode is overrepresented for shipments above 1 ton
- Cargo vessel: overrepresented for shipments above 25 ton
- Rail and road: overrepresented for shipments above 10 ton
- Ferry and road: underrepresented in segment above 25 ton
- Air: underrepresented for shipments above 100 kg
- Rail and sea: overrepresented for shipments above 25 ton

Tabell 30: Intervals of shipments sizes for inbound shipments within Sweden (according to the unadjusted primary data in the CFS data base)

Trp mode in Sweden		Weight intervals																Total	
		]0 , 30] kg		]30 , 100] kg		]100 , 1 000] kg		]1 000 , 5 000] kg		]5 000 , 10 000] kg		]10 000 , 25 000] kg		]25 000 , 50 000] kg		> 50 000 kg			
		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Road	Count	1 369 709	265 308	354 867	41 644	792 282	77 317	426 440	52 980	164 660	24 593	225 527	26 221	55 429	12 052	12 271	1 828	3 401 184	351 405
	Exp Count	1 422 999	246 755	348 327	41 624	738 685	77 068	399 275	48 444	160 653	21 642	244 322	26 413	60 424	10 582	26 498	2 876	3 401 184	351 405
	Observations	14 483		4 959		9 881		6 139		2 404		4 070		1 367		321		43 624	
Railway	Count					20 005	3 838	26 504	2 417	18 428	620	28 743	1 696	7 125	2 418	8 904	2 311	114 382	8 965
	Exp Count					24 842	2 755	13 428	1 859	5 403	848	8 217	1 218	2 032	422	891	147	114 382	8 965
	Observations					151		191		164		324		172		172		1 211	
Cargo vessel	Count	80	46											404	209	5 403	440	6 582	1 215
	Exp Count	2 754	568											117	31	51	12	6 582	1 215
	Observations	4												14		241		267	
Rail and road	Count	14 041	6 766	4 404	2 155	8 828	3 346	6 690	5 081	2 443	1 159	8 185	2 761	5 659	2 387	1 841	628	52 091	14 399
	Exp Count	21 794	6 342	5 335	1 532	11 313	3 247	6 115	1 837	2 460	755	3 742	1 134	925	315	406	124	52 091	14 399
	Observations	155		58		109		96		49		198		164		50		879	
Ferry and road	Count	151 061	43 025	54 893	19 876	99 106	27 821	40 557	9 223	16 154	4 793	36 606	10 938	3 554	1 161	354	392	402 286	80 582
	Exp Count	168 310	38 041	41 200	9 443	87 370	18 833	47 226	10 216	19 002	4 343	28 898	6 431	7 147	1 840	3 134	689	402 286	80 582
	Observations	536		341		851		553		251		459		66		8		3 065	
Cargo vessel	Count			3 752	3 427					2 212	1 083	10 543	4 594					34 023	12 223
and road	Exp Count			3 484	1 276					1 607	616	2 444	961					34 023	12 223
	Observations			19						34		110						387	
Air or	Count	275 442	134 122	23 774	9 767	16 096	4 200	1 529	896							0	0	316 939	138 446
air and road	Exp Count	132 602	64 584	32 459	13 812	68 834	28 351	37 206	15 462							2 469	1 038	316 939	138 446
	Observations	2 235		255		234		29								0		2 758	
Rail and sea	Count					2 167	1 601	1 182	668	613	566	2 325	2 024	3 565	2 005			15 647	6 435
(and road)	Exp Count					3 398	1 423	1 837	782	739	320	1 124	485	278	130			15 647	6 435
	Observations					37		32		19		40		58				248	
Total	Count	1 817 095	305 086	444 796	48 174	943 262	82 616	509 853	54 233	205 146	25 218	311 987	30 390	77 159	13 003	33 836	3 344	4 343 133	392 614
	Exp Count	1 817 095	305 086	444 796	48 174	943 262	82 616	509 853	54 233	205 146	25 218	311 987	30 390	77 159	13 003	33 836	3 344	4 343 133	392 614
	Observations	17 453		5 655		11 320		7 110		2 927		5 205		1 866		903		52 439	

Significantly overrepresented | Significantly underrepresented | Classified information

If the weight intervals for inbound shipments within Sweden are compared with outbound shipments within Sweden transports with cargo vessel are in the former case only overrepresented for the highest weight intervals and ferry and road do not have any overrepresentation.

2.3.4. Inbound shipment sizes and mode of transport outside Sweden

There is a significant difference in weight between the different modes of transport for inbound transports outside Sweden. The modes of transport have been listed in descending order of shipment weight, based on par wise comparisons of average shipment weights for the different modes (see table 31 and 32):

- Cargo vessel
- Rail-sea
- Cargo vessel-road
- Rail; Rail-road
- Road
- Ferry-road
- Air

Tabell 31: Average weights in kg for inbound transports outside Sweden (according to the adjusted data in the CFS data base)

Trp mode outside Sweden	Number of observations	Mean	Std Error	95 % Confidence Interval		Min	Max
				Lower bound	Upper bound		
Road	18 681	5 266	835	3 631	6 902	0	15 680 300
Railway	1 658	12 153	2 698	6 866	17 440	1	562 256
Cargo vessel	880	721 502	73 207	578 016	864 988	1	320 590 000
Rail and road	955	8 781	1 164	6 501	11 062	1	276 476
Ferry and road	21 374	3 081	246	2 599	3 563	0	2 876 000
Cargo vessel and road	3 044	36 027	3 553	29 063	42 991	0	5 271 000
Air or air and road	8 217	55	7	41	68	0	33 622
Rail and sea (and road)	885	56 287	5 849	44 824	67 750	0	65 608 346
Total	55 694	13 349	672	12 031	14 666	0	320 590 000

Tabell 32 Pairwise comparisons of the average shipment weight for different modes of transports for inbound shipments outside Sweden (according to the adjusted data in the CFS 2001 database)

Trp mode outside Sweden	Trp mode outside Sweden	Mean Difference	Std Error	95 % Confidence Interval	
				Lower bound	Upper bound
Road	Railway	-6 887	2 780	-12 336	-1 437
	Cargo vessel	-716 236	73 212	-859 731	-572 741
	Rail and road	-3 515	1 409	-6 276	-754
	Ferry and road	2 186	869	483	3 888
	Cargo vessel and road	-30 761	3 647	-37 909	-23 612
	Air or air and road	5 212	835	3 576	6 847
	Rail and sea (and road)	-51 021	5 907	-62 598	-39 443
Railway	Road	6 887	2 780	1 437	12 336
	Cargo vessel	-709 349	73 237	-852 893	-565 805
	Rail and road	3 372	2 935	-2 381	9 124
	Ferry and road	9 072	2 708	3 764	14 381
	Cargo vessel and road	-23 874	4 460	-32 615	-15 133
	Air or air and road	12 098	2 698	6 811	17 385
	Rail and sea (and road)	-44 134	6 456	-56 787	-31 481
Cargo vessel	Road	716 236	73 212	572 741	859 731
	Railway	709 349	73 237	565 805	852 893
	Rail and road	712 721	73 213	569 224	856 218
	Ferry and road	718 421	73 208	574 934	861 908
	Cargo vessel and road	685 475	73 297	541 812	829 137
	Air or air and road	721 447	73 207	577 961	864 934
	Rail and sea (and road)	665 215	73 454	521 245	809 185
Rail and road	Road	3 515	1 409	754	6 276
	Railway	-3 372	2 935	-9 124	2 381
	Cargo vessel	-712 721	73 213	-856 218	-569 224
	Ferry and road	5 700	1 188	3 372	8 028
	Cargo vessel and road	-27 246	3 742	-34 581	-19 911
	Air or air and road	8 726	1 164	6 446	11 007
	Rail and sea (and road)	-47 506	5 965	-59 197	-35 814
Ferry and road	Road	-2 186	869	-3 888	-483
	Railway	-9 072	2 708	-14 381	-3 764
	Cargo vessel	-718 421	73 208	-861 908	-574 934
	Rail and road	-5 700	1 188	-8 028	-3 372
	Cargo vessel and road	-32 946	3 517	-39 840	-26 053
	Air or air and road	3 026	246	2 545	3 507
	Rail and sea (and road)	-53 206	5 853	-64 678	-41 734
Cargo vessel and road	Road	30 761	3 647	23 612	37 909
	Railway	23 874	4 460	15 133	32 615
	Cargo vessel	-685 475	73 297	-829 137	-541 812
	Rail and road	27 246	3 742	19 911	34 581
	Ferry and road	32 946	3 517	26 053	39 840
	Air or air and road	35 972	3 553	29 008	42 936
	Rail and sea (and road)	-20 260	6 845	-33 677	-6 843
Air or air and road	Road	-5 212	835	-6 847	-3 576
	Railway	-12 098	2 698	-17 385	-6 811
	Cargo vessel	-721 447	73 207	-864 934	-577 961
	Rail and road	-8 726	1 164	-11 007	-6 446
	Ferry and road	-3 026	246	-3 507	-2 545
	Cargo vessel and road	-35 972	3 553	-42 936	-29 008
	Rail and sea (and road)	-56 232	5 849	-67 695	-44 769
Rail and sea (and road)	Road	51 021	5 907	39 443	62 598
	Railway	44 134	6 456	31 481	56 787
	Cargo vessel	-665 215	73 454	-809 185	-521 245
	Rail and road	47 506	5 965	35 814	59 197
	Ferry and road	53 206	5 853	41 734	64 678
	Cargo vessel and road	20 260	6 845	6 843	33 677
	Air or air and road	56 232	5 849	44 769	67 695

There is a significant difference between modes of transport and the weight intervals used (see table 33). When the shipment sizes are categorised into different intervals the following pattern emerges when the expected frequency is compared to the actual outcome:

- Road: underrepresented in segments below 30 kg and above 50 ton
- Rail: this mode is overrepresented for shipments between 5-10 ton and above 25 ton
- Cargo vessel: overrepresented for shipments between 1-5 ton and above 25 ton
- Rail and road: overrepresented for shipments above 25 ton
- Ferry and road: underrepresented in segment above 50 ton
- Air: overrepresented for the smallest shipments below 30kg
- Rail and sea: overrepresented for shipments above 5 ton

Tabell 33 Weight intervals and modes of transports for inbound transports outside Sweden

Trp mode outside Sweden		Weight intervals																Total	
		]0 , 30] kg		]30 , 100] kg		]100 , 1 000] kg		]1 000 , 5 000] kg		]5 000 , 10 000] kg		]10 000 , 25 000] kg		]25 000 , 50 000] kg		> 50 000 kg			
		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Road	Count	335 418	62 057	152 435	30 121	382 449	78 707	195 899	45 279	69 601	19 680	85 034	18 579	28 554	5 483	4 041	986	1 253 431	169 580
	Exp Count	509 800	76 264	131 182	21 668	274 117	50 583	151 767	28 474	62 771	11 530	92 307	14 920	22 025	4 677	9 461	1 541	1 253 431	169 580
	Observations	4 003		2 160		4 952		3 506		1 305		1 825		782		148		18 681	
Railway	Count	5 711	7 372	6 961	7 524	15 725	13 822	11 207	4 398	9 820	2 925	9 226	2 315	6 473	2 699	4 973	1 634	70 096	30 759
	Exp Count	28 510	12 579	7 336	3 375	15 330	7 029	8 487	3 826	3 510	1 607	5 162	2 303	1 232	582	529	239	70 096	30 759
	Observations	26		30		146		362		478		341		135		140		1 658	
Cargo vessel	Count	1 125	1 083	1 887	1 001	5 105	1 557	10 711	3 446	4 641	2 039	7 263	3 308	8 024	5 801	8 385	1 268	47 142	9 696
	Exp Count	19 174	4 300	4 934	1 084	10 310	2 280	5 708	1 334	2 361	580	3 472	835	828	256	356	90	47 142	9 696
	Observations	14		16		86		134		63		125		132		310		880	
Rail and road	Count	12 774	6 305	4 145	1 697	9 089	2 632	8 492	5 041	6 135	3 171	6 431	2 018	5 502	2 428	1 899	1 236	54 466	12 660
	Exp Count	22 153	5 547	5 700	1 391	11 911	2 919	6 595	1 711	2 728	739	4 011	1 061	957	289	411	110	54 466	12 660
	Observations	172		72		164		146		123		145		116		17		955	
Ferry and road	Count	602 700	183 207	203 103	36 696	437 440	47 942	247 058	28 287	95 080	12 969	150 701	19 675	16 996	8 595	2 145	429	1 755 223	253 878
	Exp Count	713 891	147 450	183 698	32 001	383 856	55 203	212 525	29 690	87 901	13 488	129 260	18 310	30 842	6 027	13 249	1 862	1 755 223	253 878
	Observations	6 361		2 382		4 898		3 379		1 411		2 442		421		80		21 374	
Cargo vessel	Count	34 693	16 295	15 988	5 946	42 448	7 154	44 344	5 345	26 875	3 556	54 166	8 110	7 374	3 304	4 755	1 292	230 643	29 553
and road	Exp Count	93 808	16 374	24 139	3 681	50 440	7 065	27 927	4 219	11 551	1 948	16 985	2 832	4 053	878	1 741	290	230 643	29 553
	Observations	485		254		655		425		278		673		176		98		3 044	
Air or	Count	789 701	207 640	73 157	13 046	61 865	9 795	7 899	2 367	734	670	192	73	49	26	0	0	933 598	212 934
air and road	Exp Count	379 717	115 852	97 709	20 112	204 172	39 593	113 041	22 465	46 754	9 835	68 753	14 003	16 405	4 066	7 047	1 490	933 598	212 934
	Observations	6 330		881		847		132		13		11		3		0		8 217	
Rail and sea	Count	6 555	4 855	2 587	1 602	7 644	2 945	6 878	865	7 352	1 932	10 854	1 724	4 305	1 099	6 998	1 286	53 173	10 252
(and road)	Exp Count	21 627	4 641	5 565	1 166	11 629	2 454	6 438	1 420	2 663	619	3 916	889	934	250	401	95	53 173	10 252
	Observations	43		25		81		87		177		228		115		129		885	
Total	Count	1 788 679	297 729	460 263	52 936	961 765	96 639	532 488	54 866	220 239	25 509	323 867	30 670	77 277	12 966	33 196	3 301	4 397 772	395 297
	Exp Count	1 788 679	297 729	460 263	52 936	961 765	96 639	532 488	54 866	220 239	25 509	323 867	30 670	77 277	12 966	33 196	3 301	4 397 772	395 297
	Observations	17 434		5 820		11 829		8 171		3 848		5 790		1 880		922		55 694	

Significantly overrepresented | Significantly underrepresented

2.4. Goods characteristics and transport mode selection

Traditionally it has been argued that the value of the goods is very important for the mode selection. In the CFS 2001 there is a significant difference in goods value between different modes of transport. The mode selection does also differ between different product groups. These product groups are a result of combinations of the product group used in the CFS 2001 (Commodities in CFS terms). The groups have been created mainly from the original grouping of but also by taking into account logistics considerations (e.g. how the goods may be handled or transported) see appendix 1 for a full list of the groups.

2.4.1. Goods Values for outbound shipments and modes of transport within Sweden

The different transport modes for outbound shipments within Sweden are listed below in descending order of the goods value (SEK/Kg), based on a pair wise analysis (see table 35):

- Air
- Ferry-road
- Rail-road
- Cargo vessel-road
- Rail
- Cargo vessel
- Rail sea

The shipments values for road are higher than for rail, cargo vessel and rail-sea, but not significantly different from rail-road or cargo vessel-road.

Tabell 34 Average goods value for different modes of transport in Sweden for outbound shipments within Sweden (according to the adjusted data in the CFS data base)

Trp mode in Sweden	Number of observations	Mean	Std Error	95 % Confidence Interval Lower bound	Upper bound	Min	Max
Road	762 529	8,98	0,25	8,49	9,48	0	70 651 868
Railway	7 900	3,61	0,08	3,44	3,77	0	744 030
Cargo vessel	1 285	1,71	0,08	1,55	1,86	0	6 809
Rail and road	2 599	12,20	1,79	8,69	15,71	0	418 687
Ferry and road	7 207	32,05	3,18	25,83	38,28	0	112 000
Cargo vessel and road	1 310	6,95	1,39	4,21	9,68	0	11 928
Air or air and road	6 883	176,61	41,04	96,17	257,06	0	587 000
Rail and sea (and road)	394	1,28	0,07	1,14	1,42	0	15 000
Total	790 107	7,60	0,18	7	8	0	70 651 868

Tabell 35 Pair wise comparisons of goods values for different transport modes for outbound shipments transported within Sweden (according to the adjusted data in the CFS data base)

Trp mode in Sweden	Trp mode in Sweden	Mean Difference	Std Error	95 % Confidence Interval	
				Lower bound	Upper bound
Road	Railway	5,38	0,26	4,88	5,88
	Cargo vessel	7,28	0,26	6,77	7,79
	Rail and road	-3,22	1,79	-6,73	0,30
	Ferry and road	-23,07	3,17	-29,29	-16,85
	Cargo vessel and road	2,04	1,42	-0,74	4,82
	Air or air and road	-167,63	41,03	-248,05	-87,20
	Rail and sea (and road)	7,70	0,26	7,19	8,22
Railway	Road	-5,38	0,26	-5,88	-4,88
	Cargo vessel	1,90	0,11	1,68	2,12
	Rail and road	-8,60	1,79	-12,10	-5,09
	Ferry and road	-28,45	3,18	-34,68	-22,22
	Cargo vessel and road	-3,34	1,40	-6,08	-0,60
	Air or air and road	-173,01	41,04	-253,45	-92,56
	Rail and sea (and road)	2,32	0,11	2,11	2,53
Cargo vessel	Road	-7,28	0,26	-7,79	-6,77
	Railway	-1,90	0,11	-2,12	-1,68
	Rail and road	-10,50	1,79	-14,01	-6,98
	Ferry and road	-30,35	3,18	-36,58	-24,12
	Cargo vessel and road	-5,24	1,40	-7,98	-2,51
	Air or air and road	-174,91	41,04	-255,35	-94,46
	Rail and sea (and road)	0,42	0,11	0,21	0,63
Rail and road	Road	3,22	1,79	-0,30	6,73
	Railway	8,60	1,79	5,09	12,10
	Cargo vessel	10,50	1,79	6,98	14,01
	Ferry and road	-19,85	3,63	-26,97	-12,73
	Cargo vessel and road	5,26	2,26	0,82	9,69
	Air or air and road	-164,41	41,08	-244,93	-83,89
	Rail and sea (and road)	10,92	1,79	7,40	14,43
Ferry and road	Road	23,07	3,17	16,85	29,29
	Railway	28,45	3,18	22,22	34,68
	Cargo vessel	30,35	3,18	24,12	36,58
	Rail and road	19,85	3,63	12,73	26,97
	Cargo vessel and road	25,11	3,45	18,34	31,87
	Air or air and road	-144,56	40,62	-224,16	-64,95
	Rail and sea (and road)	30,77	3,18	24,54	37,00
Cargo vessel and road	Road	-2,04	1,42	-4,82	0,74
	Railway	3,34	1,40	0,60	6,08
	Cargo vessel	5,24	1,40	2,51	7,98
	Rail and road	-5,26	2,26	-9,69	-0,82
	Ferry and road	-25,11	3,45	-31,87	-18,34
	Air or air and road	-169,67	41,06	-250,15	-89,18
	Rail and sea (and road)	5,66	1,39	2,93	8,40
Air or air and road	Road	167,63	41,03	87,20	248,05
	Railway	173,01	41,04	92,56	253,45
	Cargo vessel	174,91	41,04	94,46	255,35
	Rail and road	164,41	41,08	83,89	244,93
	Ferry and road	144,56	40,62	64,95	224,16
	Cargo vessel and road	169,67	41,06	89,18	250,15
	Rail and sea (and road)	175,33	41,04	94,88	255,77
Rail and sea (and road)	Road	-7,70	0,26	-8,22	-7,19
	Railway	-2,32	0,11	-2,53	-2,11
	Cargo vessel	-0,42	0,11	-0,63	-0,21
	Rail and road	-10,92	1,79	-14,43	-7,40
	Ferry and road	-30,77	3,18	-37,00	-24,54
	Cargo vessel and road	-5,66	1,39	-8,40	-2,93
	Air or air and road	-175,33	41,04	-255,77	-94,88

It should be noted that the goods value per kg is also linked to which combination of load unit and mode of transport is used. This is most obvious for bulk cargo, which ordinarily is used for low value goods on cargo vessels but when bulk cargo is transported by air it has been observed to have extremely high value per kg in a number of cases. Goods with unknown or unspecified load unit also have a high goods value per kg when air transports are used (the load unit may in these cases be parcels, which is not a predefined load unit in the CFS). Pre-slung goods do consistently have the lowest goods values and bulk goods also have consistently low goods values with the exception of air.

However, to a high extent the type of load unit is unknown or unspecified for all modes of transport (especially for air, rail and road).

2.4.2. Goods Values for outbound shipments and modes of transport outside Sweden

The different transport modes for outbound shipments transported outside Sweden are below listed in descending order of the goods value (SEK/Kg), based on a pair wise analysis of the average goods value (see table 37):

- Air
- Road; Ferry-road
- Cargo vessel-road
- Rail; Rail-road
- Rail-sea
- Cargo vessel

The shipment value for ferry is only lower than for air but it does not differ from the shipment values for road; ferry-road; cargo vessel-road and it has therefore not been put into the list.

Tabell 36: Average goods value for outbound shipments outside Sweden (according to the adjusted data in the CFS data base)

Trp mode outside Sweden	Number of observations	Mean	Std Error	95 % Confidence Interval		Min	Max
				Lower bound	Upper bound		
Road	31 846	23,76	1,75	20,34	27,19	0	289 688
Railway	712	8,37	0,50	7,39	9,35	0	24 120
Ferry	1 168	21,96	5,28	11,60	32,31	0	28 571
Cargo vessel	12 700	3,37	0,15	3,09	3,66	0	88 164
Rail and road	841	7,91	0,25	7,41	8,40	0	8 868
Ferry and road	16 916	24,74	1,53	21,75	27,73	0	181 725
Cargo vessel and road	3 492	11,72	1,18	9,42	14,03	0	180 186
Air or air and road	14 986	98,66	11,09	76,92	120,41	0	70 651 868
Rail and sea (and road)	1 634	5,57	0,18	5,23	5,92	0	8 000
Total	84 295	10,99	0,32	10,36	11,62	0	70 651 868

Tabell 37 Average goods value for different modes of transport outside Sweden for outbound shipments (according to the adjusted data in the CFS data base)

Trp mode outside Sweden	Trp mode outside Sweden	Mean Difference	Std Error	95 % Confidence Interval Lower bound	Upper bound
Road	Railway	15,39	1,81	11,85	18,94
	Ferry	1,81	5,55	-9,07	12,69
	Cargo vessel	20,39	1,75	16,96	23,82
	Rail and road	15,86	1,76	12,41	19,31
	Ferry and road	-0,97	2,26	-5,41	3,46
	Cargo vessel and road	12,04	2,09	7,95	16,14
	Air or air and road	-74,90	11,16	-96,78	-53,02
	Rail and sea (and road)	18,19	1,75	14,75	21,63
Railway	Road	-15,39	1,81	-18,94	-11,85
	Ferry	-13,59	5,30	-23,98	-3,19
	Cargo vessel	5,00	0,52	3,98	6,02
	Rail and road	0,46	0,52	-0,56	1,49
	Ferry and road	-16,37	1,59	-19,49	-13,25
	Cargo vessel and road	-3,35	1,27	-5,84	-0,86
	Air or air and road	-90,29	11,11	-112,06	-68,52
	Rail and sea (and road)	2,80	0,50	1,82	3,78
Ferry	Road	-1,81	5,55	-12,69	9,07
	Railway	13,59	5,30	3,19	23,98
	Cargo vessel	18,58	5,29	8,22	28,94
	Rail and road	14,05	5,29	3,68	24,42
	Ferry and road	-2,78	5,46	-13,49	7,93
	Cargo vessel and road	10,24	5,41	-0,37	20,84
	Air or air and road	-76,71	12,29	-100,79	-52,62
	Rail and sea (and road)	16,38	5,28	6,03	26,74
Cargo vessel	Road	-20,39	1,75	-23,82	-16,96
	Railway	-5,00	0,52	-6,02	-3,98
	Ferry	-18,58	5,29	-28,94	-8,22
	Rail and road	-4,53	0,29	-5,10	-3,97
	Ferry and road	-21,36	1,53	-24,37	-18,36
	Cargo vessel and road	-8,35	1,18	-10,67	-6,03
	Air or air and road	-95,29	11,10	-117,03	-73,54
	Rail and sea (and road)	-2,20	0,23	-2,65	-1,75
Rail and road	Road	-15,86	1,76	-19,31	-12,41
	Railway	-0,46	0,52	-1,49	0,56
	Ferry	-14,05	5,29	-24,42	-3,68
	Cargo vessel	4,53	0,29	3,97	5,10
	Ferry and road	-16,83	1,54	-19,86	-13,81
	Cargo vessel and road	-3,81	1,20	-6,17	-1,46
	Air or air and road	-90,76	11,10	-112,51	-69,00
	Rail and sea (and road)	2,33	0,31	1,73	2,94
Ferry and road	Road	0,97	2,26	-3,46	5,41
	Railway	16,37	1,59	13,25	19,49
	Ferry	2,78	5,46	-7,93	13,49
	Cargo vessel	21,36	1,53	18,36	24,37
	Rail and road	16,83	1,54	13,81	19,86
	Cargo vessel and road	13,02	1,89	9,31	16,73
	Air or air and road	-73,92	11,13	-95,73	-52,11
	Rail and sea (and road)	19,17	1,45	16,31	22,02
Cargo vessel and road	Road	-12,04	2,09	-16,14	-7,95
	Railway	3,35	1,27	0,86	5,84
	Ferry	-10,24	5,41	-20,84	0,37
	Cargo vessel	8,35	1,18	6,03	10,67
	Rail and road	3,81	1,20	1,46	6,17
	Ferry and road	-13,02	1,89	-16,73	-9,31
	Air or air and road	-86,94	11,15	-108,79	-65,09
	Rail and sea (and road)	6,15	1,19	3,82	8,48
Air or air and road	Road	74,90	11,16	53,02	96,78
	Railway	90,29	11,11	68,52	112,06
	Ferry	76,71	12,29	52,62	100,79
	Cargo vessel	95,29	11,10	73,54	117,03
	Rail and road	90,76	11,10	69,00	112,51
	Ferry and road	73,92	11,13	52,11	95,73
	Cargo vessel and road	86,94	11,15	65,09	108,79
	Rail and sea (and road)	93,09	11,10	71,34	114,84
Rail and sea (and road)	Road	-18,19	1,75	-21,63	-14,75
	Railway	-2,80	0,50	-3,78	-1,82
	Ferry	-16,38	5,28	-26,74	-6,03
	Cargo vessel	2,20	0,23	1,75	2,65
	Rail and road	-2,33	0,31	-2,94	-1,73
	Ferry and road	-19,17	1,45	-22,02	-16,31
	Cargo vessel and road	-6,15	1,19	-8,48	-3,82
	Air or air and road	-93,09	11,10	-114,84	-71,34

2.4.3. Goods Values for inbound shipments and modes of transport within Sweden

The goods value of the inbound shipments within Sweden differs significantly between the different modes of transport. Based on pair wise comparisons of averages shipment weights for different modes (see table 38 and 39). The modes of transport have been listed in descending order of shipment value:

- Air
- Ferry-road
- Road; Rail-road, Rail
- Rail-sea
- Cargo vessel, cargo vessel-road

Tabell 38: Table average shipment value for different modes of transport for inbound shipments transported within Sweden (according to the adjusted data in the CFS data base)

Trp mode in Sweden	Number of observations	Mean	Std Error	95 % Confidence Interval Lower bound	Upper bound	Min	Max
Road	43 617	16,05	0,76	14,57	17,53	0	1 062 985
Railway	1 211	16,01	0,88	14,29	17,73	0	11 226
Cargo vessel	267	2,06	0,04	1,98	2,13	0	4 933
Rail and road	879	13,78	1,66	10,53	17,03	0	71 548
Ferry and road	3 065	25,22	2,26	20,80	29,65	0	37 818
Cargo vessel and road	387	2,02	0,26	1,52	2,52	0	13 000
Air or air and road	2 758	1 278,52	183,44	918,98	1 638,06	0	2 105 605
Rail and sea (and road)	248	4,90	0,41	4,09	5,71	0	6 975
Total	52 432	7,94	0,20	7,53	8,34	0	2 105 605

Tabell 39: **Pair wise comparisons of shipment values between different modes of transport for inbound shipments transported within Sweden (according to the adjusted data in the CFS data base)**

Trp mode in Sweden	Trp mode in Sweden	Mean Difference	Std Error	95 % Confidence Interval	
				Lower bound	Upper bound
Road	Railway	0,04	1,13	-2,18	2,26
	Cargo vessel	13,99	0,76	12,51	15,47
	Rail and road	2,27	1,82	-1,29	5,83
	Ferry and road	-9,17	2,39	-13,85	-4,50
	Cargo vessel and road	14,03	0,80	12,47	15,59
	Air or air and road	-1 262,47	183,44	-1 622,02	-902,92
	Rail and sea (and road)	11,15	0,86	9,46	12,83
Railway	Road	-0,04	1,13	-2,26	2,18
	Cargo vessel	13,95	0,87	12,24	15,66
	Rail and road	2,23	1,87	-1,42	5,89
	Ferry and road	-9,21	2,40	-13,92	-4,51
	Cargo vessel and road	13,99	0,91	12,20	15,78
	Air or air and road	-1 262,51	183,44	-1 622,05	-902,97
	Rail and sea (and road)	11,11	0,94	9,26	12,96
Cargo vessel	Road	-13,99	0,76	-15,47	-12,51
	Railway	-13,95	0,87	-15,66	-12,24
	Rail and road	-11,72	1,66	-14,97	-8,47
	Ferry and road	-23,17	2,26	-27,59	-18,74
	Cargo vessel and road	0,04	0,26	-0,47	0,55
	Air or air and road	-1 276,46	183,44	-1 636,00	-916,92
	Rail and sea (and road)	-2,84	0,42	-3,66	-2,03
Rail and road	Road	-2,27	1,82	-5,83	1,29
	Railway	-2,23	1,87	-5,89	1,42
	Cargo vessel	11,72	1,66	8,47	14,97
	Ferry and road	-11,45	2,80	-16,94	-5,95
	Cargo vessel and road	11,76	1,68	8,47	15,04
	Air or air and road	-1 264,74	183,45	-1 624,31	-905,18
	Rail and sea (and road)	8,88	1,71	5,52	12,23
Ferry and road	Road	9,17	2,39	4,50	13,85
	Railway	9,21	2,40	4,51	13,92
	Cargo vessel	23,17	2,26	18,74	27,59
	Rail and road	11,45	2,80	5,95	16,94
	Cargo vessel and road	23,20	2,31	18,68	27,73
	Air or air and road	-1 253,30	183,48	-1 612,91	-893,68
	Rail and sea (and road)	20,32	2,30	15,81	24,84
Cargo vessel and road	Road	-14,03	0,80	-15,59	-12,47
	Railway	-13,99	0,91	-15,78	-12,20
	Cargo vessel	-0,04	0,26	-0,55	0,47
	Rail and road	-11,76	1,68	-15,04	-8,47
	Ferry and road	-23,20	2,31	-27,73	-18,68
	Air or air and road	-1 276,50	183,47	-1 636,10	-916,90
	Rail and sea (and road)	-2,88	0,49	-3,83	-1,93
Air or air and road	Road	1 262,47	183,44	902,92	1 622,02
	Railway	1 262,51	183,44	902,97	1 622,05
	Cargo vessel	1 276,46	183,44	916,92	1 636,00
	Rail and road	1 264,74	183,45	905,18	1 624,31
	Ferry and road	1 253,30	183,48	893,68	1 612,91
	Cargo vessel and road	1 276,50	183,47	916,90	1 636,10
	Rail and sea (and road)	1 273,62	183,44	914,08	1 633,16
Rail and sea (and road)	Road	-11,15	0,86	-12,83	-9,46
	Railway	-11,11	0,94	-12,96	-9,26
	Cargo vessel	2,84	0,42	2,03	3,66
	Rail and road	-8,88	1,71	-12,23	-5,52
	Ferry and road	-20,32	2,30	-24,84	-15,81
	Cargo vessel and road	2,88	0,49	1,93	3,83
	Air or air and road	-1 273,62	183,44	-1 633,16	-914,08

2.4.4. Goods Values for inbound shipments and modes of transport outside Sweden

The goods value of the inbound shipments outside Sweden differs significantly between the different modes of transport. Based on pair wise comparisons of averages shipment weights for different modes (see table 40 and 41). The modes of transport have been listed in listed in descending order of shipment value:

- Air
- Ferry-road
- Rail-road; Road
- Rail
- Cargo vessel-road
- Rail-sea
- Cargo vessel

The differences in goods value for inbound shipments transported outside Sweden is more or less the same as for inbound transports inbound transports within Sweden, but in several cases the average goods values are lower for inbound transports outside Sweden.

Tabell 40 Average goods value for inbound transports outside Sweden (according to the adjusted data in the CFS data base)

Trp mode outside Sweden	Number of observations	Mean	Std Error	95 % Confidence Interval		Min	Max
				Lower bound	Upper bound		
Road	18 677	16,19	2,44	11,41	20,98	0	234 855
Railway	1 658	9,50	1,22	7,11	11,88	1	16 088
Cargo vessel	880	2,24	0,06	2,11	2,36	0	13 000
Rail and road	955	17,54	2,28	13,07	22,01	0	16 800
Ferry and road	21 371	28,81	1,34	26,18	31,43	0	556 431
Cargo vessel and road	3 044	5,23	0,39	4,45	6,00	0	16 479
Air or air and road	8 217	738,16	53,01	634,25	842,06	0	2 105 605
Rail and sea (and road)	885	3,84	0,20	3,45	4,22	0	27 931
Total	55 687	7,63	0,22	7,20	8,06	0	2 105 605

Tabell 41 Pair wise comparisons of shipment values between different modes of transport for inbound shipments transported outside Sweden (according to the unadjusted primary data in the CFS data base)

Trp mode outside Sweden	Trp mode outside Sweden	Mean Difference	Std Error	95 % Confidence Interval	
				Lower bound	Upper bound
Road	Railway	6,70	2,70	1,41	11,99
	Cargo vessel	13,96	2,44	9,18	18,74
	Rail and road	-1,34	3,28	-7,78	5,09
	Ferry and road	-12,61	2,78	-18,06	-7,17
	Cargo vessel and road	10,97	2,47	6,13	15,81
	Air or air and road	-721,96	53,07	-825,98	-617,95
	Rail and sea (and road)	12,36	2,45	7,56	17,15
Railway	Road	-6,70	2,70	-11,99	-1,41
	Cargo vessel	7,26	1,22	4,87	9,64
	Rail and road	-8,04	2,58	-13,09	-2,99
	Ferry and road	-19,31	1,81	-22,85	-15,77
	Cargo vessel and road	4,27	1,28	1,77	6,77
	Air or air and road	-728,66	53,03	-832,59	-624,73
	Rail and sea (and road)	5,66	1,24	3,24	8,08
Cargo vessel	Road	-13,96	2,44	-18,74	-9,18
	Railway	-7,26	1,22	-9,64	-4,87
	Rail and road	-15,30	2,28	-19,77	-10,83
	Ferry and road	-26,57	1,34	-29,19	-23,94
	Cargo vessel and road	-2,99	0,40	-3,77	-2,21
	Air or air and road	-735,92	53,01	-839,82	-632,02
	Rail and sea (and road)	-1,60	0,21	-2,00	-1,19
Rail and road	Road	1,34	3,28	-5,09	7,78
	Railway	8,04	2,58	2,99	13,09
	Cargo vessel	15,30	2,28	10,83	19,77
	Ferry and road	-11,27	2,63	-16,42	-6,11
	Cargo vessel and road	12,31	2,31	7,78	16,85
	Air or air and road	-720,62	53,06	-824,62	-616,61
	Rail and sea (and road)	13,70	2,29	9,22	18,19
Ferry and road	Road	12,61	2,78	7,17	18,06
	Railway	19,31	1,81	15,77	22,85
	Cargo vessel	26,57	1,34	23,94	29,19
	Rail and road	11,27	2,63	6,11	16,42
	Cargo vessel and road	23,58	1,40	20,84	26,32
	Air or air and road	-709,35	53,04	-813,31	-605,39
	Rail and sea (and road)	24,97	1,35	22,32	27,61
Cargo vessel and road	Road	-10,97	2,47	-15,81	-6,13
	Railway	-4,27	1,28	-6,77	-1,77
	Cargo vessel	2,99	0,40	2,21	3,77
	Rail and road	-12,31	2,31	-16,85	-7,78
	Ferry and road	-23,58	1,40	-26,32	-20,84
	Air or air and road	-732,93	53,02	-836,86	-629,01
	Rail and sea (and road)	1,39	0,44	0,53	2,25
Air or air and road	Road	721,96	53,07	617,95	825,98
	Railway	728,66	53,03	624,73	832,59
	Cargo vessel	735,92	53,01	632,02	839,82
	Rail and road	720,62	53,06	616,61	824,62
	Ferry and road	709,35	53,04	605,39	813,31
	Cargo vessel and road	732,93	53,02	629,01	836,86
	Rail and sea (and road)	734,32	53,01	630,42	838,23
Rail and sea (and road)	Road	-12,36	2,45	-17,15	-7,56
	Railway	-5,66	1,24	-8,08	-3,24
	Cargo vessel	1,60	0,21	1,19	2,00
	Rail and road	-13,70	2,29	-18,19	-9,22
	Ferry and road	-24,97	1,35	-27,61	-22,32
	Cargo vessel and road	-1,39	0,44	-2,25	-0,53
	Air or air and road	-734,32	53,01	-838,23	-630,42

2.4.5. Product group and mode of transport for outbound shipments within Sweden

If the mode of transport for each type of product group is viewed relatively the expected number of shipments per product group the following modes are more frequently used than expected (see table 42):

- **Ferry-road:** metal products, paper waste
- **Rail:** ore, metal products, forest products, paper pulp
- **Rail-road:** forest products, paper pulp
- **Rail and sea:** ore, metal products, forest products, paper pulp
- **Cargo vessel:** petroleum products, forest products, paper pulp, paper products
- **Cargo vessel and road:** forest products, paper pulp
- **Air:** transport equipment, manufactured metal products

Tabell 42: Type of goods and mode of transport within Sweden for outbound shipments (according to the adjusted data in the CFS data base)

Product group		Transport mode in Sweden															
		Road		Railway		Cargo vessel		Rail and road		Ferry and road		Cargo vsl and road		Air or air and road		Rail and sea		Total	
		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Agriculture	Count	497 075	314 782							122	164			0	0	0	0	515 716	315 052
products	Exp Count	501 959	306 712							4 559	2 913			2 726	1 734	116	84	515 716	315 052
	Observations	16 075								4				0		0		16 203	
Solid	Count	34 895	9 416					0	0			0	0	0	0	0	0	35 185	9 394
mineral fuels	Exp Count	34 247	9 145					182	89			31	10	186	61	8	4	35 185	9 394
	Observations	1 342						0				0		0		0		1 349	
Petroleum	Count	676 513	101 184									0	0	0	0	0	0	686 755	101 287
products	Exp Count	668 435	98 651									608	143	3 630	885	154	64	686 755	101 287
	Observations	16 325										0		0		0		16 751	
Ore and	Count	137 097	129 033	11 716	4 394			10 347	17 470					0	0			161 280	132 343
metal waste	Exp Count	156 977	128 812	848	714			834	772					853	718			161 280	132 343
	Observations	479		624				48						0				1 301	
Metal	Count	2 377 912	398 994			1 316	914			39 673	10 967	3 630	1 901	681	332	3 588	791	2 502 208	400 592
products	Exp Count	2 435 457	390 389			2 531	730			22 119	5 619	2 216	533	13 227	3 274	562	236	2 502 208	400 592
	Observations	60 949				14				631		72		12		65		62 426	
Minerals and	Count	1 466 879	344 947	4 148	4 641	5 069	7 444	461	492	4 644	1 892	365	367	0	0	0	0	1 481 565	345 929
building materials	Exp Count	1 442 041	336 931	7 794	2 318	1 499	515	7 657	3 603	13 097	3 985	1 312	384	7 832	2 348	333	150	1 481 565	345 929
	Observations	24 249		67		64		11		107		12		0		0		24 510	
Chemical	Count	50 224	27 570					0	0	0	0	0	0	0	0	0	0	51 162	28 087
fertilisers	Exp Count	49 797	27 339					264	181	452	264	45	26	270	157	11	8	51 162	28 087
	Observations	370						0		0		0		0		0		401	
Chemical	Count	1 825 124	518 054	8 095	2 711			6 796	6 436	15 480	5 750	1 859	1 509	12 530	16 224			1 870 521	518 767
products	Exp Count	1 820 621	505 450	9 840	3 236			9 667	4 731	16 535	5 540	1 657	539	9 888	3 288			1 870 521	518 767
	Observations	9 053		98				54		211		23		57				9 508	
Textiles	Count	1 663 855	548 255							38 343	27 001	219	171	6 509	5 453	0	0	1 709 091	557 497
	Exp Count	1 663 498	542 771							15 108	5 888	1 514	556	9 035	3 397	384	193	1 709 091	557 497
	Observations	6 818								248		6		41		0		7 117	
Forestproducts	Count	268 385	42 170	5 080	1 876	938	426	4 152	1 726	2 159	531	7 830	2 161	0	0	1 085	731	289 629	43 355
	Exp Count	281 902	42 206	1 524	370	293	84	1 497	656	2 560	642	257	63	1 531	376	65	27	289 629	43 355
	Observations	5 251		227		50		146		134		304		0		38		6 150	
Lubricating oils	Count	65 759	34 153			0	0	0	0	868	1 137	0	0			0	0	66 910	34 439
and fats	Exp Count	65 125	33 522			68	39	346	228	591	327	59	32			15	10	66 910	34 439
	Observations	535				0		0		5		0				0		542	
Medical and	Count	2 205 894	511 230					10 166	14 345	21 047	8 710	371	367	10 453	6 867	0	0	2 248 355	512 410
pharmaceutical	Exp Count	2 188 376	499 294					11 620	5 386	19 875	5 942	1 992	571	11 886	3 511	505	226	2 248 355	512 410
products	Observations	26 192						109		896		7		132		0		27 339	
Paper pulp	Count	37 391	11 544	8 077	7 502	1 218	371	1 414	655	625	273			0	0			50 162	15 733
	Exp Count	48 823	15 308	264	102	51	20	259	134	443	165			265	98			50 162	15 733
	Observations	647		154		22		36		25				0				915	
Paper waste,	Count	148 359	59 952	8 019	9 109	0	0	6 444	9 550									169 332	69 601
empty packaging,	Exp Count	164 814	67 717	891	419	171	82	875	516									169 332	69 601
packaging, used	Observations	1 567		53		0		21										1 688	
Transport equipment,	Count	10 677 937	1 090 050			2 495	912			100 094	59 615	12 886	4 499	168 075	40 738			11 075 028	1 111 362
transport equipment,	Exp Count	10 779 579	1 082 680			11 204	2 887			97 900	21 961	9 810	1 985	58 546	13 533			11 075 028	1 111 362
	Observations	145 063				150				1 398		350		5 380				155 476	
Manufactured	Count	4 896 159	908 912	9 858	5 587			10 754	7 373	62 943	35 800	1 575	519	61 891	23 189			5 043 883	919 105
products of metal	Exp Count	4 909 327	895 740	26 534	6 761			26 068	11 594	44 587	12 002	4 468	1 112	26 664	7 114			5 043 883	919 105
	Observations	29 796		148				180		488		48		388				31 061	
Other manufactured	Count	15 111 053	1 611 863	58 917	24 387			63 284	18 706	183 776	65 169	10 541	4 826	66 920	30 050	2 323	1 172	15 499 937	1 622 549
products	Exp Count	15 086 445	1 587 435	81 540	16 881			80 107	33 582	137 015	30 493	13 730	2 762	81 938	17 302	3 482	1 384	15 499 937	1 622 549
	Observations	122 285		457				742		1 901		248		716		59		126 518	
Paper products	Count	9 386 220	5 336 805	93 637	21 770			116 381	127 468	26 958	9 083			12 392	5 562			9 693 828	5 339 689
	Exp Count	9 435 226	5 218 000	50 996	25 491			50 100	31 501	85 691	43 130			51 245	25 614			9 693 828	5 339 689
	Observations	124 476		2 011				521		250				88				128 007	
Foodstuffs and	Count	11 393 183	1 612 385	18 001	11 626			8 563	4 993	66 305	20 516	2 857	1 233					11 493 884	1 613 190
animal fodder	Exp Count	11 187 262	1 577 748	60 465	13 469			59 403	25 380	101 603	23 624	10 181	2 201					11 493 884	1 613 190
	Observations	169 499		569				142		838		83						171 198	
Total	Count	62 919 912	5 975 049	340 071	56 929	65 395	14 734	334 098	134 700	571 440	104 573	57 261	9 062	341 732	60 121	14 521	5 496	64 644 430	5 983 437
	Exp Count	62 919 912	5 975 049	340 071	56 929	65 395	14 734	334 098	134 700	571 440	104 573	57 261	9 062	341 732	60 121	14 521	5 496	64 644 430	5 983 437
	Observations	760 971		7 900		1 274		2 596		7 191		1 311		6 823		394		788 460	

Significantly overrepresented | Significantly underrepresented | Classified information

If the typical value of goods per mode is compared with the types of products transported both matches and mismatches are identified indicating that the type of products transported influences the mode selection in more ways than by its goods value:
•**Air**: have the highest goods values and high value products, i.e. there is a match
•**Road**: not possible to characterise
•**Rail-sea**: very low goods values and most of the product types which are overrepresented are of a low value type, the exception is pulp.
•**Rail:** rather low goods values, but a mix of product types. In some cases the shipment size may explain the difference, but in other e.g. transport equipment and paper products, the shipment sizes cannot help to explain the mode selection.
•**Cargo vessel-road:** rather low goods values and mainly low value product types, i.e. matching, with the exception of pulp.
•**Cargo vessel:** very low goods values and mainly low value products, but there are also expeceptions: paper products and pulp which have a significantly higher value per kg. The reason why pulp is shipped on cargo vessels may be explained by shipment size but the transports of paper products cannot likely be explained in the same way, i.e something unknown has influenced the mode selection.

If the value of goods or the shipment size cannot explain why certain groups of products use specific modes of transports perhaps the handling of the goods will do this. If the type of load units used are compared with the type of products the following could be observed:
•Paper products load units do not offer any explanation to the mode selection.
•Paper pulp is typically transported as bulk or pre-slung which is typical for rail or cargo vessel.
•Transport equipment: is typically transported as mobile units, which does not explain why rail was chosen.

A hypothesis is that the use of sea or rail transports for paper products could also be explained by large shippers use of system transports based on these transport modes. This is also related to the environmental policies of companies. In the case metal products a possible explanation, behind the mode selection, might be the use of existing systems, which were designed and built in another context.

When outbound shipments, transported within Sweden, are compared with inbound, the following observations can be made: the characteristic per mode is similar but inbound forest products are not overrepresented for rail or rail-sea (as for outbound) and paper pulp is specific for outbound transports and in many cases this commodity has been replaced by paper waste in the inbound shipments. This is in line with the industry structure in Sweden.

2.4.6. Product group and mode of transport for inbound shipments within Sweden

If the mode of transport for each type of product group is viewed relatively the expected number of shipments per product group the following observations could be made regarding which modes that are more frequently used than expected[6] for inbound transports within Sweden:

- **Road:** no significant differences
- **Ferry-road:** no commodity significantly overrepresented
- **Rail:** ore, metal products, paper waste, other manufactured products

[6] NB this is not the same as being the most frequently used mode per product group

- **Rail-road:** forest products, paper waste
- **Rail and sea:** ore, metal products, paper waste
- **Cargo vessel:** petroleum products, ore, forest products, paper products
- **Cargo vessel and road:** solid mineral fuels, ore, forest products
- **Air:** no commodity significantly overrepresented

Tabell 43: Type of goods and mode of transport within Sweden for inbound shipments (according to the adjusted data in the CFS data base)

Product group		Transport mode in Sweden																Total	
		Road		Railway		Cargo vessel		Rail and road		Ferry and road		Cargo vsl and road		Air or air and road		Rail and sea			
		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Agriculture	Count	16 296	10 493	0	0	0	0			1 000	1 098			0	0	0	0	17 650	10 571
products	Exp Count	13 807	8 300	466	284	24	15			1 639	1 030			1 300	939	64	46	17 650	10 571
	Observations	275		0		0				22				0		0		300	
Solid	Count			0	0	0	0	0	0	0	0			0	0	0	0	728	276
mineral fuels	Exp Count			19	8	1	0	9	4	68	29			54	30	3	1	728	276
	Observations			0		0		0		0				0		0		8	
Petroleum	Count	3 199	2 121			3 139	246					0	0	0	0	0	0	6 745	2 284
products	Exp Count	5 276	1 803			9	4					53	26	497	263	24	13	6 745	2 284
	Observations	65				121						0		0		0		189	
Ore and	Count	2 527	674											0	0	147	85	4 692	884
metal waste	Exp Count	3 671	711											346	155	17	8	4 692	884
	Observations	80												0		10		128	
Metal	Count	136 069	44 460	10 523	3 424			691	224	16 833	16 276			2 026	1 402	7 123	4 074	176 128	48 104
products	Exp Count	137 776	38 302	4 652	1 351			2 116	824	16 356	5 537			12 976	6 274	636	328	176 128	48 104
	Observations	1 735		244				34		133				60		126		2 348	
Minerals and	Count	76 211	88 343	195	274			1 144	1 849	651	839			0	0	107	70	78 572	88 370
building materials	Exp Count	61 463	69 524	2 075	2 306			944	1 078	7 297	8 185			5 789	6 814	284	335	78 572	88 370
	Observations	337		7				29		18				0		6		408	
Chemical	Count			0	0	0	0	0	0			0	0	0	0	0	0	446	235
fertilisers	Exp Count			12	6	1	0	5	3			3	2	33	22	2	1	446	235
	Observations			0		0		0				0		0		0		14	
Chemical	Count	182 478	46 493	4 386	1 181			4 231	1 701	46 505	16 496			8 091	11 877	2 503	1 659	257 381	53 460
products	Exp Count	201 337	42 569	6 799	1 551			3 092	1 081	23 902	7 019			18 962	8 656	930	435	257 381	53 460
	Observations	2 456		71				59		281				36		43		3 008	
Textiles	Count	130 916	117 177					443	346	1 986	1 544	1 082	1 359	3 273	4 939	0	0	137 877	117 315
	Exp Count	107 855	92 701					1 657	1 446	12 804	10 839	1 078	971	10 158	9 333	498	460	137 877	117 315
	Observations	989						22		44		21		13		0		1 094	
Forestproducts	Count	10 650	6 192			551	208			1 299	2 339	677	429	0	0	0	0	16 043	7 242
	Exp Count	12 550	5 693			22	11			1 490	734	125	73	1 182	717	58	36	16 043	7 242
	Observations	318				35				11		48		0		0		538	
Lubricating oils	Count	6 193	4 758			0	0			0	0	0	0	0	0	0	0	6 277	4 761
and fats	Exp Count	4 910	3 736			8	7			583	454	49	41	462	396	23	20	6 277	4 761
	Observations	92				0				0		0		0		0		94	
Medical and	Count	48 974	16 911			0	0	244	162	12 935	22 659	0	0	15 229	16 872			77 566	37 717
pharmaceutical	Exp Count	60 676	29 303			104	55	932	521	7 203	3 947	607	365	5 715	3 752			77 566	37 717
products	Observations	1 139				0		6		63		0		124				1 342	
Paper pulp	Count	3 410	2 502			0	0	0	0			0	0	0	0	0	0	3 586	2 505
	Exp Count	2 805	1 965			5	4	43	33			28	22	264	213	13	11	3 586	2 505
	Observations	81				0		0				0		0		0		93	
Paper waste,	Count	15 145	1 769			0	0			973	699	0	0					19 093	2 615
empty packaging,	Exp Count	14 936	2 154			26	7			1 773	423	149	58					19 093	2 615
packaging, used	Observations	297				0				34		0						400	
Transport equipment,	Count	1 510 539	267 617	12 805	5 954			6 783	3 944	144 277	32 506	8 279	8 190	106 801	60 771			1 791 325	282 747
transport equipment,	Exp Count	1 401 266	243 971	47 318	6 467			21 522	6 361	166 353	36 267	14 007	5 360	131 973	57 228			1 791 325	282 747
	Observations	17 239		120				103		746		38		1 314				19 598	
Manufactured	Count	386 280	118 930	1 201	1 429			2 031	2 340	26 353	12 277	910	620	22 314	11 900			439 953	120 661
products of metal	Exp Count	344 154	98 175	11 621	3 135			5 286	1 997	40 857	12 832	3 440	1 503	32 413	15 454			439 953	120 661
	Observations	4 628		13				30		320		21		341				5 360	
Other manufactured	Count	624 800	84 823					24 162	10 376	129 543	60 987	7 578	6 334	156 353	121 001			1 015 787	163 939
products	Exp Count	794 600	112 098					12 204	3 901	94 332	25 612	7 943	3 058	74 837	39 211			1 015 787	163 939
	Observations	10 229						312		974		97		839				12 889	
Paper products	Count	77 484	32 311					3 658	4 995	5 535	2 562	263	140	4 493	2 539			97 941	33 224
	Exp Count	76 615	26 391					1 177	527	9 095	3 520	766	373	7 216	3 768			97 941	33 224
	Observations	1 257						43		134		16		40				1 659	
Foodstuffs and	Count	155 252	45 460	5 078	4 453	129	103	5 322	2 813	13 899	4 069	1 992	913					182 353	47 412
animal fodder	Exp Count	142 646	37 977	4 817	1 381	246	83	2 191	842	16 934	5 382	1 426	632					182 353	47 412
	Observations	2 142		65		5		112		336		60						2 733	
Total	Count	3 387 260	351 503	114 382	8 965	5 832	1 215	52 025	14 399	402 123	79 362	33 859	12 222	319 017	138 464	15 647	6 435	4 330 144	392 403
	Exp Count	3 387 260	351 503	114 382	8 965	5 832	1 215	52 025	14 399	402 123	79 362	33 859	12 222	319 017	138 464	15 647	6 435	4 330 144	392 403
	Observations	43 379		1 211		217		875		3 124		376		2 773		248		52 203	

Significantly overrepresented | Significantly underrepresented | Classified information

2.4.7. Product group and mode of transports for inbound shipments outside Sweden

If the mode of transport for each type of product group is viewed relatively the expected number of shipments per product group the following modes are more frequently used than expected[7] for inbound transports outside Sweden:

- **Road:** paper waste
- **Ferry-road:** no commodity significantly overrepresented
- **Rail:** ore, metal products, paper waste
- **Rail-road:** paper waste, foodstuffs.
- **Rail and sea:** metal products, chemical products, forest products, paper products, other manufactured products
- **Cargo vessel:** petroleum products, ore, forest products,
- **Cargo vessel and road:** ore, other manufactured products
- **Air:** no commodity significantly overrepresented (but a number of commodities are underrepresented)

[7] NB this is not the same as being the most frequently used mode per product group

Tabell 44 Type of goods and mode of transport outside Sweden for inbound shipments (according to the adjusted data in the CFS data base)

Product group		Transport mode outside Sweden															
		Road		Railway		Cargo vessel		Rail and road		Ferry and road		Cargo vsl and road		Air or air and road		Rail and sea		Total	
		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Agriculture	Count	8 224	4 196							4 768	2 265			0	0	0	0	20 233	10 838
products	Exp Count	5 769	3 167							8 047	4 373			4 325	2 445	245	140	20 233	10 838
	Antal	154								137				0		0		331	
Solid	Count			0	0			0	0					0	0	0	0	728	276
mineral fuels	Exp Count			12	7			9	4					156	66	9	4	728	276
	Antal			0				0						0		0		8	
Petroleum	Count	861	738	0	0	3 362	423			1 905	1 922	0	0					6 861	2 306
products	Exp Count	1 956	700	110	60	72	29			2 729	961	359	129					6 861	2 306
	Antal	21		0		126				39		0						191	
Ore and	Count	979	552											0	0			4 383	878
metal waste	Exp Count	1 250	295											937	257			4 383	878
	Antal	25												0				106	
Metal	Count	84 299	37 524	22 927	6 625					72 757	23 700	10 187	6 907	4 547	2 167	7 675	2 766	207 491	49 717
products	Exp Count	59 166	16 684	3 314	1 672					82 524	21 309	10 870	2 923	44 349	13 122	2 513	793	207 491	49 717
	Antal	1 632		1 000						961		106		94		124		3 974	
Minerals and	Count	56 197	87 939	78	62	1 072	172	1 445	1 971	5 669	3 857					746	307	78 424	88 370
building materials	Exp Count	22 363	26 433	1 253	1 490	824	930	973	1 105	31 191	34 669					950	1 070	78 424	88 370
	Antal	184		4		19		30		78						28		407	
Chemical	Count			0	0	0	0	0	0			0	0	0	0	0	0	446	235
fertilisers	Exp Count			7	5	5	3	6	3			23	13	95	53	5	3	446	235
	Antal			0		0		0				0		0		0		14	
Chemical	Count	53 702	17 898	3 525	1 365	1 505	816	3 022	1 105	154 264	42 104	20 820	8 224	19 848	17 021	6 242	1 952	262 927	53 761
products	Exp Count	74 974	17 492	4 200	2 002	2 761	818	3 264	1 018	104 572	24 864	13 775	3 341	56 198	15 371	3 184	920	262 927	53 761
	Antal	1 029		107		59		52		1 444		227		117		59		3 094	
Textiles	Count	24 085	10 006			1 120	738			94 859	116 105	6 337	4 037	7 490	5 770	255	399	135 156	117 183
	Exp Count	38 540	32 745			1 419	1 235			53 755	48 999	7 081	6 023	28 888	24 892	1 637	1 417	135 156	117 183
	Antal	375				38				425		144		57		4		1 069	
Forestproducts	Count	2 324	2 137	0	0	6 515	5 742			3 492	2 834	629	285	0	0			16 061	7 242
	Exp Count	4 580	2 137	257	161	169	99			6 388	2 950	841	394	3 433	1 672			16 061	7 242
	Antal	72		0		145				136		56		0				541	
Lubricating oils	Count	1 869	1 540	0	0	0	0			3 084	2 924					0	0	5 768	3 787
and fats	Exp Count	1 645	1 099	92	73	61	42			2 294	1 526					70	48	5 768	3 787
	Antal	43		0		0				50						0		102	
Medical and	Count	41 829	26 986							27 211	23 161	1 529	2 271	21 531	12 628	30	16	92 536	38 456
pharmaceutical	Exp Count	26 387	11 615							36 804	15 744	4 848	2 075	19 779	8 953			92 536	38 456
products	Antal	681								583		33		478				1 785	
Paper pulp	Count	1 413	690					0	0	1 121	1 533							3 152	1 720
	Exp Count	899	503					39	23	1 253	698							3 152	1 720
	Antal	39						0		13								88	
Paper waste,	Count	13 081	1 638							2 473	644			66	37	0	0	18 203	2 411
empty packaging,	Exp Count	5 191	944							7 240	1 218			3 891	895	220	55	18 203	2 411
packaging, used	Antal	205								111				3		0		373	
Transport equipment	Count	425 484	108 116	14 486	5 969	12 675	4 762	5 265	2 334	839 686	200 689	60 546	17 449	458 513	157 771	2 897	1 679	1 819 552	294 504
transport equipment,	Exp Count	518 846	91 613	29 065	12 844	19 107	4 557	22 586	5 761	723 677	149 746	95 325	18 280	388 910	103 988	22 037	4 857	1 819 552	294 504
	Antal	5 599		259		110		113		9 453		890		3 435		27		19 886	
Manufactured	Count	125 505	36 053	14 408	27 418	1 767	1 125	5 256	5 145	107 580	22 777	7 182	1 439	140 551	67 176	790	305	403 038	100 220
products of metal	Exp Count	114 926	30 884	6 438	3 726	4 232	1 340	5 003	1 684	160 297	41 573	21 115	5 423	86 145	28 950	4 881	1 489	403 038	100 220
	Antal	2 018		25		21		76		1 844		260		1 153		16		5 413	
Other manufactured	Count	282 563	54 866	2 548	1 158	9 926	5 325	23 543	9 403	329 927	78 762	92 029	18 375	265 025	122 821	24 508	6 159	1 030 069	163 216
products	Exp Count	293 725	53 405	16 454	7 424	10 817	2 772	12 786	3 544	409 682	73 292	53 964	9 850	220 167	63 222	12 475	3 061	1 030 069	163 216
	Antal	4 823		71		155		369		4 209		863		2 673		289		13 452	
Paper products	Count	38 977	27 758	4 887	4 969	608	251	1 197	989	27 485	13 287	3 874	3 448	18 882	9 502	6 218	3 859	102 129	33 327
	Exp Count	29 122	10 251	1 631	884	1 072	413	1 268	502	40 619	13 653	5 350	1 811	21 829	8 472	1 237	486	102 129	33 327
	Antal	634		108		24		41		528		90		279		180		1 884	
Foodstuffs and	Count	90 065	42 365					6 341	2 751	69 133	14 529	10 917	4 956	728	567	2 084	1 249	183 222	47 216
animal fodder	Exp Count	52 246	15 909					2 274	825	72 872	19 721	9 599	2 716	39 162	12 145	2 219	721	183 222	47 216
	Antal	1 080						107		1 274		241		13		68		2 898	
Total	Count	1 251 918	169 563	70 130	30 759	46 103	9 689	54 497	12 660	1 746 152	253 497	230 008	29 549	938 397	212 951	53 173	10 252	4 390 379	395 104
	Exp Count	1 251 918	169 563	70 130	30 759	46 103	9 689	54 497	12 660	1 746 152	253 497	230 008	29 549	938 397	212 951	53 173	10 252	4 390 379	395 104
	Antal	18 630		1 660		818		957		21 314		3 035		8 317		885		55 616	

Significantly overrepresented | Significantly underrepresented | Classified information

2.4.8. Dangerous goods and mode of transport for outbound shipments

For outbound transports within Sweden no modes of transport are overrepresented when dangerous goods is transported. However, the following modes of transport are underrepresented when dangerous goods is transported:

- Cargo vessel-road
- Air
- Rail-sea

Tabell 45: Dangerous goods and mode of transport for outbound shipments within Sweden (according to the unadjusted primary data in the CFS data base)

Trp mode in Sweden		Dangerous goods					
		No		Yes		Total	
		Estimate	CI95	Estimate	CI95	Estimate	CI95
Road	Count	62 034 011	5 980 916	1 383 362	248 262	63 417 373	5 985 709
	Exp Count	62 046 039	5 977 429	1 371 335	241 975	63 417 373	5 985 709
	Observations	738 936		23 715		762 651	
Railway	Count	329 737	56 829	10 334	3 318	340 071	56 929
	Exp Count	332 717	55 726	7 354	1 887	340 071	56 929
	Observations	7 647		253		7 900	
Cargo vessel	Count	64 301	14 730	1 194	298	65 495	14 734
	Exp Count	64 079	14 418	1 416	422	65 495	14 734
	Observations	1 225		60		1 285	
Rail and road	Count	333 403	134 770	3 128	1 693	336 531	134 788
	Exp Count	329 254	131 894	7 277	3 232	336 531	134 788
	Observations	2 567		32		2 599	
Ferry and road	Count	560 095	104 257	11 800	7 769	571 895	104 573
	Exp Count	559 528	102 387	12 367	3 279	571 895	104 573
	Observations	6 810		398		7 208	
Cargo vessel	Count	57 156	9 061	105	161	57 261	9 062
and road	Exp Count	56 023	8 870	1 238	311	57 261	9 062
	Observations	1 307		4		1 311	
Air or	Count	426 470	163 896	573	540	427 044	163 912
air and road	Exp Count	417 809	160 398	9 234	3 959	427 044	163 912
	Observations	6 864		19		6 883	
Rail and sea	Count	14 482	5 496	39	0	14 521	5 496
(and road)	Exp Count	14 207	5 378	314	134	14 521	5 496
	Observations	391		3		394	
Total	Count	63 819 656	5 989 922	1 410 535	248 687	65 230 191	5 994 728
	Exp Count	63 819 656	5 989 922	1 410 535	248 687	65 230 191	5 994 728
	Observations	765 747		24 484		790 231	

Significantly overrepresented | Significantly underrepresented

For outbound transports outside Sweden the combination rail-sea is the only mode where dangerous goods is overrepresented.

Tabell 46: Dangerous goods and mode of transport for outbound shipments outside Sweden (according to the adjusted data in the CFS data base)

Trp mode outside Sweden		Dangerous goods					
		No		Yes		Total	
		Estimate	CI95	Estimate	CI95	Estimate	CI95
Road	Count	2 226 906	305 370	26 076	5 125	2 252 982	305 418
	Exp Count	2 219 912	304 243	33 070	7 040	2 252 982	305 418
	Observations	31 411		443		31 854	
Railway	Count	39 404	12 940	1 085	561	40 489	12 953
	Exp Count	39 894	12 765	594	233	40 489	12 953
	Observations	698		14		712	
Ferry	Count	77 530	56 794	319	530	77 849	56 797
	Exp Count	76 706	55 993	1 143	846	77 849	56 797
	Observations	1 163		5		1 168	
Cargo vessel	Count	413 863	78 339	3 820	2 114	417 682	78 366
	Exp Count	411 551	77 386	6 131	1 723	417 682	78 366
	Observations	12 621		80		12 701	
Rail and road	Count	41 948	10 137	1 504	1 775	43 451	10 310
	Exp Count	42 814	10 156	638	214	43 451	10 310
	Observations	831		10		841	
Ferry and road	Count	1 785 428	422 264	27 458	9 069	1 812 885	422 369
	Exp Count	1 786 275	418 892	26 610	6 555	1 812 885	422 369
	Observations	16 196		721		16 917	
Cargo vessel	Count	216 447	33 857	3 402	3 114	219 850	34 595
and road	Exp Count	216 623	34 121	3 227	888	219 850	34 595
	Observations	3 454		38		3 492	
Air or	Count	1 083 796	156 744	22 647	11 280	1 106 443	163 928
air and road	Exp Count	1 090 202	160 886	16 241	4 811	1 106 443	163 928
	Observations	14 886		104		14 990	
Rail and sea	Count	69 468	16 381	2 398	916	71 866	16 420
(and road)	Exp Count	70 811	16 183	1 055	341	71 866	16 420
	Observations	1 606		28		1 634	
Total	Count	5 954 788	716 935	88 709	18 736	6 043 497	718 679
	Exp Count	5 954 788	716 935	88 709	18 736	6 043 497	718 679
	Observations	82 866		1 443		84 309	

Significantly overrepresented Significantly underrepresented

2.4.9. Dangerous goods and mode of transport for inbound shipments

Inbound shipments with dangerous goods are overrepresented for the following modes for transports within Sweden:

- Cargo vessel;
- Ferry-road

Tabell 47 Dangerous goods and mode of transport for inbound shipments transported within Sweden (according to the unadjusted primary data in the CFS data base)

Trp mode in Sweden		Dangerous goods					
		No		Yes		Total	
		Estimate	CI95	Estimate	CI95	Estimate	CI95
Road	Count	3 366 451	351 317	45 943	10 129	3 412 394	351 873
	Exp Count	3 350 101	350 196	62 293	10 766	3 412 394	351 873
	Observations	42 715		962		43 677	
Railway	Count	111 348	8 887	3 033	1 134	114 382	8 965
	Exp Count	112 294	8 811	2 088	420	114 382	8 965
	Observations	1 166		45		1 211	
Cargo vessel	Count	3 470	1 170	3 112	327	6 582	1 215
	Exp Count	6 462	1 193	120	31	6 582	1 215
	Observations	169		98		267	
Rail and road	Count	50 914	14 156	1 177	825	52 091	14 399
	Exp Count	51 140	14 137	951	316	52 091	14 399
	Observations	873		6		879	
Ferry and road	Count	390 663	79 439	19 263	7 162	409 925	80 666
	Exp Count	402 442	79 194	7 483	2 032	409 925	80 666
	Observations	3 062		99		3 161	
Cargo vessel and road	Count	30 421	10 821	3 602	2 908	34 023	12 223
	Exp Count	33 402	11 990	621	260	34 023	12 223
	Observations	376		11		387	
Air or air and road	Count	316 602	138 234	2 416	2 867	319 017	138 464
	Exp Count	313 194	136 132	5 824	2 567	319 017	138 464
	Observations	2 758		15		2 773	
Rail and sea (and road)	Count	14 526	6 319	1 120	749	15 647	6 435
	Exp Count	15 361	6 317	286	130	15 647	6 435
	Observations	216		32		248	
Total	Count	4 284 396	392 205	79 666	13 501	4 364 062	393 042
	Exp Count	4 284 396	392 205	79 666	13 501	4 364 062	393 042
	Observations	51 335		1 268		52 603	

Significantly overrepresented | Significantly underrepresented

Inbound shipments with dangerous goods are overrepresented for the following modes outside Sweden:

- Cargo vessel;
- Cargo vessel-road;
- Rail-sea

Tabell 48 Dangerous goods and mode of transport for inbound shipments transported outside Sweden (according to the adjusted data in the CFS data base)

Trp mode outside Sweden		Dangerous goods					
		No		Yes		Total	
		Estimate	CI95	Estimate	CI95	Estimate	CI95
Road	Count	1 260 044	170 249	12 542	4 605	1 272 586	170 606
	Exp Count	1 249 071	168 363	23 515	4 784	1 272 586	170 606
	Observations	18 553		325		18 878	
Railway	Count	68 043	30 740	2 087	739	70 130	30 759
	Exp Count	68 834	30 206	1 296	602	70 130	30 759
	Observations	1 594		66		1 660	
Cargo vessel	Count	42 444	9 045	4 698	2 056	47 142	9 696
	Exp Count	46 271	9 510	871	245	47 142	9 696
	Observations	759		121		880	
Rail and road	Count	53 625	12 639	872	714	54 497	12 660
	Exp Count	53 490	12 431	1 007	295	54 497	12 660
	Observations	949		8		957	
Ferry and road	Count	1 713 806	253 144	41 607	9 679	1 755 413	253 879
	Exp Count	1 722 977	250 889	32 436	6 447	1 755 413	253 879
	Observations	20 919		463		21 382	
Cargo vessel and road	Count	220 762	28 930	10 029	4 596	230 791	29 558
	Exp Count	226 526	29 095	4 265	907	230 791	29 558
	Observations	2 793		259		3 052	
Air or air and road	Count	934 093	212 759	7 085	5 385	941 178	212 973
	Exp Count	923 787	209 911	17 391	4 339	941 178	212 973
	Observations	8 236		102		8 338	
Rail and sea (and road)	Count	50 329	9 823	2 844	1 311	53 173	10 252
	Exp Count	52 190	10 060	983	264	53 173	10 252
	Observations	863		22		885	
Total	Count	4 343 147	394 904	81 763	13 567	4 424 910	395 743
	Exp Count	4 343 147	394 904	81 763	13 567	4 424 910	395 743
	Observations	54 666		1 366		56 032	

Significantly overrepresented Significantly underrepresented

2.5. Type of load unit and transport mode selection

A large portion of the respondents has not answered the question about load units and this causes problems for the analysis.

2.5.1. Load unit and mode of transport for outbound shipments within Sweden

The fact that more than 60% of the observed cases are missing represents a major problem with the analysis of load units and the mode of transports. This makes the analysis not relevant but still an example of how it could be made is presented below.

- Road: there is no clear tendencies regarding the relation between the use of this mode and type of load unit.
- Rail: bulk goods, containers or swap-bodies and pre-slug goods are overrepresented
- Cargo vessel: bulk gods, container/swap bodies and pre-slung goods are overrepresented load units.
- Rail-road: there is no clear tendencies regarding the relation between the use of this mode and type of load unit.
- Ferry-road: bulk goods and container/swap bodies are underrepresented

- Cargo vessel-road: bulk goods, container/swap bodies are overrepresented
- Air: bulk goods; pre-slung goods and mobile units are underrepresented
- Rail-sea: bulk goods, container/swap bodies , pre-slung goods are overrepresented

Tabell 49 Load unit and type of transport for outbound transports within Sweden (according to the adjusted data in the CFS data base)

Trp mode in Sweden		Cargo type											
		Solid and liquid bulk goods		Large container or swap body		Palletized goods		Pre slung goods		Mobile units		Total	
		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Road	Count	1 618 360	293 504	1 965 369	456 636	20 759 360	1 875 840	732 791	163 836	1 309 445	299 791	26 385 323	1 962 822
	Exp Count	1 646 704	282 733	2 265 924	477 372	20 432 140	1 864 311	744 438	158 825	1 296 118	288 440	26 385 323	1 962 822
	Observations	26 875		12 697		216 870		25 220		26 141		307 803	
Railway	Count	45 136	9 680	52 577	19 620	84 048	27 283	25 467	9 119	15 224	5 736	222 452	37 914
	Exp Count	13 883	3 395	19 104	5 270	172 262	29 629	6 276	1 784	10 927	3 069	222 452	37 914
	Observations	2 100		876		1 125		343		119		4 563	
Cargo vessel	Count	17 084	7 628	38 346	12 453	1 242	901	5 394	1 454	1 293	596	63 359	14 696
	Exp Count	3 954	1 187	5 441	1 713	49 064	11 429	1 788	569	3 112	999	63 359	14 696
	Observations	529		354		44		213		16		1 156	
Rail and road	Count	7 423	8 838	37 101	14 115	111 021	99 476	2 049	976	9 676	12 192	167 270	101 647
	Exp Count	10 439	6 521	14 365	9 171	129 530	79 026	4 719	3 024	8 217	5 293	167 270	101 647
	Observations	87		603		935		56		67		1 748	
Ferry and road	Count	6 468	4 126	7 904	2 310	277 313	71 294	7 660	1 717	28 192	15 817	327 537	73 288
	Exp Count	20 442	5 703	28 128	8 475	253 637	57 617	9 241	2 854	16 090	5 156	327 537	73 288
	Observations	159		155		3 371		285		630		4 600	
Cargo vessel	Count	5 155	1 437	13 137	3 742	16 084	5 081	7 976	3 761	1 581	993	43 932	7 829
and road	Exp Count	2 742	688	3 773	1 038	34 020	6 150	1 240	353	2 158	616	43 932	7 829
	Observations	232		266		263		122		40		923	
Air or	Count	362	539	7 748	5 610	52 121	17 912	32	20	255	129	60 518	19 000
air and road	Exp Count	3 777	1 352	5 197	1 963	46 863	14 803	1 707	651	2 973	1 141	60 518	19 000
	Observations	7		109		544		2		6		668	
Rail and sea	Count	2 133	656	1 837	857	2 930	803	2 074	584	2 726	5 195	11 700	5 409
(and road)	Exp Count	730	361	1 005	511	9 060	4 195	330	169	575	297	11 700	5 409
	Observations	140		50		52		52		40		334	
Total	Count	1 746 894	297 074	2 403 789	511 544	21 675 287	1 939 564	789 731	167 630	1 374 978	304 284	27 990 678	2 035 831
	Exp Count	1 746 894	297 074	2 403 789	511 544	21 675 287	1 939 564	789 731	167 630	1 374 978	304 284	27 990 678	2 035 831
	Observations	30 443		17 710		224 655		26 400		27 111		326 319	

Significantly overrepresented Significantly underrepresented

2.5.2. Load unit and mode of transport for outbound shipments outside Sweden

The fact that almost 70% of the observed cases are missing represents a major problem and no further comments will be made regarding the cross tabulation (in table 50).

Tabell 50 Load unit and type of transport for outbound transports outside Sweden (according to the adjusted data in the CFS data base)

Trp mode outside Sweden		Cargo type											
		Solid and liquid bulk goods		Large container or swap body		Palletized goods		Pre slung goods		Mobile units		Total	
		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Road	Count	23 602	6 318	59 279	14 405	861 164	162 353	30 655	8 729	124 049	48 068	1 098 749	169 969
	Exp Count	42 352	7 168	113 015	18 027	797 471	143 956	39 892	6 443	106 018	27 122	1 098 749	169 969
	Observations	603		616		6 674		762		3 995		12 650	
Railway	Count	7 516	2 247	1 229	543	7 939	1 591	5 247	2 261	1 699	1 577	23 631	4 191
	Exp Count	911	238	2 431	571	17 151	3 095	858	218	2 280	652	23 631	4 191
	Observations	247		27		203		94		21		592	
Ferry	Count	4 378	8 035	435	680	55 081	55 413	2 918	1 628	1 876	728	64 688	56 024
	Exp Count	2 493	2 132	6 654	5 554	46 951	41 382	2 349	1 985	6 242	5 359	64 688	56 024
	Observations	10		3		941		49		76		1 079	
Cargo vessel	Count	22 257	2 924	71 121	10 265	77 152	15 176	9 948	2 269	9 477	2 338	189 955	19 244
	Exp Count	7 322	1 404	19 538	3 814	137 870	15 336	6 897	1 247	18 329	4 361	189 955	19 244
	Observations	1 135		1 253		862		318		244		3 812	
Rail and road	Count	7 017	2 037	4 470	968	8 579	2 790	9 159	3 142	117	61	29 342	4 747
	Exp Count	1 131	278	3 018	688	21 296	3 527	1 065	261	2 831	769	29 342	4 747
	Observations	351		56		143		84		3		637	
Ferry and road	Count	20 289	6 464	51 977	24 483	784 210	142 424	24 334	4 417	113 324	23 233	994 134	145 720
	Exp Count	38 319	6 590	102 255	17 699	721 542	124 539	36 094	5 756	95 924	22 740	994 134	145 720
	Observations	288		561		7 270		859		830		9 808	
Cargo vessel	Count	11 634	3 644	70 665	16 891	74 138	13 601	15 397	4 712	8 302	2 655	180 136	23 838
and road	Exp Count	6 943	1 453	18 528	4 161	130 742	17 970	6 540	1 331	17 381	4 379	180 136	23 838
	Observations	376		685		1 476		279		117		2 933	
Air or	Count	5 972	3 493	17 133	5 733	234 658	46 567	378	127	17 114	5 273	275 256	47 337
air and road	Exp Count	10 610	2 293	28 312	5 839	199 781	37 718	9 994	2 077	26 559	6 980	275 256	47 337
	Observations	236		327		2 074		11		119		2 767	
Rail and sea	Count	8 819	1 942	22 040	4 592	19 681	13 811	4 124	1 059	10 795	4 260	65 460	16 129
(and road)	Exp Count	2 523	758	6 733	1 976	47 511	11 905	2 377	683	6 316	2 084	65 460	16 129
	Observations	213		686		443		112		58		1 512	
Total	Count	116 174	16 662	310 009	42 175	2 187 521	285 656	109 426	14 233	290 816	64 124	3 013 946	296 451
	Exp Count	116 174	16 662	310 009	42 175	2 187 521	285 656	109 426	14 233	290 816	64 124	3 013 946	296 451
	Observations	3 529		4 385		21 008		2 974		5 570		37 466	

Significantly overrepresented Significantly underrepresented

2.5.3. Load unit and mode of transport for inbound shipments within Sweden

The fact that more than 40% of the cases are missing represents a major problem but still an example of how the analysis could be made is presented below. When the combinations of load units and transports modes for inbound shipments within Sweden are compared, the following load units are overrepresented when the expected frequency is compared to the actual outcome:

- Road: no significant differences
- Rail: large containers/swap bodies, pre-slung goods
- Cargo vessel: bulk goods
- Rail-road: no load type is overrepresented, mobile units are underrepresented
- Ferry-road: no load type is overrepresented, several load types are underrepresented
- Cargo vessel-road: bulk goods

Tabell 51 Load unit and type of transport for inbound transports within Sweden (according to the adjusted data in the CFS data base)

Cargo type		Transport mode in Sweden																Total	
		Road		Railway		Cargo vessel		Rail and road		Ferry and road		Cargo vsl and road		Air or air and road		Rail and sea			
		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Solid and liquid	Count	41 143	12 176	4 071	1 193	4 759	328	642	370	1 095	598	2 903	957	293	449	942	604	55 847	12 450
bulk goods	Exp Count	46 927	10 581	2 372	602	124	32	972	378	4 130	1 213	550	225	510	184	262	134	55 847	12 450
	Observations	855		67		208		26		35		22		4		34		1 251	
Large container or	Count	224 870	60 789	28 646	1 303	24	23	8 740	5 720	7 175	4 306	6 366	4 287	2 197	2 384	939	1 193	278 957	62 138
swap body	Exp Count	234 400	53 494	11 849	2 841	619	148	4 858	1 863	20 628	5 781	2 748	1 102	2 547	893	1 308	656	278 957	62 138
	Observations	2 279		109		1		155		167		121		20		12		2 864	
Other	Count	17 736	5 333	0	0	0	0	6 137	7 107	388	286	203	396	463	903	17	16	24 944	8 940
container	Exp Count	20 960	7 494	1 060	396	55	21	434	246	1 845	750	246	121	228	107	117	68	24 944	8 940
	Observations	300		0		0		18		16		2		1		1		338	
Palletized goods	Count	1 410 179	146 097	62 821	7 326	39	72	25 170	9 360	160 156	29 637	14 543	6 623	17 714	5 130	6 965	4 524	1 697 587	150 428
	Exp Count	1 426 440	141 562	72 107	8 624	3 768	476	29 560	9 501	125 533	26 026	16 720	5 818	15 498	4 406	7 961	3 671	1 697 587	150 428
	Observations	18 858		589		1		352		1 887		121		280		99		22 187	
Pre slung goods	Count	12 389	7 248	3 485	2 243	65	116	569	866	629	454	0	0	0	0	0	0	17 137	7 807
	Exp Count	14 400	6 574	728	348	38	18	298	166	1 267	627	169	96	156	84	80	52	17 137	7 807
	Observations	236		149		2		18		27		0		0		0		432	
Mobile units	Count	366 048	209 367	5 736	1 326	587	308	1 688	753	12 935	14 418	276	263	1 848	1 557	2 702	1 485	391 821	209 915
	Exp Count	329 237	181 679	16 643	7 678	870	404	6 823	3 730	28 974	14 235	3 859	2 158	3 577	1 887	1 837	1 180	391 821	209 915
	Observations	6 635		95		22		48		201		12		24		32		7 069	
Totalt	Count	2 072 365	263 028	104 759	7 969	5 474	470	42 946	13 251	182 377	33 284	24 292	8 087	22 516	6 045	11 565	5 221	2 466 293	266 231
	Exp Count	2 072 365	263 028	104 759	7 969	5 474	470	42 946	13 251	182 377	33 284	24 292	8 087	22 516	6 045	11 565	5 221	2 466 293	266 231
	Observations	29 163		1 009		234		617		2 333		278		329		178		34 141	

Significantly overrepresented Significantly underrepresented

2.5.4. Load unit and mode of transport for inbound shipments outside Sweden

The fact that more than 40% of the cases observed are missing represents a major problem but still an example of how the analysis could be made is presented below. When the combinations of load units and transports modes (for inbound shipments outside Sweden) are compared the following load units are overrepresented when the expected frequency is compared to the actual outcome:

- Road: no significant differences
- Rail: bulk goods, pre-slung goods
- Cargo vessel: bulk goods, large containers/swap bodies
- Rail-road: no load unit overrepresented
- Ferry-road: no differences
- Cargo vessel-road: large containers/swap bodies
- Rail-sea: bulk

Tabell 52: Load unit and type of transport for inbound transports outside Sweden (according to the unadjusted primary data in the CFS data base)

Cargo type		Transport mode outside Sweden																Total	
		Road		Railway		Cargo vessel		Rail and road		Ferry and road		Cargo vsl and road		Air or air and road		Rail and sea			
		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Solid and liquid	Count	14 869	3 730	3 012	878	9 881	1 888	279	173	15 646	9 868	7 806	4 180	1 527	1 832	4 404	1 596	57 424	12 537
bulk goods	Exp Count	19 311	4 943	982	702	948	310	1 094	378	27 323	6 651	4 422	1 139	2 372	649	973	311	57 424	12 537
	Observations	416		97		296		14		303		106		13		65		1 310	
Large container or	Count	90 188	53 348	959	186	21 287	8 304	7 658	5 522	95 903	26 648	56 692	7 050	12 088	6 556	7 307	1 244	292 083	64 647
swap body	Exp Count	98 223	27 876	4 996	3 536	4 821	1 569	5 562	1 948	138 976	32 045	22 491	5 385	12 067	3 378	4 947	1 505	292 083	64 647
	Observations	817		13		287		96		729		777		62		57		2 838	
Other	Count	8 728	3 935	17	16	509	839	1 038	1 833	6 267	2 388	1 042	561	1 978	1 443	6 167	7 109	25 747	9 124
container	Exp Count	8 658	3 284	440	336	425	180	490	224	12 251	4 496	1 983	734	1 064	418	436	226	25 747	9 124
	Observations	135		1		6		16		140		10		20		19		347	
Palletized goods	Count	666 791	118 469	20 204	10 902	7 049	2 058	33 959	9 959	777 599	82 672	101 008	20 402	80 206	12 378	18 825	4 704	1 705 640	149 745
	Exp Count	573 581	109 532	29 174	19 874	28 151	6 578	32 482	8 854	811 559	98 836	131 340	17 228	70 466	11 810	28 887	6 716	1 705 640	149 745
	Observations	10 013		241		102		539		9 985		966		1 048		293		23 187	
Pre slung goods	Count	5 108	1 869	2 040	831	0	0	2 405	2 643	4 511	2 013	3 648	5 836	185	332	386	146	18 282	7 826
	Exp Count	6 148	2 751	313	252	302	147	348	182	8 699	3 814	1 408	659	755	346	310	150	18 282	7 826
	Observations	190		91		0		54		90		28		2		24		479	
Mobile units	Count	52 770	45 082	16 414	27 433	2 424	979	2 143	798	286 402	185 623	21 796	14 388	7 022	3 013	5 137	1 615	394 108	209 925
	Exp Count	132 533	63 575	6 741	6 101	6 505	3 261	7 505	3 893	187 520	113 083	30 348	16 168	16 282	7 684	6 675	3 340	394 108	209 925
	Observations	568		53		76		56		5 657		497		104		72		7 083	
Totalt	Count	838 454	137 856	42 647	29 546	41 150	8 953	47 481	12 239	1 186 327	204 922	191 991	26 960	103 007	14 664	42 227	9 063	2 493 285	266 362
	Exp Count	838 454	137 856	42 647	29 546	41 150	8 953	47 481	12 239	1 186 327	204 922	191 991	26 960	103 007	14 664	42 227	9 063	2 493 285	266 362
	Observations	12 139		496		767		775		16 904		2 384		1 249		530		35 244	

Significantly overrepresented Significantly underrepresented

2.6. Infrastructure and transport mode selection

The infrastructure factors have only been linked to the characteristics of the outbound shipments due to practical reasons related to the initial analysis of the data (it is in the database for outbound shipments the infrastructure information is available).

2.6.1. Access and use of industrial rail tracks and mode of transport for outbound shipments within Sweden

Very few of the shipments in the CFS 2001 have been shipped from units where industrial rail tracks are used (see table 53). The number of cases where rail tracks are used is also in the same magnitude as the cases where existing tracks are not used. However, it has to be observed that for as many as 55% of the shipments observed (i.e. the unadjusted primary data) the question about industrial rail tracks has not been answered.

Tabell 53a: Frequency of industrial rail track usage (according to the unadjusted data in the CFS data base)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No access to rail tracks	327268	38,3	85,0	85,0
	Accessible rail tracks not used	23638	2,8	6,1	91,1
	Rail tracks used	34317	4,0	8,9	100,0
	Total	385223	45,0	100,0	
Missing	,00	470046	55,0		
Total		855269	100,0		

Tabell 53b Frequency of industrial rail track usage (according to the adjusted data in the CFS data base)

	Trp mode in Sweden	Frequency	Percent	Valid percent	Cumulative percent
Valid	No access to rail tracks	50 194 862	72,8	87,9	87,9
	Accessible rail tracks not used	3 257 665	4,7	5,7	93,6
	Rail tracks used	3 664 321	5,3	6,4	100,0
Total	Total	57 116 848	82,8	100,0	
Missing		11 826 973	17,2		
Total		68 943 821	100,0		

There is a link between the mode selection and the existence and use of industrial rail tracks (see table 54). If existent industrial rail tracks are used all modes, except road or air, are overrepresented for outbound shipments within Sweden. When there are no tracks or when accessible tracks are not used rail or cargo vessel are underrepresented.

The available data cannot explain why existing rail tracks are not used, but hypothetically it could be a matter of:

- Localisation, i.e. how close the unit is to a train-building point. The distance will influence the time and the cost for transporting the rail cars.
- New load units may have been introduced, which do not fint into the existing material handling system connected to the use of the rail tracks.
- The maintenance cost of the industrial rail tracks, i.e. it is possible that there are existing tracks but they are not fit for use.

Interesting to note is that the respondents who have answered that they use intermodal transports have also to a higher degree answered the question about availability and use of industrial rail tracks.

Tabell 54 Cross tabulation of usage of industrial rail tracks and transport mode in Sweden for outbound shipments (according to the unadjusted primary data in the CFS data base)

Trp mode in Sweden		Use of industrial rail tracks						Total	
		No access		Rail tracks used		Tracks not used			
		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Road	Count	46 532 029	5 012 881	2 820 247	379 414	3 526 524	843 230	52 878 800	5 062 539
	Exp Count	46 257 466	4 994 946	3 112 970	375 838	3 508 364	821 509	52 878 800	5 062 539
	Observations	303 489		27 830		22 314		353 633	
Railway	Count	68 217	30 409	196 420	25 190	4 358	3 951	268 995	39 607
	Exp Count	235 312	34 834	15 836	3 472	17 847	5 002	268 995	39 607
	Observations	671		3 023		27		3 721	
Cargo vessel	Count	14 849	7 579	41 302	12 555	53	37	56 205	14 657
	Exp Count	49 167	12 858	3 309	1 003	3 729	1 319	56 205	14 657
	Observations	344		372		2		718	
Rail and road	Count	247 045	131 737	59 075	22 747	16 579	15 520	322 699	134 567
	Exp Count	282 291	117 946	18 997	8 392	21 410	10 256	322 699	134 567
	Observations	1 502		648		202		2 352	
Ferry and road	Count	414 152	93 751	69 868	15 151	33 830	10 734	517 851	95 493
	Exp Count	453 007	84 410	30 486	7 106	34 358	10 301	517 851	95 493
	Observations	3 808		872		407		5 087	
Cargo vessel	Count	39 312	8 627	10 510	1 999	3 457	1 136	53 279	8 900
and road	Exp Count	46 608	7 861	3 137	698	3 535	1 030	53 279	8 900
	Observations	678		327		99		1 104	
Air or	Count	355 631	162 233	5 195	2 437	30 981	17 434	391 808	163 178
air and road	Exp Count	342 746	143 107	23 066	10 111	25 995	12 430	391 808	163 178
	Observations	4 705		84		203		4 992	
Rail and sea	Count	7 284	5 383	5 984	905	359	649	13 627	5 496
(and road)	Exp Count	11 921	4 815	802	345	904	424	13 627	5 496
	Observations	151		170		5		326	
Total	Count	47 678 519	5 023 916	3 208 602	387 008	3 616 143	845 224	54 503 264	5 073 161
	Exp Count	47 678 519	5 023 916	3 208 602	387 008	3 616 143	845 224	54 503 264	5 073 161
	Observations	315 348		33 326		23 259		371 933	

Significantly overrepresented Significantly underrepresented

The localisation issue, which limits the use of railway as a preferred mode of transport, despite an existing rail track, could be explained by several different hypotheses. The distance to the closest train building point can have been increased due to a close down of a building point. This results in longer pre-transport time and cost, but the same effect may have been a result of changed services. There may also be cost or accounting related reasons behind the

decision not to pay for the rail pre-transport from the industrial rail track to the train building point. Further discussions about the industrial rail tracks are to be found in chapter 3.

The second hypothesis is that the development of different technical transport solutions in combination with the development of the companies´ logistics systems have negatively influenced the use of existing industrial rail tracks (and the use of rail transports). For instance, there are cases where the handling of bulk goods in rail cars have been replaced by swap-bodies which are used for temporary storage. In general the design of warehouses and production facilities in combination with the design of load units do influence the mode selections. At the time a warehouse/production unit was build it is possible that it was designed based on the fact that the goods arrived or was sent by rail cars. Since these are loaded and unloaded from the side the rail track was most likely positioned along the side of the building. If the good now is transported in units, which cannot be efficiently loaded/unloaded from the industrial rail track (but which can be efficiently transported by both road and rail) the use of the rail track will be reduced. For instance containers can only be loaded/unloaded from the short end, which makes it impossible to use an industrial rail track designed for long side handling of goods.

The fact that existing industrial rail tracks not are being used for outbound transports may also be related to the extent rail transports are used for inbound goods to the consignor or any other unit nearby.

In table some possible errors are visible, e.g 600 shipments are sent by rail even though there is no industrial rail tracks. However, it some of the cases it may be explained by the fact that the local unit load the rail cars directly on the main tracks. In other cases it is claimed that existing industrial rail tracks not are used even though rail transports are utilised.

The following patterns can be detected for the different modes of transport and the use of industrial rail tracks:

- Rail: if there is an industrial rail track then rail is overrepresented.
- Rail-road: This combination is overrepresented when industrial rail tracks are used.
- Cargo vessel or cargo vessel-road: The use of industrial rail tracks seems to be linked to the use of cargo vessels. The most likely reason is that traditionally there are industrial rail tracks in the harbour areas where the respondents who use cargo vessels are likely to be situated (and there does not have to be any direct link between their operations and the rail tracks).
- Air or air-road: Underrepresented when there is a industrial rail track in use.

2.6.2. Access and use of quays and mode of transport

An interesting question is how the accessibility of quays may influence the mode selection, especially regarding export shipments. However, more than 50% of the cases observed are missing and in addition large part of the table has been classified.

Tabell 55 Crosstabulation of the use of quay and transport mode selection for outbound shipments outside Sweden (according to the adjusted data in the CFS data base)

Trp mode outside Sweden		Use of quay						Total	
		No access		Quay used		Quay not used			
		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Road	Count	1 772 563	234 166					1 979 217	296 845
	Exp Count	1 741 858	222 400					1 979 217	296 845
	Observations	17 418						20 452	
Railway	Count	33 360	12 863					38 724	12 946
	Exp Count	34 080	11 978					38 724	12 946
	Observations	527						619	
Ferry	Count	51 878	39 061					52 657	39 063
	Exp Count	46 343	34 903					52 657	39 063
	Observations	300						317	
Cargo vessel	Count	224 303	36 801	22 741	3 178	30 958	13 164	278 002	39 143
	Exp Count	244 662	43 278	25 719	27 121	7 621	3 104	278 002	39 143
	Observations	3 457		616		1 235		5 308	
Rail and road	Count	31 830	10 102					40 202	10 275
	Exp Count	35 380	9 801					40 202	10 275
	Observations	645						789	
Ferry and road	Count	1 457 200	175 063	232 910	383 693	37 136	10 207	1 727 245	421 814
	Exp Count	1 520 105	241 748	159 794	202 805	47 347	16 900	1 727 245	421 814
	Observations	12 967		468		1 163		14 598	
Cargo vessel	Count	141 160	31 619					192 315	34 147
and road	Exp Count	169 251	35 367					192 315	34 147
	Observations	2 025						2 422	
Air or	Count	898 668	154 284	6 612	2 289	23 870	13 874	929 149	154 851
air and road	Exp Count	817 720	166 031	85 959	90 614	25 470	9 507	929 149	154 851
	Observations	7 597		184		322		8 103	
Rail and sea	Count	55 468	16 148	9 333	2 107	0	0	64 801	16 276
(and road)	Exp Count	57 030	15 603	5 995	6 457	1 776	760	64 801	16 276
	Observations	1 065		153		0		1 218	
Total	Count	4 666 430	414 271	490 536	564 807	145 347	48 443	5 302 312	701 411
	Exp Count	4 666 430	414 271	490 536	564 807	145 347	48 443	5 302 312	701 411
	Observations	46 001		2 725		5 100		53 826	

Significantly overrepresented | Significantly underrepresented | Classified information

2.7. Size of the local unit and transport mode selection

The size of the local unit is interesting from a logistics point of view because it defines the possibilities to achieve economies of scale in the material flows. However, there is two problems with the available information regarding the size of the local unit. Firstly it is the number of employees that is stated in the CFS 2001 and this does not necessarily have to be closely correlated with the material flow volume. Secondly the number of employees has been used for sampling purposes and a certain size category does not always correspond to the

same number of employees. In addition, the total number of shipments or shipping volume is not known.

2.7.1. Mode of transports for outbound shipments at local units of different sizes

The selection of mode of transport differs between local units of different sizes. The use of the dominating mode, road transport, does not show any clear link to the size of the local units. Rail, cargo vessel, cargo vessel-road, and rail-sea are overrepresented in the group with the largest units (group 1) and underrepresented at units of very small size (group 3 and 4). This may be a reflection of the possibility to make infrastructure investments.

Tabell 56 Size of the local unit and transport mode in Sweden for outbound shipments (according to the adjusted data in the CFS data base)

Trp mode in Sweden		Size of the local unit									
		1		2		3		4		Total	
		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Road	Count	23 256 431	901 576	12 748 182	1 283 999	18 967 871	4 686 279	8 389 445	3 377 181	63 361 930	5 985 654
	Exp Count	22 982 317	944 242	12 445 830	1 241 061	19 226 512	4 510 639	8 707 269	3 257 223	63 361 930	5 985 654
	Observations	606 909		72 727		40 051		25 988		745 675	
Railway	Count	255 859	44 929	26 892	14 129	32 540	18 306	24 779	26 222	340 071	56 929
	Exp Count	123 349	23 598	66 798	13 601	103 191	24 569	46 733	17 366	340 071	56 929
	Observations	7 245		400		220		35		7 900	
Cargo vessel	Count	59 946	12 683	5 337	7 495					65 495	14 734
	Exp Count	23 756	5 770	12 865	3 280					65 495	14 734
	Observations	1 238		39						1 285	
Rail and road	Count	146 102	26 224	85 263	83 451	36 317	21 419	68 848	100 286	336 529	134 788
	Exp Count	122 064	49 937	66 103	27 671	102 116	44 248	46 246	24 285	336 529	134 788
	Observations	1 901		390		230		76		2 597	
Ferry and road	Count	274 486	28 382	109 275	51 903	159 921	83 136	28 212	22 901	571 894	104 573
	Exp Count	207 434	41 870	112 334	24 444	173 535	43 839	78 590	29 654	571 894	104 573
	Observations	5 164		1 516		477		50		7 207	
Cargo vessel	Count	40 576	6 075	10 663	5 370	5 443	3 979	579	735	57 261	9 062
and road	Exp Count	20 770	3 796	11 248	2 240	17 375	4 029	7 869	2 879	57 261	9 062
	Observations	1 121		138		49		3		1 311	
Air or	Count	187 755	30 448	34 721	13 818	122 033	52 793	82 535	151 532	427 044	163 912
air and road	Exp Count	154 895	60 817	83 882	33 467	129 582	54 538	58 685	30 021	427 044	163 912
	Observations	6 173		258		378		74		6 883	
Rail and sea	Count	10 255	1 274	1 170	994					14 521	5 496
(and road)	Exp Count	5 267	2 052	2 852	1 131					14 521	5 496
	Observations	327		24						394	
Total	Count	24 457 969	908 243	13 244 954	1 290 169	20 461 011	4 723 618	9 266 347	3 456 296	67 430 281	6 062 012
	Exp Count	24 457 969	908 243	13 244 954	1 290 169	20 461 011	4 723 618	9 266 347	3 456 296	67 430 281	6 062 012
	Observations	636 851		77 088		43 762		26 798		784 499	

Significantly overrepresented | Significantly underrepresented | Classified information

2.7.2. Mode of transport for inbound shipments to local units of different sizes

The only observation made with respect to links between transport mode and size of local units is that rail transports are primarily used for inbound transport within Sweden to large local units.

Tabell 57 Cross tabulation of the size of the receiving local unit and the selected mode of transport for inbound shipments transported within Sweden (according to the adjusted data in the CFS data base)

Trp mode outside Sweden		Size of the local unit									
		1		2		3		4		Total	
		Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95	Estimate	CI95
Road	Count	2 003 281	266 396	509 813	162 073	550 554	122 875	348 746	107 152	3 412 394	351 873
	Exp Count	1 947 509	253 352	491 430	149 503	609 973	123 074	363 482	100 582	3 412 394	351 873
	Observations	32 773		6 446		3 516		942		43 677	
Railway	Count	104 276	6 714	4 015	2 763	5 755	5 233			114 382	8 965
	Exp Count	65 279	7 225	16 472	4 701	20 446	4 163			114 382	8 965
	Observations	1 081		78		50				1 211	
Cargo vessel	Count	4 223	442	334	226					6 582	1 215
	Exp Count	3 756	756	948	312					6 582	1 215
	Observations	241		19						267	
Rail and road	Count	33 708	11 186	8 071	4 854					52 091	14 399
	Exp Count	29 729	8 567	7 502	2 909					52 091	14 399
	Observations	627		193						879	
Ferry and road	Count	273 275	44 567	22 868	8 126	51 658	27 327	62 124	60 894	409 925	80 666
	Exp Count	233 951	47 934	59 035	19 134	73 275	19 848	43 665	16 003	409 925	80 666
	Observations	2 265		526		262		108		3 161	
Cargo vessel and road	Count	17 853	6 285	3 351	2 077	10 462	9 461	2 357	4 007	34 023	12 223
	Exp Count	19 418	7 065	4 900	2 186	6 082	2 575	3 624	1 593	34 023	12 223
	Observations	221		75		60		31		387	
Air or air and road	Count	111 318	30 926	89 365	117 371	80 908	57 884	37 426	33 004	319 017	138 464
	Exp Count	182 068	74 810	45 943	27 752	57 025	27 150	33 981	17 029	319 017	138 464
	Observations	1 886		435		368		84		2 773	
Rail and sea (and road)	Count	9 952	4 536	2 821	3 442					15 647	6 435
	Exp Count	8 930	3 736	2 253	1 115					15 647	6 435
	Observations	174		52						248	
Total	Count	2 594 148	275 668	654 602	200 246	812 505	167 817	484 171	133 382	4 545 426	402 548
	Exp Count	2 594 148	275 668	654 602	200 246	812 505	167 817	484 171	133 382	4 545 426	402 548
	Observations	40 038		8 147		4 748		1 276		54 209	

Significantly overrepresented | Significantly underrepresented | Classified information

2.8. Combinations of modes of transport within and outside Sweden

Due to technical problems at an early stage in the analysis of the unadjusted data a variable representing a whole transport chain from origin to the final destination (in or outside Sweden) has not been constructed (of unknown reasons it was only possible to include three different modes, any combination was possible, though). It may be possible to solve this problem but it has not been investigated further. But what cannot be solved for the present survey CFS 2001 is the fact that there is such a large portion missing cases that relatively few complete chains can be constructed. Instead the modes of transport within and outside Sweden have been cross tabulated for outbound as well as for inbound shipments.

2.8.1. Mode of transport for outbound flows within and outside Sweden

In order to understand what kind of transport chains that are used for outbound shipments a cross tabulation has been made of the mode of transports within and outside Sweden. Of the possible combinations (i.e. outbound transports within Sweden going to a foreign destination and outbound transports outside Sweden) 36% of the cases were missing.

The starting point is the mode of transport used from the shipping unit and if this starts with specific mode then it is more likely that the transport will continue with[8] a certain mode:

- **Starting with: continuing with**
- Road transport: no pattern visible
- Rail: rail in different combinations (rail, rail-road, rail-sea) or cargo vessel
- Cargo vessel: cargo vessel or cargo vessel-road
- Rail-road: rail in different combinations (rail, rail-road, rail-sea) or cargo vessel
- Ferry-road: ferry-road
- Cargo vessel-road: cargo vessel or cargo vessel-road
- Air: air
- Rail-sea: rail in different combinations (rail, rail-road, rail-sea), cargo vessel or cargo vessel-road

[8] NB this is not the same as being the most freqently used mode of transport

Tabell 58: Cross tabulation of modes of transport within (origal mode of transport) and outside Sweden (contiuning mode of transport) for outbound shipments (according to the adjusted data in the CFS data base)

		Transport mode within Sweden																
Transport mode outside Sweden		Road		Railway		Cargo vessel		Rail and road		Ferry and road		Cargo vessel and road		Air or air and road		Rail and sea (road)		TOTAL
		Estimate	95% CI	Estimate	95% CI	Estima	95% CI	Estimat	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate
Road	Count	1898904	274748	5669	1010	3208	1191	22737	7695	152271	69394	11729	4269	73406	37798	381	147	2168305
	Exp. Count	1779393	276959	48885	6253	21326	5119	30316	6791	158763	39206	20970	3827	105034	22879	3616	725	2168305
	Obervations	25835	25835	49	49	24	24	175	175	2165	2165	164	164	2438	2438	5	5	30855
Railway	Count	13581	12251	19588	3502	66	43	2987	1895	294	265	224	93	167	156	2405	922	39311
	Exp. Count	32260	10665	886	331	387	162	550	225	2878	1140	380	147	1904	730	66	27	39311
	Obervations	79	79	482	482	3	3	55	55	8	8	15	15	2	2	43	43	687
Cargo vessel	Count	201261	40372	33411	7655	14332	1661	20800	6684	5359	3712	19502	3926	7059	3556	1483	432	303208
	Exp. Count	248824	36586	6836	1413	2982	852	4239	1192	22201	5718	2932	703	14688	3476	506	128	303208
	Obervations	4916	4916	685	685	598	598	176	176	55	55	486	486	175	175	53	53	7144
Rail and road	Count	7049	2220	18641	3658	0	0	15995	9293	518	241	0	0	0	0	800	237	43004
	Exp. Count	35291	8466	970	290	423	157	601	246	3149	1030	416	132	2083	650	72	24	43004
	Obervations	96	96	421	421	0	0	274	274	12	12	0	0	0	0	25	25	828
Ferry and road	Count	1500081	417530	4662	1482	17	16	4625	3424	248219	53131	2192	2950	187	226	1347	631	1761330
	Exp. Count	1445414	380328	39710	6834	17323	4594	24626	6142	128964	32103	17034	3624	85320	18323	2937	678	1761330
	Obervations	13266	13266	74	74	1	1	46	46	2854	2854	10	10	3	3	19	19	16273
Cargo vessel and road	Count	150537	31777	5137	1104	34789	11826	3891	2262	1214	676	19397	5462	0	0	1478	800	216443
	Exp. Count	177622	29431	4880	1054	2129	710	3026	878	15848	4170	2093	540	10485	2555	361	95	216443
	Obervations	2471	2471	224	224	215	215	34	34	36	36	423	423	0	0	18	18	3421
Air or air and road	Count	796955	151940	517	230	2486	870	1016	486	226	324	1031	852	190030	31130	31	15	992292
	Exp. Count	814313	135314	22371	4384	9760	2755	13874	3718	72656	18591	9597	2245	48067	12088	1655	413	992292
	Obervations	7678	7678	9	9	90	90	42	42	2	2	35	35	3501	3501	1	1	11358
Rail and sea (road)	Count	20101	13864	38434	7525	95	79	6124	1450	1297	1808	0	0	0	0	1399	761	67450
	Exp. Count	55352	13213	1521	470	663	230	943	319	4939	1602	652	202	3267	1007	112	37	67450
	Obervations	379	379	891	891	3	3	269	269	8	8	0	0	0	0	37	37	1587
TOTAL	Count	4588469	680510	126058	13335	54993	12645	78175	16571	409398	87822	54075	8938	270849	50070	9325	1736	5591342
	Exp. Count	4588469	680510	126058	13335	54993	12645	78175	16571	409398	87822	54075	8938	270849	50070	9325	1736	5591342
	Obervations	54720	54720	2835	2835	934	934	1071	1071	5140	5140	1133	1133	6119	6119	201	201	72153

Significantly overrepresented Significantly underrepresented

2.8.2. Mode of transport for inbound flows within and outside Sweden

The transport chains that are used for inbound shipments are indicated by a cross tabulation of the mode of transports within and outside Sweden (see table 61). The starting point is the mode of transport used from the shipping unit and if this starts with specific mode then it is more likely that the transport will continue with[9] a certain mode:

- **Starting with: continuing with**
- Road transport: no mode is overrepresented
- Rail: rail or rail-sea
- Cargo vessel: cargo vessel, cargo vessel-road
- Rail-road: rail-road
- Ferry-road: ferry-road
- Cargo vessel-road: cargo vessel-road, rail
- Air: air
- Rail-sea: rail in different combinations (rail, rail-road, rail-sea)

[9] NB this is not the same as being the most freqently used mode of transport

Tabell 59: Cross tabulation of modes of transport outside Sweden (original mode of transport) and transports within Sweden (continuing mode of transport) for inbound shipments (according to the adjusted data in the CFS data base)

		Transport mode within Sweden																	
Transport mode outside Sweden		Road		Railway		Cargo vessel		Rail and road		Ferry and road		Cargo vessel and road		Air or air and road		Rail and sea (road)		TOTAL	
		Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI
Road	Count	1051072	144873	5132	4500	0	0	3222	2261	19244	11181	1048	1865	9705	12628	0	0	1089423	147228
	Exp. Count	846522	127628	29632	4533	1681	385	13483	4114	105378	23004	8905	3384	79790	35371	4032	1748	1089423	147228
	Obervations	14888	14888	103	103	0	0	65	65	282	282	10	10	67	67	0	0	15415	15415
Railway	Count	20777	28958	22782	6716	60	23	2890	4875	350	196	0	0	328	259	4032	1522	51220	30186
	Exp. Count	39800	23637	1393	840	79	49	634	419	4954	3025	419	286	3751	2692	190	138	51220	30186
	Obervations	68	68	452	452	4	4	40	40	6	6	0	0	3	3	91	91	664	664
Cargo vessel	Count	31541	8198	1888	749	6045	1196	661	702	0	0	5261	4420	0	0	0	0	45396	9568
	Exp. Count	35274	7617	1235	297	70	23	562	202	4391	1262	371	167	3325	1579	168	79	45396	9568
	Obervations	515	515	26	26	236	236	22	22	0	0	44	44	0	0	0	0	843	843
Rail and road	Count	13509	3653	2763	2361	0	0	30719	10658	734	392	0	0	0	0	1609	1556	49335	11662
	Exp. Count	38335	9158	1342	357	76	24	611	293	4772	1456	403	175	3613	1757	183	90	49335	11662
	Obervations	338	338	45	45	0	0	447	447	19	19	0	0	0	0	24	24	873	873
Ferry and road	Count	1342391	240729	2927	1099	0	0	2195	1912	376671	79331	206	340	386	228	885	375	1725661	253097
	Exp. Count	1340903	219124	46937	6001	2663	572	21357	6319	166920	40658	14106	5218	126389	54803	6387	2738	1725661	253097
	Obervations	18133	18133	41	41	0	0	48	48	2679	2679	2	2	5	5	59	59	20967	20967
Cargo vessel and road	Count	145855	27080	51972	528	205	142	2628	1433	143	150	27038	11239	17	17	2036	3308	229894	29550
	Exp. Count	178636	25355	6253	956	355	82	2845	872	22237	4926	1879	784	16838	7425	851	376	229894	29550
	Obervations	2449	2449	156	156	11	11	58	58	5	5	309	309	1	1	26	26	3015	3015
Air or air and road	Count	606534	162468	127	114	32	34	221	130	2020	1789	0	0	292951	137143	0	0	901886	212468
	Exp. Count	700799	158530	24531	5103	1392	377	11162	3763	87238	24304	7372	3056	66055	38975	3338	1528	901886	212468
	Obervations	5335	5335	6	6	1	1	13	13	5	5	0	0	2475	2475	0	0	7835	7835
Rail and sea (road)	Count	7059	4016	25078	2240	50	60	8730	7140	1516	810	306	212	0	0	6769	4990	49507	9905
	Exp. Count	38469	7813	1347	317	76	22	613	248	4789	1363	405	168	3626	1703	183	98	49507	9905
	Obervations	126	126	347	347	2	2	156	156	22	22	14	14	0	0	41	41	708	708
TOTAL	Count	3218738	343436	112669	8946	6393	1212	51266	14356	400679	80575	33860	12222	303387	137989	15331	6389	4142323	385648
	Exp. Count	3218738	343436	112669	8946	6393	1212	51266	14356	400679	80575	33860	12222	303387	137989	15331	6389	4142323	385648

Significantly overrepresented | Significantly underrepresented

3. Factors influencing availability and usage of infrastructure

The factors influencing the availability and usage of infrastructure have only been linked to the characteristics of the outbound shipments due to practical reasons related to the initial analysis of the data (it is in the database for outbound shipments the infrastructure information is available).

3.1. The availability and access and usage of infrastructure in different regions

3.1.1. Access and use of industrial rail tracks in different despatching regions

There is a difference in the usage of industrial rail tracks between different regions in Sweden (see table 60). However, in this analysis 55% of the cases observed are missing and the results are therefore not reliable. The available data indicates that in the following regions (län) rail tracks are used more than expected:

- Dalarna
- Gävleborgs
- Jämtland
- Västernorrland

The available data indicates that in the following regions there are less cases than expected where existing rail tracks are not used (see table 60):

- Jönköping,
- Kronoberg
- Västra Götaland
- Dalarna
- Västernorrland

There are no simple explanations behind these patterns. According to Banverket the following terminals train building (cargo load long distance**)** did exist in 2001:Boden, Vännäs, Ånge, Sundsvall, Gävle, Borlänge, Nässjö, Göteborg (Sävenäs), Helsingborg, Oreö. However, this offers no explanation. It must also be observed that tn addition to these terminals there are also “system trains” which are build at the site from which the goods originates.

In the Jönköping region there is a terminal for train building in Nässjö, and in addition there is a rail combi terminal in Jönköping (city) in connection to a concentrated and centrally located industrial area. This industrial area is very densely populated with rail tracks and is closely situated to the railway station and the main rail tracks.

The available data indicates that in the following regions there is an overrepresentation of shipments not using existing industrial rail tracks:

- Halland
- Jämtland

In Jämtland where existing industrial rail tracks are not used it may be explained by changes in the industrial structure. In this region many small timber terminals and saw mills no longer purchase their own rail transports as a result of them being incorporated in large corporate entities, which consolidate shipments. This has resulted in a number of rail tracks being redundant since in most cases road transports are used for the pre-transport to a large terminal from which the rail transport originates.

Tabell 60 Crosstabulation of region where the shipping unit is located and the use of industrial rail track (according to the adjusted data in the CFS data base)

Despatching region		Use of industrial rail tracks							
		No access to rail tracks		Rail tracks used		Accessible rail tracks not used		Total	
		Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI
STOCKHOLMS LÄN	Count	15412544	4455856	438935	179007	904590	594622	16756070	4492858
	Exp. Count	14725403	4094044	955684	218016	1074983	333873	16756070	4492858
	Obervations	102549		1979		1888		106416	
UPPSALA LÄN	Count	723249	385579					913427	404926
	Exp. Count	802729	356322					913427	404926
	Obervations	4050						4597	
SÖDERMANLANDS LÄN	Count	1104528	279077					1173609	286429
	Exp. Count	1031379	252924					1173609	286429
	Obervations	6961						7526	
ÖSTERGÖTLANDS LÄN	Count	1839297	635928	144790	38817	190107	102351	2174193	641038
	Exp. Count	1910703	567262	124005	39743	139485	51672	2174193	641038
	Obervations	7846		1560		1941		11347	
JÖNKÖPINGS LÄN	Count	2985894	778851	90320	20525	75322	51781	3151536	779961
	Exp. Count	2769602	692443	179748	49718	202186	67476	3151536	779961
	Obervations	11937		1022		797		13756	
KRONOBERGS LÄN	Count	1656099	451815	102787	31648	30607	24941	1789493	453524
	Exp. Count	1572624	401176	102064	29349	114805	39297	1789493	453524
	Obervations	12507		1145		231		13883	
KALMAR LÄN	Count	836955	363703	34290	18814	188074	214243	1059319	422392
	Exp. Count	930940	370452	60418	25306	67960	32882	1059319	422392
	Obervations	3725		647		1121		5493	
GOTLANDS LÄN	Count	119079	93543					120158	93543
	Exp. Count	105596	82257					120158	93543
	Obervations	1005						1088	
BLECINGE LÄN	Count	390712	133072	10377	7506	34735	28022	435824	136176
	Exp. Count	383007	119928	24857	8528	27960	11009	435824	136176
	Obervations	9249		234		472		9955	
SKÅNE LÄN	Count	6651647	1046117	428235	136654	492500	141559	7572382	1061466
	Exp. Count	6654686	955559	431892	83339	485805	130053	7572382	1061466
	Obervations	46947		4184		3912		55043	
HALLANDS LÄN	Count	1661656	837929	85527	38875	426746	184772	2173930	858482
	Exp. Count	1910471	757561	123990	50613	139468	63864	2173930	858482
	Obervations	7289		902		1135		9326	
VÄSTRA GÖTALANDS LÄN	Count	9376247	1327548	495236	98832	245538	68828	10117020	1328703
	Exp. Count	8890939	1209149	577025	104446	649056	168383	10117020	1328703
	Obervations	73980		4171		4701		82852	
VÄRMLANDS LÄN	Count	664132	179829	90751	73428	79212	114396	834095	223710
	Exp. Count	733011	196331	47573	14687	53511	19643	834095	223710
	Obervations	4204		1885		497		6586	
ÖREBRO LÄN	Count	1338349	452922					1780578	618697
	Exp. Count	1564790	538212					1780578	618697
	Obervations	9859						12783	
VÄSTMANLANDS LÄN	Count	1418795	1062736	157949	83139	239851	108987	1816595	1070836
	Exp. Count	1596442	946199	103610	61337	116543	71239	1816595	1070836
	Obervations	5292		5274		1048		11614	
DALARNAS LÄN	Count	1159430	350601	156670	24975	33825	12266	1349925	351682
	Exp. Count	1186328	311000	76993	22626	86604	30083	1349925	351682
	Obervations	4067		1997		1439		7503	
GÄVLEBORGS LÄN	Count	586652	226282	106492	34259	56320	18215	749464	228323
	Exp. Count	658637	201475	42746	14331	48082	18365	749464	228323
	Obervations	3832		1615		895		6342	
VÄSTERNORRLANDS LÄN	Count	662998	251113					949899	308771
	Exp. Count	834781	270707					949899	308771
	Obervations	3275						5400	
JÄMTLANDS LÄN	Count	348699	232674	113900	42645	93560	34981	556159	239053
	Exp. Count	488758	210487	31721	14337	35680	17427	556159	239053
	Obervations	1375		600		494		2469	
VÄSTERBOTTENS LÄN	Count	50194862	5111048	3257665	389927	3664321	846137	57116848	5158747
	Exp. Count	50194862	5111048	3257665	389927	3664321	846137	57116848	5158747
	Obervations	327268		34317		23638		385223	

Significantly overrepresented | Significantly underrepresented | Classified information

3.1.2. Access and use of quays in the despatching region

There seems to be a difference in the usage of quays between different regions in Sweden (see table 61). However, in this analysis 55% of the cases are missing and therefore the results are not reliable.

Tabell 61 Crosstabulation of region where the shipping unit is located and the use of quays (according to the adjusted data in the CFS data base

Despatching region		Use of industrial rail tracks							
		No access to rail tracks		Rail tracks used		Accessible rail tracks not used		Total	
		Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI
STOCKHOLMS LÄN	Count	15412544	4455856	438935	179007	904590	594622	16756070	4492858
	Exp. Count	14725403	4094044	955684	218016	1074983	333873	16756070	4492858
	Obervations	102549		1979		1888		106416	
UPPSALA LÄN	Count	723249	385579					913427	404926
	Exp. Count	802729	356322					913427	404926
	Obervations	4050						4597	
SÖDERMANLANDS LÄN	Count	1104528	279077					1173609	286429
	Exp. Count	1031379	252924					1173609	286429
	Obervations	6961						7526	
ÖSTERGÖTLANDS LÄN	Count	1839297	635928	144790	38817	190107	102351	2174193	641038
	Exp. Count	1910703	567262	124005	39743	139485	51672	2174193	641038
	Obervations	7846		1560		1941		11347	
JÖNKÖPINGS LÄN	Count	2985894	778851	90320	20525	75322	51781	3151536	779961
	Exp. Count	2769602	692443	179748	49718	202186	67476	3151536	779961
	Obervations	11937		1022		797		13756	
KRONOBERGS LÄN	Count	1656099	451815	102787	31648	30607	24941	1789493	453524
	Exp. Count	1572624	401176	102064	29349	114805	39297	1789493	453524
	Obervations	12507		1145		231		13883	
KALMAR LÄN	Count	836955	363703	34290	18814	188074	214243	1059319	422392
	Exp. Count	930940	370452	60418	25306	67960	32882	1059319	422392
	Obervations	3725		647		1121		5493	
GOTLANDS LÄN	Count	119079	93543					120158	93543
	Exp. Count	105596	82257					120158	93543
	Obervations	1005						1088	
BLECINGE LÄN	Count	390712	133072	10377	7506	34735	28022	435824	136176
	Exp. Count	383007	119928	24857	8528	27960	11009	435824	136176
	Obervations	9249		234		472		9955	
SKÅNE LÄN	Count	6651647	1046117	428235	136654	492500	141559	7572382	1061466
	Exp. Count	6654686	955559	431892	83339	485805	130053	7572382	1061466
	Obervations	46947		4184		3912		55043	
HALLANDS LÄN	Count	1661656	837929	85527	38875	426746	184772	2173930	858482
	Exp. Count	1910471	757561	123990	50613	139468	63864	2173930	858482
	Obervations	7289		902		1135		9326	
VÄSTRA GÖTALANDS LÄN	Count	9376247	1327548	495236	98832	245538	68828	10117020	1328703
	Exp. Count	8890939	1209149	577025	104446	649056	168383	10117020	1328703
	Obervations	73980		4171		4701		82852	
VÄRMLANDS LÄN	Count	664132	179829	90751	73428	79212	114396	834095	223710
	Exp. Count	733011	196331	47573	14687	53511	19643	834095	223710
	Obervations	4204		1885		497		6586	
ÖREBRO LÄN	Count	1338349	452922					1780578	618697
	Exp. Count	1564790	538212					1780578	618697
	Obervations	9859						12783	
VÄSTMANLANDS LÄN	Count	1418795	1062736	157949	83139	239851	108987	1816595	1070836
	Exp. Count	1596442	946199	103610	61337	116543	71239	1816595	1070836
	Obervations	5292		5274		1048		11614	
DALARNAS LÄN	Count	1159430	350601	156670	24975	33825	12266	1349925	351682
	Exp. Count	1186328	311000	76993	22626	86604	30083	1349925	351682
	Obervations	4067		1997		1439		7503	
GÄVLEBORGS LÄN	Count	586652	226282	106492	34259	56320	18215	749464	228323
	Exp. Count	658637	201475	42746	14331	48082	18365	749464	228323
	Obervations	3832		1615		895		6342	
VÄSTERNORRLANDS LÄN	Count	662998	251113					949899	308771
	Exp. Count	834781	270707					949899	308771
	Obervations	3275						5400	
JÄMTLANDS LÄN	Count	348699	232674	113900	42645	93560	34981	556159	239053
	Exp. Count	488758	210487	31721	14337	35680	17427	556159	239053
	Obervations	1375		600		494		2469	
VÄSTERBOTTENS LÄN	Count	50194862	5111048	3257665	389927	3664321	846137	57116848	5158747
	Exp. Count	50194862	5111048	3257665	389927	3664321	846137	57116848	5158747
	Obervations	327268		34317		23638		385223	

Significantly overrepresented | Significantly underrepresented | Classified information

3.2. Product characteristics and the utilisation of infrastructure

3.2.1. Product groups and access and use of industrial rail tracks

In the analysis of product groups and the use of industrial rail tracks 55% of the cases are missing and therefore the results are not reliable. When industrial rail tracks are used the following groups of products are overrepresented:

- Metal products,
- Forest products,
- Paper pulp,
- Paper waste

Tabell 62 Cross tabulation of product type and the use of industrial rail tracks (according to the adjusted data in the CFS data base)

Products		Use of industrial rail tracks							
		No access to rail tracks		Rail tracks used		Accessible rail tracks not used		Total	
		Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI
Agriculture products	Count	318838	263437	73733	48892	107816	166042	500387	315146
	Exp. Count	439127	276184	28833	18570	32426	22389	500387	315146
	Observations	1250		341		259		1850	
Solid mineral fuels	Count	32832	9130					33868	9124
	Exp. Count	29721	8033					33868	9124
	Observations	1258						1316	
Petroleum products	Count	218858	87532					313088	97808
	Exp. Count	274759	85973					313088	97808
	Observations	1086						5667	
Ore and metal waste	Count	67210	96039	30558	19670	12531	17289	110299	99545
	Exp. Count	96796	87375	6356	5815	7148	6673	110299	99545
	Observations	173		565		137		875	
Metal products	Count	934176	207925	533923	110684	70519	57692	1538618	241039
	Exp. Count	1350253	212627	88659	19719	99706	28265	1538618	241039
	Observations	9748		5163		1504		16415	
Minerals and building materia	Count	1147467	308232	98943	89646	76817	66765	1323228	327262
	Exp. Count	1161232	288268	76247	22037	85749	29273	1323228	327262
	Observations	14255		1290		1024		16569	
Chemical fertilisers	Count	43032	26515					50067	28204
	Exp. Count	43938	24773					50067	28204
	Observations	179						379	
Chemical products	Count	1614585	509970	169465	86279	67090	52464	1851140	519182
	Exp. Count	1624514	458906	106667	33035	119959	43143	1851140	519182
	Observations	6888		1519		488		8895	
Textiles	Count	1604452	550120	58023	83140	7608	7555	1670083	556210
	Exp. Count	1465623	490713	96234	34465	108226	43414	1670083	556210
	Observations	6749		160		91		7000	
Forest products	Count	207259	40911	51161	8604	19584	12958	278004	43203
	Exp. Count	243969	38233	16019	3424	18015	5124	278004	43203
	Observations	3083		2262		418		5763	
Lubricating oils and fats	Count	49726	32597					62847	32998
	Exp. Count	55153	28988					62847	32998
	Observations	302						422	
Medical and pharmaceutical p	Count	1640751	485019					1827100	500748
products	Exp. Count	1603418	441670					1827100	500748
	Observations	10577						10955	
Paper pulp	Count	21664	9876	25142	11536	0	0	46806	15154
	Exp. Count	41076	13311	2697	974	3033	1217	46806	15154
	Observations	280		550		0		830	
Paper waste,	Count	56250	21832	92333	57410	18200	32675	166783	69565
empty packaging,	Exp. Count	146365	60947	9610	4382	10808	5218	166783	69565
packaging used	Observations	780		731		69		1580	
Transport equipment	Count	9257501	1055372	326251	176831	539105	278848	10122857	1100996
	Exp. Count	8883567	989547	583302	103052	655988	171317	10122857	1100996
	Observations	98325		2855		3706		104886	
Manufactured products	Count	4922996	949405	90865	69390	167352	78115	5181213	954297
of metal	Exp. Count	4546904	851442	298553	67201	335756	97900	5181213	954297
	Observations	24301		1111		1792		27204	
Other manufactured	Count	13758288	1541357	514941	130814	630899	432281	14904128	1597134
products	Exp. Count	13079492	1449455	858810	142775	965827	251415	14904128	1597134
	Observations	64349		4331		3449		72129	
Paper products	Count	5331335	4312185	416932	81562	895519	557332	6643787	4348615
	Exp. Count	5830422	3871914	382830	226566	430535	275289	6643787	4348615
	Observations	18205		4852		1998		25055	
Foodstuffs and	Count	8292065	1696369	599704	188543	911333	300230	9803102	1728478
animal fodder	Exp. Count	8602958	1553945	564877	119283	635267	179334	9803102	1728478
	Observations	62470		8032		3588		74090	
TOTAL	Count	49519285	5094648	3251475	389139	3656644	846127	56427403	5142734
	Exp. Count	49519285	5094648	3251475	389139	3656644	846127	56427403	5142734
	Observations	324258		34216		23406		381880	

Significantly overrepresented | Significantly underrepresented | Classified information

3.2.2. Product groups and access and use of quays

However, in the analysis of product groups and the use of quays 55% of the cases are missing and therefore the results are not reliable. When quays are used the following groups of products are overrepresented:

- Chemical products
- Chemical fertilisers
- Forest products
- Paper pulp

Tabell 63 Cross tabulation of product type and the use of industrial quays (according to the adjusted data in the CFS data base)

Products		Use of quay							
		No_access_to_quay		Quay used		Accessible quay not used		Total	
		Skattning	95% CI	Skattning	95% CI	Skattning	95% CI	Skattning	95% CI
Agriculture products	Count	485802	315099					500387	315146
	Exp. Count	477114	300692					500387	315146
	Observations	1753						1850	
Solid mineral fuels	Count	33853	9124					33868	9124
	Exp. Count	32292	8713					33868	9124
	Observations	1315						1316	
Petroleum products	Count	193594	84716					313088	97808
	Exp. Count	298527	93239					313088	97808
	Observations	978						5667	
Ore and metal waste	Count	107869	99489					110299	99545
	Exp. Count	105169	94930					110299	99545
	Observations	835						875	
Metal products	Count	1356787	235590	75545	37198	107744	40788	1540077	241050
	Exp. Count	1468448	230824	38395	19739	33233	10811	1540077	241050
	Observations	15164		676		620		16460	
Minerals and building material	Count	1059612	297920					1323228	327262
	Exp. Count	1261685	311555					1323228	327262
	Observations	8335						16569	
Chemical fertilisers	Count	21560	23066					50067	28204
	Exp. Count	47739	26891					50067	28204
	Observations	101						379	
Chemical products	Count	1519785	508288					1850965	519182
	Exp. Count	1764877	496240					1850965	519182
	Observations	7270						8894	
Textiles	Count	1593074	549943	74214	84682	2795	3328	1670083	556210
	Exp. Count	1592408	531215	41636	24658	36038	15516	1670083	556210
	Observations	6753		211		36		7000	
Forest products	Count	260005	43175	15406	2766	2592	2248	278004	43203
	Exp. Count	265074	41380	6931	3563	5999	1941	278004	43203
	Observations	4838		843		82		5763	
Lubricating oils and fats	Count	46496	28204	16350	22992	0	0	62847	32998
	Exp. Count	59924	31465	1567	1133	1356	810	62847	32998
	Observations	340		82		0		422	
Medical and pharmaceutical p	Count	1815887	500365					1827100	500748
products	Exp. Count	1742123	478850					1827100	500748
	Observations	10886						10955	
Paper pulp	Count	20467	13774	26340	6385	0	0	46806	15154
	Exp. Count	44629	14450	1167	692	1010	436	46806	15154
	Observations	401		429		0		830	
Paper waste,	Count	127197	50797	2252	1997	12076	19744	141525	54534
empty packaging,	Exp. Count	134943	52009	3528	2202	3054	1480	141525	54534
packaging used	Observations	1369		58		48		1475	
Transport equipment	Count	9906877	1092733	15835	3867	186225	137535	10108936	1100905
	Exp. Count	9638775	1064498	252023	125421	218139	66248	10108936	1100905
	Observations	102906		596		1341		104843	
Manufactured products	Count	5027152	948198	63573	39438	82492	107143	5173217	954280
of metal	Exp. Count	4932613	914974	128972	66874	111632	37620	5173217	954280
	Observations	25863		726		527		27116	
Other manufactured	Count	14260593	1450619	465745	670306	242644	119466	14968981	1599330
products	Exp. Count	14272781	1480431	373187	200340	323012	96007	14968981	1599330
	Observations	69025		1876		1371		72272	
Paper products	Count	6405469	4347691	154401	73670	4478	2982	6564348	4348277
	Exp. Count	6259044	4170409	163654	124279	141651	91643	6564348	4348277
	Observations	23911		902		150		24963	
Foodstuffs and	Count	9512802	1718190	118604	54637	181713	198212	9813119	1728512
animal fodder	Exp. Count	9356716	1662653	244648	125021	211755	69770	9813119	1728512
	Observations	72374		1204		532		74110	
TOTAL	Count	53754882	5095362	1405516	692662	1216546	334644	56376944	5142574
	Exp. Count	53754882	5095362	1405516	692662	1216546	334644	56376944	5142574
	Observations	354417		14612		12730		381759	

Significantly overrepresented | Significantly underrepresented | Classified information

3.3. Type of load unit and use of infrastructure

A hypothesis is that the development of different technological solutions in the transport system in combination with the development of companies' logistics systems have influenced the use of rail way transports in a negative direction. For instance, earlier solutions for handling bulk goods demanded that the goods was blown from a rail car to a fixed container at the receiving company. Today this procedure can be replaced by a self unloading swap body and thereby both safety advantages as well as logistics advantages are achieved by the use of this two bin system. However, it has not been possible to analyse the relationships between the use of industrial rail tracks and different load units since the number of missing cases is 77% and the same amount of missing cases is at hand also for quays.

Tabell 64 Use of industrial rail tracks and type of load unit (according to the adjusted data in the CFS data base)

Type of goods		Use of industrial rail tracks							
		No access to railtracks		Rail tracks used		Accessible rail tracks not used		Total	
		Estimate	95 % CI	Estimate	95 % CI	Estimate	95 % CI	Estimate	95 % CI
Solid and liquid bulk goods	Count	966936	288627	209222	41761	118364	50288	1294521	295655
	Exp Count	1071595	249918	105026	27746	117900	44877	1294521	295655
	Observations	5423		4705		4732		14860	
Container or swap body	Count	1831873	473384	259116	131209	104551	88671	2195540	498212
	Exp Count	1817451	420353	178127	48040	199961	75638	2195540	498212
	Observations	9547		2230		677		12454	
Palletized goods	Count	16233135	1715551	1104606	179560	1958713	733773	19296454	1844323
	Exp Count	15973458	1666374	1565550	212348	1757447	592591	19296454	1844323
	Observations	106509		15298		11553		133360	
Pre slung goods	Count	493647	145028	208918	65697	47317	55747	749882	167486
	Exp Count	620747	140112	60839	16599	68296	26190	749882	167486
	Observations	8016		2536		485		11037	
Mobile units	Count	1027543	267193	232539	137306	32372	14588	1292454	300594
	Exp Count	1069883	251153	104859	30633	117712	44935	1292454	300594
	Observations	21324		1675		343		23342	
TOTAL	Count	20553134	1822614	2014401	273928	2261316	743239	24828852	1943542
	Exp Count	20553134	1822614	2014401	273928	2261316	743239	24828852	1943542
	Observations	150819		26444		17790		195053	

Significantly overrepresented Significantly underrepresented

Tabell 65 Use of quay and type of load unit (according to the adjusted data in the CFS data base)

Type of goods		Use of quay							
		No access to quay		Quay used		Accessible quay not used		Total	
		Estimate	95 % CI	Estimate	95 % CI	Estimate	95 % CI	Estimate	95 % CI
Solid and liquid bulk goods	Count	950822	280853	322495	92516	21204	22241	1294521	295655
	Exp Count	1218930	277962	41057	12772	34534	13259	1294521	295655
	Antal	7457		7287		116		14860	
Container or swap body	Count	2066097	495755	86947	26798	41900	44018	2194944	498212
	Exp Count	2066774	471530	69615	19338	58555	22291	2194944	498212
	Antal	11271		918		237		12426	
Palletized goods	Count	18397426	1833937	336943	80879	495637	194293	19230006	1843622
	Exp Count	18107103	1812374	609898	102962	513005	161958	19230006	1843622
	Antal	127768		3293		2356		133417	
Pre slung goods	Count	609878	158940	28161	6534	85188	35547	723227	162965
	Exp Count	680996	153731	22938	6515	19294	7504	723227	162965
	Antal	9757		625		507		10889	
Mobile units	Count	1266563	300524	9954	4818	15937	5648	1292454	300594
	Exp Count	1216983	284214	40991	11724	34479	13260	1292454	300594
	Antal	22983		201		158		23342	
TOTAL	Count	23290786	1931680	784499	131532	659867	206171	24735152	1942627
	Exp Count	23290786	1931680	784499	131532	659867	206171	24735152	1942627
	Antal	179236		12324		3374		194934	

Significantly overrepresented Significantly underrepresented

4. Factors influencing load unit selection

4.1. Weight of shipments and type of load unit

There is a significant difference in the shipment weight between different types of load units. Based on pair wise comparisons of the different types of load units the following ranking has been made (however, it should be noted that 62% of the cases are missing), goods weight in descending order:

- Pre-slung goods
- Bulk goods
- Container/swap body; Mobile units
- Palletized goods

Tabell 66 Differences in average weight between different cargo types

Type of load unit	Number of observations	Mean	Std Error	95 % Confidence Interval		Min	Max
				Lower bound	Upper bound		
Solid and liquid bulk goods	30 443	53 617	3 817	46 137	61 098	1	234 760 000
Large container or swap body	17 710	5 774	713	4 376	7 172	0	1 540 500
Palletized goods	224 655	1 682	82	1 520	1 843	0	4 000 000
Pre slung goods	26 400	82 516	8 268	66 312	98 721	1	601 320 000
Mobile units	27 111	4 712	862	3 023	6 401	0	13 679 350
Total	326 319	7 704	291	7 134	8 274	0	601 320 000

Tabell 67 Pair wise comparisons of the weight for different load units (according to the unadjusted primary data in the CFS data base

Type of load unit	Type of load unit	Mean Difference	Std Error	95 % Confidence Interval	
				Lower bound	Upper bound
Solid and liquid bulk goods	Large container or swap body	47 844	3 880	40 238	55 449
	Palletized goods	51 936	3 817	44 455	59 417
	Pre slung goods	-28 899	9 122	-46 778	-11 021
	Mobile units	48 905	3 927	41 209	56 602
Large container or swap body	Solid and liquid bulk goods	-47 844	3 880	-55 449	-40 238
	Palletized goods	4 092	719	2 683	5 501
	Pre slung goods	-76 743	8 301	-93 012	-60 474
	Mobile units	1 062	1 111	-1 117	3 240
Palletized goods	Solid and liquid bulk goods	-51 936	3 817	-59 417	-44 455
	Large container or swap body	-4 092	719	-5 501	-2 683
	Pre slung goods	-80 835	8 268	-97 041	-64 629
	Mobile units	-3 030	866	-4 727	-1 334
Pre slung goods	Solid and liquid bulk goods	28 899	9 122	11 021	46 778
	Large container or swap body	76 743	8 301	60 474	93 012
	Palletized goods	80 835	8 268	64 629	97 041
	Mobile units	77 804	8 313	61 511	94 098
Mobile units	Solid and liquid bulk goods	-48 905	3 927	-56 602	-41 209
	Large container or swap body	-1 062	1 111	-3 240	1 117
	Palletized goods	3 030	866	1 334	4 727
	Pre slung goods	-77 804	8 313	-94 098	-61 511

There is a significant difference between load units and the weight intervals used in table 33. When the shipment sizes are categorised into different intervals the following pattern emerges when the expected frequency is compared to the actual outcome:

- Bulk goods: overrepresented above 5 ton
- Pre-slung goods: overrepresented above 5 ton
- Palletised goods: underrepresented above 10 ton

Tabell 68 Crosstabluation of shipment weight intervals and load unit (according to the adjusted data in the CFS data base)

Cargo type		Weight group																	
		]0 , 30] kg		]30 , 100] kg		]100 , 1 000] kg		]1 000 , 5 000] kg		]5 000 , 10 000] kg		]10 000 , 25 000] kg		]25 000 , 50 000] kg		> 50 000 kg		Total	
		Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI
Solid and	Count	148697	89794	76589	56458	134356	22750	311834	76473	187368	51526	378283	129772	392922	91316	117087	15937	1747137	297081
liquid bulk goods	Exp Count	453665	86731	267912	51165	547345	96194	242911	46615	80073	20587	85170	21922	54418	13481	15644	3169	1747137	297081
	Observations	736		712		4249		5649		3059		4917		5513		5610		30445	
Container or	Count	995950	351970	252882	71929	386415	151766	299799	146272	89930	21553	211620	86798	134167	43480	33026	9905	2403789	511544
swap body	Exp Count	624172	157797	368606	83015	753061	162700	334208	75817	110167	29514	117180	29051	74871	18426	21524	4912	2403789	511544
	Observations	4772		1369		2615		2470		1395		2533		1998		558		17710	
Palletized goods	Count	5444265	851930	3758874	578652	7840900	952813	3E+06	270262	878450	225024	573097	42233	171348	14999	50450	6871	21706795	1940207
	Exp Count	5636422	777952	3328599	507419	6800326	864980	3E+06	271967	994839	185095	1058166	122759	676100	83050	194366	17457	21706795	1940207
	Observations	64108		30411		67452		35906		10837		10267		4345		1365		224691	
Pre slung goods	Count	50921	29062	48835	21962	162155	75148	152550	49486	80521	18171	124739	25932	133979	35134	36032	5056	789731	167630
	Exp Count	205063	47074	121100	27803	247408	55715	109799	25581	36194	10165	38498	9736	24598	6421	7071	1677	789731	167630
	Observations	345		299		1143		1940		2511		4663		3275		12224		26400	
Mobile units	Count	636518	220859	159881	49917	255069	61517	142470	37627	48021	12756	78301	17340	40395	11041	14322	4690	1374978	304284
	Exp Count	357029	91354	210844	50476	430754	97565	191168	44218	63016	17565	67028	16845	42826	10916	12312	2952	1374978	304284
	Observations	15486		3697		3793		1507		683		1045		755		145		27111	
TOTAL	Count	7276350	947261	4297062	586920	8778894	967316	4E+06	323353	1E+06	232807	1366041	164275	872813	108842	250918	21595	28022429	2036406
	Exp Count	7276350	947261	4297062	586920	8778894	967316	4E+06	323353	1E+06	232807	1366041	164275	872813	108842	250918	21595	28022429	2036406
	Observations	85447		36488		79252		47472		18485		23425		15886		19902		326357	

Significantly overrepresented Significantly underrepresented

4.2. Goods value and load unit

4.2.1. Goods value and type of load unit for outbound shipments

There is, with one exception, a significant difference in goods value between all types of load units for outbound shipments. The only exception is container/swap body and palletised goods between which there is no difference in goods value per kg. Based on pair wise comparisons, of the average goods value, of the different types of load units the following ranking has been made, goods value in descending order:

- Palletised goods
- Mobile units
- Container/swap bodies
- Bulk goods
- Pre-slung goods

Tabell 69 Differences in average outbound shipment value (SEK/kg) for different load units

Type of load unit	Number of observations	Mean	Std Error	95 % Confidence Interval		Min	Max
				Lower bound	Upper bound		
Solid and liquid bulk goods	30 443	1,39	0,06	1,28	1,50	0	183 260
Large container or swap body	17 710	8,73	0,78	7,20	10,26	0	829 322
Palletized goods	224 577	24,68	0,94	22,83	26,52	0	524 000
Pre slung goods	26 400	0,87	0,03	0,82	0,93	0	7 436
Mobile units	27 111	13,16	2,04	9,16	17,15	0	30 723
Total	326 241	6,00	0,15	5,70	6,30	0	829 322

Tabell 70 Pair wise comparisons of the average goods value (SEK/kg) for outbound shipments and different types of load units

Type of load unit	Type of load unit	Mean Difference	Std Error	95 % Confidence Interval	
				Lower bound	Upper bound
Solid and liquid bulk goods	Large container or swap body	-7,34	0,78	-8,87	-5,81
	Palletized goods	-23,29	0,94	-25,14	-21,44
	Pre slung goods	0,52	0,06	0,39	0,64
	Mobile units	-11,77	2,04	-15,76	-7,77
Large container or swap body	Solid and liquid bulk goods	7,34	0,78	5,81	8,87
	Palletized goods	-15,95	1,22	-18,34	-13,55
	Pre slung goods	7,86	0,78	6,33	9,39
	Mobile units	-4,43	2,17	-8,68	-0,17
Palletized goods	Solid and liquid bulk goods	23,29	0,94	21,44	25,14
	Large container or swap body	15,95	1,22	13,55	18,34
	Pre slung goods	23,80	0,94	21,96	25,65
	Mobile units	11,52	2,24	7,13	15,92
Pre slung goods	Solid and liquid bulk goods	-0,52	0,06	-0,64	-0,39
	Large container or swap body	-7,86	0,78	-9,39	-6,33
	Palletized goods	-23,80	0,94	-25,65	-21,96
	Mobile units	-12,28	2,04	-16,27	-8,29
Mobile units	Solid and liquid bulk goods	11,77	2,04	7,77	15,76
	Large container or swap body	4,43	2,17	0,17	8,68
	Palletized goods	-11,52	2,24	-15,92	-7,13
	Pre slung goods	12,28	2,04	8,29	16,27

4.2.2. Goods value and type of load unit for inbound shipments

There is a significant difference in the goods shipment value between different types of load units for inbound shipments. However, the differences are not as clear as they are for outbound shipments. Based on pair wise comparisons of the different types of load units the following ranking has been made goods value in descending order (see table 72):

- Other container, large container/swap bodies, palletised goods
- Pre-slung goods
- Bulk goods

Mobile units do not differ from other container and large container, but has a lower value than palletised goods and higher than bulk goods.

Tabell 71 Differences in average inbound shipment value (SEK/kg) for different load units (according to the adjusted data in the CFS data base)

Type of load unit	Number of observations	Mean	Std Error	95 % Confidence Interval		Min	Max
				Lower bound	Upper bound		
Solid and liquid bulk goods	1 331	1,87	0,04	1,80	1,95	0	100 000
Large container or swap body	3 007	23,10	2,63	17,96	28,25	0	115 334
Other container	352	31,62	7,55	16,82	46,43	0	556 431
Palletized goods	23 841	23,21	2,34	18,62	27,80	0	2 105 605
Pre slung goods	472	6,20	2,21	1,88	10,53	0	5 922
Mobile units	7 190	16,14	2,42	11,40	20,87	0	265 490
Total	36 193	6,68	0,20	6,28	7,08	0	2 105 605

Tabell 72 Pair wise comparisons of the average goods value for inbound shipments and different types of load units

Type of load unit	Type of load unit	Mean Difference	Std Error	95 % Confidence Interval	
				Lower bound	Upper bound
Solid and liquid bulk goods	Large container or swap body	-21,23	2,63	-26,38	-16,09
	Other container	-29,75	7,55	-44,56	-14,95
	Palletized goods	-21,34	2,34	-25,93	-16,74
	Pre slung goods	-4,33	2,21	-8,66	-0,01
	Mobile units	-14,27	2,42	-19,00	-9,53
Large container or swap body	Solid and liquid bulk goods	21,23	2,63	16,09	26,38
	Other container	-8,52	7,92	-24,05	7,01
	Palletized goods	-0,11	3,51	-6,98	6,77
	Pre slung goods	16,90	3,43	10,17	23,63
	Mobile units	6,97	3,56	-0,01	13,94
Other container	Solid and liquid bulk goods	29,75	7,55	14,95	44,56
	Large container or swap body	8,52	7,92	-7,01	24,05
	Palletized goods	8,41	7,90	-7,07	23,90
	Pre slung goods	25,42	7,87	10,00	40,84
	Mobile units	15,49	7,93	-0,06	31,03
Palletized goods	Solid and liquid bulk goods	21,34	2,34	16,74	25,93
	Large container or swap body	0,11	3,51	-6,77	6,98
	Other container	-8,41	7,90	-23,90	7,07
	Palletized goods	17,01	3,22	10,70	23,31
	Mobile units	7,07	3,35	0,50	13,64
Pre slung goods	Solid and liquid bulk goods	4,33	2,21	0,01	8,66
	Large container or swap body	-16,90	3,43	-23,63	-10,17
	Other container	-25,42	7,87	-40,84	-10,00
	Palletized goods	-17,01	3,22	-23,31	-10,70
	Mobile units	-9,93	3,27	-16,35	-3,52
Mobile units	Solid and liquid bulk goods	14,27	2,42	9,53	19,00
	Large container or swap body	-6,97	3,56	-13,94	0,01
	Other container	-15,49	7,93	-31,03	0,06
	Palletized goods	-7,07	3,35	-13,64	-0,50
	Pre slung goods	9,93	3,27	3,52	16,35

4.3. Type of goods and load unit for outbound shipments

Type of product and type of load unit for outbound shipments is cross tabulated in table 73 below, but since 62% of the cases are missing the results are not further discussed.

Tabell 73 Goods type and load unit for outbound shipments (according to the adjusted data in the CFS data base)

Product type		Solid and liquid bulk goods Estimate	CI95	Container or swap body Estimate	CI95	Palletized goods Estimate	CI95	Pre slung goods Estimate	CI95	Mobile units Estimate	CI95	TOTAL Estimate	CI95
Agriculture products	Count	15613	11689			409983	309918			0	0	470335	312112
	Exp Count	29210	19752			364564	243301			23243	16015	470335	312112
	Antal	285				1229				0		15969	
Solid mineral fuels	Count	8939	4225			20416	8051	265	508	0	0	34345	9187
	Exp Count	2133	684			26621	7172	975	337	1697	591	34345	9187
	Antal	282				762		1		0		1336	
Petroleum products	Count	542743	83363	20445	38972							664439	94252
	Exp Count	41265	10275	56463	14503							664439	94252
	Antal	16152		73								16664	
Ore and metal waste	Count	18800	9752	31107	23276			0	0			58541	29161
	Exp Count	3636	1922	4975	2728			1662	904			58541	29161
	Antal	780		350				0				1161	
Metal products	Count			79733	41330	673173	210932	313102	136150			1143942	263670
	Exp Count			97210	30428	886687	204515	32470	12148			1143942	263670
	Antal			710		12748		2510				19323	
Minerals and building materials	Count	422277	224976	95062	85042	365008	131382	59545	69832	50309	45923	992201	288686
	Exp Count	61620	25354	84315	30412	769070	218946	28163	10506	49033	18049	992201	288686
	Antal	1889		555		4385		479		554		7862	
Chemical fertilisers	Count	2297	1572					0	0	0	0	44022	26258
	Exp Count	2734	1697					1250	792	2176	1381	44022	26258
	Antal	53						0		0		225	
Chemical products	Count	171214	101688	88659	41098	751908	185368	775	489	5523	4342	1018079	270722
	Exp Count	63227	21927	86514	29122	789128	210304	28897	9744	50312	17111	1018079	270722
	Antal	1172		963		4809		39		132		7115	
Textiles	Count	0	0	179016	152081	461162	318932	0	0	3802	4655	643980	353220
	Exp Count	39994	22527	54724	32917	499158	274614	18279	10583	31825	18479	643980	353220
	Antal	0		458		3529		0		80		4067	
Forest products	Count	85894	15221	20964	6578	12133	3636	116747	28932	13312	10730	249050	38146
	Exp Count	15467	3662	21164	5525	193042	29968	7069	1984	12308	3346	249050	38146
	Antal	1631		360		494		2166		304		4955	
Lubricating oils and fats	Count	9684	15649	8751	10763	37322	25033					55863	32526
	Exp Count	3469	2118	4747	2944	43300	25243					55863	32526
	Antal	22		238		257						519	
Medical and pharmaceutical pr	Count			42936	36097	508354	162066	0	0			551809	166025
products	Exp Count			46892	17155	427716	130019	15663	5760			551809	166025
	Antal			235		3690		0				3933	
Paper pulp	Count	14464	10366	3068	2161					133	92	36902	12057
	Exp Count	2292	860	3136	1221					1824	721	36902	12057
	Antal	367		76						7		707	
Paper waste,	Count			17699	20027	71152	20876					146425	67433
empty packaging,	Exp Count			12443	6293	113496	52160					146425	67433
packaging used	Antal			237		911						1377	
Transport equipment	Count			272903	197003	2344555	495182			641063	259562	3297927	593975
	Exp Count			280251	79260	2556272	461661			162980	52672	3297927	593975
	Antal			2032		15884				18614		36830	
Manufactured products	Count	34313	34734	313587	226604	1925629	382411	25529	24897	58175	33411	2357232	450322
of metal	Exp Count	146394	36523	200313	61749	1827126	351236	66908	18875	116492	33285	2357232	450322
	Antal	195		1080		16268		114		396		18053	
Other manufactured	Count	64503	25314	690214	288284	4657246	866942	95258	36521	266868	109820	5774089	919366
products	Exp Count	358596	77568	490670	130540	4475582	747150	163893	41526	285348	74732	5774089	919366
	Antal	1268		4934		31395		1485		1592		40674	
Paper products	Count	43514	24225	210137	109275	2712616	734320	56289	13274	100877	25252	3123433	743468
	Exp Count	193979	53201	265423	80741	2421019	597551	88656	26927	154356	47435	3123433	743468
	Antal	1469		1749		37411		1051		790		42470	
Foodstuffs and	Count	221229	119879	253956	160107	6467361	1392878					7160362	1406926
animal fodder	Exp Count	444690	101609	608472	157387	5550103	1174335					7160362	1406926
	Antal	4211		2804		89556						101917	
TOTAL	Count	1727929	295701	2364337	510395	21566002	1931689	789731	167630	1374978	304284	27822977	2028332
	Exp Count	1727929	295701	2364337	510395	21566002	1931689	789731	167630	1374978	304284	27822977	2028332
	Antal	30333		17355		223958		26400		27111		325157	

Significantly overrepresented | Significantly underrepresented | Classified information

4.4. Type of products and load unit for inbound shipments

If the type of products is compared to what kind of load unit that is used for inbound shipments the following products are overrepresented for each load unit (NB 40% of the cases observed are missing and thereby the results are unreliable):

- Bulk: solid mineral fule, petroleum produkter, ore, chemical fertilisers, chemical products, forest products,
- Large container/swap body: ore
- Other container: chemical fertilisers, chemical products
- Palletised: no commodities are overrepresented
- Pre-slung: metal products
- Mobile units: paper waste

Tabell 74 Goods type and load unit for inbound shipments (according to the adjusted data in the CFS data base)

Product type		Solid and liquid bulk goods Estimate	CI95	Large container or swap body Estimate	CI95	Other container Estimate	CI95	Palletized goods Estimate	CI95	Pre slung goods Estimate	CI95	Mobile units Estimate	CI95	TOTAL Estimate	CI95
Agriculture products	Count			1714	2258			16570	10380	0	0	0	0	19421	10773
	Exp Count			2277	1350			13357	7528	140	98	3021	2149	19421	10773
	Antal			20				264		0		0		313	
Solid mineral fuels	Count			0	0	0	0			0	0	0	0	728	276
	Exp Count			85	37	7	4			5	3	113	67	728	276
	Antal			0		0				0		0		8	
Petroleum products	Count	5088	2046	0	0	0	0			0	0			6982	2942
	Exp Count	156	80	819	386	69	39			50	30			6982	2942
	Antal	144		0		0				0				185	
Ore and metal waste	Count	2644	568			0	0			0	0	0	0	4122	675
	Exp Count	92	27			41	16			30	14	641	308	4122	675
	Antal	49				0				0		0		107	
Metal products	Count	3113	1248					94422	41051	10493	6869	8554	6018	128653	44020
	Exp Count	2875	1159					88483	31726	927	538	20012	11153	128653	44020
	Antal	29						1185		294		92		1674	
Minerals and building materials	Count	1738	349	1213	1065	0	0	73768	88326	0	0	783	1037	77501	88340
	Exp Count	1732	1958	9086	10228	766	892	53303	61777	558	663	12055	14385	77501	88340
	Antal	46		19		0		298		0		23		386	
Chemical fertilisers	Count			0	0					0	0	0	0	446	235
	Exp Count			52	30					3	2	69	48	446	235
	Antal			0						0		0		14	
Chemical products	Count	31376	11536	10083	2535	8407	3609	180393	47126	270	268	1184	831	231713	50110
	Exp Count	5178	1800	27167	7919	2291	1014	159365	38299	1669	797	36043	17709	231713	50110
	Antal	618		264		122		1707		14		30		2755	
Textiles	Count	0	0	8097	5526			26575	11277			3001	2281	38493	13300
	Exp Count	860	357	4513	1856			26474	9468			5988	3388	38493	13300
	Antal	0		119				464				77		692	
Forest products	Count			3620	5469	0	0	2109	2822	2709	2870			13098	7177
	Exp Count			1536	920	130	85	9009	4984	94	70			13098	7177
	Antal			81		0		32		76				330	
Lubricating oils and fats	Count	815	1231	402	609	0	0	3340	2743	0	0	0	0	4557	3607
	Exp Count	102	87	534	439	45	39	3134	2495	33	30	709	644	4557	3607
	Antal	21		4		0		65		0		0		90	
Medical and pharmaceutical pr	Count	190	160	2383	2585	310	422	32030	15005	0	0	83	90	34995	15340
products	Exp Count	782	384	4103	1989	346	197	24069	10837	252	155	5444	3399	34995	15340
	Antal	9		38		5		642		0		3		697	
Paper pulp	Count			1295	1468	0	0	1794	1520	0	0			3573	2356
	Exp Count			419	291	35	27	2457	1636	26	20			3573	2356
	Antal			39		0		27		0				87	
Paper waste,	Count			0	0			10669	1456	0	0			18041	2567
empty packaging,	Exp Count			2115	546			12408	2090	130	59			18041	2567
packaging used	Antal			0				134		0				349	
Transport equipment	Count	934	651	93374	26320	6131	3582	623583	82070					1006752	217610
	Exp Count	22499	5822	118035	29409	9954	3811	692411	110995					1006752	217610
	Antal	38		686		45		6499						12995	
Manufactured products	Count	1145	1307	29513	22080	1145	1860	139717	22552	835	347	33961	49916	206315	59318
of metal	Exp Count	4611	1634	24189	8791	2040	927	141897	40191	1486	756	32093	18561	206315	59318
	Antal	28		331		20		2577		46		153		3155	
Other manufactured	Count	1453	1689	77895	26010	6309	5040	388504	51032	1467	1671	42233	39883	517862	70531
products	Exp Count	11573	3020	60716	15681	5120	2026	356168	56241	3729	1673	80555	38651	517862	70531
	Antal	22		681		50		7169		10		352		8284	
Paper products	Count	1917	2682	16484	27055			38038	8440	110	33			61799	28576
	Exp Count	1381	710	7246	4155			42504	19622	445	279			61799	28576
	Antal	27		98				851		7				1214	
Foodstuffs and	Count	2625	1416	40383	37899	783	636	123510	27275	0	0	12375	4619	179676	47360
animal fodder	Exp Count	4015	1373	21066	8445	1776	784	123575	33320	1294	647	27949	14356	179676	47360
	Antal	106		457		26		1862		0		258		2709	
TOTAL	Count	57094	12577	299525	65087	25258	9086	1757058	150740	18398	7832	397394	2E+05	2554727	267072
	Exp Count	57094	12577	299525	65087	25258	9086	1757058	150740	18398	7832	397394	2E+05	2554727	267072
	Antal	1257		2942		338		23837		484		7186		36044	

Significantly overrepresented | Significantly underrepresented | Classified information

5. Main observations

The purpose of the report is to investigate how data from current and future CFS's can be used to analyse factors influencing a transport solution. This includes mode of transport (single or in combination) for domestic transports and transports abroad and choice of cargo type, and combinations of modes for entire chains of transports. A major issue is the fact that the data has been collected for descriptive purposes and a design based inference type of analysis. The fact that the data collection was stratified has caused problems for this attempt to do an explanatory analysis (as input for modelling purposes). The issue when analysing what influences the mode selection is not to calculate representative average values for the total population (in this case Sweden) instead it is a matter of handling uncertainties and variance in the observations and making statements about a general (infinite) population. However, there is no simple solution to how to do explanatory/modelling analysis on this stratified data. A possible solution to handle the problem is to make analyses of individual homogenous strata. This approach could be considered when the CFS 2004 is designed. Analytical statistical methods are based on the assumption that the observations must have been selected in a completely random fashion. But in the CFS the inclusion probabilities are far from constant, and analyses applied on all data can give completely wrong inferences. This is especially true, when the sample design is based on cluster sampling. This warning was issued in the introduction chapter and is repeated here but it has not been issued continuously in the previous chapters.

The analyses have also been influenced by a large portion missing cases for outbound transports outside Sweden and also for transports within Sweden that will continue abroad. In addition there have been very many missing cases related to type of load unit but also for questions about infrastructure.

The analysis of transport solutions is primarily a question of analyses of the interrelationships between transport mode selection and a number of different factors. There is a significant difference in average transport distance between different modes of transport and all the modes are significantly different. There is also a difference in average transport distance in Sweden between transports that either will reach their destination in this country or that will continue abroad. When the domestic transports were split in this way there were also further indices indicating that some of the transports labelled as being carried out within Sweden actually consists of a pre-transport, which fully is carried out in the country, and a main transport that starts in Sweden but does not end here (e.g. road-air, road-cargo vessel). When a transport which starts in Sweden and has been defined as domestic transports but does not have an end point in Sweden, this leads to very short transport distances since these are based on the pre-transport made by road.

There are significant differences between different modes with respect to shipment weights as well as goods values and the observed pattern are the same for both inbound and outbound shipments within and outside Sweden. The shipment weights do also vary depending on if the transport is outbound or inbound or if it is within or outside Sweden.

The different modes can be characterised (descriptive) in the following way (NB this does not say anything about what influences the mode selection and in addition the independent variables are most likely interrelated):

- Air transports are characterised by in general high value goods (SEK/Kg); short distances; and low shipment weights (however the weights are much higher for outbound transports outside Sweden)
- Road transports have, for outbound transports in Sweden, shorter mean distances than other modes, however there is no clear pattern if different distance intervals are reviewed. The shipment weights are in general relatively low for road transport.
- Ferry and road: outbound transports in Sweden have medium transport distances, and high value goods. The transports have in general low shipment weights.
- Railway transports for outbound shipments in Sweden are characterised by long distances and heavy shipment weights. Outbound shipments transported by rail outside Sweden have low goods values.
- Rail and road: long distances outbound transports in Sweden, the mean shipment weights are not high but the mode is overrepresented in the high weight intervals.
- Rail and sea transports are used for low value goods and outbound transport of heavy shipment weights; for outbound transports in Sweden the transport distances are long.
- Cargo vessel transports do in general have low value goods and heavy shipment weights.
- Cargo vessel and road is used for heavy shipment weights (especially inbound) and for inbound transports in Sweden it is used for low value goods.

The transport modes used for all kinds of shipments (outbound as well as inbound) do also differ between the regions (län) in Sweden.

There is a link between access as well as use of existing infrastructure (industrial rail tracks and quays) and different transport modes. However, it must be noted that the answer rate for the infrastructure questions is below 50%. There are linkages between the type of load unit and the type of transport mode but also in these analyses there is a large portion of missing cases (40-70%)

An attempt has also been made to analyse the influence of the size of local units, i.e. the respondents (measured in number of employees). There are differences between local units of different sizes and in particular rail or cargo vessel transports seem to be more likely when the investigated unit belongs to the group with the largest number of employees. However, there are uncertainties in this analysis since the definition of the size of the local unit is not ideal for the purposes of this kind of analysis.

It was not technically possible to create new variables which described whole transport chains, but cross tabulation of transports within and outside Sweden (for outbound as well as inbound shipments) gave some information. There were significant differences between the different combinations and a picture of very homogenous combinations of modes emerged, i.e. there were no dramatic shifts between different modes used for one shipment within and outside Sweden. If a transport started with some kind of rail transport there was an overrepresentation of rail (as a single mode or in combination with something else) or cargo vessel in the next section of the transport chain. The same kind of pattern was detected for cargo vessel in different combinations. Air transports were linked with air and the combination ferry-road with ferry-road.

Finally the relation between in-bound and outbound shipments should have been analysed but this has not been done since it has not been possible to link the cases in the two databases.

6. Suggestions for future CFSs

When designing future CFS´s an important issue to consider is the content of the survey and how the collected data is handled as wells as who is answering the questions. However, from the perspective of analytical data analysis the main issue is how the problem with stratified data (collected for descriptive purposes) should be handled. A possible solution is to make analyses of individual homogenous strata. This issue will not be further discussed since it is outside the scope of this report, but it is recommended that it is addressed in a separate project.

6.1. Possible changes of present CFS questions

There is a problem with missing values for several different variables related to transports outside Sweden. This leads to the question whether or not the respondents are the right ones, or if the questions are hard to understand. The problems with missing values also influences the possibilities to create and analyse whole transport chains from point of origin to point of consumption.

The questions about mode of transports within and outside Sweden have to be reconsidered. It is not clear how the split should be done (or how it has been done by the respondents), i.e. what should be defined as a transport within Sweden and what is to be considered as transport outside (is a cargo vessel or a ferry departuring from a Swedish harbour the last link in a transport chain within Sweden or is it the first link in a transport chain outside Sweden). The results of the analysis of the CFS 2001 data do also indicate that it is motivated to make a difference between domestic transports with a Swedish end destination and transports bound for another country. Alternatives should be defined in such a way that it is clear what is transportation within Sweden and what is an international transport.

The division into different sizes of the responding units does not support an analysis of the impact of different sizes of the logistics operations. This is partly due to the use of number of employees as a definition of size but also the fact that this measure is not kept constant when the unit size is defined. If it would be possible to include something that indicated the size of the handled volumes this could have a positive impact on the analysis.

The service demands put on the transport solutions could partly be indicated by the frequency of transports but no frequency data is included in the database. The purpose of questions about the frequencies and also about the size is apparently related to the sampling technique but if this information could be refined in some way it could be very beneficial for later analyses.

Additional changes of the present questions in the CFS, which could be contemplated are:

- Code the answers about rail track and quay as one variable instead of three nominal variables (the will simplify the work with the analysis)
- Give possibility to give some indication about the reasons behind missing values (e.g. NA, not known etc)
- Predefine modes and define ways to aggregate transport modes or eliminate certain modes. In the current analysis some of the aggregations may have been less beneficial for the analysis since they have increased the variance.

- Transport distances could be calculated based on current variables and included as a new variable when the database is compiled
- It is possible that the shipment size and value could be more accurate from a mode selection point of view if it was required that this information was collected from the way bills, at least could this issue be discussed.
- New definitions for load units may have to be discussed , e.g. introduce a new definition for small units (parcels), reconsider the division between different containers (which may be confusing and it does also not consider large containers and combinations of load units).

6.2. Suggestions for new questions in future CFSs

6.2.1. Suggestions for new questions to be asked for each shipment

It would be of interest to better understand who is really making the transport mode selection. Therefore one of the following could be developed into a new question:

–Who is selecting the transport mode?
–Which incoterm is used?
–Who is paying?

The latter questions is important in several other ways than the explicit mode selection, partly because it is related to how costs are to be linked to transport volumes/distances and partly this will give a indication of the ongoing changes in the division of responsibilities in the logistics systems

The structure of the transport system is also important to the mode selection analysis. Interesting questions are e.g. if the shipment is a direct shipment, milk-run, or if it goes via a termial . This question is linked to the demands of the logistics systems and changes in transport patterns but it does also give important information for environmental analysis.

6.2.2. Suggestions for new questions to be asked at each local unit

The service demands are very important to understand but if it is not possible to include questions about this they may indirectly be indicated by e.g. questions about the whether or not the majority of the shipments are delivered as warehouse replenishment or if it is customer order driven. It is also important to understand the position of the local unit in the supply chain. This information could be obtained by asking the respondent to mark an alternative which best represents their position: e.g. raw material, manufacturing of subassemblies/components, manufacturing of finished products, distributor, sales to end customer, …, recycling.

A question about to what extent industrial rail tracks and quays are used instead of the current 1/0 questions will facilitate more interesting multivariate data analysis. In addition a number of standard answers to why rail tracks and quays are not used could be predefined (instead of the open ended questions in the current questionnaire).

6.3. Data and variable handling

In order to simplify the data analysis, which will reduce the time it takes to conduct it and reduce the potential errors, a number of variables may be calculated and included in the official database. Examples of these kinds of variables are: mode of transport (there are a huge number of combinations that have to be grouped together, and the combinations of the

basic modes differ between the four different transports (outbound or inbound shipments: in or outside Sweden, only outbound transports within Sweden has more than 100 different combinations that need to grouped). Distance can be calculated and added as a variable.

I may be worthwhile to investigate which medium is the most suitable for storage of the very large quantities of data and also is easy for most potential users to use, taking into account compability with statistical programs and also the possibility to extract and handle different strata. In addition will be interesting to do comparison of developments over time (between different CFSs) and this will put additional requirements on how the data is stored and distributed. According to some (not corroborated) information the currently Access database in which data is made available is not suitable for this kind of very large database. Problems have arisen during the data transfer from Acess to SPSS (and this has resulted in extra non value adding work), however, it is not clear to what extent this is a result of the incompatibility of the software or if it was a result of handling errors.

Another issue regarding the data storage and data handling is the division of the data (collected in one questionnaire from on respondent) into two databases (inbound and outbound shipments). Analyses of the combination of inbound and outbound shipments are of interest but there is no easy (or correct) way to combine the databases. How to solve this requires some thoughts before future CFSs are launched.

6.4. Use of other sources of information to support the CFS analysis

Costs is a very important factor in the transport mode decision, however, it is not likely that it will possible to collect this kind of data in future CFSs. Instead it should be further investigated how other official statistics can be used in combination with the CFS data. Currently official statistics regarding costs in Swedish companies is collected on an account level based on EU-kontoplan 97. Due to this there is detailed information about transport costs but also other logistics costs, which also influence the mode selection. However, the problem is how the cost data should be linked to the CFS data, this requires further investigation

The distance to the closest train building point is important information when the use of rail transport is analysed, but this measure does not have to come from the respondent, instead secondary information from different sources can be used to calculate the distance. Information about the existence of rail tracks can also be obtained from official sources.

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Appendix 1 Commodity groups

Agriculture products
010 Grain
020 Potatoes
030 Other vegetables, fresh or frozen or frozen fresh fruit and nuts
060 Sugar beet
710 Natural fertilisers

Forest products
051 Pulp wood
052 Pit props
055 Round timber
056 Railways and tramway sleepers of wood and other wood roughly squared, half-sawn or sawn
057 Wood, charcoal, untreated cork and cork and wood waste

Textilies
040 Textiles, textile goods, textile waste and artificial fibres
962 Textile yarn, cloth, composite and other similar textile products

Foodstuffs and animal fodder
100 Sugar, beverages, coffee, spices, fruit, vegetables, meat, fish, dairy products and other foodstuffs and animal fodder and food waste

Solid mineral fuels
210 Coal and carbon bricks
220 Brown coal, brown coal bricks and peat
230 Coke, semi-coke of coal or brown coal

Petroleum products
321 Petrol
323 Paraffin, jet fuel and mineral turpentine
325 Distilled fuels
327 Residual combustible oils
330 Gaseous hydrocarbons, liquid or compressed
349 Other derivatives of non-fuels

Lubricating oils and fats
341 Lubricating oils and fats

Ore and metal waste
410 Iron ore and concentrated except iron pyrites
450 Non-iron ore and waste
460 Iron and steel waste and flue dust

Metal products
510 Pig iron and furnace steel, ferro alloys
520 Semi-finished rolled steel products and other semifinished steel products
530 Rolled steel, beams, sections, wire rods, iron and tramway construction material of iron and steel
540 Steel plates, plates, band and band steel
550 Pipes, pipelines, cast iron and steel and forging
560 Non ferrous metals

Mineral and building material
610 Sand, gravel, clay, pumice stones and slag
620 Salt, iron pyrites, sulphur
630 Other stone, earth, macadam, chalk and minerals
640 Cement, lime
650 Plaster
690 Other manufactured building materials e.g.. concrete, bricks and tiles

Chemical fertilisers
720 Chemical fertilisers

Chemical products
811 Sulphuric acid, smoking sulphuric acid
812 Caustic soda and soda lye
813 Sodium carbonate, soda
814 Calcium carbide
819 Other basic chemicals
820 Aluminium oxides and hydroxides
831 Benzol
891 Plastic material, unprocessed
892 Dyeing, tanning and colouring material
894 Manufactured explosives, fireworks and other pyrotechnic products, sport ammunition
895 Starch and gluten
896 Other chemical products and preparations

Medical and pharmaceutical products
893 Medical and pharmaceutical products, perfume and cleaning substances

Paper pulp
839 Paper pulp

Paper waste, begagnade förpackningar och emballage
842 Paper waste and waste products of paper
991 Empty packaging, packaging, used

Transport equipment, transport equipment, machinery
910 Transport equipment, transport equipment, assembled or in parts and parts for
920 Tractors, agricultural machinery and equipment, assembled or in parts and appurtenant parts
931 Electrical machinery, apparatus, equipment and appurtenant parts
939 Non-electric machinery, apparatus, tools and motors and appurtenant parts

Manufactured metal products
941 Finished metal constructions and parts of metal constructions
949 Other manufactured products of metal

Paper products
972 Paper and cardboard, unprocessed
973 Paper and cardboard products
974 Paper material

Other manufactured products

951 Glass
952 Glassware, ceramic and other mineral products
961 Leather, leather products, of raw hides and skin
963 Bags, clothing, knitted and crochet products, footwear
971 Semi-finished products of rubber and rubber products
O975 Furniture, new
976 Wooden and cork products, besides furniture
979 Other manufactured products
992 Construction material, entertainment park vehicles and equipment, used
993 Removal equipment
994 Gold, coins, medals
999 Other manufactured products, not specified